FINAL

SAMPLING AND ANALYSIS PLAN
FOR
REMEDIAL INVESTIGATION /
FEASIBILTY STUDY / DECISION DOCUMENTS

FORT MONMOUTH, OCEANPORT,
MONMOUTH COUNTY, NEW JERSEY

BRAC 05 Facility
Contract W912DY-09-D-0062
Task Order: 0012, Project No. 36985

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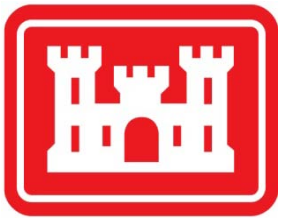

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FINAL
SAMPLING AND ANALYSIS PLAN

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LIST OF ACRONYMS

ACRONYM	DEFINITION
ASTM	American Society for Testing and Materials
BRAC	Base Realignment and Closure
CECOM	Communications and Electronic Command
CENAE	Corps of Engineers, New England District
CENAN	Corps of Engineers, New York District
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CoC	chain-of-custody
CWA	Charles Wood Area
DA	Department of the Army
DD	Decision Documents
DO	Dissolved Oxygen
DoD	Department of Defense
DOT	Department of Transportation
EA	Evans Area
ELAP	Environmental Laboratory Accreditation Program
EPA	Environmental Protection Agency
FD	Field Duplicate
FS	Feasibility Study
FSP	Field Sampling Plan
FTMM	Fort Monmouth
HTRW	hazardous, toxic and radiological waste
ID	Inside Diameter
IDW	Investigation Derived Waste
LCS	Laboratory Control Sample
LDPE	Low-Density Polyethylene
LFPS	Low-flow Purge and Sampling
MP	Main Post
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NCP	National Contingency Plan
NJAC	New Jersey Administrative Code
ORP	Oxygen Reduction Potential
PDB	Passive Diffusion Bag
PID	Photoionization Detector
PMP	Project Management Plan
PPE	personal protective equipment
PVC	Polyvinyl Chloride
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
SAP	Sampling and Analysis Plan
SOP	Standard Operating Procedure
TO	Task Order

ACRONYM	DEFINITION
TRSR	Technical Requirements for Site Remediation
UFP-QAPP	Uniform Federal Policy for Quality Assurance Project Plan
USACE	U.S. Army Corps of Engineers
USAESCH	U.S. Army Engineering and Support Center, Huntsville
VOA	Volatile Organic Analysis
VOCs	Volatile Organic Compounds
WERS	Worldwide Environmental Remediation Services

SECTION 1
INTRODUCTION AND PROJECT DESCRIPTION

1.1 INTRODUCTION

This document contains the Sampling and Analysis Plan (SAP) for the Remedial Investigation (RI), Feasibility Study (FS), and Decision Documents (DD) project at Fort Monmouth (FTMM), Oceanport, Monmouth County, New Jersey for task order (TO) 0012 issued under the Worldwide Environmental Restoration Services (WERS) contract number W912DY-09-D-0062 by the United States Army Engineering & Support Center (USAESCH). This document outlines anticipated sampling and analysis procedures that may be used in support of this project. The SAP has been developed in accordance with Uniform Federal Policy and is presented in two parts: the Field Sampling Plan (FSP) and the Uniform Federal Policy for Quality Assurance Project Plan (UFP-QAPP). The FSP is presented in Subsection 1.2 through Section 6 and the UFP-QAPP is presented as a series of worksheets in Section 7.

1.2 TASK ORGANIZATION AND RESPONSIBILITIES

1.2.1 Project Team

The project team is composed of the USAESCH; U.S. Army Corps of Engineers, New York District (CENAN); U.S. Army Corps of Engineers, New England District (CENAE), FTMM, Parsons Government Services, Inc. (Parsons); ALS Environmental (primary laboratory), and Accutest Laboratories (quality assurance laboratory). Details of specific roles and responsibilities are presented in the Project Management Plan (PMP) (Parsons 2012a). A Summary of roles of the team members as applicable to sampling activities are described below. QAPP Worksheets #3 and #5 include a project organization chart.

1.2.2 U.S. Army Engineering & Support Center, Huntsville

USAESCH has the primary responsibility for the administration of this project.

1.2.3 U.S. Army Corps of Engineers, New York District

CENAN has the role of Project Manager for the FTMM project. Roles and responsibilities are summarized as follows:

- Coordinates activities with the various U.S. Army Corps of Engineers technical supporting elements, as appropriate;
- Provides overall guidance to the Contractor when necessary or requested for purposes of PWS clarification;
- Provides review and comment and coordination of Government comments on Contractor prepared reports and other project documents;
- Works with the Contractor to identify and correct any deficiencies prior to those deficiencies adversely affecting the project;

- Works with the customer and state regulator to identify challenges to achieving regulator acceptance prior to adversely affecting the project; and
- Attends project related meetings/calls, as necessary.

1.2.4 U.S. Army Corps of Engineers, New England District

CENAE has the role of Technical Lead for the FTMM project. Roles and responsibilities are summarized as follows:

- Provides support to CENAN and USAESCH;
- Responsible for providing technical review and comment of Contractor prepared reports and other project documents; and
- Attends and/or participates in project related meetings/calls, as necessary.

1.2.5 Fort Monmouth

FTMM is the customer for whom services will be provided. FTMM is responsible for providing available, site-specific environmental records and data to facilitate the RI/FS activities.

1.2.6 Parsons

Parsons, as the prime contractor to USAESCH, will provide overall technical support and services for the project. Parsons' responsibilities during the sampling activities include coordination of equipment and personnel mobilization, collection and shipment of samples to the laboratories, assistance in solving any non-compliant technical issues with the laboratories, and oversight of validation and reporting of sample results.

1.2.7 Primary Laboratory (ALS Environmental)

ALS Environmental (ALS) is the primary analytical laboratory responsible for performing specified analyses as well as any necessary Investigation Derived Waste (IDW) sample analyses, in accordance with the methods and guidelines presented in this SAP. ALS possesses a current Department of Defense (DoD) Environmental Laboratory Accreditation Program (ELAP) certification (Accreditation No. 65817; Certificate No. L12-48) and is certified in the State of New Jersey (Laboratory Certification ID # NY004).

1.2.8 Quality Assurance Laboratory (Accutest Laboratories, Inc.)

A quality assurance (QA) laboratory will be used in an effort to maintain QA of the project sampling task. Accutest Laboratories, Inc. (Accutest) maintains current DoD ELAP certification (Certificate No. L22-48) and is certified in the State of New Jersey (Laboratory Certification ID # 12129). Accutest will be in charge of receiving and processing QA samples from FTMM. Five percent of the samples will be collected in triplicate. One of the triplicate sample containers will be shipped to the QA laboratory for analysis. Requested parameters will be identical to those requested for the other two sample containers (one serves as the parent sample and the other one serves as the field duplicate [FD] sample) sent to ALS.

1.3 SITE DESCRIPTIONS AND PLANNED ACTIVITIES

1.3.1 Background

1.3.1.1 The FTMM site is located in the central-eastern portion of New Jersey in Monmouth County, approximately 45 miles south of New York City, 70 miles northeast of Philadelphia, and 40 miles east of Trenton. The Atlantic Ocean is approximately 3 miles to the east. The primary mission of FTMM was to provide command, administrative, and logistical support for Headquarters, and U.S. FTMM Communications and Electronics Command (CECOM). CECOM was a major subordinate command of the U.S. FTMM Material Command and was the host activity. FTMM was the center for the development of the FTMM's Command and Control Communications, Computers, Intelligence, Sensors and Reconnaissance systems, formerly the primary tenants of FTMM.

1.3.1.2 FTMM is comprised of three areas; Main Post (MP), the Charles Wood Area (CWA) and the Evans Area (EA). FTMM falls within the Boroughs of Eatontown, Oceanport, and Tinton Falls (Figure 1.1). The MP is in the Eatontown and Oceanport Boroughs. The CWA is in the Eatontown and Tinton Falls Boroughs. MP includes 637 acres and the CWA covers 489 acres. The MP provided supporting administrative, training, and housing functions, as well as many of the community and industrial facilities for FTMM. The CWA was used primarily for research and development, testing, housing, and recreation. The CWA research, development and testing facilities occupied the southwest corner of the sub-post. The northwest corner formerly held residential units but is currently undeveloped. Residential units currently occupy the southeastern boundary and the golf course occupies the northeast corner. The EA is located approximately 8 miles to the south of the MP and CWA and was formerly used for administrative, research and development and some training. EA was closed under the Base Realignment and Closure (BRAC) process in 1998 and all but 2 acres have been transferred from FTMM.

1.3.1.3 On September 15, 2011, FTMM was closed under the 2005 BRAC process. This TO was established to address a number of environmental sites in various stages of hazardous, toxic and radiological waste (HTRW) investigations and remediation at FTMM. The sites to be investigated and/or monitored under this TO are shown in **Table 1.1** and site locations are displayed on Figures 1.2 and 1.3.

Table 1.1 FTMM RI and and Long-term Groundwater Monitoring Sites

Site Name	Area	Description	Required Sampling
FTMM-02	MP	M2-Closed Solid Waste Landfill	Long-term groundwater monitoring/RI sampling activities
FTMM-03	MP	M3-Closed Solid Waste Landfill	Long-term groundwater monitoring
FTMM-04	MP	M4-Closed Solid Waste Landfill	Long-term groundwater monitoring
FTMM-05	MP	M5-Closed Solid Waste Landfill	Long-term groundwater monitoring
FTMM-08	MP	M8-Closed Solid Waste Landfill	Long-term groundwater monitoring
FTMM-12	MP	M12-Closed Solid Waste Landfill	Long-term groundwater monitoring

Site Name	Area	Description	Required Sampling
FTMM-14	MP	M14-Closed Solid Waste Landfill	Long-term groundwater monitoring
FTMM-18	MP	M18-Closed Solid Waste Landfill/Former Training Area	Long-term groundwater monitoring
FTMM-22	CWA	(CW-1) Waste Water Treat Lime Pit	Long-term groundwater monitoring / RI sampling activities
FTMM-25	CWA	(CW-3A) Landfill	Long-term groundwater monitoring
FTMM-53	MP	M53-Bldg 699 Gasoline Storage	Long-term groundwater monitoring / RI sampling activities
FTMM-54	MP	M54-Bldg 296 Gasoline Storage	Long-term groundwater monitoring
FTMM-55	MP	M55-Bldg 290 UST Gasoline	Long-term groundwater monitoring
FTMM-56	MP	M56-Bldg 80 Petroleum Release	Long-term groundwater monitoring
FTMM-57	MP	M57-Bldg 108 UST Gasoline Release	Long-term groundwater monitoring
FTMM-58	CWA	M58-Bldg 2567 UST Gasoline	Long-term groundwater monitoring
FTMM-59	MP	M59-Bldg 1122 Unknown Discharge	Long-term groundwater monitoring/ RI sampling activities
FTMM-61	MP	M61-B37 Bldg 283 Gasoline Storage	Long-term groundwater monitoring
FTMM-64	MP	M64-Bldg 812 UST Gasoline	Long-term groundwater monitoring
FTMM-66	MP	M66-Bldg 886 Former AST	Long-term groundwater monitoring
FTMM-68	MP	M68-Bldg 700 Former UST	Long-term groundwater monitoring / RI sampling activities

1.3.2 Task Objectives

1.3.2.1 The detailed sampling strategy with objectives for the RI field activities is described in Section 3 of the RI/FS Work Plan (Parsons, 2012b), Section 3 of the Landfill RI/FS Work Plan (Parsons, 2012c) and the sampling strategy for long-term groundwater monitoring is described in Section 3 of the Long-term Groundwater Monitoring Work Plan (Parsons, 2012d). A summary of required sampling activities and analytical requirements is included in Section 2 of this document. This SAP describes the specific methods with which samples will be collected, handled, and analyzed.

1.3.2.2 When additional activities that are not addressed in this SAP are to be performed, an addendum to the SAP will be prepared to incorporate these activities and include the applicable standard operating procedures SOP(s). For instance, historic site data are not indicative of the presence of dense non-aqueous phase liquid (DNAPL). However, under the unlikely scenario that DNAPL is encountered, procedures for drilling and sampling will be modified accordingly.

1.3.3 Project Schedule

The detailed project schedule is included in Figure 6.1 of the PMP.

1.4 REGULATORY FRAMEWORK

1.4.1 The SAP has been developed in accordance with the following standards:

- Engineer Regulation (ER) 1110-1-263;
- Engineer Manual (EM) 200-1-3; and
- FTMM Performance Work Statement (PWS, dated 30 August 2012).

1.4.2 Work shall be conducted in compliance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Contingency Plan (NCP), 40 CFR Part 300, and to the extent possible to meet requirements provided by the State of New Jersey Administrative Code (N.J.A.C.) 7:26E Technical Requirements for Site Remediation (TRSR). Activities involving work in areas potentially containing hazards shall be conducted in full compliance with United States Army Corps of Engineers (USACE), Department of the Army (DA), and DoD regulations and policies. The investigative process is in accordance with CERCLA, NCP, Army Regulation 200-1, Defense Environmental Restoration Program, BRAC, and the Defense/State Memorandum of Agreement. Methods and guidance developed under these regulations and programs will be used, however, the requirements of TRSR and related guidance will be used to the extent possible. Risk assessments will be conducted as necessary to achieve TRSR requirements and to meet or show equivalency with CERCLA requirements. The state's role as lead regulator is specified under these federal regulations.

SECTION 2
FIELD ACTIVITIES AND SAMPLING METHODS

The field and sampling activities associated with this TO include groundwater monitoring, soil sampling, monitoring well installation and development, and slug testing. The following SOPs, which have been formulated to comply, to the extent possible, with the requirements outlined in the NJDEP Field Sampling Procedures Manual, are included in **Appendix A**:

- SOP #1 – Site Reconnaissance, Preparation, and Restoration Procedures;
- SOP #2 – Equipment Decontamination;
- SOP #3 – Groundwater Field Measurements;
- SOP #4 – Groundwater Monitoring Low-Flow Purging and Sampling;
- SOP #5 – Groundwater Sampling with Passive Diffusion Bag Samplers;
- SOP #6 – Soil Sampling;
- SOP #7 – Monitoring Well Installation and Development; and
- SOP #8 – Slug Tests.

The field forms to be used to conduct the work described in selected SOPs are included in **Appendix B**.

2.1 GROUNDWATER SAMPLING PROCEDURES

2.1.1 During each groundwater sampling event, static water level measurements (gauging) will be collected using an oil-water interface probe in accordance with Standard Operating Procedure (SOP) #3 - Groundwater Field Measurements (**Appendix A**). Initially, the probe will be lowered into each monitoring well without touching the probe to the well casing until the alarm sounds and/or the indicator light illuminates. The probe will then be withdrawn several feet and slowly lowered again until the groundwater surface is contacted, as noted by the alarm and/or indicator light. Water level measurements will be estimated to the nearest 0.01 ft from the top of the well casing.

2.1.2 Groundwater monitoring will be conducted in support of the RI and long-term monitoring phases of the project in accordance with SOP #4 – Groundwater Low-Flow Purging and Sampling or SOP #5 – Groundwater Sampling with Passive Diffusion Bag Samplers. Passive diffusion bag (PDB) samplers will be the preferred method of sampling when VOCs (Volatile Organic Compounds) are the only target analytes at locations consulted with the NJDEP. Groundwater sampling using purging techniques will be applied when additional target analytes (other than VOCs) are required or at locations not sampled with PDBs for VOCs. Additional analytical requirements (sample containers, preservatives, holding times, etc.) are contained within Section 7 of the SAP. Based upon historical groundwater data, the sequence of well sampling will take place from the least contaminated to the most contaminated wells.

2.2 SOIL SAMPLING PROCEDURES

Soil sampling will be conducted in support of RI characterization activities in accordance with SOP #6 – Soil Sampling. Additional analytical requirements (sample containers, preservatives, holding times, etc.) are contained within Section 7 of the SAP.

2.3 SAMPLE CONTAINERS AND PRESERVATION TECHNIQUES

The specific containers and preservatives required for the collection and preservation of groundwater and soil samples are listed in QAPP Worksheets #19a and 19b.

2.4 EQUIPMENT DECONTAMINATION

Decontamination of non-dedicated sampling equipment and field measurement instruments will be conducted in accordance with SOP #2 – Equipment Decontamination.

2.5 FIELD QUALITY CONTROL (QC) AND QUALITY ASSURANCE (QA) SAMPLES

2.5.1 Equipment (Field) Blank

Equipment blanks will be collected during groundwater and soil sampling. An equipment blank is a sample of reagent-grade water poured into, over, or pumped through a decontaminated sampling device and collected in a sample container; it is then transported to the laboratory for analysis. Equipment blanks are used to assess the effectiveness of equipment decontamination procedures. Equipment blanks will be collected at a frequency of 5 percent or at a minimum of one per day if less than 20 samples are collected. The equipment blank shall be analyzed for the same laboratory analyses requested for the environmental samples collected at the site on the day that the equipment blank is collected.

2.5.2 Trip Blank

The trip blank consists of a VOC sample vial filled in the laboratory with reagent-grade water, preserved with hydrochloric acid transported to the sampling site, handled like an environmental sample, and returned to the laboratory for analysis. Trip blanks are not opened in the field. Trip blanks are prepared only when VOC samples are taken. Trip blanks are used to assess the potential introduction of contaminants from sample containers or during the transportation and storage procedures. One trip blank shall accompany each cooler of groundwater samples sent to the laboratory for analysis of VOCs. Trip blanks are not required for non-aqueous samples, per NJDEP's Field Sampling Procedures Manual.

2.5.3 Field Duplicates

A field duplicate sample is a second sample collected at the same location as the original sample. Duplicate samples are collected simultaneously or in immediate succession, using identical recovery techniques, and treated in an identical manner during storage, transportation, and analysis. The sample containers are assigned an identification number in the field such that they cannot be identified (blind duplicate) as duplicate samples by laboratory personnel

performing the analysis. Specific locations are designated for collection of field duplicate samples prior to the beginning of sample collection. The minimum frequency of collection for field duplicates is 5 percent (1 per 20 samples) per parameter and per matrix. Field duplicate samples will not be collected for waste characterization purposes.

2.5.4 Matrix Spike/ Matrix Spike Duplicate

2.5.4.1 Matrix Spike/Matrix Spike Duplicates (MS/MSDs) are used to assess possible interferences from the sample matrix in analytical results. The analytical laboratory spikes the MS/MSD with known concentrations of representative target compounds, and then analyzes the MS/MSD. The percent recovery is calculated and is used to evaluate possible interference effects. MS/MSD samples will not be collected for waste characterization purposes.

2.5.4.2 One pair of MS/MSD will be collected for every 20 field samples per parameter per matrix. For non-aqueous (e.g., soil) samples, the MS/MSD samples will be collected from the sample jar(s) that contain the normal field sample (no extra volume). For aqueous samples, the required sample volume will be tripled to ensure that enough sample is collected for MS/MSD analyses. The sampler shall note on the chain-of custody forms which samples are to be used for MS/MSD analyses.

2.5.5 Quality Assurance Split

The QA split is defined as a field split that is collected from the same location as the parent sample under identical conditions. Five percent (1 per 20 samples) of the samples per matrix and per parameter will be collected in triplicate, and one of the triplicate sample containers will be shipped to the QA laboratory for analysis. Requested parameters will be identical to those requested for the other two sample containers (one serves as the parent sample and the other one serves as the field duplicate sample). The QA sample number will be identical to the parent sample with the addition of "QA" at the end. QA split samples will not be collected for waste characterization purposes.

2.6 CALIBRATION PROCEDURES AND FREQUENCY FOR FIELD TEST EQUIPMENT

Instruments and equipment used to gather, generate, or measure environmental data will be calibrated with sufficient frequency and in such a manner that accuracy and reproducibility of results are consistent with the manufacturer's specifications. Field test equipment will be calibrated and maintained in accordance with the manufacturer's instructions. The results of the calibrations will be recorded on calibration log sheets or in a field book, if no calibration log is established. For example, for low-flow groundwater sampling (SOP #3 – Groundwater Field Measurements), an NJDEP Certified Laboratory Low-flow Groundwater Calibration Procedures Checklist Form and Field Calibration Log Sheet Form will be used (**Appendix B**).

2.7 MONITORING WELL INSTALLATION AND DEVELOPMENT

Monitoring wells will be installed in support of the RI in accordance with SOP #7 – Monitoring Well Installation and Development (**Appendix A**).

2.8 SLUG TESTS HYDRAULIC CONDUCTIVITY TESTING

Slug tests will be performed to determine hydraulic conductivity soils in the area of monitoring wells in accordance with SOP #8 – Slug Tests (**Appendix A**).

SECTION 3
FIELD DOCUMENTATION

3.1 FIELD LOGBOOKS AND FORMS

3.1.1 Information pertinent to sampling activities, including field instrument calibration data, will be recorded in field logbooks and/or on the forms included in **Appendix B**. The logbooks will be bound, and the pages will be consecutively numbered.

3.1.2 Sufficient information will be recorded in the logbooks to permit reconstruction of sampling activities conducted. Information recorded on other project documents will not be repeated in the logbooks, except in summary form where determined necessary. Field logbooks will be kept in the possession of field personnel responsible for completing the logbooks, or in a secure place when not being utilized during fieldwork. Upon completion of the field activities, logbooks will become part of the final project evidence file. The title page of each logbook will be labeled with the following information:

- Project name;
- USAESCH contract number and task order number;
- Start date for field activities recorded in the logbook; and
- End date for field activities recorded in the logbook.

3.1.3 Entries recorded in logbooks or field forms may include, but not be limited to, the following information:

- Name and title of author, date, and times of arrival at and departure from the work site;
- Purpose of the sampling activity;
- Names and responsibilities of field crew members;
- Names and titles of any site visitors;
- Type, matrix, and containerization method for IDW generated;
- Sample collection method;
- Number and volume of sample(s) collected;
- References for maps of the sampling site(s);
- Information regarding sampling changes, scheduling modifications, and change orders;
- Information regarding access agreements, if applicable;
- Date and time of sample collection, and name of collector;
- Field observations;

- Types of field instruments used and purpose(s) of use, including calibration methods and results;
- Any field measurements made (e.g., pH, specific conductance, temperature, and static groundwater level);
- Sample identification number(s);
- Information from containers, labels of reagents used, deionized and organic-free water used, etc.;
- Sampling type and methodology (e.g., grab or composite samples);
- Sample preservation methods;
- Sample distribution and transportation (e.g., name and address of the laboratory and courier);
- Decontamination procedures;
- IDW documentation information including:
  - types of containers/drums;
  - contents, type, and approximate volume of waste; and
  - type of contamination and predicted level of contamination based on available information;
- Summary of daily tasks and documentation on any cost or scope of work changes required by field conditions; and
- Signature and date entered by personnel responsible for observations recorded.

3.2 PHOTOGRAPHS

Photographs taken to document sampling points, conditions, or activities will include two or more reference points to facilitate relocation of each point at a later date. For each photograph taken, the following information will be recorded in the field logbook:

- Date and time;
- General direction faced and description of the subject taken; and
- Sequential number of the photograph.

3.3 SAMPLE NUMBERING SYSTEM

3.3.1 Samples will be assigned unique field identifiers in order to distinguish between samples and to facilitate the correlation of analytical information to sample locations. Investigative and quality control (QC) samples will be identified by different sample identification schemes in order to ensure blind analysis of QC samples, such as field duplicates. Sample identification numbers will be used on sample labels, field data sheets and/or logbooks, chain-of-custody (CoC) records, and other applicable documentation used during the project.

3.3.2 Investigative samples will be identified with a three-part identification number, which consists of a site name, a sample type code, and series code:

- Example source code: FTMM-55
- Sample type codes: GW = groundwater sample, SS = soil sample
- Series code: MW96

Hence a groundwater monitoring sample collected at location MW96 at FTMM-55 would be identified as follows: "FTMM-55-GW-MW96." If a QA sample is collected from this same location it will be designated as follows: "FTMM-55-GW-MW96-QA." If a sample is submitted for MS/MSD analysis it would be designated as follows: "FTMM-55-GW-MW96-MS/MSD." Duplicate samples will be submitted to the laboratory as a "blind" duplicate. An arbitrary series code that is not a valid series code for any other location at the site will be assigned to the identification to mask the identity of the parent sample. For example, "FTMM-55-GW-MW196" could be used as a duplicate ID for "FTM-55-GW-MW96." Duplicate IDs must be documented on the field sampling form and/or the log book.

3.3.3 QC samples such as trip blanks and equipment blanks will be assigned a three-part identifier. The first part is the source location (e.g., "FTMM 55"), the second part is the sample type code (e.g., TB or EB), and the third part is the date. Therefore, the blank for June 5, 2013 at FTMM-55 is "FTMM55-TB-06052013".

3.4 SAMPLE DOCUMENTATION

3.4.1 Sample Labels

Labels will be affixed to sample containers during sampling activities. Information will be recorded on each sample container label at the time of sample collection. The information to be recorded on the labels will be as follows:

- Sample identification number;
- Sample type (discrete or composite);
- Site name and sampling station number;
- Analysis to be performed;
- Type of chemical preservative present in container;
- Date of sample collection (time will be noted on field form and CoC), and
- Sampler's name and initials.

3.4.2 Sample Field Form

3.4.2.1 Field forms (**Appendix B**) will be completed by the field personnel during sampling or other field activities. Information to be documented on the field form for each individual sample will include the following:

- Any measurements made;

- Field sample identification;
- Date and time of sample collection;
- Type and physical description of sample;
- Whether grab or composite (if composite, then how composited);
- Equipment used to collect sample;
- Volume and number of sample containers;
- How sample is preserved;
- Analyses requested;
- Signature of sampler;
- Sample depths;
- Samples submitted to the laboratory for analysis; and
- Sample type (e.g., field duplicates).

3.4.2.2 Sample forms will also act as the field CoC form for each sample collected until the samples are transferred to the laboratory CoC form for shipment.

3.4.3 Chain-of-Custody Records

3.4.3.1 CoC forms will be used to document the integrity of samples collected. To maintain a record of sample collection, transfers between personnel, shipment, and receipt by the laboratory, CoC forms will be completed for sample sets as determined appropriate during the course of fieldwork. The following information will be recorded on CoC forms:

- Sample number (for each sample in shipment);
- Collection date and time (for each sample in shipment);
- Number of containers for each sample;
- Sample description (i.e., environmental medium);
- Analyses required for each sample;
- Sample preservation technique(s);
- CoC or shipment number;
- Shipping address of the laboratory;
- Date, time, method of shipment, courier, and airbill number; and
- Spaces to be signed as custody are transferred between individuals.

3.4.3.2 CoC procedures implemented for the project will provide documentation of the handling of each sample from the time of collection until completion of laboratory analysis. The CoC form serves as a legal record of possession of the sample. A sample is considered to be under custody if one or more of the following criteria are met:

- The sample is in the sampler's possession;
- The sample is in the sampler's view after being in possession;
- The sample was in the sampler's possession and then was placed into a locked area to prevent tampering; and/or
- The sample is in a designated secure area.

3.4.3.3 Custody will be documented throughout the project field sampling activities by the CoC form initiated for each day during which samples are collected. This record will accompany the samples from the site to the laboratory, and will be returned to Parsons with the final analytical report. Personnel with sample custody responsibilities will be required to sign, date, and note the time on the CoC form when relinquishing samples from their immediate custody (except in the case where samples are placed into designated secure areas for temporary storage prior to shipment). Bills of Lading or airbills will be used as custody documentation during times when the samples are being shipped from the site to the laboratory, and will be retained as part of the permanent sample custody documentation.

3.4.3.4 The individual responsible for shipping of the samples from the field to the laboratory will be responsible for completing the CoC form and noting the date and time of shipment. This individual will also inspect the form for completeness and accuracy. In addition, this individual will be responsible for determining the shipping classification for samples under U.S. Department of Transportation (DOT) HM126F. After the form has been inspected and determined to be satisfactorily complete, the responsible individual will sign, date, and note the time of transfer on the form. When a commercial carrier is used, the CoC form will be placed in a sealable plastic bag and placed inside the cooler used for sample transport after the field copy of the form has been detached. When using a laboratory courier, the CoC form will be placed in a sealable bag on the inside of the cooler. The field copy will be detached after the laboratory carrier has signed for the samples. The field copy of the form will be appropriately filed and kept at the site for the duration of the site activities. In addition to the CoC form, CoC seals will also be placed on each cooler used for sample transport. These seals will consist of a tamper-proof adhesive material placed across the lid and body of the coolers in such a manner that if the cooler is opened, the seals will be broken. The CoC seals will be used to ensure that no sample tampering occurs between the time that the samples are placed into the coolers and the time that the coolers are opened for analysis at the laboratory. Cooler custody seals will be signed and dated by the individual responsible for completing the CoC form contained within the cooler.

3.5 DOCUMENTATION PROCEDURES

The tracking procedure to be utilized for documentation of samples collected during the project will involve the following series of steps:

1. Collection and placement of samples into laboratory sample containers;
2. Completion of sample container label information;
3. Placement of sample containers into an ice-filled cooler;
4. Completion of sample documentation information in the field logbook and field forms;

5. Completion of project and sampling information sections of the CoC form(s) for samples to be transported in a single cooler;
6. Completion of the airbill for the cooler to be shipped, if needed;
7. Performance of a completeness and accuracy check of the CoC form(s);
8. Completion of the sample relinquishment section of the CoC form(s) and placement of the form(s) into or onto the cooler;
9. Placement of CoC seals on the exterior of the cooler;
10. Packaging and shipment of the cooler to the laboratory;
11. Receipt of cooler at the laboratory, inspection of contents, and transmittal via fax of contained CoC form(s); and.
12. Transmittal of original CoC form(s) with final analytical results from laboratory.

3.5.1 Field Forms

The Parsons field forms which will facilitate the documentation of information pertinent to field activities are provided in **Appendix B**. These forms are designed to facilitate the documentation of information and activities completed in the field without duplication of field logbooks. The following field forms have been developed for use during the project; however, additional forms may be developed as needed:

- NJDEP Certified Laboratory Low-flow Groundwater Calibration Procedures Checklist Form;
- Field Calibration Log Sheet Form;
- Groundwater Measurements Record;
- Low-flow Purge and Sampling (LFPS) Record - Groundwater;
- Soil Boring Log;
- Well Construction Detail (Single Cased - Road Box);
- Well Development Report;
- Slug Test Form;
- Chain of Custody Form; and
- Waste Generation Form.

SECTION 4
SAMPLE PACKAGING AND SHIPPING

4.1 SAMPLE PACKAGING

4.1.1 Sample containers will be packaged in thermally insulated, rigid-body coolers that will be sealed and used for shipping. Sample packaging and shipping will be conducted in accordance with applicable DOT specifications. Packaging and shipping procedures to be used for environmental samples collected during the project will include the following:

- Sample containers will be adequately identified with sample labels placed onto each container. Clear plastic tape will be attached over the completed sample labels;
- Each sample bottle will be placed into a separate plastic bag that will then be sealed. Trip blank containers will also be wrapped and placed in the bag with the volatile organic analyte vials. As much air as possible will be squeezed from the sample container bags prior to sealing;
- Sample containers will be placed upright in the shipping coolers along with wet ice in double plastic bags that will be placed around, among, and on top of the sample containers. Before initial placement of samples into a rigid-body cooler, the cooler drain plug will be taped shut from both the inside and outside, and the cooler will be lined with a large plastic bag;
- Inert packing material will be placed into the cooler, if required, to prevent shifting of the sample containers during transport;
- Required laboratory paperwork, including the CoC form(s), will be placed inside a plastic bag and taped to the inside of the cooler lid;
- Upon completion of the packing process, the cooler lid will be closed and a signed/dated custody seal will be placed on the cooler;
- The rigid-body coolers will be sealed by applying strapping tape directly to the cooler body; and
- The airbill for the shipment will be completed and attached to the handle of the shipping cooler, which will then be transferred to the courier for delivery to the laboratory.

4.1.2 The individual responsible for packaging samples will verify completeness of sample shipment preparations. In addition, the laboratory will document the condition of the environmental samples upon receipt at the laboratory.

4.2 SAMPLE SHIPPING

Storage and shipping schedules will be coordinated to allow adequate time for samples to reach the lab within the required holding times for analytes. Environmental samples collected during the project will be shipped no later than 48 to 72 hours (hrs) after the time of collection. The latter time of 72 hours may be necessary if the samples are collected on a Friday or Saturday

and have to be shipped on a Monday via commercial courier. Samples with 24-hour holding times (e.g., hexavalent chromium) will be shipped immediately. During the time period between collection and shipment, samples will be stored in ice-filled coolers or refrigerated and maintained in a secure area. Coolers containing environmental samples will then be shipped overnight to the laboratory by Federal Express, a similar courier, or a laboratory-provided courier.

4.3 ANALYTICAL LABORATORIES

4.3.1 The primary analytical laboratory to be used for the project will be ALS located in Rochester, NY. Environmental samples and associated QC samples collected during the project investigations will be submitted to the laboratory for chemical testing. A summary of the specific chemical analyses and associated testing methods for each sample type to be collected is presented in the QAPP worksheets. The lab will be responsible for the supply of laboratory glassware, packaging, and coolers suitable for shipping in a quantity sufficient for the collection of these samples.

4.3.2 Samples will be shipped to:

ALS Environmental
1565 Jefferson Road, Building 300, Suite 360
Rochester, NY 14623
(585) 288-5380

4.3.3 The QA laboratory to be used for the project will be Accutest. The QA laboratory will be used in an effort to maintain quality assurance of the project sampling task. A summary of the specific chemical analyses and associated testing methods for each sample type to be collected is presented in the QAPP worksheets. The QA lab will be responsible for the supply of laboratory glassware, packaging, and coolers suitable for shipping in a quantity sufficient for the collection of these samples.

4.3.4 Samples will be shipped to:

Accutest Laboratories
2235 Route 130
Dayton, NJ 08810
(732) 355-4550
(732) 329-3499 (fax)

SECTION 5
INVESTIGATIVE DERIVED WASTE

5.0.1 During the performance of investigation activities at FTMM, investigative derived waste (IDW) will be managed in accordance with RCRA (Resource Conservation and Recovery Act) FTMM requirements and the EPA (Environmental Protection Agency) IDW policy. IDW includes materials generated during performance of an investigation that cannot be effectively reused, recycled, or decontaminated in the field. IDW consists of materials that could potentially pose a risk to human health and the environment (e.g., sampling and decontamination wastes) and materials that pose no risk to human health and the environment (e.g., miscellaneous trash). The types of IDW anticipated to be generated during the field activities are: (1) monitoring well purge/development water, (2) soils from monitoring well installation, (3) decontamination fluids, and (4) non-contaminated compactable and miscellaneous trash. IDW will be collected, drummed/contained, and staged in a designated area. Pre-existing waste profiles will be used whenever possible. Otherwise, a combination of analytical results from groundwater and soil samples submitted for laboratory analysis, historical analytical results, and/or TCLP analyses will be used for waste characterization and profiling depending on disposal facility requirements.

5.0.2 While it is unlikely that any IDW generated during the project will result in a hazardous waste classification, sample results will be reviewed and a recommendation will be sent to the FTMM representative(s) as to whether any drummed IDW are considered to be potentially hazardous. The FTMM representative(s) will then determine what waste is hazardous and notify Parsons of this decision. Any hazardous waste drums will be labeled as soon as possible following the FTMM determination.

5.1 INVESTIGATION-DERIVED WASTE COLLECTION AND CONTAINERIZATION

5.1.1 Types of Waste

Indigenous IDW will include groundwater from purging monitoring wells and soils from monitoring well installation/soil borings. Non-indigenous IDW will include solid compactable trash [expendable sampling materials, disposable personal protective equipment (PPE), etc.], decontamination solutions (water/isopropyl alcohol and water/soap) from the decontamination of equipment, and possibly sludge (water/soil) from the cleaning of equipment in the equipment decontamination area.

5.1.2 Waste Collection and Containment

5.1.2.1 Personal Protective Equipment and Other Solid Waste

Used PPE and sanitary waste that are non-contaminated will be placed in trash bags and disposed in an on-site dumpster. PPE and other solid waste visibly contaminated will be placed in a plastic bag at the point of generation and then transferred to a reconditioned 55-gal DOT Specification open-head drum (UN/1A2/Y.2/100) located in the staging area where it will be

temporarily stored, in accordance with requirements defined in Section 5.3 of this document, until the waste is transferred by Parsons for final disposal.

5.1.2.2 Groundwater and Decontamination Water Waste

Monitoring well purge water and decontamination fluids will be placed into temporary containment vessels (buckets with lids) at the point of generation. These vessels will then be transported to the IDW staging area at the end of each day and the water placed into reconditioned 55-gal DOT Specification open-head drums (UN/1A2/Y.2/100).

5.1.2.3 Soil Waste

Soil waste derived from drilling during monitoring well installation will be placed in reconditioned 55-gal DOT Specification open-head drums (UN/1A2/Y.2/100) and staged in the IDW staging area.

5.1.2.4 Excess Sample Waste

Excess quantities of groundwater and soil samples used for measurement of field parameters or headspace measurements will be placed into temporary containment vessels at the point of generation. These vessels will then be transported to the staging area and placed into reconditioned 55-gal DOT Specification open-head drums (UN/1A2/Y.2/100).

5.1.2.5 Waste Minimization

During project activities, waste generation will be minimized to the extent practicable. For example, waste will be minimized by using low-flow sampling techniques or PDB samplers to minimize groundwater purge volumes, by reuse of decontaminated equipment, and by use of non-hazardous materials.

5.2 IDW CONTAINER LABELING AND STAGING

5.2.0.1 Drums/containers containing the same type of waste will be grouped within the staging area with labels clearly visible for identification and inspection. Labels will consist of an accepted weather resistant type and be applied adjacent to, but not covering, the container's seam to allow for visual inspection of the seam. Labels will not be placed on the top of the container lid. If a container is not actively being used for waste accumulation, the container will be stored in an "empty container" portion of the staging area.

5.2.0.2 IDW drums/containers will be labeled with the location, date of containerization (earliest date material was placed into the drum), personnel responsible, relevant phone numbers, and media location. The labeling shall also state that material is awaiting analytical results for final disposition. Drums will be staged at a FTMM-approved location with labels clearly visible for inspection. Containers of any size utilized to accumulate IDW will be labeled to identify the contents, and there shall be no unlabeled containers accumulating IDW at anytime on Fort Monmouth. Drums or other containers will be properly sealed when not in use and labeled in

indelible, waterproof ink. IDW drums will be placed on wooden pallets to facilitate relocation, if necessary.

5.2.1 Non-hazardous and Hazardous Waste Labeling Requirements

IDW will be managed as non-hazardous waste until characterization and classification of the waste for disposal are completed in accordance with the requirements defined in this document. Prior to classification, a non-hazardous waste label will be utilized and will state that analysis for the purposes of classification of the waste is in progress. Containers of IDW determined to be hazardous will be marked with a Hazardous Waste label after receipt of the final analytical results that are used for waste characterization and classification.

5.3 INVESTIGATION-DERIVED WASTE CHARACTERIZATION AND CLASSIFICATION FOR DISPOSAL

5.3.1 Liquid and Soil Waste

A combination of analytical results from groundwater and soil samples submitted for laboratory analysis, historical analytical results, and/or TCLP analyses will be used for waste characterization and profiling depending on disposal facility requirements. The profile will be submitted to a FTMM representative for concurrence (FTMM is the generator). The waste will then be disposed of off-site in accordance with applicable EPA, DOT, and State of New Jersey regulations at a permitted treatment facility capable of accepting the waste, and in accordance with the responsibilities outlined in Section 5.4.2.

5.3.2 Solid Waste/Personal Protective Equipment Waste

5.3.2.1 Solid waste and PPE waste generated during the project will be handled as non-contaminated (i.e., used) or contaminated non-hazardous (i.e., visibly contaminated) waste, as applicable. This type of waste will be considered non-contaminated if it did not come into contact with contaminated media (e.g., media exhibiting detectable headspace gas readings as measured during field screening) and no visible contamination is present, or if visible contamination is present but can be removed by decontamination. In the event that contaminated media cannot be removed from the waste by decontamination, the waste will be considered to be contaminated non-hazardous. With the exception of the criteria noted above, no other characterization of solid and PPE waste will be conducted.

5.3.2.2 Solid waste and PPE that are non-contaminated will be bagged and placed in a sanitary waste dumpster(s) specified for this use by FTMM. No free liquids or hazardous substances will be placed in the dumpster(s). In the event that use of FTMM dumpsters is not approved for disposal of non-contaminated waste, Parsons will arrange for transportation of the waste off-site for disposal.

5.4 IDW RECORDKEEPING AND DOCUMENTATION

5.4.1 Waste Inventory and Tracking Log

IDW will be tracked from the time of generation until it is treated and/or disposed of. An example Waste Generation Form is provided in **Appendix B**.

5.4.2 Shipping Forms

5.4.2.1 Waste profile forms and waste manifests are required for waste transported off-post to waste treatment or disposal facilities. Waste profile forms will be obtained from the waste treatment/disposal facility and completed by Parsons and submitted to FTMM for approval. The waste profile form must be approved by the receiving facility before the waste is transported off-post. When possible, Parsons will utilize existing waste profiles for IDW shipments.

5.4.2.2 A Uniform Hazardous and/or Nonhazardous Waste Manifest or bill of lading must be prepared and accompany any load of waste transported off-post. Parsons will fill out the hazardous and/or nonhazardous waste manifest or bill of lading and submit it to a FTMM Representative for approval before making arrangements for disposal. Hazardous and/or nonhazardous waste manifests and bills-of lading will be signed by authorized FTMM personnel. After shipment to the disposal/treatment facility, a copy of the waste manifests or bills of lading will be provided to the post. In accordance with 40 CFR 262.42(a)(1), Parson must supply FTMM with a copy of the manifest with the handwritten signature of the designated facility within 45 days of the date that the waste was accepted by the initial transporter.

5.4.3 Disposal Documentation

Copies of off-post waste disposal documentation will be submitted to the post and kept in the project files. The following disposal documentation may be required for non-hazardous waste:

- Waste tracking log;
- Laboratory analysis reports;
- Waste profile form;
- Copy of the facility-signed non-hazardous waste manifest/bill of lading; and
- Certificate of treatment, recycling, disposal.

SECTION 6
REFERENCES

NJEDP, 2005. New Jersey Department of Environmental Protection Field Sampling Procedures Manual, August 2005.

Parsons, 2012a. Project Management Plan for Remedial Investigation/Feasibility Study/Decision Documents, Fort Monmouth, Oceanport, Monmouth County New Jersey

Parsons, 2012b. Remedial Investigation/Feasibility Study Work Plan For Sites FTMM-22, FTMM-53, FTMM-59 and FTMM-68, Fort Monmouth, Oceanport, Monmouth County New Jersey

Parsons, 2012c. Landfill Feasibility Study Work Plan For Sites FTMM-02, FTMM-03, FTMM-04, FTMM-05, FTMM-08, FTMM-12, FTMM-14, FTMM-18, and FTMM-25, Fort Monmouth, Oceanport, Monmouth County New Jersey

Parsons, 2012d. Groundwater Monitoring Work Plan, Fort Monmouth, Oceanport, Monmouth County New Jersey

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QAPP WORKSHEETS

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1. Project Identifying Information
    a. Site name/project name: Remedial Investigation/Feasibility Study/Decision Documents
    b. Site location/number: Fort Monmouth, Oceanport, Monmouth County, New Jersey
    c. Contract/Work assignment number: W912DY-09-0062; Task Order 0012, Project No. 36985

2. Lead Organizations
    a. Lead Organization Project Manager
        i. Name: James T. Moore, U.S. Army Corps of Engineers, New York District (CENAN)
        ii. Title: Project Manager
        iii. Signature:
        iv. Date:
    b. Lead Organization Technical Lead
        i. Name: Jim Kelly, U.S. Army Corps of Engineers, New England District (CENAE)
        ii. Title: Technical Lead
        iii. Signature:
        iv. Date:
    c. Lead Organization Environmental Coordinator
        i. Name: Wanda Green, Fort Monmouth (FTMM)
        ii. Title: Environmental Coordinator
        iii. Signature:
        iv. Date:

3. Regulatory Agency:
        i. Name: Linda Range, New Jersey Department of Environmental Protection (NJDEP)
        ii. Title: Project Manager
        iii. Signature: Not applicable (not required to review and approve QAPP)
        iv. Date:

4. Other Stakeholders
    a. Primary Contractor: Parsons Government Services, Inc. (Parsons)
        i. Name: Chris Greene, PE
        ii. Title: Project Manager
        iii. Signature:
        iv. Date:
    b. Subcontractor: Primary Laboratory (ALS)
        i. Name: Mike Perry
        ii. Title: Project Manager and Lab Director
        iii. Signature:
        iv. Date:

QAPP Worksheet #1 & 2: Title and Approval Page

c. Subcontractor: QA Laboratory (Accutest)
   i. Name: Matt Cordova
   ii. Title: Project Manager
   iii. Signature:
   iv. Date:

5. List plans and reports from previous investigations relevant to this project:
   The following reports and documents were used to develop the QAPP.

FTMM-02

Versar, 2001. Remedial Investigation Report and Remedial Action Work Plan, M-2 Landfill. Report prepared for US Army Fort Monmouth, Directorate of Public Works, Fort Monmouth NJ. January.

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QAPP Worksheet #1 & 2: Title and Approval Page

Versar, 2004. FINAL Remedial Investigation Report and Sediment Quality Investigation, M-18 Landfill Site, US Army Installation, Fort Monmouth, New Jersey.

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FTMM-25

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FTMM-53

Handex, 2006. Remedial Action Progress Report, October 2004 through September 2005, Fort Monmouth Main Post Gas Station, Building 699, Fort Monmouth, New Jersey. March.

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FTMM-56

Versar, 2005. FINAL Remedial Investigation Report, Site 80/166 – Main Post, US Army Garrison Fort Monmouth, Main Post, Fort Monmouth, New Jersey. January.

FTMM-57

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FTMM-58

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FTMM-59

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FTMM-61

VEETech, P.C., 2010. Site 283 (FTMM-61) Remedial Action Progress Report (2nd Quarter 2004 through 4th Quarter 2008) NJDEP Case Number #97-08-28-1330-33, US Army Garrison Fort Monmouth, Main Post, Fort Monmouth, New Jersey.

FTMM-64

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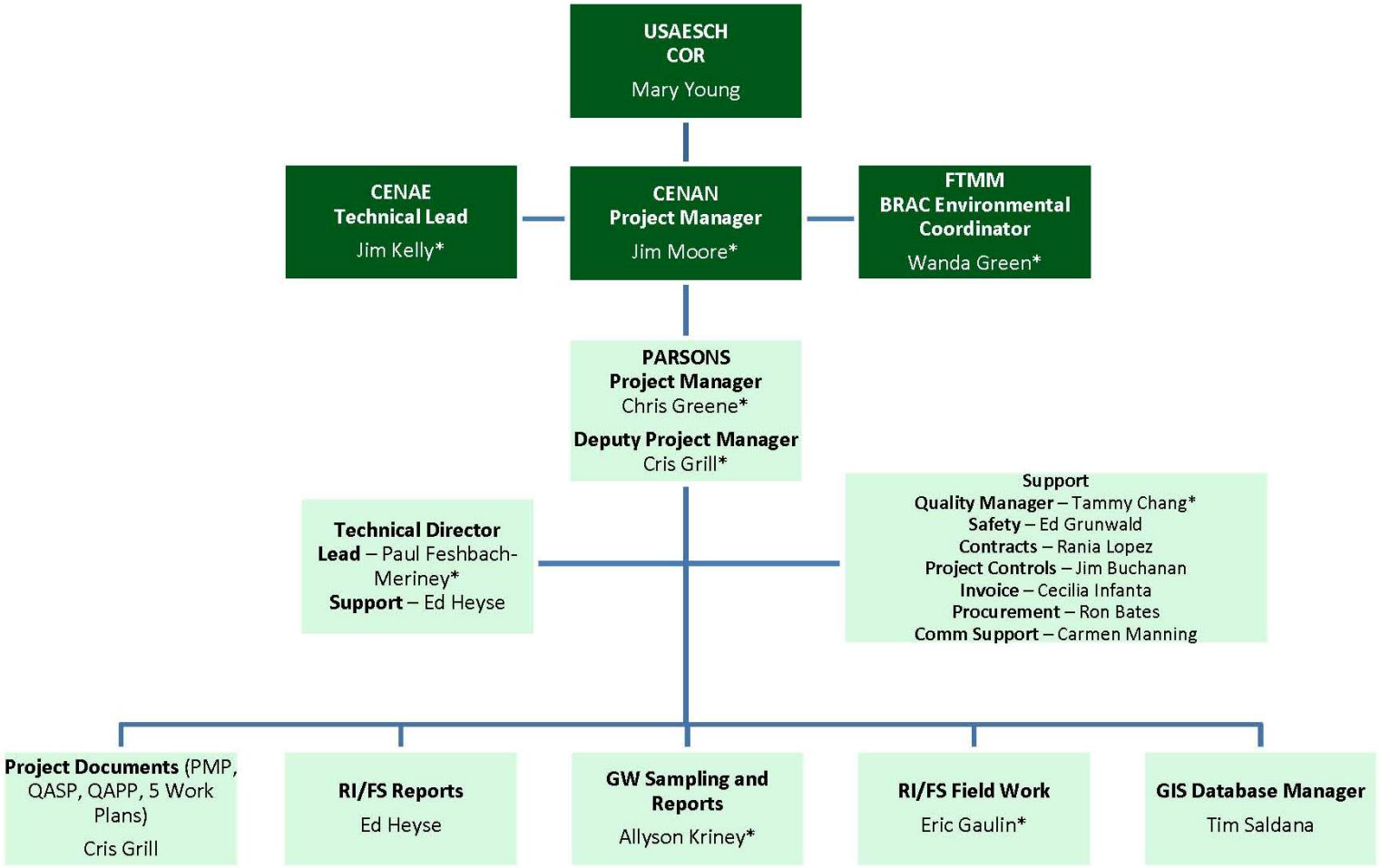
QAPP Worksheet #3 & 5: Project Organization and QAPP Distribution



***QAPP recipient**

QAPP Worksheet #4, 7 & 8: Personnel Qualifications and Sign-off Sheet

ORGANIZATION: Parsons Government Services, Inc. (Parsons)

Name	*Project Title/Role*	*Education/Experience*	*Specialized Training/Certifications*	*Signature/Date*
Don Silkebakken	Program Manager	M.S., Environmental Engineering / 22 years experience	Professional Engineer (PE), Parsons Certified Project Manager	
Chris Greene	Project Manager	M.S., Engineering Management and Environmental Geotechnology/ 17 years experience	Professional Engineer (PE), Parsons Certified Project Manager, OSHA 40-hour HAZWOPER training, OSHA 8-hour Supervisory HAZWOPER Training,	
Cris Grill	Deputy Project Manager	B.S., Geology/ 14 years experience	Professional Geologist (PG), Parsons Certified Project Manager, OSHA 40-hour HAZWOPER training, OSHA 8-hour Supervisory HAZWOPER Training, First Aid and CPR training	
Paul Feshbach-Meriney	Project Technical Director	M.S., Geology/ 23 years experience	Professional Geologist (PG), New Jersey Licensed Remediation Professional (LSRP), Licensed Site Professional (LSP), OSHA 40-hour HAZWOPER training, OSHA 8-hour Supervisory HAZWOPER Training,	

QAPP Worksheet #4, 7 & 8: Personnel Qualifications and Sign-off Sheet

ORGANIZATION: Parsons Government Services, Inc. (Parsons)

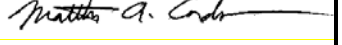
Name	*Project Title/Role*	*Education/Experience*	*Specialized Training/Certifications*	*Signature/Date*
Tammy Chang	Project QC Manager	M.S., Chemistry/ 23 years experience	TCEQ sponsored NELAC Laboratory Assessment Training Class	Tammy Chang
Sandra de las Fuentes	Project Chemist	B.A., Microbiology / 25 years experience	NA	
Allyson Kriney	Field Team Lead	B.S., Environmental Science/ 11 years experience	OSHA 40-hour HAZWOPER training, OSHA 8-hour Supervisory HAZWOPER Training, First Aid and CPR Training, OSHA 8-hour DOT Training, LPS Safety Training	
Eric Gaulin	Field Team Lead	Ph.D., Environmental Science/ 12 years experience	New Jersey Licensed Remediation Professional (LSRP), Certified Hazardous Materials Manager (CHMM), OSHA 40-hour HAZWOPER training, OSHA 8-hour Supervisory HAZWOPER Training	

QAPP Worksheet #4, 7 & 8: Personnel Qualifications and Sign-off Sheet

ORGANIZATION: ALS – Primary Laboratory

Name	Project Title/Role	Education/Experience	Specialized Training/Certifications	Signature/Date
Michael Perry	Project Manager/ Laboratory Director	B.S., Chemistry/ 30 years experience	NA	

ORGANIZATION: Accutest – QA Laboratory

Name	Project Title/Role	Education/Experience	Specialized Training/Certifications	Signature/Date
Matthew Cordova	Project Manager	B.S., Marine Biology/ 31 years experience	Project Management/Lab Quality Assurance, Laboratory analysis	

*Signatures indicate personnel have read and agree to implement this QAPP as written.

QAPP Worksheet #6: Communication Pathways

Communication Driver	Organization	Name	Contact Information	Procedure (timing, pathway, documentation, etc.)
Regulatory agency interface	CESNY	James Moore	(917) 790-8230	As needed
Field progress reports	Parsons	Allyson Kriney Eric Gaulin	(732) 537-3524 (732) 537-3570	Daily Reports and Daily Quality Control Report will be available upon request after Parsons completes internal review for project team members to review.
Stop work due to safety issues	Parsons	SSHO / Field Personnel	TBD	As needed, Parsons Project Manager will notify CENAN Project Manager.
QAPP changes prior to field work	Parsons	Chris Greene	(617) 449-1573	As needed, revision will be sent to original QAPP recipients
QAPP changes during project execution	Parsons	Chris Greene	(617) 449-1573	As needed, communicate to project team via email and/or phone calls
Field corrective actions	Parsons	Allyson Kriney Eric Gaulin	(732) 537-3524 (732) 537-3570	As needed, communicate to field team members
Sample receipt variances	ALS and Accutest	Mike Perry Matthew Cordova	(585) 288-5380 (732) 355-4550	Upon discovery, lab will notify Parsons Project Chemist
Laboratory non-compliant issues	ALS and Accutest	Mike Perry Matthew Cordova	(585) 288-5380 (732) 355-4550	Upon discovery, lab will notify Parsons Project Chemist
Analytical corrective actions	ALS and Accutest	Mike Perry Matthew Cordova	(585) 288-5380 (732) 355-4550	Upon completion, lab will notify Parsons Project Chemist
Data verification issues, e.g., incomplete records	Parsons	Sandra de las Fuentes	(512) 719-6018	Upon discovery, Parsons Project Chemist will notify lab(s)
Data validation issues, e.g., non-compliance with procedures	Parsons	Sandra de las Fuentes	(512) 719-6018	Upon discovery, Parsons Project Chemist will notify lab(s)

QAPP Worksheet #9: Project Planning Session Summary

Date of planning session: October 16, 2012
Location: Fort Monmouth
Purpose: Project Kick-off
Participants:

Name	Organization	Title/Role	Email/Phone
Wanda Green	ASCIM	Base Environmental Coordinator	wanda.s.green2.civ@mail.mil 732-380-7064
Robert Youhas	Chenaga – FTMM contractor	BEC Support	ryouhas@chenega.com
Frank Accorski	Chenaga – FTMM contractor	BEC Support	faccorsi@chenega.com
Joe Pearson	Calibre Systems	ASCIM Contractor	Joseph.Pearson@calibresys.com
Paul Feshbach-Meriney	Parsons	Technical Director	Paul.Feshbach-Meriney@parsons.com 617-449-1561
Sal Van Wert	USACE – Baltimore District	Design Team Leader	sallie.l.van-wert@usace.army.mil 410-962-0674
James T. Moore	USACE – New York District	Project Manager	james.t.moore@usace.army.mil 917-790-8230
James Kelly	USACE – New England District	Design Team Leader	james.a.kelly@usace.army.mil 978-318-8227
Allen Roos	USACE – New York District	Chief Env. Branch	allen.d.roos@usace.army.mil 917-790-8333
Ed Heyse	Parsons	Document Coordinator/TD	ed.heyse@parsons.com 256-217-2325
Joe Fallon	ASCIM	BEC Support	joseph.m.fallon.civ@mail.mil 732-380-7913
Chris Greene	Parsons	Project Manager	chris.greene@parsons.com 617-449-1573
Rick Keenan	ASCIM	BEC Support	Richard.l.keenan8.civ@mail.mil 732-383-7981
Alice Kearney	ASCIM	FTMM Safety	alice.m.kearney2.civ@mail.mil 732-380-3712
Cris Grill (not in attendance)	Parsons	Deputy Project Manager	cris.grill@parsons.com 617-449-1583

QAPP Worksheet #9: Project Planning Session Summary

Notes/Comments:

- Introductions: Fort Monmouth Staff, USACE Team, Parsons Team and other Stakeholders
- Discussion of general scope of work
- Communications
- Schedule
- Final Comments
- Action Items

Consensus decisions made: NA

Action Items:

Action	Responsible Party
Prepare Meeting Minutes.	Parsons
Put together matrix of attendee names with emails and circulate so that it can be populated with phone numbers and other information.	USACE
Provide CDs of available information to Parsons at the end of the meeting.	FTMM
Send a template of the Monthly Report and Manpower report so that FTMM and USACE can revise it appropriately.	Parsons
Compile information on NJDEP comments on landfill remedies, caps, etc.	FTMM (Wanda Greene)
Provide a general safety plan to Parsons.	FTMM
Review the information received and provide a list of documents that we think are missing to Jim Moore and USACE.	Parsons

QAPP Worksheet #10: Conceptual Site Model

Detailed Conceptual Site Models (CSMs) for the four RI sites (FTMM-22, FTMM-53, FTMM-59, and FTMM-68) are included in Chapter 3 of the RI/FS Work Plan and for landfill FTMM-02 is included in Chapter 3 of the Landfill Work Plan. A summary of the CSMs for these sites are included below. A CSM has not been developed for the remaining 16 long-term groundwater monitoring sites (see Table 1.1 of the FSP) because these sites have been fully characterized through various phases of investigation and have proceeded to a remedial action phase, which includes performance monitoring of groundwater to evaluate contaminant trends. Detailed information regarding contaminant trends at the long-term monitoring sites is included in the Long-term Groundwater Monitoring Work Plan.

FTMM-02

The preliminary CSM for site FTMM-02 (Landfill M-2) indicates that VOCs and metals are present in shallow and deep groundwater at concentrations that exceed NJDEP criteria. Although previous sampling has indicated that VOCs and metals are not COCs in vadose zone soil at FTMM-02, additional data regarding VOC and metal concentrations in soil should be collected to confirm that they are not COCs in soil. Potentially, complete exposure pathways are present at the site that might result in intrusive site workers being exposed to VOCs and/or metals if contaminated soil and/or groundwater are encountered during intrusive activities.

FTMM-22

The preliminary CSM for Site FTMM-22 (former CW-1 lime pit) indicates that VOCs and metals (TCE, antimony, arsenic, and lead) are present in shallow and deep groundwater at concentrations that exceed NJDEP criteria. Chlorinated VOCs have been detected in soils, although VOCs and metals have not been considered COCs in vadose zone soil at FTMM-22. Additional data regarding VOC and metal concentrations in soil should be collected to confirm that they are not COCs in soil. Potentially complete exposure pathways are present at the site that might result in intrusive site workers being exposed to VOCs and/or metals if contaminated soil and/or groundwater is encountered during intrusive activities. A baseline ecological assessment was not performed because no contaminant migration toward Parker Creek was occurring.

FTMM-53

The preliminary CSM for FTMM-53 (Building 699 Service Station) indicates that elevated concentrations of fuel hydrocarbons (BTEX and TPHC) were present in soil between Building 699 and Saltzman Avenue to the north in 2001, when soils were last sampled, and may still be present to some degree despite the occurrence of natural attenuation over the past 11 years. In addition fuel-related VOCs, lead, and low concentrations of chlorinated solvents are present in groundwater at concentrations above the NJDEP GWQC. The source of chlorinated solvents in groundwater at FTMM-53 is likely adjacent site FTMM-68 (former dry cleaners).

QAPP Worksheet #10: Conceptual Site Model

Additional soil and groundwater quality data needs to be collected to better define the current magnitude and vertical/lateral extent of site-related COCs. Potentially complete exposure pathways are present at the site that might result in intrusive site workers being exposed to fuel hydrocarbons, chlorinated solvents, and/or metals if contaminated soil and/or groundwater is encountered during intrusive activities. A baseline ecological assessment was not performed because contaminant migration to environmentally sensitive areas had not been detected.

FTMM-59

The preliminary CSM for FTMM-59 (Building 1122) indicates that the site has been adequately characterized and the RI can be completed using existing information. However, supplemental sampling maybe required at a future date. Existing data indicate that the only potentially complete exposure pathway present at the site consists of potential future exposure of intrusive workers to low concentrations of trichloroethene (TCE) in shallow groundwater. Ecological evaluations have concluded that site-related contamination is unlikely to have a deleterious effect on nearby sensitive ecological receptors or habitats in Mill Creek, and that additional ecological assessments related to Building 1122 were not warranted. Based on the available data there is no evidence that contaminants have migrated off-site. Potentially complete exposure pathways are present at the site that might result in residents, intrusive and non-intrusive site workers, site visitors, and recreational users from being exposed to VOCs and/or metals from impacted surface or subsurface soil and groundwater. The Final Basewide Ecological Evaluation Report (Shaw, 2011) concluded that constituents at Building 1122 (FTMM-59) and Parcel 43 are unlikely to have a deleterious effect on sensitive ecological receptors or habitats, and additional ecological assessments related to Building 1122 (FTMM-59) and Parcel 43 were not warranted or recommended. The Baseline Ecological Evaluation has been evaluated and determined to be CERCLA-compliant.

FTMM-68

The preliminary CSM for FTMM-68 indicates that impacts to soil and groundwater resulting from releases from the former solvent UST at Building 700 have not been adequately characterized. Sampling data for adjacent site FTMM-53 indicate that this site has been impacted by chlorinated solvent contamination sourced at FTMM-68, and that contact with chlorinated solvents in the subsurface at FTMM-68 during intrusive activities represents a potential risk pathway of concern. Additional site characterization is necessary to properly assess risks posed by site-related contamination.

QAPP Worksheet #11: Project/Data Quality Objectives

Data Quality Objectives Summary

DQO Process Steps	DQO Decision Statements
Step 1. State the Problem	Historical military activities within FTMM have resulted in contamination of soil and groundwater with various VOCs, metals, and pesticides. RI investigation will be conducted at landfill FTMM 02 and RI field activities will be conducted at FTMM-22, FTMM-53, FTMM-59, and FTMM-68 to determine the nature and extent of contamination, identify and quantify associated risks to human health, and support an FS. In addition, long-term groundwater monitoring will be conducted at 21 sites (see FSP Table 1.1) to assess contaminant trends in groundwater at sites in the remedial action phase.
Step 2. Identify Goal of the Study	At the RI sites, to determine the nature and extent of contamination, to determine presence of residual sources of contamination (i.e., DNAPL, however, historical data do not support the presence of residual sources), to determine if contaminant concentrations exceed applicable screening levels, to quantify risk to different reuse activities, and to determine the COCs and impacted media in those portions if RI sites that must be evaluated in the FS for remedies.
Step 3. Identify Information Inputs	The following information is needed to make the decisions specified above: • Analytical results from samples collected during the RI; • Results of the risk assessment for the RI sites; and • Analytical results from the long-term groundwater monitoring sites.
Step 4. Define the Study Boundaries	The study area boundaries will include the areas within the established site boundaries (see Landfill Work Plan, RI/FS Work Plan and Long-term Groundwater Monitoring Work Plan). The sites are generally accessible, but may include features that result in constraints on the extent of the investigation, such as the presence of roads or buildings. Therefore, RI sampling will be focused within areas where these constraints are not present or can be overcome.
Step 5. Develop Analytical Approach	A detailed explanation of the project decision rules is presented in Chapter 3 of the Landfill work Plan, RI/FS Work Plan and Long-term Groundwater Monitoring Work Plan.
Step 6. Specify Performance or Acceptance Criteria	Data quality evaluation procedures and determination of usability are defined in this UFP-QAPP. Results of QA/QC efforts during sample collection and analysis, in combination with professional judgment, will be used to evaluate the usability of chemical data for making decisions. Acceptable limits for the sampling include analytical method reporting and/or detection limits that are sufficiently low to meet applicable screening criteria. Analytical method detection limits, reporting limits, and QC acceptance criteria are specified in this QAPP.
Step 7. Develop Plan for Obtaining Data	The overall field data collection plan is presented in Chapter 3 of the landfill Work Plan, RI/FS Work Plan and the Long-tem Groundwater Monitoring Work Plan. The project team will have opportunities to provide input through regular project updates during data collection activities, analysis of data, and preparation of reports.

QAPP Worksheet #12: Measurement Performance Criteria

Matrix: Groundwater, Soil, Investigation Derived Waste (IDW)-Water, IDW-Soil
Analytical Group or Method: Volatiles, Semivolatiles, Metals, Pesticides, Total Petroleum Hydrocarbons (TPH), Ignitability, Corrosivity, Hexavalent Chromium
EPA 8260C, 8270D, 6010C, 7470A, 7471B, 8081B, 8015M, 1010A, 9040C, 7199
Concentration Level: Low

Data Quality Indicator (DQI)	QC sample or measurement performance activity	Measurement Performance Criteria
Overall Precision	Field Duplicates (FDs)	Relative Percent Difference (RPD) ≤ 40% for waters and ≤ 70% for soils. There won't be FD samples collected for IDW samples.
Analytical Precision (laboratory)	Matrix Spike/Matrix Spike Duplicate ***or*** Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicate (LSD)	Matrix Spike/Matrix Spike Duplicate will not be applicable for IDW samples. See Worksheet #15 for %RPD requirements. MS/MSD samples will not be collected for IDW samples.
Analytical Accuracy/Bias (laboratory)	Laboratory Control Samples	See Worksheet #15
Analytical Accuracy/Bias (laboratory)	Matrix Spike/Matrix Spike Duplicate	Matrix Spike/Matrix Spike Duplicate will not be applicable for IDW samples. See Worksheet #15
Accuracy/Bias (contamination)	Method Blanks	For lab non-common contaminants: No target analyte concentrations ≥ ½ of Limit of Quantitation (LOQ). For lab common contaminants: No target analyte concentrations ≥ LOQ.
Sensitivity	Method Detection Limit (MDL) Verification sample (spiked at up to 4x MDL)	Target analytes
Completeness	See Worksheet #34	See Worksheet #34

QAPP Worksheet #13: Secondary Data Criteria and Limitations Table

Secondary Data	Data Source (Originating Organization, Report Title, and Date)	Data Generator(s) (Originating Org., Data Types, Data Generation/Collection Dates)	How Data Will Be Used	Limitations on Data Use
- Remedial Investigation / Feasibility Study Work Plans - Remedial Investigation Reports - Remedial Action Progress Reports	Refer to Worksheet #1 for a list of data sources	Multiple organizations – refer to Worksheet 1	Secondary data will be used to obtain site background information, previous investigation information, monitoring well locations, and similar information for preparing project work plans.	None

QAPP Worksheet #14 & 16: Project Tasks & Schedule

Activity	Responsible Party	Planned Start Date	Planned Completion Date	Deliverable(s)	Deliverable Due Date
A detailed schedule is provided as Figure 6.1 of the Project Management Plan (PMP).					

QAPP Worksheet #15.1a: Reference Limits and Evaluation Table (ALS Environmental)

Matrix: Water
Analytical Groups: Volatiles (8260C), Semi-Volatiles (8270D), Pesticides (8081B), TPH (8015M), Metals (6010C/7471B), TCLP-VOCs (1311/8260C), TCLP-Metals (1311/6010C/7470A), Corrosivity (9045D), Ignitability (1010A), Hexavalent Chromium (7199), EPH (NJ EPH)

Analyte	CAS Number	Higher of PQL and Ground Water Quality Criterion[1]	USEPA Tapwater RSL[2]	Units	LOQs	LODs	DLs	Control Limits LCS/MS/MSD (%R)	RPD
VOCs (8260C) + top 15 TICs									
1,1,1-Trichloroethane	71-55-6	30	0.24	ug/L	5	1	0.36	65-130	30
1,1,2,2-Tetrachloroethane	79-34-5	1	0.066	ug/L	5	1	0.25	65-130	30
1,1,2-Trichloroethane	79-00-5	3	0.24	ug/L	5	1	0.34	75-125	30
1,1-Dichloroethane	75-34-3	50	2.4	ug/L	5	1	0.2	70-135	30
1,1-Dichloroethene	75-35-4	1	260	ug/L	5	1	0.57	70-130	30
1,2,3-Trichlorobenzene	87-61-6	NA	5.2	ug/L	5	1	0.82	75-125	30
1,2,4-Trichlorobenzene	120-82-1	9	0.99	ug/L	5	1	0.23	65-135	30
1,2-Dibromo-3-Chloropropane	96-12-8	0.02	0.00032	ug/L	5	1	0.74	50-130	30
1,2-Dibromoethane	106-93-4	0.03	0.0065	ug/L	5	1	0.24	80-120	30
1,2-Dichlorobenzene	95-50-1	600	280	ug/L	5	1	0.21	70-120	30
1,2-Dichloroethane	107-06-2	2	0.15	ug/L	5	1	0.36	70-130	30
1,2-Dichloropropane	78-87-5	1	0.38	ug/L	5	1	0.2	75-125	30
1,3-Dichlorobenzene	541-73-1	600	NA	ug/L	5	1	0.2	75-125	30
1,4-Dichlorobenzene	106-46-7	75	0.42	ug/L	5	1	0.2	75-125	30
2-Butanone (MEK)	78-93-3	300	4900	ug/L	5	1	0.81	30-150	30
2-Hexanone	591-78-6	300[6]	34	ug/L	5	5	1.7	55-130	30

QAPP Worksheet #15.1a: Reference Limits and Evaluation Table (ALS Environmental)

Matrix: Water
Analytical Groups: Volatiles (8260C), Semi-Volatiles (8270D), Pesticides (8081B), TPH (8015M), Metals (6010C/7471B), TCLP-VOCs (1311/8260C), TCLP-Metals (1311/6010C/7470A), Corrosivity (9045D), Ignitability (1010A), Hexavalent Chromium (7199), EPH (NJ EPH)

Analyte	CAS Number	Higher of PQL and Ground Water Quality Criterion[1]	USEPA Tapwater RSL[2]	Units	LOQs	LODs	DLs	Control Limits LCS/MS/MSD (%R)	RPD
4-Methyl-2-Pentanone (MIBK)	108-10-1	NA	1000	ug/L	5	1	0.67	60-135	30
Acetone	67-64-1	6000	12000	ug/L	5	5	1.2	40-140	30
Benzene	71-43-2	1	0.39	ug/L	5	1	0.2	80-120	30
Bromochloromethane	74-97-5	NA	83	ug/L	5	1	0.32	65-130	30
Bromodichloromethane	75-27-4	NA	0.12	ug/L	5	1	0.32	75-120	30
Bromoform	75-25-2	1	7.9	ug/L	5	1	0.42	70-130	30
Bromomethane	74-83-9	1	7	ug/L	5	1	0.29	30-145	30
Carbon Tetrachloride	56-23-5	1	0.39	ug/L	5	1	0.45	65-140	30
Chlorobenzene	108-90-7	50	72	ug/L	5	1	0.29	80-120	30
Chloroethane	75-00-3	5[5]	21000	ug/L	5	1	0.24	60-135	30
Chloroform	67-66-3	70	0.19	ug/L	5	1	0.25	65-135	30
Chloromethane	74-87-3	NA	190	ug/L	5	1	0.21	40-125	30
cis-1,2-Dichloroethene	156-59-2	70	28	ug/L	5	1	0.3	70-125	30
cis-1,3-Dichloropropene	10061-01-5	NA	NA	ug/L	5	1	0.24	70-130	30
Dibromochloromethane	124-48-1	1	0.15	ug/L	5	1	0.31	78-127	30
Dichlorodifluoromethane (Freon 12)	75-71-8	1000	190	ug/L	5	1	0.46	30-155	30
Dichloromethane	75-09-2	3	9.9	ug/L	5	1	0.32	55-140	30

QAPP Worksheet #15.1a: Reference Limits and Evaluation Table (ALS Environmental)

Matrix: Water
Analytical Groups: Volatiles (8260C), Semi-Volatiles (8270D), Pesticides (8081B), TPH (8015M), Metals (6010C/7471B), TCLP-VOCs (1311/8260C), TCLP-Metals (1311/6010C/7470A), Corrosivity (9045D), Ignitability (1010A), Hexavalent Chromium (7199), EPH (NJ EPH)

Analyte	CAS Number	Higher of PQL and Ground Water Quality Criterion[1]	USEPA Tapwater RSL[2]	Units	LOQs	LODs	DLs	Control Limits LCS/MS/MSD (%R)	RPD
Ethylbenzene	100-41-4	700	1.3	ug/L	5	1	0.2	75-125	30
Isopropylbenzene	98-82-8	NA	390	ug/L	5	1	0.2	75-125	30
m & p-Xylene	179601-23-1	NA	NA	ug/L	10	2	0.33	75-130	30
Methyl-tert-Butyl Ether (MTBE)	1634-04-4	70	12	ug/L	5	1	0.29	65-125	30
o-Xylene	95-47-6	NA	190	ug/L	5	1	0.2	80-120	30
Styrene	100-42-5	100	1100	ug/L	5	1	0.2	65-135	30
Tetrachloroethene	127-18-4	1	9.7	ug/L	5	1	0.3	45-150	30
Toluene	108-88-3	600	860	ug/L	5	1	0.2	75-120	30
trans-1,2-Dichloroethene	156-60-5	100	86	ug/L	5	1	0.33	60-140	30
trans-1,3-Dichloropropene	10061-02-6	NA	NA	ug/L	5	1	0.2	55-140	30
Trichloroethene	79-01-6	1	0.44	ug/L	5	1	0.22	70-125	30
Trichlorofluoromethane (Freon 11)	75-69-4	2000	1100	ug/L	5	1	0.20	60-145	30
Vinyl Chloride	75-01-4	1	0.015	ug/L	5	1	0.32	50-145	30
n-Propylbenzene	103-65-1	NA	530	ug/L	5	1	0.2	70-130	30
n-Butylbenzene	104-51-8	NA	780	ug/L	5	1	0.21	70-135	30
p-Chlorotoluene	106-43-4	NA	190	ug/L	5	1	0.24	75-130	30
1,3,5-Trimethylbenzene	108-67-8	NA	87	ug/L	5	1	0.39	75-130	30

QAPP Worksheet #15.1a: Reference Limits and Evaluation Table (ALS Environmental)

Matrix: Water
Analytical Groups: Volatiles (8260C), Semi-Volatiles (8270D), Pesticides (8081B), TPH (8015M), Metals (6010C/7471B), TCLP-VOCs (1311/8260C), TCLP-Metals (1311/6010C/7470A), Corrosivity (9045D), Ignitability (1010A), Hexavalent Chromium (7199), EPH (NJ EPH)

Analyte	CAS Number	Higher of PQL and Ground Water Quality Criterion[1]	USEPA Tapwater RSL[2]	Units	LOQs	LODs	DLs	Control Limits LCS/MS/MSD (%R)	RPD
Bromobenzene	108-86-1	NA	54	ug/L	5	1	0.28	75-125	30
Xylene (total)	1330-20-7	1000	190	ug/L	15	3	0.53	77-122	30
sec-Butylbenzene	135-98-8	NA	NA	ug/L	5	1	0.27	70-125	30
1,3-Dichloropropane	142-28-9	NA	290	ug/L	5	1	0.27	75-125	30
1,1-Dichloropropene	563-58-6	NA	NA	ug/L	5	1	0.29	75-130	30
2,2-Dichloropropane	594-20-7	NA	NA	ug/L	5	1	0.27	70-135	30
1,1,1,2-Tetrachloroethane	630-20-6	1	0.5	ug/L	5	1	0.22	80-130	30
Hexachlorobutadiene	87-68-3	1	0.26	ug/L	5	1	0.62	50-140	30
Naphthalene	91-20-3	300	0.14	ug/L	5	1	0.20	55-140	30
o-Chlorotoluene	95-49-8	NA	180	ug/L	5	1	0.20	75-125	30
1,2,4-Trimethylbenzene	95-63-6	NA	15	ug/L	5	1	0.20	75-130	30
1,2,3-Trichloropropane	96-18-4	0.03	0.00065	ug/L	5	1	0.70	75-125	30
tert-Butylbenzene	98-06-6	NA	NA	ug/L	5	1	0.20	70-130	30
p-Isopropyltoluene	99-87-6	NA	NA	ug/L	5	1	0.20	75-130	30
VOC Surrogates									
Dibromofluoromethane	1868-53-7	NA	NA	ug/L	NA	NA	NA	85-115	NA
1,2-Dichloroethane-d4	17060-07-0	NA	NA	ug/L	NA	NA	NA	70-120	NA

QAPP Worksheet #15.1a: Reference Limits and Evaluation Table (ALS Environmental)

Matrix: Water
Analytical Groups: Volatiles (8260C), Semi-Volatiles (8270D), Pesticides (8081B), TPH (8015M), Metals (6010C/7471B), TCLP-VOCs (1311/8260C), TCLP-Metals (1311/6010C/7470A), Corrosivity (9045D), Ignitability (1010A), Hexavalent Chromium (7199), EPH (NJ EPH)

Analyte	CAS Number	Higher of PQL and Ground Water Quality Criterion[1]	USEPA Tapwater RSL[2]	Units	LOQs	LODs	DLs	Control Limits LCS/MS/MSD (%R)	RPD
Toluene-d8	2037-26-5	NA	NA	ug/L	NA	NA	NA	85-120	NA
4-Bromofluorobenzene	460-00-4	NA	NA	ug/L	NA	NA	NA	75-120	NA
SVOCs (8270D) + top 15 TICs									
1,2-Dichlorobenzene	95-50-1	600	280	ug/L	10	5	1	35-100	30
1,3-Dichlorobenzene	541-73-1	600	NA	ug/L	10	5	1	30-100	30
1,4-Dichlorobenzene	106-46-7	75	0.42	ug/L	10	5	1.2	30-100	30
2,4,5-Trichlorophenol	95-95-4	700	890	ug/L	10	5	1.1	50-110	30
2,4,6-Trichlorophenol	88-06-2	20	3.5	ug/L	10	5	1	50-115	30
2,4-Dichlorophenol	120-83-2	20	35	ug/L	10	5	1	50-105	30
2,4-Dimethylphenol	105-67-9	100	270	ug/L	10	5	1.3	30-110	30
2,4-Dinitrophenol	51-28-5	40	30	ug/L	50	25	5.8	15-140	30
2,4-Dinitrotoluene	121-14-2	NA	0.2	ug/L	10	5	1	50-120	30
2,6-Dinitrotoluene	606-20-2	NA	15	ug/L	10	5	1	50-115	30
2-Chloronaphthalene	91-58-7	600	550	ug/L	10	5	1	50-105	30
2-Chlorophenol	95-57-8	40	71	ug/L	10	5	1	35-105	30
2-Methylnaphthalene	91-57-6	30[6]	27	ug/L	10	5	1	45-105	30
2-Methylphenol	95-48-7	NA	720	ug/L	10	5	1.4	40-110	30

QAPP Worksheet #15.1a: Reference Limits and Evaluation Table (ALS Environmental)

Matrix: Water
Analytical Groups: Volatiles (8260C), Semi-Volatiles (8270D), Pesticides (8081B), TPH (8015M), Metals (6010C/7471B), TCLP-VOCs (1311/8260C), TCLP-Metals (1311/6010C/7470A), Corrosivity (9045D), Ignitability (1010A), Hexavalent Chromium (7199), EPH (NJ EPH)

Analyte	CAS Number	Higher of PQL and Ground Water Quality Criterion[1]	USEPA Tapwater RSL[2]	Units	LOQs	LODs	DLs	Control Limits LCS/MS/MSD (%R)	RPD
2-Nitroaniline	88-74-4	NA	150	ug/L	50	25	6.5	50-115	30
2-Nitrophenol	88-75-5	NA	NA	ug/L	10	5	1.1	40-115	30
3,3'-Dichlorobenzidine	91-94-1	30	0.11	ug/L	10	5	1.4	20-110	30
3&4-Methylphenol	106-44-5 & 108-39-4	NA	NA	ug/L	10	10	1.3	30-110	30
3-Nitroaniline	99-09-2	NA	NA	ug/L	50	25	5.8	20-125	30
4,6-Dinitro-2-Methylphenol	534-52-1	1[6]	1.2	ug/L	50	25	7.7	40-130	30
4-Bromophenyl-Phenylether	101-55-3	NA	NA	ug/L	10	5	1.1	50-115	30
4-Chloro-3-Methylphenol	59-50-7	100[5]	1100	ug/L	10	5	1	45-110	30
4-Chloroaniline	106-47-8	30	0.32	ug/L	10	5	1	15-110	30
4-Chlorophenyl-Phenylether	7005-72-3	NA	NA	ug/L	10	5	1	50-110	30
4-Nitroaniline	100-01-6	NA	3.3	ug/L	50	25	6.7	35-120	30
4-Nitrophenol	100-02-7	NA	NA	ug/L	50	25	6.5	1-125	30
Acenaphthene	83-32-9	400	400	ug/L	10	5	1	45-110	30
Acenaphthylene	208-96-8	100[5]	NA	ug/L	10	5	1	50-105	30
Anthracene	120-12-7	2000	1300	ug/L	10	5	1	55-110	30
Benzo(a)anthracene	56-55-3	0.1	0.029	ug/L	10	5	1	55-110	30
Benzo(a)Pyrene	50-32-8	0.1	0.0029	ug/L	10	5	1	55-110	30

QAPP Worksheet #15.1a: Reference Limits and Evaluation Table (ALS Environmental)

Matrix: Water
Analytical Groups: Volatiles (8260C), Semi-Volatiles (8270D), Pesticides (8081B), TPH (8015M), Metals (6010C/7471B), TCLP-VOCs (1311/8260C), TCLP-Metals (1311/6010C/7470A), Corrosivity (9045D), Ignitability (1010A), Hexavalent Chromium (7199), EPH (NJ EPH)

Analyte	CAS Number	Higher of PQL and Ground Water Quality Criterion[1]	USEPA Tapwater RSL[2]	Units	LOQs	LODs	DLs	Control Limits LCS/MS/MSD (%R)	RPD
Benzo(b)Fluoranthene	205-99-2	0.2	0.029	ug/L	10	5	1.6	45-120	30
Benzo(g,h,i)Perylene	191-24-2	100[5]	NA	ug/L	10	5	1.1	40-125	30
Benzo(k)Fluoranthene	207-08-9	0.5	0.29	ug/L	10	5	1.1	45-125	30
Benzyl Alcohol	100-51-6	2000	1500	ug/L	10	5	1	30-110	30
bis(1-Chloroisopropyl)ether	108-60-1	300	0.31	ug/L	10	5	1.2	25-130	30
bis(-2-Chloroethoxy)methane	111-91-1	NA	46	ug/L	10	5	1.2	45-105	30
bis(2-Chloroethyl)ether	111-44-4	7	0.012	ug/L	10	5	1	35-110	30
bis(2-Ethylhexyl)Phthalate	117-81-7	3	4.8	ug/L	10	5	1.2	40-125	30
Butyl Benzyl Phthalate	85-68-7	100	14	ug/L	10	5	1.1	45-115	30
Carbazole	86-74-8	NA	NA	ug/L	10	5	1	50-115	30
Chrysene	218-01-9	5	2.9	ug/L	10	5	1	55-110	30
Dibenzo(a,h)Anthracene	53-70-3	0.3	0.0029	ug/L	10	5	1	40-125	30
Dibenzofuran	132-64-9	NA	NA	ug/L	10	5	1	55-105	30
Diethylphthalate	84-66-2	6000	11000	ug/L	10	5	1	40-120	30
Dimethyl Phthalate	131-11-3	100[5]	NA	ug/L	10	5	1	25-125	30
di-n-Butyl Phthalate	84-74-2	700	670	ug/L	10	5	1	55-115	30
di-n-Octyl Phthalate	117-84-0	100	190	ug/L	10	5	1.3	35-135	30

QAPP Worksheet #15.1a: Reference Limits and Evaluation Table (ALS Environmental)

Matrix: Water
Analytical Groups: Volatiles (8260C), Semi-Volatiles (8270D), Pesticides (8081B), TPH (8015M), Metals (6010C/7471B), TCLP-VOCs (1311/8260C), TCLP-Metals (1311/6010C/7470A), Corrosivity (9045D), Ignitability (1010A), Hexavalent Chromium (7199), EPH (NJ EPH)

Analyte	CAS Number	Higher of PQL and Ground Water Quality Criterion[1]	USEPA Tapwater RSL[2]	Units	LOQs	LODs	DLs	Control Limits LCS/MS/MSD (%R)	RPD
Fluoranthene	206-44-0	300	630	ug/L	10	5	1	55-115	30
Fluorene	86-73-7	300	220	ug/L	10	5	1	50-110	30
Hexachlorobenzene	118-74-1	0.02	0.042	ug/L	10	5	1.6	50-110	30
Hexachlorobutadiene	87-68-3	1	0.26	ug/L	10	5	1	25-105	30
Hexachloroethane	67-72-1	7	0.79	ug/L	10	5	1.1	30-100	30
Indeno(1,2,3-cd)Pyrene	193-39-5	0.2	0.029	ug/L	10	5	1	45-125	30
Isophorone	78-59-1	40	67	ug/L	10	5	1	50-110	30
Naphthalene	91-20-3	300	0.14	ug/L	10	5	1	40-100	30
Nitrobenzene	98-95-3	6	0.12	ug/L	10	5	1	45-110	30
n-Nitroso-di-n-Propylamine	621-64-7	10	0.0093	ug/L	10	5	1	35-130	30
n-Nitrosodiphenylamine	86-30-6	10	10	ug/L	10	5	1	50-110	30
Pentachlorophenol (PCP)	87-86-5	0.3	0.035	ug/L	50	25	5.9	40-115	30
Phenanthrene	85-01-8	100[5]	NA	ug/L	10	5	1	50-115	30
Phenol	108-95-2	2000	4500	ug/L	10	5	1	0-115	30
Pyrene	129-00-0	200	87	ug/L	10	5	1	50-130	30
Benzidine	92-87-5	20	0.000092	ug/L	100	100	95	10-99	30
1,2,4-Trichlorobenzene	120-82-1	9	0.99	ug/L	10	5	1.0	35-105	30

QAPP Worksheet #15.1a: Reference Limits and Evaluation Table (ALS Environmental)

Matrix: Water
Analytical Groups: Volatiles (8260C), Semi-Volatiles (8270D), Pesticides (8081B), TPH (8015M), Metals (6010C/7471B), TCLP-VOCs (1311/8260C), TCLP-Metals (1311/6010C/7470A), Corrosivity (9045D), Ignitability (1010A), Hexavalent Chromium (7199), EPH (NJ EPH)

Analyte	CAS Number	Higher of PQL and Ground Water Quality Criterion[1]	USEPA Tapwater RSL[2]	Units	LOQs	LODs	DLs	Control Limits LCS/MS/MSD (%R)	RPD
1,2-Diphenylhydrazine	122-66-7	20	0.067	ug/L	10	5	1.0	55-115	30
n-Nitrosodimethylamine	62-75-9	0.8	0.00042	ug/L	10	5	1.0	25-110	30
Hexachlorocyclopentadiene	77-47-4	40	22	ug/L	10	5	1.0	10-99	30
SVOC Surrogates									
2-Fluorobiphenyl	NA	NA	NA	ug/L	NA	NA	NA	50-110	
Terphenyl-d14	NA	NA	NA	ug/L	NA	NA	NA	50-135	
2,4,6-Tribromophenol	NA	NA	NA	ug/L	NA	NA	NA	40-125	
2-Fluorophenol	NA	NA	NA	ug/L	NA	NA	NA	20-110	
Nitrobenzene-d5	NA	NA	NA	ug/L	NA	NA	NA	40-110	
Pesticides (8081B)									
4,4'-DDD	72-54-8	0.1	0.027	ug/L	0.05	0.025	0.039	25-150	30
4,4'-DDE	72-55-9	0.1	0.2	ug/L	0.05	0.025	0.025	35-140	30
4,4'-DDT	50-29-3	0.1	0.2	ug/L	0.05	0.025	0.025	45-140	30
Aldrin	309-00-2	0.04	0.004	ug/L	0.05	0.025	0.025	25-140	30
alpha-BHC	319-84-6	0.02	0.0062	ug/L	0.05	0.025	0.025	60-130	30
alpha-Chlorodane	5103-71-9	NA	NA	ug/L	0.05	0.025	0.025	65-125	30
beta-BH	319-85-7	0.04	0.022	ug/L	0.05	0.025	0.025	65-125	30

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Analyte	CAS Number	Higher of PQL and Ground Water Quality Criterion[1]	USEPA Tapwater RSL[2]	Units	LOQs	LODs	DLs	Control Limits LCS/MS/MSD (%R)	RPD
delta-BHC	319-86-8	NA	NA	ug/L	0.05	0.025	0.025	45-135	30
Dieldrin	60-57-1	0.03	0.0015	ug/L	0.05	0.025	0.025	60-130	30
Endosulfan I	959-98-8	40	NA	ug/L	0.05	0.025	0.025	50-110	30
Endosulfan II	33213-65-9	40	NA	ug/L	0.05	0.025	0.025	30-130	30
Endosulfan Sulfate	1031-07-8	40	NA	ug/L	0.05	0.025	0.025	55-135	30
Endrin	72-20-8	2	1.7	ug/L	0.05	0.025	0.025	55-135	30
Endrin Aldehyde	7421-93-4	NA	NA	ug/L	0.05	0.025	0.025	55-135	30
Endrin Ketone	53494-70-5	NA	NA	ug/L	0.05	0.025	0.025	75-125	30
gamma-BHC (Lindane)	58-89-9	0.03	0.036	ug/L	0.05	0.025	0.025	25-135	30
gamma-Chlordane	5566-34-7	NA	NA	ug/L	0.05	0.025	0.025	60-125	30
Heptachlor	76-44-8	0.05	0.0018	ug/L	0.05	0.025	0.025	40-130	30
Heptachlor Epoxide	1024-57-3	0.2	0.0033	ug/L	0.05	0.025	0.025	60-130	30
Methoxylchlor	72-43-5	40	27	ug/L	0.5	0.025	0.025	55-150	30
Toxaphene	8001-35-2	2	0.013	ug/L	1	0.5	0.38	46-130	30
Pesticide Surrogate									
Decachlorobiphenyl (DCB)								55-130	NA
Tetrachloro-m-xylene (TCMX)								70-125	NA

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Analyte	CAS Number	Higher of PQL and Ground Water Quality Criterion[1]	USEPA Tapwater RSL[2]	Units	LOQs	LODs	DLs	Control Limits LCS/MS/MSD (%R)	RPD
Metals (6010C/7471B)									
Aluminum	7429-90-5	0.04	16000	ug/L	20	20	7.8	80-120	20
Antimony	7440-36-0	6	6	ug/L	10	4	2.3	80-120	20
Arsenic	7440-38-2	3	0.045	ug/L	5	5	1.9	80-120	20
Barium	7440-39-3	6000	2900	ug/L	20	1	0.38	80-120	20
Beryllium	7440-41-7	1	NA	ug/L	5	0.3	0.15	80-120	20
Cadmium	7440-43-9	4	6.9	ug/L	1	0	0.17	80-120	20
Calcium	7440-70-2	NA	NA	ug/L	500	250	176	80-120	20
Chromium	7440-47-3	70	NA	ug/L	1	1	0.88	80-120	20
Cobalt	7440-48-4	100[5]	4.7	ug/L	3	1	0.34	80-120	20
Copper	7440-50-8	1300	620	ug/L	10	4	1.5	80-120	20
Iron	7439-89-6	300	11000	ug/L	100	10	5.1	80-120	20
Lead	7439-92-1	5	15 [3]	ug/L	5	2	0.77	80-120	20
Magnesium	7439-95-4	NA	NA	ug/L	500	15	4.6	80-120	20
Manganese	7439-96-5	50	320	ug/L	10	1	0.7	80-120	20
Nickel	7440-02-0	100	300	ug/L	5	5	2.1	80-120	20
Potassium	7782-49-2	NA	NA	ug/L	2000	250	70	80-120	20

QAPP Worksheet #15.1a: Reference Limits and Evaluation Table (ALS Environmental)

Matrix: Water
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Analyte	CAS Number	Higher of PQL and Ground Water Quality Criterion[1]	USEPA Tapwater RSL[2]	Units	LOQs	LODs	DLs	Control Limits LCS/MS/MSD (%R)	RPD
Selenium	7782-49-2	40	78	ug/L	5	5	3.8	80-120	20
Silver	7440-22-4	40	71	ug/L	10	2	1.2	80-120	20
Sodium	7440-23-5	50000	NA	ug/L	500	250	99	80-120	20
Thallium	7440-28-0	2	0.16	ug/L	10	5	3.6	80-120	20
Vanadium	7440-62-2	NA	78	ug/L	3	0.6	0.28	80-120	20
Zinc	7440-66-6	2000	4700	ug/L	5	4	1.4	80-120	20
Mercury	7439-97-6	2	0.63	ug/L	0.1	0.06	0.027	80-120	20
Gasoline Range Organics (8015M)	8006-61-9	NA	NA	ug/L	50	25	8	61-141	30
GRO Surrogate									
Chlorofluorobenzene								73-112	
Diesel Range Organics (8015M)	68334-30-5	NA	NA	ug/L	100	100	75	38-113	30
DRO Surrogate									
o-TerphenylL								40-147	
Corrosivity (9040C)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ignitability (1010A)	NA	NA	NA	Degrees	20°C	NA	NA	NA	NA
Hexavalent Chromium (7199)	18540-29-9	NA	0.031	ug/L	10	10	2.9	70-130	20

QAPP Worksheet #15.1a: Reference Limits and Evaluation Table (ALS Environmental)

Matrix: Water
Analytical Groups: Volatiles (8260C), Semi-Volatiles (8270D), Pesticides (8081B), TPH (8015M), Metals (6010C/7471B), TCLP-VOCs (1311/8260C), TCLP-Metals (1311/6010C/7470A), Corrosivity (9045D), Ignitability (1010A), Hexavalent Chromium (7199), EPH (NJ EPH)

Analyte	CAS Number	Higher of PQL and Ground Water Quality Criterion[1]	USEPA Tapwater RSL[2]	Units	LOQs	LODs	DLs	Control Limits LCS/MS/MSD (%R)	RPD
TCLP-VOCs (4)									
1,1-Dichloroethene (1,1-DCE)	75-35-4	0.7	NA	mg/L	0.005	NA	0.00057	67-119	30
1,2-Dichloroethane	107-06-2	0.5	NA	mg/L	0.005	NA	0.00036	72-130	30
1,4-Dichlorobenzene	106-46-7	7.5	NA	mg/L	0.005	NA	0.0002	79-119	30
2-Butanone (MEK)	78-93-3	200	NA	mg/L	0.01	NA	0.00081	60-133	30
Benzene	71-43-2	0.5	NA	mg/L	0.005	NA	0.0002	78-118	30
Carbon Tetrachloride	56-23-5	0.5	NA	mg/L	0.005	NA	0.00045	64-129	30
Chlorobenzene	108-90-7	100	NA	mg/L	0.005	NA	0.00029	80-121	30
Chloroform	67-66-3	6.0	NA	mg/L	0.005	NA	0.00025	75-123	30
Tetrachloroethene (PCE)	127-18-4	0.7	NA	mg/L	0.005	NA	0.0003	71-127	30
Trichloroethene (TCE)	79-01-6	0.5	NA	mg/L	0.005	NA	0.00022	75-122	30
Vinyl Chloride	75-01-4	0.2	NA	mg/L	0.005	NA	0.00032	68-139	30
TCLP-VOC Surrogates									
Dibromofluoromethane	1868-53-7	NA	NA	ug/L	NA	NA	NA	85-115	NA
1,2-Dichloroethane-d4	17060-07-0	NA	NA	ug/L	NA	NA	NA	70-120	NA
Toluene-d8	2037-26-5	NA	NA	ug/L	NA	NA	NA	85-120	NA
4-Bromofluorobenzene	460-00-4	NA	NA	ug/L	NA	NA	NA	75-120	NA

QAPP Worksheet #15.1a: Reference Limits and Evaluation Table (ALS Environmental)

Matrix: Water
Analytical Groups: Volatiles (8260C), Semi-Volatiles (8270D), Pesticides (8081B), TPH (8015M), Metals (6010C/7471B), TCLP-VOCs (1311/8260C), TCLP-Metals (1311/6010C/7470A), Corrosivity (9045D), Ignitability (1010A), Hexavalent Chromium (7199), EPH (NJ EPH)

Analyte	CAS Number	Higher of PQL and Ground Water Quality Criterion(1)	USEPA Tapwater RSL(2)	Units	LOQs	LODs	DLs	Control Limits LCS/MS/MSD (%R)	RPD
TCLP-Metals (4)									
Arsenic	7440-38-2	5.0	NA	mg/L	0.5	NA	0.002	80-120	20
Barium	7440-39-3	100	NA	mg/L	1	NA	0.0004	80-120	20
Cadmium	7440-43-9	1.0	NA	mg/L	0.1	NA	0.0002	80-120	20
Chromium	7440-47-3	5.0	NA	mg/L	0.1	NA	0.001	80-120	20
Lead	7439-92-1	5.0	NA	mg/L	0.1	NA	0.001	80-120	20
Selenium	7782-49-2	1.0	NA	mg/L	0.5	NA	0.004	80-120	20
Silver	7440-22-4	5.0	NA	mg/L	0.1	NA	0.001	80-120	20
Mercury	7439-97-6	0.2	NA	mg/L	0.0003	NA	0.000027	80-120	20
Total Unfractionated EPH (C9-C40)	NFTEPH				0.1	0.1	0.0025	40-140	50

(1) Specific Ground Water Quality Criteria - Class IIA and Practical Quantitation Levels
(2) USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites for Tapwater, November 2012. (http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/pdf/master_sl_table_run_NOV2012.pdf). Both the Ground Water Quality Criterion and the USEPA Tapwater RSL are provided for reference purposes, as the Ground Water Quailty Criterion is applicable at some sites, while the USEPA Tapwater RSLs are applicable at others.
(3) Value not available from USEPA RSL. Used USEPA Maximum Contaminant Level (MCL).
(4) TCLP Regulatory Levels
(5) = Interim generic groundwater quality criteria
(6) = Interim specific ground water quality criteria

QAPP Worksheet #15.1b: Reference Limits and Evaluation Table (Accutest Laboratories)

Matrix: Water
Analytical Group: Volatiles (8260C), Semi-volatiles (8270D), Pesticides (8081B), Metals (6010C/7470A), Total Petroleum Hydrocarbons (8015M), Hexavalent Chromium (7199), NJDEP EPH

Analyte	CAS Number	Higher of PQL and Ground Water Quality Criterion [1]	USEPA Tapwater RSL [2]	Units	LOQs	LODs	DLs	Control Limits LCS (%R)	Control Limits MS/MSD (%R)	RPD
VOCs (8260B) + top 15 TICs										
Acetone	67-64-1	6000	12000	ug/l	10	5	3.3	39-152	34-156	22
Benzene	71-43-2	1	0.39	ug/l	1	0.5	0.24	79-116	48-138	11
Bromobenzene	108-86-1	NA	NA	ug/l	5	0.5	0.14	79-123	73-130	10
Bromochloromethane	74-97-5	NA	83	ug/l	5	1	0.3	82-123	76-131	10
Bromodichloromethane	75-27-4	1	0.12	ug/l	1	0.5	0.21	83-125	74-130	10
Bromoform	75-25-2	4	7.9	ug/l	4	0.5	0.21	74-133	66-136	12
Bromomethane	74-83-9	1	7	ug/l	2	1	0.22	63-139	55-146	14
2-Butanone (MEK)	78-93-3	300	4900	ug/l	10	5	2.4	63-137	56-144	15
n-Butylbenzene	104-51-8	NA	780	ug/l	5	1	0.17	76-124	58-136	13
sec-Butylbenzene	135-98-8	NA	NA	ug/l	5	0.5	0.21	78-122	60-135	12
tert-Butylbenzene	98-06-6	NA	NA	ug/l	5	0.5	0.3	80-124	64-136	12
Carbon tetrachloride	56-23-5	1	0.39	ug/l	1	1	0.22	79-137	58-151	15
Chlorobenzene	108-90-7	50	72	ug/l	1	0.5	0.23	83-118	70-128	10
Chloroethane	75-00-3	5[4]	21000	ug/l	1	1	0.26	66-135	54-144	14
Chloroform	67-66-3	70	0.19	ug/l	1	0.5	0.2	82-124	69-132	11
Chloromethane	74-87-3	NA	190	ug/l	1	1	0.21	52-136	45-146	16
o-Chlorotoluene	95-49-8	NA	180	ug/l	5	0.5	0.15	81-121	69-130	11
p-Chlorotoluene	106-43-4	NA	190	ug/l	5	0.5	0.3	77-119	67-127	10

QAPP Worksheet #15.1b: Reference Limits and Evaluation Table (Accutest Laboratories)

Matrix: Water
Analytical Group: Volatiles (8260C), Semi-volatiles (8270D), Pesticides (8081B), Metals (6010C/7470A), Total Petroleum Hydrocarbons (8015M), Hexavalent Chromium (7199), NJDEP EPH

Analyte	CAS Number	Higher of PQL and Ground Water Quality Criterion [1]	USEPA Tapwater RSL [2]	Units	LOQs	LODs	DLs	Control Limits LCS (%R)	Control Limits MS/MSD (%R)	RPD
1,2-Dibromo-3-chloropropane	96-12-8	0.02	0.00032	ug/l	10	5	0.54	66-128	62-133	13
Dibromochloromethane	124-48-1	1	0.15	ug/l	1	0.5	0.14	77-127	71-132	10
1,2-Dibromoethane	106-93-4	0.03	0.0065	ug/l	2	1	0.2	77-125	73-130	10
1,2-Dichlorobenzene	95-50-1	600	280	ug/l	1	0.5	0.22	81-119	73-126	10
1,3-Dichlorobenzene	541-73-1	600	NA	ug/l	1	0.5	0.22	82-119	72-126	10
1,4-Dichlorobenzene	106-46-7	75	0.42	ug/l	1	0.5	0.3	78-118	70-124	10
Dichlorodifluoromethane	75-71-8	1000	190	ug/l	5	1	0.27	40-146	33-161	19
1,1-Dichloroethane	75-34-3	50	2.4	ug/l	1	0.5	0.11	78-126	63-134	12
1,2-Dichloroethane	107-06-2	2	0.15	ug/l	1	1	0.26	75-133	68-139	10
1,1-Dichloroethene	75-35-4	1	2.4	ug/l	1	0.5	0.19	75-124	52-142	15
cis-1,2-Dichloroethene	156-59-2	70	28	ug/l	1	0.5	0.19	74-132	59-137	11
trans-1,2-Dichloroethene	156-60-5	100	86	ug/l	1	0.5	0.21	68-125	60-134	12
1,2-Dichloropropane	78-87-5	1	0.38	ug/l	1	0.5	0.48	79-119	70-126	10
1,3-Dichloropropane	142-28-9	NA	290	ug/l	5	0.5	0.23	79-118	73-124	10
2,2-Dichloropropane	594-20-7	NA	NA	ug/l	5	0.5	0.15	55-138	51-142	15
1,1-Dichloropropene	563-58-6	NA	NA	ug/l	5	0.5	0.3	81-121	59-138	14
cis-1,3-Dichloropropene	10061-01-5	NA	NA	ug/l	1	0.5	0.21	80-118	74-125	10
trans-1,3-Dichloropropene	10061-02-6	NA	NA	ug/l	1	0.5	0.19	76-124	71-127	11
Ethylbenzene	100-41-4	700	1.3	ug/l	1	0.5	0.23	81-118	48-139	11

QAPP Worksheet #15.1b: Reference Limits and Evaluation Table (Accutest Laboratories)

Matrix: Water
Analytical Group: Volatiles (8260C), Semi-volatiles (8270D), Pesticides (8081B), Metals (6010C/7470A), Total Petroleum Hydrocarbons (8015M), Hexavalent Chromium (7199), NJDEP EPH

Analyte	CAS Number	Higher of PQL and Ground Water Quality Criterion [1]	USEPA Tapwater RSL [2]	Units	LOQs	LODs	DLs	Control Limits LCS (%R)	Control Limits MS/MSD (%R)	RPD
Hexachlorobutadiene	87-68-3	1	0.042	ug/l	5	0.5	0.24	73-131	53-143	14
2-Hexanone	591-78-6	300[5]	34	ug/l	5	5	1.1	61-130	59-135	15
Isopropylbenzene	98-82-8	NA	390	ug/l	2	0.5	0.45	74-123	61-135	12
p-Isopropyltoluene	99-87-6	NA	NA	ug/l	5	0.5	0.22	81-126	63-134	12
Methyl Tert Butyl Ether	1634-04-4	70	NA	ug/l	1	0.5	0.16	77-120	63-133	11
4-Methyl-2-pentanone (MIBK)	108-10-1	NA	1000	ug/l	5	5	0.83	71-127	66-134	12
Methylene bromide	74-95-3	NA	NA	ug/l	5	1	0.26	84-124	77-128	10
Naphthalene	91-20-3	300	0.14	ug/l	5	2	1.1	64-129	58-142	12
n-Propylbenzene	103-65-1	NA	530	ug/l	5	0.5	0.24	76-121	57-135	12
Styrene	100-42-5	100	1100	ug/l	5	0.5	0.21	81-120	66-132	11
1,1,1,2-Tetrachloroethane	630-20-6	1	0.5	ug/l	5	0.5	0.24	81-126	74-133	10
1,1,2,2-Tetrachloroethane	79-34-5	1	0.066	ug/l	1	0.5	0.21	71-116	69-124	11
Tetrachloroethene	127-18-4	1	9.7	ug/l	1	0.5	0.28	60-159	57-144	13
Toluene	108-88-3	600	860	ug/l	1	1	0.23	82-119	55-138	11
1,2,3-Trichlorobenzene	87-61-6	NA	5.2	ug/l	5	1	0.28	75-129	67-133	11
1,2,4-Trichlorobenzene	120-82-1	9	0.99	ug/l	5	0.5	0.2	79-131	68-133	11
1,1,1-Trichloroethane	71-55-6	30	0.24	ug/l	1	0.5	0.24	81-131	61-146	14
1,1,2-Trichloroethane	79-00-5	3	0.24	ug/l	1	0.5	0.29	81-119	75-125	10
Trichloroethene	79-01-6	1	0.44	ug/l	1	0.5	0.22	84-122	59-140	12

QAPP Worksheet #15.1b: Reference Limits and Evaluation Table (Accutest Laboratories)

Matrix: Water
Analytical Group: Volatiles (8260C), Semi-volatiles (8270D), Pesticides (8081B), Metals (6010C/7470A), Total Petroleum Hydrocarbons (8015M), Hexavalent Chromium (7199), NJDEP EPH

Analyte	CAS Number	Higher of PQL and Ground Water Quality Criterion [1]	USEPA Tapwater RSL [2]	Units	LOQs	LODs	DLs	Control Limits LCS (%R)	Control Limits MS/MSD (%R)	RPD
Trichlorofluoromethane	75-69-4	2000	1100	ug/l	5	1	0.27	71-142	49-158	20
1,2,3-Trichloropropane	96-18-4	0.03	0.00065	ug/l	5	2	0.53	75-120	71-126	11
1,2,4-Trimethylbenzene	95-63-6	NA	15	ug/l	2	1	0.19	78-122	48-140	10
1,3,5-Trimethylbenzene	108-67-8	NA	87	ug/l	2	0.5	0.36	77-122	58-135	11
Vinyl chloride	75-01-4	1	0.015	ug/l	1	0.5	0.21	64-133	45-150	16
m,p-Xylene		NA	NA	ug/l	1	0.5	0.42	81-119	47-141	11
o-Xylene	95-47-6	NA	190	ug/l	1	0.5	0.24	83-120	58-136	11
Xylene (total)	1330-20-7	1000	190	ug/l	1		0.24	82-119	51-139	11
VOC Surrogates										
Dibromofluoromethane	1868-53-7	NA	NA	ug/l	NA	NA	NA	81-121	NA	NA
1,2-Dichloroethane-D4	17060-07-0	NA	NA	ug/l	NA	NA	NA	74-127	NA	NA
Toluene-D8	2037-26-5	NA	NA	ug/l	NA	NA	NA	80-122	NA	NA
4-Bromofluorobenzene	460-00-4	NA	NA	ug/l	NA	NA	NA	78-116	NA	NA
SVOCs (8270D) + top 15 TICs										
2-Chlorophenol	95-57-8	40	71	ug/l	5	2.5	0.97	47-107	32-117	29
4-Chloro-3-methyl phenol	59-50-7	100[4]	1100	ug/l	5	2.5	1.8	55-126	48-134	21
2,4-Dichlorophenol	120-83-2	20	35	ug/l	5	2.5	1.2	51-124	34-129	28
2,4-Dimethylphenol	105-67-9	100	270	ug/l	5	2.5	1.5	54-132	50-140	20
2,4-Dinitrophenol	51-28-5	40	30	ug/l	20	20	17	16-156	10-156	41
4,6-Dinitro-o-cresol	534-52-1	1[5]	1.2	ug/l	20	2.5	0.99	30-138	10-139	36

QAPP Worksheet #15.1b: Reference Limits and Evaluation Table (Accutest Laboratories)

Matrix: Water
Analytical Group: Volatiles (8260C), Semi-volatiles (8270D), Pesticides (8081B), Metals (6010C/7470A), Total Petroleum Hydrocarbons (8015M), Hexavalent Chromium (7199), NJDEP EPH

Analyte	CAS Number	Higher of PQL and Ground Water Quality Criterion (1)	USEPA Tapwater RSL (2)	Units	LOQs	LODs	DLs	Control Limits LCS (%R)	Control Limits MS/MSD (%R)	RPD
2-Methylphenol	95-48-7	NA	720	ug/l	2	2	1	34-109	34-120	25
3&4-Methylphenol		NA	NA	ug/l	2	2	0.93	26-106	31-121	28
2-Nitrophenol	88-75-5	NA	NA	ug/l	5	2.5	1.5	49-126	30-130	29
4-Nitrophenol	100-02-7	NA	NA	ug/l	10	10	5.2	10-86	10-115	43
Pentachlorophenol	87-86-5	0.3	0.035	ug/l	10	2.5	1.4	27-127	10-136	36
Phenol	108-95-2	2000	4500	ug/l	2	2	1.3	10-78	10-91	36
2,4,5-Trichlorophenol	95-95-4	700	890	ug/l	5	2.5	1.6	55-128	33-136	29
2,4,6-Trichlorophenol	88-06-2	20	3.5	ug/l	5	2.5	1.3	55-124	29-133	30
Acenaphthene	83-32-9	400	400	ug/l	1	0.5	0.26	57-118	55-119	21
Acenaphthylene	208-96-8	100(4)	NA	ug/l	1	0.5	0.23	49-110	47-110	20
Anthracene	120-12-7	2000	1300	ug/l	1	0.5	0.29	63-128	59-128	21
Benzidine	92-87-5	20	0.000092	ug/l	20	20	4	10-154	10-142	43
Benzo(a)anthracene	56-55-3	0.1	0.029	ug/l	1	0.5	0.23	59-124	54-124	21
Benzo(a)pyrene	50-32-8	0.1	0.0029	ug/l	1	0.5	0.23	63-129	57-129	21
Benzo(b)fluoranthene	205-99-2	0.2	0.029	ug/l	1	0.5	0.46	50-139	46-138	28
Benzo(g,h,i)perylene	191-24-2	100(4)	NA	ug/l	1	0.5	0.32	61-132	52-135	23
Benzo(k)fluoranthene	207-08-9	0.5	0.29	ug/l	1	1	0.51	53-140	45-141	30
4-Bromophenyl phenyl ether	101-55-3	NA	NA	ug/l	2	0.5	0.36	61-127	56-128	21
Butyl benzyl phthalate	85-68-7	100	14	ug/l	2	0.5	0.29	55-139	50-142	23
Benzyl Alcohol	100-51-6	2000	1500	ug/l	2	1	0.35	24-102	33-117	26

QAPP Worksheet #15.1b: Reference Limits and Evaluation Table (Accutest Laboratories)

Matrix: Water
Analytical Group: Volatiles (8260C), Semi-volatiles (8270D), Pesticides (8081B), Metals (6010C/7470A), Total Petroleum Hydrocarbons (8015M), Hexavalent Chromium (7199), NJDEP EPH

Analyte	CAS Number	Higher of PQL and Ground Water Quality Criterion (1)	USEPA Tapwater RSL (2)	Units	LOQs	LODs	DLs	Control Limits LCS (%R)	Control Limits MS/MSD (%R)	RPD
2-Chloronaphthalene	91-58-7	600	550	ug/l	2	0.5	0.3	51-115	50-115	22
4-Chloroaniline	106-47-8	30	0.32	ug/l	5	2	0.53	35-114	20-116	31
Carbazole	86-74-8	NA	NA	ug/l	1	0.5	0.36	65-129	59-131	20
Chrysene	218-01-9	5	2.9	ug/l	1	0.5	0.29	59-128	55-127	20
bis(2-Chloroethoxy)methane	111-91-1	NA	46	ug/l	2	0.5	0.31	56-127	52-127	22
bis(2-Chloroethyl)ether	111-44-4	7	0.012	ug/l	2	0.5	0.31	51-120	44-122	25
bis(2-Chloroisopropyl)ether	108-60-1	300	0.31	ug/l	2	0.5	0.45	38-125	37-124	22
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	ug/l	2	0.5	0.31	58-122	54-122	20
1,2-Dichlorobenzene	95-50-1	600	280	ug/l	1	0.5	0.29	34-102	34-105	25
1,2-Diphenylhydrazine	122-66-7	20	NA	ug/l	1	0.5	0.29	55-143	49-145	23
1,3-Dichlorobenzene	541-73-1	600	NA	ug/l	1	0.5	0.38	28-99	30-101	26
1,4-Dichlorobenzene	106-46-7	75	0.42	ug/l	1	0.5	0.36	31-101	32-103	25
2,4-Dinitrotoluene	121-14-2	NA	0.2	ug/l	2	0.5	0.43	63-127	55-130	22
2,6-Dinitrotoluene	606-20-2	NA	15	ug/l	2	0.5	0.46	59-140	55-142	20
3,3'-Dichlorobenzidine	91-94-1	30	0.11	ug/l	5	0.5	0.36	26-139	10-143	35
Dibenzo(a,h)anthracene	53-70-3	0.3	0.0029	ug/l	1	0.5	0.38	61-135	54-136	23
Dibenzofuran	132-64-9	NA	NA	ug/l	5	0.5	0.27	60-116	57-118	21
Di-n-butyl phthalate	84-74-2	700	670	ug/l	2	1	0.56	62-136	57-137	21
Di-n-octyl phthalate	117-84-0	100	190	ug/l	2	0.5	0.31	59-142	52-145	22
Diethyl phthalate	84-66-2	6000	11000	ug/l	2	0.5	0.33	53-131	49-132	22

QAPP Worksheet #15.1b: Reference Limits and Evaluation Table (Accutest Laboratories)

Matrix: Water
Analytical Group: Volatiles (8260C), Semi-volatiles (8270D), Pesticides (8081B), Metals (6010C/7470A), Total Petroleum Hydrocarbons (8015M), Hexavalent Chromium (7199), NJDEP EPH

Analyte	CAS Number	Higher of PQL and Ground Water Quality Criterion [1]	USEPA Tapwater RSL [2]	Units	LOQs	LODs	DLs	Control Limits LCS (%R)	Control Limits MS/MSD (%R)	RPD
Dimethyl phthalate	131-11-3	100[4]	NA	ug/l	2	0.5	0.28	37-137	36-135	26
bis(2-Ethylhexyl)phthalate	117-81-7	3	4.8	ug/l	2	1	0.59	59-141	51-146	24
Fluoranthene	206-44-0	300	630	ug/l	1	0.5	0.32	61-129	55-129	20
Fluorene	86-73-7	300	220	ug/l	1	0.5	0.28	62-124	57-125	21
Hexachlorobenzene	118-74-1	0.02	0.042	ug/l	1	0.5	0.34	58-127	53-128	21
Hexachlorobutadiene	87-68-3	1	0.26	ug/l	1	1	0.51	17-120	27-122	27
Hexachlorocyclopentadiene	77-47-4	40	22	ug/l	10	10	7.1	13-160	10-165	30
Hexachloroethane	67-72-1	7	0.79	ug/l	2	1	0.55	18-106	24-108	28
Indeno(1,2,3-cd)pyrene	193-39-5	0.2	0.029	ug/l	1	0.5	0.37	59-138	53-138	23
Isophorone	78-59-1	40	67	ug/l	2	0.5	0.27	44-141	42-139	20
2-Methylnaphthalene	91-57-6	30[5]	27	ug/l	1	1	0.38	45-110	41-118	22
2-Nitroaniline	88-74-4	NA	150	ug/l	5	5	1.1	50-147	45-151	25
3-Nitroaniline	99-09-2	NA	NA	ug/l	5	5	1.3	44-116	28-120	28
4-Nitroaniline	100-01-6	NA	NA	ug/l	5	5	1.7	50-125	32-131	28
Naphthalene	91-20-3	300	0.14	ug/l	1	0.5	0.26	47-107	40-116	24
Nitrobenzene	98-95-3	6	0.12	ug/l	2	0.5	0.42	53-118	48-122	22
n-Nitrosodimethylamine	62-75-9	0.8	0.00042	ug/l	2	1	0.43	10-78	10-101	31
N-Nitroso-di-n-propylamine	621-64-7	10	0.0093	ug/l	2	0.5	0.3	50-134	44-136	22
N-Nitrosodiphenylamine	86-30-6	10	10	ug/l	5	0.5	0.31	61-121	52-130	23
Phenanthrene	85-01-8	100[+]	NA	ug/l	1	0.5	0.29	62-124	57-126	21

QAPP Worksheet #15.1b: Reference Limits and Evaluation Table (Accutest Laboratories)

Matrix: Water
Analytical Group: Volatiles (8260C), Semi-volatiles (8270D), Pesticides (8081B), Metals (6010C/7470A), Total Petroleum Hydrocarbons (8015M), Hexavalent Chromium (7199), NJDEP EPH

Analyte	CAS Number	Higher of PQL and Ground Water Quality Criterion [1]	USEPA Tapwater RSL [2]	Units	LOQs	LODs	DLs	Control Limits LCS (%R)	Control Limits MS/MSD (%R)	RPD
Pyrene	129-00-0	200	87	ug/l	1	0.5	0.27	56-126	50-128	21
1,2,4-Trichlorobenzene	120-82-1	9	0.99	ug/l	1	0.5	0.31	33-110	38-111	24
SVOC Surrogates										
2-Fluorophenol	367-12-4	NA	NA	ug/l	NA	NA	NA	10-83	NA	NA
Phenol-d5	4165-62-2	NA	NA	ug/l	NA	NA	NA	10-74	NA	NA
2-Chlorophenol-d4		NA	NA	ug/l	NA	NA	NA	70-130	NA	NA
2,4,6-Tribromophenol	118-79-6	NA	NA	ug/l	NA	NA	NA	24-148	NA	NA
1,2-Dichlorobenzene-d4	2199-69-1	NA	NA	ug/l	NA	NA	NA	70-130	NA	NA
Nitrobenzene-d5	4165-60-0	NA	NA	ug/l	NA	NA	NA	38-129	NA	NA
2-Fluorobiphenyl	321-60-8	NA	NA	ug/l	NA	NA	NA	42-117	NA	NA
Terphenyl-d14	1718-51-0	NA	NA	ug/l	NA	NA	NA	14-132	NA	NA
Pesticides (SW8081B)										
Aldrin	309-00-2	0.04	0.004	ug/l	0.01	0.01	0.0079	50-144	36-160	39
alpha-BHC	319-84-6	0.02	0.0062	ug/l	0.01	0.01	0.0023	56-151	36-172	37
beta-BHC	319-85-7	0.04	0.022	ug/l	0.01	0.01	0.0023	59-143	37-170	38
delta-BHC	319-86-8	NA	NA	ug/l	0.01	0.01	0.0019	43-146	22-173	34
gamma-BHC (Lindane)	58-89-9	0.03	0.036	ug/l	0.01	0.005	0.0017	60-147	39-166	36
alpha-Chlordane	5103-71-9	NA	NA	ug/l	0.01	0.01	0.0029	59-144	36-162	36
gamma-Chlordane	5103-74-2	NA	NA	ug/l	0.01	0.005	0.0021	58-148	26-173	34
Dieldrin	60-57-1	0.03	0.0015	ug/l	0.01	0.01	0.0016	62-151	40-169	35

QAPP Worksheet #15.1b: Reference Limits and Evaluation Table (Accutest Laboratories)

Matrix: Water
Analytical Group: Volatiles (8260C), Semi-volatiles (8270D), Pesticides (8081B), Metals (6010C/7470A), Total Petroleum Hydrocarbons (8015M), Hexavalent Chromium (7199), NJDEP EPH

Analyte	CAS Number	Higher of PQL and Ground Water Quality Criterion (1)	USEPA Tapwater RSL (2)	Units	LOQs	LODs	DLs	Control Limits LCS (%R)	Control Limits MS/MSD (%R)	RPD
4,4'-DDD	72-54-8	0.1	0.027	ug/l	0.01	0.01	0.0025	57-153	38-164	36
4,4'-DDE	72-55-9	0.1	0.2	ug/l	0.01	0.01	0.0017	56-149	30-169	36
4,4'-DDT	50-29-3	0.1	0.2	ug/l	0.01	0.01	0.0032	54-161	33-180	40
Endrin	72-20-8	2	1.7	ug/l	0.01	0.01	0.002	60-150	40-173	35
Endosulfan sulfate	1031-07-8	40	NA	ug/l	0.01	0.01	0.0019	60-151	36-171	34
Endrin aldehyde	7421-93-4	NA	NA	ug/l	0.01	0.01	0.0037	51-138	23-158	39
Endrin ketone	53494-70-5	NA	NA	ug/l	0.01	0.01	0.0047	56-153	39-169	34
Endosulfan-I	959-98-8	40	NA	ug/l	0.01	0.01	0.0028	59-146	32-164	36
Endosulfan-II	33213-65-9	40	NA	ug/l	0.01	0.01	0.002	59-146	35-168	34
Heptachlor	76-44-8	0.05	0.0018	ug/l	0.01	0.01	0.0022	55-143	33-163	40
Heptachlor epoxide	1024-57-3	0.2	0.0033	ug/l	0.01	0.01	0.0026	60-144	29-175	37
Methoxychlor	72-43-5	2	27	ug/l	0.02	0.01	0.0041	57-158	41-179	38
Toxaphene	8001-35-2	NA	0.013	ug/l	0.25	0.25	0.15	50-150	50-150	30
Pesticide Surrogates										
Tetrachloro-m-xylene	877-09-8	NA	NA	ug/l	NA	NA	NA	26-145	26-145	NA
Decachlorobiphenyl	2051-24-3	NA	NA	ug/l	NA	NA	NA	10-141	10-141	NA
Metals (SW6010C/7470A)										
Aluminum	7429-90-5	0.04	16000	ug/l	200	100	16	80-120	75-125	20
Antimony	7440-36-0	6	6	ug/l	6	5	1.44	80-120	75-125	20
Arsenic	7440-38-2	3	0.045	ug/l	8	3	0.97	80-120	75-125	20

QAPP Worksheet #15.1b: Reference Limits and Evaluation Table (Accutest Laboratories)

Matrix: Water
Analytical Group: Volatiles (8260C), Semi-volatiles (8270D), Pesticides (8081B), Metals (6010C/7470A), Total Petroleum Hydrocarbons (8015M), Hexavalent Chromium (7199), NJDEP EPH

Analyte	CAS Number	Higher of PQL and Ground Water Quality Criterion [1]	USEPA Tapwater RSL [2]	Units	LOQs	LODs	DLs	Control Limits LCS (%R)	Control Limits MS/MSD (%R)	RPD
Barium	7440-39-3	6000	2900	ug/l	200	10	0.66	80-120	75-125	20
Beryllium	7440-41-7	1	NA	ug/l	1	1	0.44	80-120	75-125	20
Cadmium	7440-43-9	4	6.9	ug/l	3	2	0.24	80-120	75-125	20
Calcium	7440-70-2	NA	NA	ug/l	5000	200	39.44	80-120	75-125	20
Chromium	7440-47-3	700	NA	ug/l	10	5	0.91	80-120	75-125	20
Cobalt	7440-48-4	100[4]	4.7	ug/l	50	2	0.59	80-120	75-125	20
Copper	7440-50-8	1300	620	ug/l	10	5	1.27	80-120	75-125	20
Iron	7439-89-6	300	11000	ug/l	100	50	23.6	80-120	75-125	20
Lead	7439-92-1	5	15 [3]	ug/l	3	3	1.66	80-120	75-125	20
Magnesium	7439-95-4	NA	NA	ug/l	5000	100	15.8	80-120	75-125	20
Manganese	7439-96-5	50	320	ug/l	15	2	0.4	80-120	75-125	20
Nickel	7440-02-0	100	300	ug/l	10	4	0.94	80-120	75-125	20
Potassium	2023695	NA	NA	ug/l	10000	100	12.8	80-120	75-125	20
Selenium	7782-49-2	40	78	ug/l	10	5	2.43	80-120	75-125	20
Silver	7440-22-4	40	71	ug/l	10	4	0.85	80-120	75-125	20
Sodium	7440-23-5	50000	NA	ug/l	10000	100	12.8	80-120	75-125	20
Thallium	7440-28-0	2	0.16	ug/l	10	2	1.73	80-120	75-125	20
Vanadium	7440-62-2	NA	78	ug/l	50	4	0.77	80-120	75-125	20
Zinc	7440-66-6	2000	4700	ug/l	20	5	2.81	80-120	75-125	20
Mercury	7439-97-6	2	0.63	ug/l	0.2	0.15	0.075	80-120	75-125	20

QAPP Worksheet #15.1b: Reference Limits and Evaluation Table (Accutest Laboratories)

Matrix: Water
Analytical Group: Volatiles (8260C), Semi-volatiles (8270D), Pesticides (8081B), Metals (6010C/7470A), Total Petroleum Hydrocarbons (8015M), Hexavalent Chromium (7199), NJDEP EPH

Analyte	CAS Number	Higher of PQL and Ground Water Quality Criterion (1)	USEPA Tapwater RSL (2)	Units	LOQs	LODs	DLs	Control Limits LCS (%R)	Control Limits MS/MSD (%R)	RPD
TPH(8015B)										
GRO	8006-61-9	NA	NA	ug/l	200	100	40	72-125	46-131	20
GRO Surrogates										
Chlorofluorobenzene	NA	NA	NA	ug/l	NA	NA	NA	68-114	NA	NA
DRO	68334-30-5	NA	NA	ug/l	100	75	53	15-111	23-160	31
DRO Surrogates										
o-Terphenyl	NA	NA	NA	ug/l	NA	NA	NA	36-144	NA	NA
Tetracosane	NA	NA	NA	ug/l	NA	NA	NA	32-138	NA	NA
5a-Androstane	NA	NA	NA	ug/l	NA	NA	NA	31-136	NA	NA
Hexavalent Chromium (7199)	18540-29-9	NA	0.031	ug/l	5	5	2.8	90-110	85-115	20
NJDEP EPH										
C10-C12 Aromatics				ug/l	40	40	0.38	40-140	40-140	25
C12-C16 Aromatics				ug/l	40	40	0.53	40-140	40-140	25
C16-C21 Aromatics				ug/l	40	40	1.3	40-140	40-140	25
C21-C36 Aromatics				ug/l	40	40	3.7	40-140	40-140	25
C10-C12 Aliphatics				ug/l	40	40	1.4	40-140	40-140	25
C12-C16 Aliphatics				ug/l	40	40	2.1	40-140	40-140	25
C16-C21 Aliphatics				ug/l	40	40	2.4	40-140	40-140	25
C21-C40 Aliphatics				ug/l	40	40	2.6	40-140	40-140	25

QAPP Worksheet #15.1b: Reference Limits and Evaluation Table (Accutest Laboratories)

Matrix: Water
Analytical Group: Volatiles (8260C), Semi-volatiles (8270D), Pesticides (8081B), Metals (6010C/7470A), Total Petroleum Hydrocarbons (8015M), Hexavalent Chromium (7199), NJDEP EPH

Analyte	CAS Number	Higher of PQL and Ground Water Quality Criterion (1)	USEPA Tapwater RSL (2)	Units	LOQs	LODs	DLs	Control Limits LCS (%R)	Control Limits MS/MSD (%R)	RPD

(1) Specific Ground Water Quality Criteria - Class IIA and Practical Quantitation Levels
(2) USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites for Tapwater, November 2012. (http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/pdf/master_sl_table_run_NOV2012.pdf). Both the Ground Water Quality Criterion and the USEPA Tapwater RSL are provided for reference purposes, as the Ground Water Quailty Criterion is applicable at some sites, while the USEPA Tapwater RSLs are applicable at others.
(3) Value not available from USEPA RSL. Used USEPA Maximum Contaminant Level (MCL).
(4) = Interim generic groundwater quality criteria
(5) = Interim specific groundwater quality criteria

QAPP Worksheet #15.2a: Reference Limits and Evaluation Table (ALS Environmental)

Matrix: Soil
Analytical Groups: Volatiles (8260C), Metals (6010C/7471B), Corrosivity (9045D), Ignitability (1010A), Hexavalent Chromium (7199), EPH (NJ EPH)

Analyte	CAS Number	NJ Residential Direct Contact Soil Remediation Standard	USEPA Residential Soil RSL[(1)]	Units	LOQs	LODs	DLs	Control Limits LCS/MS/SD (%R)	RPD
VOCs (8260C) + top 15 TICs									
1,1,1-Trichloroethane	71-55-6	290	1.1	mg/kg	0.005	0.0025	0.00073	70-135	30
1,1,2,2-Tetrachloroethane	79-34-5	1	0.56	mg/kg	0.005	0.0025	0.00081	55-130	30
1,1,2-Trichloroethane	79-00-5	2	1.1	mg/kg	0.005	0.0025	0.00073	60-125	30
1,1-Dichloroethane	75-34-3	8	3.3	mg/kg	0.005	0.0025	0.0013	75-125	30
1,1-Dichloroethene	75-35-4	11	240	mg/kg	0.005	0.0025	0.0013	65-135	30
1,2,3-Trichlorobenzene	87-61-6	NA	49	mg/kg	0.005	0.0025	0.00062	60-135	30
1,2,4-Trichlorobenzene	120-82-1	73	22	mg/kg	0.005	0.0025	0.00059	65-130	30
1,2-Dibromo-3-Chloropropane	96-12-8	0.08	0.0054	mg/kg	0.005	0.0025	0.0019	40-135	30
1,2-Dibromoethane	106-93-4	0.008	0.034	mg/kg	0.005	0.0025	0.0012	70-125	30
1,2-Dichlorobenzene	95-50-1	5300	1900	mg/kg	0.005	0.0025	0.00061	75-120	30
1,2-Dichloroethane	107-06-2	0.9	0.43	mg/kg	0.005	0.0025	0.00061	70-135	30
1,2-Dichloropropane	78-87-5	2	0.94	mg/kg	0.005	0.0025	0.00097	70-120	30
1,3-Dichlorobenzene	541-73-1	5300	NA	mg/kg	0.005	0.0025	0.00063	70-125	30
1,4-Dichlorobenzene	106-46-7	5	2.4	mg/kg	0.005	0.0025	0.00056	70-125	30
2-Butanone (MEK)	78-93-3	3100	28000	mg/kg	0.005	0.0025	0.0023	30-160	30
2-Hexanone	591-78-6	NA	210	mg/kg	0.005	0.0025	0.0012	45-145	30
4-Methyl-2-Pentanone (MIBK)	108-10-1	NA	5300	mg/kg	0.005	0.002	0.00098	45-145	30
Acetone	67-64-1	70000	61000	mg/kg	0.005	0.005	0.0028	20-160	30
Benzene	71-43-2	2	1.1	mg/kg	0.005	0.0025	0.00029	75-125	30

QAPP Worksheet #15.2a: Reference Limits and Evaluation Table (ALS Environmental)

Matrix: Soil
Analytical Groups: Volatiles (8260C), Metals (6010C/7471B), Corrosivity (9045D), Ignitability (1010A), Hexavalent Chromium (7199), EPH (NJ EPH)

Analyte	CAS Number	NJ Residential Direct Contact Soil Remediation Standard	USEPA Residential Soil RSL[(1)]	Units	LOQs	LODs	DLs	Control Limits LCS/MS/SD (%R)	RPD
Bromochloromethane	74-97-5	NA	160	mg/kg	0.005	0.0025	0.0014	70-125	30
Bromodichloromethane	75-27-4	1	0.27	mg/kg	0.005	0.0025	0.00061	70-130	30
Bromoform	75-25-2	81	62	mg/kg	0.005	0.0025	0.00093	55-135	30
Bromoethane	74-83-9	25	7.3	mg/kg	0.005	0.0025	0.0014	30-160	30
Carbon Tetrachloride	56-23-5	0.6	0.61	mg/kg	0.005	0.0025	0.00092	65-135	30
Chlorobenzene	108-90-7	510	290	mg/kg	0.005	0.0025	0.00029	75-125	30
Chloroethane	75-00-3	220	15000	mg/kg	0.005	0.005	0.0029	40-155	30
Chloroform	67-66-3	0.6	0.29	mg/kg	0.005	0.0025	0.0013	70-125	30
Chloromethane	74-87-3	4	120	mg/kg	0.005	0.0025	0.0004	50-130	30
cis-1,2-Dichloroethene	156-59-2	230	160	mg/kg	0.005	0.0025	0.00095	65-125	30
cis -1,3-Dichloropropene	10061-01-5	NA	NA	mg/kg	0.005	0.0025	0.0009	70-125	30
Dibromochloromethane	124-48-1	3	0.68	mg/kg	0.005	0.0025	0.00073	55-140	30
Dichlorodifluoromethane (Freon 12)	75-71-8	490	94	mg/kg	0.005	0.0025	0.0019	35-135	30
Dichloromethane	75-09-2	34	56	mg/kg	0.005	0.0025	0.00057	75-122	30
Ethyl Benzene	100-41-4	7800	5.4	mg/kg	0.005	0.0025	0.00023	75-125	30
Isopropylbenzene	98-82-8	NA	2100	mg/kg	0.005	0.0025	0.00067	75-130	30
m & p -Xylene	179601-23-1	NA	NA	mg/kg	0.01	0.005	0.0011	80-125	30
Methyl-tert-Butyl Ether (MTBE)	1634-04-4	110	43	mg/kg	0.005	0.0025	0.00094	69-124	30
o-Xylene	95-47-6	NA	690	mg/kg	0.005	0.0025	0.00048	75-125	30
Styrene	100-42-5	90	6300	mg/kg	0.005	0.0025	0.0003	75-125	30

QAPP Worksheet #15.2a: Reference Limits and Evaluation Table (ALS Environmental)

Matrix: Soil
Analytical Groups: Volatiles (8260C), Metals (6010C/7471B), Corrosivity (9045D), Ignitability (1010A), Hexavalent Chromium (7199), EPH (NJ EPH)

Analyte	CAS Number	NJ Residential Direct Contact Soil Remediation Standard	USEPA Residential Soil RSL[(1)]	Units	LOQs	LODs	DLs	Control Limits LCS/MS/SD (%R)	RPD
Tetrachloroethene	127-18-4	2	22	mg/kg	0.005	0.0025	0.00088	65-140	30
Toluene	108-88-3	6300	5000	mg/kg	0.005	0.0025	0.00067	70-125	30
trans-1,2-Dichloroethene	156-60-5	300	150	mg/kg	0.005	0.0025	0.00086	65-135	30
trans -1,3-Dichloropropene	10061-02-6	NA	NA	mg/kg	0.005	0.0025	0.0002	65-125	30
Trichloroethene	79-01-6	7	0.91	mg/kg	0.005	0.0025	0.001	75-125	30
Trichlorofluoromethane (Freon 11)	75-69-4	23000	790	mg/kg	0.005	0.0025	0.00066	25-185	30
Vinyl Chloride	75-01-4	0.7	0.06	mg/kg	0.005	0.0025	0.0018	60-125	30
n-Propylbenzene	103-65-1	NA	3400	mg/kg	0.005	0.0025	.00078	65-135	30
n-Butylbenzene	104-51-8	NA	3900	mg/kg	0.005	0.0025	0.00098	65-140	30
p-Chlorotoluene	106-43-4	NA	1600	mg/kg	0.005	0.0025	.00055	75-125	30
1,3,5-Trimethylbenzene	108-67-8	NA	780	mg/kg	0.005	0.0025	.00079	65-135	30
Bromobenzene	108-86-1	NA	300	mg/kg	0.005	0.0025	.00095	65-120	30
Xylene (total)	1330-20-7	12000	630	mg/kg	0.015	0.0075	.0016	70-129	30
sec-Butylbenzene	135-98-8	NA	NA	mg/kg	0.005	0.0025	.00072	65-130	30
1,3-Dichloropropane	142-28-9	NA	1600	mg/kg	0.005	0.0025	.00040	75-125	30
1,1-Dichloropropene	563-58-6	NA	NA	mg/kg	0.005	0.0025	.0011	70-135	30
2,2-Dichloropropane	594-20-7	NA	NA	mg/kg	0.005	0.0025	.0011	65-135	30
1,1,1,2-Tetrachloroethane	630-20-6	NA	1.9	mg/kg	0.005	0.0025	.00083	75-125	30
Hexachlorobutadiene	87-68-3	6	6.2	mg/kg	0.005	0.0025	.00092	55-140	30
Naphthalene	91-20-3	6	3.6	mg/kg	0.005	0.0025	.00051	40-125	30

QAPP Worksheet #15.2a: Reference Limits and Evaluation Table (ALS Environmental)

Matrix: Soil
Analytical Groups: Volatiles (8260C), Metals (6010C/7471B), Corrosivity (9045D), Ignitability (1010A), Hexavalent Chromium (7199), EPH (NJ EPH)

Analyte	CAS Number	NJ Residential Direct Contact Soil Remediation Standard	USEPA Residential Soil RSL[(1)]	Units	LOQs	LODs	DLs	Control Limits LCS/MS/SD (%R)	RPD
o-Chlorotoluene	95-49-8	NA	1600	mg/kg	0.005	0.0025	.00061	70-130	30
1,2,4-Trimethylbenzene	95-63-6	NA	62	mg/kg	0.005	0.0025	0.00054	65-135	30
1,2,3-Trichloropropane	96-18-4	NA	0.005	mg/kg	0.005	0.0025	.0013	65-130	30
tert-Butylbenzene	98-06-6	NA	NA	mg/kg	0.005	0.0025	.00058	65-130	30
p-Isopropyltoluene	99-87-6	NA	NA	mg/kg	0.005	0.0025	.00087	75-135	30
VOC Surrogates									
Dibromofluoromethane	1868-53-7	NA	NA	NA	NA	NA	NA	63-138	NA
1,2-Dichloroethane-D4	17060-07-0	NA	NA	NA	NA	NA	NA	61-145	NA
Toluene-D8	2037-26-5	NA	NA	NA	NA	NA	NA	85-115	NA
4-Bromofluorobenzene	460-00-4	NA	NA	NA	NA	NA	NA	85-120	NA
Metals (6010C/7471B)									
Aluminum	7429-90-5	78000	77000	mg/kg	10	2	1.2	80-120	20
Antimony	7440-36-0	31	31	mg/kg	6	0	0.16	80-120	20
Arsenic	7440-38-2	19	0.39	mg/kg	1	0.5	0.3	80-120	20
Barium	7440-39-3	16000	15000	mg/kg	2	0.14	0.047	80-120	20
Beryllium	7440-41-7	16	NA	mg/kg	0.5	0.02	0.017	80-120	20
Cadmium	7440-43-9	78	70	mg/kg	0.5	0.04	0.014	80-120	20
Calcium	7440-70-2	NA	NA	mg/kg	100	15	15	80-120	20
Chromium	7440-47-3	NA	NA	mg/kg	1	0.06	0.025	80-120	20
Cobalt	7440-48-4	1600	23	mg/kg	5	0.07	0.034	80-120	20

QAPP Worksheet #15.2a: Reference Limits and Evaluation Table (ALS Environmental)

Matrix: Soil
Analytical Groups: Volatiles (8260C), Metals (6010C/7471B), Corrosivity (9045D), Ignitability (1010A), Hexavalent Chromium (7199), EPH (NJ EPH)

Analyte	CAS Number	NJ Residential Direct Contact Soil Remediation Standard	USEPA Residential Soil RSL[(1)]	Units	LOQs	LODs	DLs	Control Limits LCS/MS/SD (%R)	RPD
Copper	7440-50-8	3100	3100	mg/kg	2	0.4	0.18	80-120	20
Iron	7439-89-6	NA	55000	mg/kg	10	10	3.9	80-120	20
Lead	7439-92-1	400	400	mg/kg	5	0.25	0.093	80-120	20
Magnesium	7439-95-4	NA	NA	mg/kg	100	1	0.63	80-120	20
Manganese	7439-96-5	11000	1800	mg/kg	1	0.18	0.18	80-120	20
Nickel	7440-02-0	1600	1500	mg/kg	4	5	0.025	80-120	20
Potassium	7782-49-2	NA	NA	mg/kg	200	15	4.7	80-120	20
Selenium	7782-49-2	390	390	mg/kg	1	0.6	0.28	80-120	20
Silver	7440-22-4	390	390	mg/kg	1	0.2	0.088	75-120	20
Sodium	7440-23-5	NA	NA	mg/kg	100	10	3.9	80-120	20
Thallium	7440-28-0	5	0.78	mg/kg	1	0.5	0.021	80-120	20
Vanadium	7440-62-2	78	390	mg/kg	5	0.06	0.028	80-120	20
Zinc	7440-66-6	23000	23000	mg/kg	6	1.5	0.96	80-120	20
Mercury	7439-97-6	23	10	mg/kg	0.033	0.0067	0.0014	80-120	20
Corrosivity (9045D)									
Corrosivity		NA			NA	NA	NA	NA	NA
Ignitability (1010A)									
Ignitability		NA			NA	NA	NA	NA	NA
Hexavalent Chromium (7199)	18540-29-9	NA	0.29	mg/kg	0.4	0.2	0.1	82-120 (*BSP) 75-125 (MS)	20

QAPP Worksheet #15.2a: Reference Limits and Evaluation Table (ALS Environmental)

Matrix: Soil
Analytical Groups: Volatiles (8260C), Metals (6010C/7471B), Corrosivity (9045D), Ignitability (1010A), Hexavalent Chromium (7199), EPH (NJ EPH)

Analyte	CAS Number	NJ Residential Direct Contact Soil Remediation Standard	USEPA Residential Soil RSL(1)	Units	LOQs	LODs	DLs	Control Limits LCS/MS/SD (%R)	RPD
Aliphatic C9 to C12	C9_C12			mg/kg	1.0	1.0	0.11	40-140	40
Aliphatic C12 to C16	C12_C16			mg/kg	1.0	1.0	0.20	40-140	40
Aliphatic C16 to C21	C16_C21			mg/kg	1.0	1.0	0.18	40-140	40
Aliphatic C21 to C40	C21_C40			mg/kg	1.0	1.0	0.46	40-140	40
Total EPH Aliphatic	TEPH_ALI			mg/kg					
Aromatic C10 to C12	C10_C12			mg/kg	1.0	1.0	0.44	40-140	40
Aromatic C12 to C16	C12_C16			mg/kg	1.0	1.0	0.30	40-140	40
Aromatic C16 to C21	C16_C21			mg/kg	1.0	1.0	0.29	40-140	40
Aromatic C21 to C36	C21_C36			mg/kg	1.0	1.0	0.44	40-140	40
Total EPH Aromatic	TEPH_ARO			mg/kg					
Total EPH Aliphatic + Aromatic	TOTALEPH	5,100(2)	NA	mg/kg					

(1) USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites for Soil, Residential Screening, November 2012. (http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/pdf/master_sl_table_run_NOV2012.pdf). Both the NJ Residential Direct Contact Soil Remediation Standard and the USEPA Residential soil RSLs are provided for reference purposes, as the NJ Residential Direct Contact Soil Remediation Standard is applicable at some sites, while the USEPA RSLs are applicable at others.

(2) For non-residential, 54,000 mg/kg will be used as the screening criteria based on #2 fuel oil and diesel (Category 1).

QAPP Worksheet #15.2b: Reference Limits and Evaluation Table (Accutest Laboratories)

Matrix: Soil
Analytical Group: Volatiles (8260B), Metals (6010C/7471B), Hexavalent Chromium (7199), NJDEP EPH

Analyte	CAS Number	NJ Residential Direct Contact Soil Remediation Standard	USEPA Residential Soil RSL (1)	Units	LOQs	LODs	DLs	Control Limits BSP (%R)	Control Limits MS/MSD (%R)	RPD
VOCs (8260B) + top 15 TICs										
Acetone	67-64-1	70000	61000	mg/kg	0.01	0.005	0.0017	31-168	10-198	35
Benzene	71-43-2	2	1.1	mg/kg	0.001	0.0005	0.00012	76-117	44-130	21
Bromobenzene	108-86-1	NA	NA	mg/kg	0.005	0.001	0.00015	76-118	32-138	23
Bromochloromethane	74-97-5	NA	160	mg/kg	0.005	0.002	0.00027	79-128	52-136	19
Bromodichloromethane	75-27-4	1	0.27	mg/kg	0.005	0.001	0.00011	78-128	43-141	20
Bromoform	75-25-2	81	62	mg/kg	0.005	0.002	0.00015	71-138	34-149	22
Bromomethane	74-83-9	25	7.3	mg/kg	0.005	0.002	0.00027	55-145	10-159	28
2-Butanone (MEK)	78-93-3	3100	28000	mg/kg	0.01	0.005	0.0024	55-149	27-174	31
n-Butylbenzene	104-51-8	NA	3900	mg/kg	0.005	0.001	0.00011	63-124	10-147	32
sec-Butylbenzene	135-98-8	NA	NA	mg/kg	0.005	0.0005	0.00011	70-120	17-144	28
tert-Butylbenzene	98-06-6	NA	NA	mg/kg	0.005	0.0005	0.00029	70-121	23-143	26
Carbon tetrachloride	56-23-5	0.6	0.61	mg/kg	0.005	0.002	0.00013	70-140	33-153	22
Chlorobenzene	108-90-7	510	290	mg/kg	0.005	0.001	0.00011	78-120	35-137	23
Chloroethane	75-00-3	220	15000	mg/kg	0.005	0.002	0.00023	62-139	29-146	27
Chloroform	67-66-3	0.6	0.29	mg/kg	0.005	0.0005	0.000083	78-124	49-133	21
Chloromethane	74-87-3	4	120	mg/kg	0.005	0.002	0.00019	50-132	36-140	23
o-Chlorotoluene	95-49-8	NA	1600	mg/kg	0.005	0.001	0.00013	71-119	26-139	28
p-Chlorotoluene	106-43-4	NA	1600	mg/kg	0.005	0.0005	0.00014	67-117	23-136	27
1,2-Dibromo-3-chloropropane	96-12-8	0.08	0.0054	mg/kg	0.01	0.005	0.00089	61-132	24-149	26

QAPP Worksheet #15.2b: Reference Limits and Evaluation Table (Accutest Laboratories)

Matrix: Soil
Analytical Group: Volatiles (8260B), Metals (6010C/7471B), Hexavalent Chromium (7199), NJDEP EPH

Analyte	CAS Number	NJ Residential Direct Contact Soil Remediation Standard	USEPA Residential Soil RSL (1)	Units	LOQs	LODs	DLs	Control Limits BSP (%R)	Control Limits MS/MSD (%R)	RPD
Dibromochloromethane	124-48-1	3	0.68	mg/kg	0.005	0.001	0.00016	75-128	40-142	21
1,2-Dibromoethane	106-93-4	0.008	0.034	mg/kg	0.001	0.001	0.00013	77-122	41-139	21
1,2-Dichlorobenzene	95-50-1	5300	1900	mg/kg	0.005	0.001	0.00019	76-119	23-141	27
1,3-Dichlorobenzene	541-73-1	5300	NA	mg/kg	0.005	0.0005	0.00019	75-120	22-141	27
1,4-Dichlorobenzene	106-46-7	5	2.4	mg/kg	0.005	0.001	0.00018	72-113	21-136	26
Dichlorodifluoromethane	75-71-8	490	94	mg/kg	0.005	0.002	0.00023	41-138	24-162	25
1,1-Dichloroethane	75-34-3	8	3.3	mg/kg	0.005	0.001	0.00014	75-127	48-132	20
1,2-Dichloroethane	107-06-2	0.9	0.43	mg/kg	0.001	0.001	0.00014	68-134	43-139	19
1,1-Dichloroethene	75-35-4	11	3.3	mg/kg	0.005	0.001	0.00026	73-127	42-139	23
cis-1,2-Dichloroethene	156-59-2	230	160	mg/kg	0.005	0.002	0.00018	77-121	46-132	21
trans-1,2-Dichloroethene	156-60-5	300	150	mg/kg	0.005	0.001	0.00024	76-123	44-135	22
1,2-Dichloropropane	78-87-5	2	0.94	mg/kg	0.005	0.001	0.00015	75-121	45-130	20
1,3-Dichloropropane	142-28-9	NA	1600	mg/kg	0.005	0.001	0.00015	75-120	44-130	20
2,2-Dichloropropane	594-20-7	NA	NA	mg/kg	0.005	0.001	0.0002	58-133	37-136	22
1,1-Dichloropropene	563-58-6	NA	NA	mg/kg	0.005	0.001	0.00021	75-124	38-139	22
cis-1,3-Dichloropropene	10061-01-5	NA	NA	mg/kg	0.005	0.001	0.00014	76-122	43-133	23
trans-1,3-Dichloropropene	10061-02-6	NA	NA	mg/kg	0.005	0.002	0.00016	75-126	41-138	23
Ethylbenzene	100-41-4	7800	5.4	mg/kg	0.001	0.0005	0.00026	74-119	29-137	25
Hexachlorobutadiene	87-68-3	6	0.3	mg/kg	0.005	0.002	0.0002	64-129	10-164	35
2-Hexanone	591-78-6	NA	210	mg/kg	0.005	0.002	0.00062	60-136	25-161	28

QAPP Worksheet #15.2b: Reference Limits and Evaluation Table (Accutest Laboratories)

Matrix: Soil
Analytical Group: Volatiles (8260B), Metals (6010C/7471B), Hexavalent Chromium (7199), NJDEP EPH

Analyte	CAS Number	NJ Residential Direct Contact Soil Remediation Standard	USEPA Residential Soil RSL (1)	Units	LOQs	LODs	DLs	Control Limits BSP (%R)	Control Limits MS/MSD (%R)	RPD
Isopropylbenzene	98-82-8	NA	2100	mg/kg	0.005	0.0005	0.000074	71-119	27-138	26
p-Isopropyltoluene	99-87-6	NA	NA	mg/kg	0.005	0.001	0.0001	73-125	17-147	28
Methyl Tert Butyl Ether	1634-04-4	110	NA	mg/kg	0.001	0.0005	0.00024	72-124	51-128	20
4-Methyl-2-pentanone(MIBK)	108-10-1	NA	5300	mg/kg	0.005	0.002	0.00075	68-134	39-143	22
Methylene chloride	75-09-2	34		mg/kg	0.005	0.002	0.0013	72-120	50-125	20
Naphthalene	91-20-3	6	3.6	mg/kg	0.005	0.005	0.00012	60-127	10-152	31
n-Propylbenzene	103-65-1	NA	3400	mg/kg	0.005	0.0005	0.00012	69-121	18-142	27
Styrene	100-42-5	90	6300	mg/kg	0.005	0.001	0.000092	77-121	27-146	25
1,1,1,2-Tetrachloroethane	630-20-6	NA	1.9	mg/kg	0.005	0.001	0.00014	79-124	41-140	22
1,1,2,2-Tetrachloroethane	79-34-5	1	0.56	mg/kg	0.005	0.001	0.00013	67-117	36-130	27
Tetrachloroethene	127-18-4	2	22	mg/kg	0.005	0.001	0.00017	63-146	20-173	26
Toluene	108-88-3	6300	5000	mg/kg	0.001	0.001	0.00011	77-121	40-135	22
1,2,3-Trichlorobenzene	87-61-6	NA	49	mg/kg	0.005	0.001	0.00016	64-131	10-155	34
1,2,4-Trichlorobenzene	120-82-1	73	22	mg/kg	0.005	0.001	0.00014	65-132	10-152	34
1,1,1-Trichloroethane	71-55-6	290	1.1	mg/kg	0.005	0.001	0.00011	74-133	41-145	22
1,1,2-Trichloroethane	79-00-5	2	1.1	mg/kg	0.005	0.002	0.00017	76-124	45-137	21
Trichloroethene	79-01-6	7	0.91	mg/kg	0.005	0.001	0.00017	79-124	35-149	23
Trichlorofluoromethane	75-69-4	23000	790	mg/kg	0.005	0.001	0.0003	61-147	26-164	25
1,2,3-Trichloropropane	96-18-4	NA	0.005	mg/kg	0.005	0.002	0.0004	70-123	40-139	23
1,2,4-Trimethylbenzene	95-63-6	NA	62	mg/kg	0.005	0.002	0.00021	72-118	17-142	28

QAPP Worksheet #15.2b: Reference Limits and Evaluation Table (Accutest Laboratories)

Matrix: Soil
Analytical Group: Volatiles (8260B), Metals (6010C/7471B), Hexavalent Chromium (7199), NJDEP EPH

Analyte	CAS Number	NJ Residential Direct Contact Soil Remediation Standard	USEPA Residential Soil RSL (1)	Units	LOQs	LODs	DLs	Control Limits BSP (%R)	Control Limits MS/MSD (%R)	RPD
1,3,5-Trimethylbenzene	108-67-8	NA	780	mg/kg	0.005	0.001	0.00016	69-118	20-140	27
Vinyl chloride	75-01-4	0.7	0.06	mg/kg	0.005	0.002	0.00014	57-138	36-150	23
m,p-Xylene		NA	NA	mg/kg	0.001	0.0005	0.00017	75-119	28-139	26
o-Xylene	95-47-6	NA	690	mg/kg	0.001	0.0005	0.00014	77-121	31-139	24
Xylene (total)	1330-20-7	12000	630	mg/kg	0.001	0	0.00014	76-119	28-139	25
VOC Surrogates			NA							
Dibromofluoromethane	1868-53-7	NA	NA	NA	NA	NA	NA	70-130	NA	NA
1,2-Dichloroethane-D4	17060-07-0	NA	NA	NA	NA	NA	NA	70-122	NA	NA
Toluene-D8	2037-26-5	NA	NA	NA	NA	NA	NA	81-127	NA	NA
4-Bromofluorobenzene	460-00-4	NA	NA	NA	NA	NA	NA	66-132	NA	NA
Metals (6010C/7471B)										
Aluminum	7429-90-5	78000	77000	mg/kg	50	10	0.74	80-120	75-125	20
Antimony	7440-36-0	31	31	mg/kg	2	0.5	0.15	80-120	75-125	20
Arsenic	7440-38-2	19	0.39	mg/kg	2	0.5	0.11	80-120	75-125	20
Barium	7440-39-3	16000	15000	mg/kg	20	1	0.34	80-120	75-125	20
Beryllium	7440-41-7	16	NA	mg/kg	0.2	0.1	0.02	80-120	75-125	20
Cadmium	7440-43-9	78	70	mg/kg	0.5	0.2	0.025	80-120	75-125	20
Calcium	7440-70-2	NA	NA	mg/kg	500	20	1.95	80-120	75-125	20
Chromium	7440-47-3	NA	NA	mg/kg	1	0.5	0.113	80-120	75-125	20
Cobalt	7440-48-4	1600	23	mg/kg	5	0.2	0.031	80-120	75-125	20

QAPP Worksheet #15.2b: Reference Limits and Evaluation Table (Accutest Laboratories)

Matrix: Soil
Analytical Group: Volatiles (8260B), Metals (6010C/7471B), Hexavalent Chromium (7199), NJDEP EPH

Analyte	CAS Number	NJ Residential Direct Contact Soil Remediation Standard	USEPA Residential Soil RSL (1)	Units	LOQs	LODs	DLs	Control Limits BSP (%R)	Control Limits MS/MSD (%R)	RPD
Copper	7440-50-8	3100	3100	mg/kg	2.5	0.5	0.09	80-120	75-125	20
Iron	7439-89-6	NA	55000	mg/kg	50	5	0.786	80-120	75-125	20
Lead	7439-92-1	400	400	mg/kg	2	0.5	0.113	80-120	75-125	20
Magnesium	7439-95-4	NA	NA	mg/kg	500	10	3.06	80-120	75-125	20
Manganese	7439-96-5	11000	1800	mg/kg	1.5	0.2	0.04	80-120	75-125	20
Nickel	7440-02-0	1600	1500	mg/kg	4	0.4	0.105	80-120	75-125	20
Potassium	2023695	NA		mg/kg	1000	50	3.88	80-120	75-125	20
Selenium	7782-49-2	390	390	mg/kg	2	0.5	0.239	80-120	75-125	20
Silver	7440-22-4	390	390	mg/kg	0.5	0.4	0.062	80-120	75-125	20
Sodium	7440-23-5	NA	NA	mg/kg	1000	10	1.35	80-120	75-125	20
Thallium	7440-28-0	5	0.78	mg/kg	1	0.5	0.218	80-120	75-125	20
Vanadium	7440-62-2	78	390	mg/kg	5	0.4	0.048	80-120	75-125	20
Zinc	7440-66-6	23000	23000	mg/kg	2	0.5	0.094	80-120	75-125	20
Mercury	7439-97-6	23	10	mg/kg	0.034	0.026	0.013	80-120	75-125	20
Hexavalent Chromium (7199)	18540-29-9	NA	0.29	mg/kg	0.8	0.8	0.434	80-120	75-125	20
NJDEP EPH										
C10-C12 Aromatics				mg/kg	2.7	2.7	0.089	40-140	40-140	25
C12-C16 Aromatics				mg/kg	2.7	2.7	0.19	40-140	40-140	25
C16-C21 Aromatics				mg/kg	2.7	2.7	0.33	40-140	40-140	25

QAPP Worksheet #15.2b: Reference Limits and Evaluation Table (Accutest Laboratories)

Matrix: Soil
Analytical Group: Volatiles (8260B), Metals (6010C/7471B), Hexavalent Chromium (7199), NJDEP EPH

Analyte	CAS Number	NJ Residential Direct Contact Soil Remediation Standard	USEPA Residential Soil RSL (1)	Units	LOQs	LODs	DLs	Control Limits BSP (%R)	Control Limits MS/MSD (%R)	RPD
C21-C36 Aromatics				mg/kg	2.7	2.7	0.50	40-140	40-140	25
C10-C12 Aliphatics				mg/kg	2.7	2.7	0.066	40-140	40-140	25
C12-C16 Aliphatics				mg/kg	2.7	2.7	0.11	40-140	40-140	25
C16-C21 Aliphatics				mg/kg	2.7	2.7	0.14	40-140	40-140	25
C21-C40 Aliphatics				mg/kg	2.7	2.7	0.28	40-140	40-140	25
Total EPH		5,100 (2)	NA	mg/kg						

(1) USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites for Soil, Residential Screening, November 2012. (http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/pdf/master_sl_table_run_NOV2012.pdf). Both the NJ Residential Direct Contact Soil Remediation Standard and the USEPA Residential soil RSLs are provided for reference purposes, as the NJ Residential Direct Contact Soil Remediation Standard is applicable at some sites, while the USEPA RSLs are applicable at others.

(2) For non-residential, 54,000 mg/kg will be used as the screening criteria based on #2 fuel oil and diesel (Category 1).

QAPP Worksheet #17: Sampling Design and Rationale

Describe and provide a rationale for choosing the sampling approach (e.g. grid system, biased statistical approach):

- The sample design is based on the data quality objectives of the investigation which are discussed in Chapter 3 of the project Work Plans. At the RI sites, the sampling approach has been designed to characterize the nature and extent of contamination in both soil and groundwater. At the long-term groundwater monitoring sites, performance monitoring is being conducted pursuant to specific requirements outlined in the Performance Work Statement.

Describe the sampling design and rationale in terms of what matrices will be sampled, what analytical groups will be analyzed and at what concentration levels, the sampling locations (including QC, critical, and background samples), the number of samples to be taken, and the sampling frequency (including seasonal considerations) [May refer to map to Worksheet #18 for details]:

- Sampling design and rationale will be outlined in each of the project Work Plans. The design and rationale will be based on recommendations and regulator comments from existing site documents and will be developed to satisfy the project data quality objectives following USEPA guidance. The number of samples, analytes, and background sampling information are noted in Chapter 3 of the Landfill Work Plan, RI/FS Work Plan and in Chapter 3 of the Long-term Groundwater Monitoring Work Plan. A summary of the field QC sampling is noted on UFP QAPP Worksheet #20.

QAPP Worksheet #18: Sampling Locations and Methods

Sample ID	Matrix	Depth	Type	Analyte/ Analytical Group	Sampling Standard Operating Procedure	Comments
TBD	Groundwater	NA	Grab	VOC, SVOCs, Metals, TPH, Pesticides, Hexavalent Chromium	See Field Sampling Plan	
TBD	Water (IDW)	NA	Grab	Ignitability, Corrosivity, TCLP-Metals, TCLP-VOCs	See Field Sampling Plan	
TBD	Soil	TBD	Grab for VOC samples and composite for other samples	VOCs, SVOCs, Metals, Hexavalent Chromium	See Field Sampling Plan	

QAPP Worksheet #19a: Analytical SOP Requirements Table (ALS Environmental)

Matrix	**Analytical Group**	**Analytical and Preparation Method/ SOP**	**Container(s)** (number, size & type per sample)	**Preservation Requirements** (chemical, temperature, light protected)	**Maximum Holding Time** (preparation/ analysis)
Soil	VOCs + 15 highest TICs	5035/8260C/ VOC-5035/VOC-8260	(3) 5g Encores	Cool, 0-6 °C. Transfer to 2x40 DI and 1x40 MeOH within 48 hours	48hrs/14 days
Water	VOCs + 15 highest TICs	SW8260C/VOC-8260	(3) 40-ml VOA vials w/ PTFE-faced silicone septum	Cool, 0-6 °C no headspace	14 days
Water	Waste Characterization – TCLP RCRA VOCs	SW8260C/1311/MET-TZHE/VOC-8260	(3) 40-ml VOA vials w/ PTFE-faced silicone septum	Cool, 0-6 °C	14 days/14 days
Soil	Waste Characterization – TCLP RCRA VOCs	SW8260C/1311/MET-TZHE/VOC-8260	(1) 8-oz glass jar w/ PTFE-lined cap	Cool, 0-6 °C	14 days/14 days
Water	SVOCs	SW8270D/ 3510C/SOC-8270/EXT-3510C	2x 1000 mL amber glass, Teflon lined cap.	Cool, 0-6 °C	7 days/40 days from extraction

QAPP Worksheet #19a: Analytical SOP Requirements Table (ALS Environmental)

Matrix	**Analytical Group**	**Analytical and Preparation Method/ SOP**	**Container(s)** (number, size & type per sample)	**Preservation Requirements** (chemical, temperature, light protected)	**Maximum Holding Time** (preparation/ analysis)
Pesticides	Water	SW-846 8081B/ SOC-8081	(2) 1 L amber glass bottles	Cool, 0-6 °C	7 days/40 days from extraction to analysis
Water	Metals	SW 6010C/ MET-200.7/6010C	(1) 250-mL plastic bottle	Nitric acid to a pH less than 2	180 days
Soil	Metals	SW 6010C/ MET-200.7/6010C	(1) 4 ounce glass jar	None	180 days
Water	Metals (Mercury)	SW 7470A/MET7470A/ 245.1	(1) 250-mL plastic bottle	Nitric acid to a pH less than 2	28 days
Soil	Metals (Mercury)	SW 7471B/MET7471B/ 245.5	(1) 4 ounce glass jar	Cool 0-6˚ Celsius	28 days
Water	Waste Characterization – TCLP RCRA Metals	SW 1311/ SW 6010C/ 7470A/METTCLP/ MET-200.7/6010C /MET-7470A/245.1	(1) 1000 mL plastic bottle	Sample: Cool 0-6˚ Celsius Extract: Nitric acid to a pH less than 2	180 days except Hg = 28 days

QAPP Worksheet #19a: Analytical SOP Requirements Table (ALS Environmental)

Matrix	**Analytical Group**	**Analytical and Preparation Method/ SOP**	**Container(s)** (number, size & type per sample)	**Preservation Requirements** (chemical, temperature, light protected)	**Maximum Holding Time** (preparation/ analysis)
Soil	Waste Characterization – TCLP RCRA Metals	SW1311/6010C/7471B/ MET-TCLP/MET-200.7/6010C /MET-7471B/245.5	(1) 8 ounce glass jar	Sample: Cool 0-6˚ Celsius Extract: Nitric acid to a pH less than 2	180 days except Hg = 28 days
Water	Gasoline Range Organics/Total Petroleum Hydrocarbons	SW-846 8015C/ VOC-8015GRO	(3) 40 mL glass vials with Teflon lined septum cap	Cool, 0-6 °C, HCl to pH<2 No headspace	14 days
Water	Diesel Range Organics/Total Petroleum Hydrocarbons	SW-846 8015C/ SOC-8015-DRO	(2) 1000 mL amber glass bottles with Teflon lined cap	Cool, 0-6 °C	7 days/40 days after extraction
Water	Ignitability	SW 1010A/ GEN-CCIGN	(3) 40-mL glass vials	Cool, 0-6 °C	14 days
Soil	Ignitability	SW 1010A mod / GEN-OCIGN	(1) 4-oz glass jar	Cool, 0-6 °C	None
Water	Corrosivity	SW 9040C/ GEN-9040B/SM4500H+ B	(1) 100-mL plastic container	None	ASAP
Soil	Corrosivity	SW 9045D/ GEN-9045C	(1) 8 ounce glass jar	None	ASAP

QAPP Worksheet #19a: Analytical SOP Requirements Table (ALS Environmental)

Matrix	**Analytical Group**	**Analytical and Preparation Method/ SOP**	**Container(s)** (number, size & type per sample)	**Preservation Requirements** (chemical, temperature, light protected)	**Maximum Holding Time** (preparation/ analysis)
Water	Hexavalent Chromium	SW-846 7199	250ml HDPE; 10ml	Cool, 0-6 °C	24 hours
Soil	Hexavalent Chromium	SW-846 7199	1-4 oz wide mouth; 2.5g	Cool, 0-6 °C	30 days/9 days until pH adjustment and analysis
water	EPH	NJDEP EPH / 1A-EPH	2 x 1 Liter Glass	cool to 0 - 6° C	14 days from collection to extraction / 40 days from extraction to analysis
Soil	EPH	NJDEP EPH / 1A-EPH	1 x 4 oz wide mouth	cool to 0 - 6° C	14 days from collection to extraction / 40 days from extraction to analysis

QAPP Worksheet #19b: Analytical SOP Requirements Table (Accutest Laboratory)

Matrix	Analytical Group	Analytical and Preparation Method / SOP Reference[1]	Sample Size/Volume	Containers (number, size, and type)	Preservation Requirements (chemical, temperature, light protected)	Maximum Holding Time (preparation / analysis)
Aqueous	VOCs	8260B / EMS8260B-21	40 ml	(3) 40ml VOC vials	Cool <6°C pH <2	14 days
Aqueous	SVOCs	3510C/8270D EOP001 / EMS8270D-03	1 Liter	1-L amber Jar	Cool <6°C	7 days to extract/ 40 days
Aqueous	Pesticides	3510C/8081B EOP001 / EGC8081B-05	1 Liter	1-L amber Jar	Cool <6°C	14 days to extract/ 40 days
Aqueous	TAL Metals	3010A/6010C EMP070/ EMA227-03	1 Liter	1-L poly bottle	Cool <6°C HNO_3 - pH <2	6 months
Aqueous	Mercury	7470A EMA215-13	1 Liter	1-L poly bottle	Cool <6°C HNO_3 - pH <2	6 months
Aqueous	TPH DRO	3510C/8015C EOP001 / EGCDRO8015C-02	1 Liter	1-L poly bottle	Cool <6°C pH<2	7 days to extract/ 40 days
Aqueous	TPH GRO	8015C / EGCGRO8015C-02	40 ml	(3) 40ml VOC vials	Cool <6°C pH < 2	14 days
Aqueous	Extractable Petroleum Hydrocarbons	NJDEP EPH	2 1 liter amber glass bottles	1000ml	Cool to 4° C Acidify to pH< 2 with HCl	Extract within 14 days, analyze within 40 days of sampling
Water	Hexavalent Chromium	SW-846 7199 / EGN291-04	250ml HDPE	50 mL	Cool <6°C	24 hours

QAPP Worksheet #19b: Analytical SOP Requirements Table (Accutest Laboratory)

Matrix	Analytical Group	Analytical and Preparation Method / SOP Reference[1]	Sample Size/Volume	Containers (number, size, and type)	Preservation Requirements (chemical, temperature, light protected)	Maximum Holding Time (preparation / analysis)
Solid	VOCs	5035/8260B EOP5035 / EMS8260B-21	5 grams	Encore™ sampler	Cool <6°C	14 days
Solid	TAL Metals	3050B/6010C EMP073/ EMA227-03	5 grams	250 ml jar	Cool <6°C	6 months
Solid	Mercury	7471B / EMA228-04	2 grams	250 ml jar	Cool <6°C	6 months
Soil	Hexavalent Chromium	SW-846 7199 / EGN292-11	1-4 oz wide mouth	2.5 g	Cool <6°C	30 days until digestion; 7 days until pH adjustment and analysis
Soil	Extractable Petroleum Hydrocarbons	NJDEP EPH	1-4 oz wide mouth	15 g	Cool <6°C	14 days until digestion; 40 days from extraction to analysis

[1] The lower line of the blocks reference Accutest Laboratory, Dayton, New Jersey SOP numbers (Worksheet #23).

QAPP Worksheet #20: Field Quality Control Summary

Matrix	Analytical Group	Field Samples	FDs*	Matrix Spike/ Matrix Spike Duplicates*	QA Split*	EB*	Total Number of Analyses*
Groundwaters	VOCs, SVOCs, Metals, TPH, Pesticides, and Hexavalent Chromium	Varies between sites/events	5%	5%	5%	One per sampling day	TBD
IDW Waters	Corrosivity, Ignitability, TCLP-VOCs, TCLP-Metals	Varies between sites/events	NA	NA	NA	NA	TBD
Soils	VOCs, SVOCs, Metals, TCLP-VOCs, TCLP-Metals, Corrosivity, Ignitability, and Hexavalent Chromium	Varies between sites/events	5%	5%	5%	Disposable sampling tool will be used and one EB will be collected for each batch of sampling tool purchased.	TBD

FD: field duplicate
QA split: quality assurance split sample
EB: equipment blank
*IDW samples won't have any QA/QC samples included
NA: Not Applicable
TBD: To Be Determined

QAPP Worksheet #21: Field Standard Operating Procedures

SOP Number or Reference	Title, Revision, Date, and URL (if available)	Originating Organization	SOP Option or Equipment Type (if SOP Provides Different Options)	Modified for Project? Yes/No	Comments
SOPs are provided in Appendix A of this document.					

This table needs to include detail information related to field use SOPs.

QAPP Worksheet #22: Field Equipment Calibration, Maintenance, Testing, and Inspection

Field Equipment	Activity	Standard Operating Procedure Reference	Title or position of responsible person	Frequency	Acceptance Criteria	Corrective Action
Water Quality Instruments	"Out of the box" inventory check	Follow manufacturer's maintenance recommendations and Parsons SOPs for low-flow purge and sample (for field) per the requirements from NJDEP Office of Quality Assurance.	Equipment operator	Start and end of each day	Calibration standards and instrument measurement range located in user manual	Retest, repair, and/or replace equipment
Digital Camera	Check battery and electronic storage capacity	Follow manufacturer's maintenance recommendations	Equipment operator	Start and end of each day	Batteries must be charged or extra batteries should be available. Storage capacity is sufficient for anticipated activities	Replace/recharge battery or electronic storage devices
Cell Phone	• Check battery • Check cell phone has adequate coverage at the site	Follow manufacturer's maintenance recommendations	Equipment operator	Start and end of each day	Batteries must be charged or extra batteries should be available.	• Replace/charge battery • Determine alternate communication plan for out of coverage areas

QAPP Worksheet #23a: Analytical SOP References Table (ALS Environmental)

Lab SOP #	Title, Revision Date, and/or Number	Definitive or Screening Data	Matrix/Analytical Group	Instrument/ Equipment Type	Modified for Project? Y/N
VOC-8260	Volatile Organic Compounds by GC/MS; 8/20/12; Rev 12	Definitive	Water and Soil/VOCs + 15 highest TICs	GC.MS	N
VOC-5035	Closed System Purge-and-Trap/Extraction for VOCs in Soil and Waste, 12/15/11, Rev 3	Definitive	Soil/VOCs + 15 highest TICs	Encores	N
SOC-8270	Semivolatile Organic Compounds by GC/MS and Low Level Analysis Using a Large Volume Injector (LVI), Rev 9. 4/4/12	Definitive	GW/SVOCs	GC/MS	N
EXT-3510C	Separatory Funnel Liquid Extraction, Rev 5. 9/17/09	Definitive	GW/SVOCs	NA	N
SOC-8081	Analysis of Organochlorine Pesticides in Waters and Soils. Rev 10. 2/22/12	Definitive	Water/Pesticides	GC	N
EXT-5310C	Separatory Funnel Liquid Extraction, Rev 5. 9/17/09.	Definitive	Water/Pesticides	NA	N
MET-200.7/6010C	Determination of Metal and Trace Elements by Inductively Coupled Plasma Atomic Emission Spectrometry, Revision 13, 10/15/12	Definitive	GW/Metals	ICP	N
MET-3010A	Metals Digestion, Waters for ICP Analysis, Revision 5, 9/21/09.	Definitive	GW/Metals	NA	N

QAPP Worksheet #23a: Analytical SOP References Table (ALS Environmental)

Lab SOP #	Title, Revision Date, and/or Number	Definitive or Screening Data	Matrix/Analytical Group	Instrument/ Equipment Type	Modified for Project? Y/N
MET-7470A/245.1	Determination of Mercury in Water by Cold Vapor Atomic Absorption Spectrometry, Revision 6, 12/17/09	Definitive	GW/Metals	CVAA	N
MET-7471B/245.5	Determination of Mercury in Solid or Semi-Solid Waste by Cold Vapor Atomic Absorption Spectrometry, Revision 0, 8/10/10.	Definitive	SO/Metals	CVAA	N
MET-TCLP	Metals and Semivolatiles TCLP Extraction (EPA Method 1311), Revision 2, 2/24/10.	Definitive	GW and SO/Waste Characterization – TCLP RCRA Metals	ICP	N
VOC-8015GRO	Analysis of Water, Soil, and Soluble Waste for Petroleum Hydrocarbons as Gasoline Range Organics. Rev 7. 6/15/12	Definitive	Water/Total Petroleum Hydrocarbons	GC	N
SOC-8015-DRO	Analysis of Water, Soil, and Soluble Waste for Petroleum Hydrocarbons by GC/FID Including Modifications for Connecticut. Rev 7. 12/20/11	Definitive	Water/Total Petroleum Hydrocarbons	Using the EPA 8015 DRO option(not ORO nor CT); GC	N
EXT-5310C	Separatory Funnel Liquid Extraction, Rev 5. 9/17/09	Definitive	Water/Total Petroleum Hydrocarbons	NA	N
GEN-CCIGN	Flashpoint/Ignitability – Pensky Martens Closed Cup, Revision 2, 12/1/09.	Definitive	Water/Ignitability	NA	N
GEN-OCIGN	Flashpoint/Ignitability – Cleveland Open Cup, Revision 2, 12/1/09.	Definitive	Soil/Ignitability	NA	N

QAPP Worksheet #23a: Analytical SOP References Table (ALS Environmental)

Lab SOP #	Title, Revision Date, and/or Number	Definitive or Screening Data	Matrix/Analytical Group	Instrument/ Equipment Type	Modified for Project? Y/N
GEN-9045C	Corrosivity pH by 9045C, Revision 2, 6/11/08	Definitive	Soil/Corrosivity	NA	N
GEN-9040B/SM4500H+B	pH in Water and Aqueous Wastes, Revision 4, 11/12/09.	Definitive	Water/Corrosivity	NA	N
GEN-7199	Hexavalent Chromium by Ion Chromatography, Rev. 5, 6/7/12	Definitive	Groundwater, Soil/Hexavalent Chromium	IC	N
1A-EPH	Method for Determination of Extractable Petroleum Hydrocarbons (EPH) by GC/FID, Rev. 2, 01/14/2013	Definitive	Groundwater and Soil/ NJ EPH	GC	N
09-3510 EPH	Separatory Funnel Extraction of Waters for the Determination of Extractable Petroleum Hydrocarbons (EPH), Rev.2, 01/16/2013	Definitive	Groundwater/ NJ EPH	Prep	N
09-EPH-ME	Microwave Extraction and Silica Gel Fractionation of Solids for the Analysis of Extractable Petroleum Hydrocarbons, Rev. 3, 01/22/2013	Definitive	Soil/NJ EPH	Prep	N

QAPP Worksheet #23b: Analytical SOP References Table (Accutest Laboratories)

Lab SOP #	Title, Revision Date, and/or Number	Definitive or Screening Data	Matrix/Analytical Group	Instrument/ Equipment Type	Modified for Project Work? Y/N
EMS8260B	Volatile Organics by SW8260B Rev 21 4/12/12	Definitive	Water/Soil/SW-846 8260B: Volatile Organic Compounds by Gas Chromatography/ Mass Spectroscopy	HP 5890/5973 HP 6890/5973 Agilent 6890/5973	No
EMS8270D	Semi-Volatile Organics by SW8270D Rev 3 1/24/11	Definitive	Water/SW-846 8270D: Semivolatile Organic Compounds by Gas Chromatography/ Mass Spectrometry	HP 5890/5972 HP 6890/5973 Agilent 6890/5975	No
EGC8081B	Pesticides Analysis by SW8081B Rev 5 10/26/10	Definitive	Water/SW-846 8081B: Organochlorine Pesticides by Gas Chromatography	HP 5890, 6890 Dual ECD	No
EMA227	Metals: ICP Emission Spec. SW846 6010C Rev 6 9/10/12	Definitive	Water/Soil/SW-846 6010C: Inductively Coupled Plasma-Atomic Emission Spectormetry	Thermo 6500 Solid State ICP	No
EMA215	Mercury Analysis In Aqueous Samples by SW7470A Rev 13 5/20/10	Definitive	Water/SW-846 7470A: Mercury in Liquid Waste (Manual Cold-Vapor Technique)	Leeman Hydra II AA Leeman Hydra AA	No
EMA228	Mercury Analysis In Solid Samples by SW7471B Rev 4 5/20/12	Definitive	Soil/SW-846 7471A: Mercury in Solid or Semi-Solid Waste (Manual Cold-Vapor Technique)	Leeman Hydra II AA Leeman Hydra AA	No

QAPP Worksheet #23b: Analytical SOP References Table (Accutest Laboratories)

Lab SOP #	Title, Revision Date, and/or Number	Definitive or Screening Data	Matrix/Analytical Group	Instrument/ Equipment Type	Modified for Project Work? Y/N
EGCDRO8015C	Diesel Range Organics by SW8015C Rev 2 11/3/11	Definitive	Water/SW-846 8015C: Total Petroleum Hydrocarbons – Diesel Range Organics	HP 6890 PID/FID	No
EGCGRO8015C	Gasoline Range Organics by SW8015C Rev 2 11/2/11	Definitive	Water/SW-846 8015C: Total Petroleum Hydrocarbons – Gasoline Range Organics	HP 6890 FID	No
EGN291-04	Hexavalent Chromium in Waters by Ion Chromatography Rev 4 9/27/11	Definitive	Groundwater/Hexavalent Chromium	IC	No
EGN 292-11	Hexavalent Chromium in Soils by Ion Chromatography Rev 11 5/8/2012	Definitive	Soil/Hexavalent Chromium	IC	No
EGCNJEPH-04	Extractable Petroleum Hydrocarbons Rev 4 11/27/12	Definitive	Groundwater/EPH	GC	No
EGCNJEPH-04	Extractable Petroleum Hydrocarbons Rev 4 11/27/12	Definitive	Soil/EPH	GC	No

QAPP Worksheet #24a: Analytical Instrument Calibration Table (ALS Environmental)

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference[1]
GC/MS	ICAL	Prior to sample analysis	RSD for RFs for CCCs<30% and 1. each target<15%z or 2. LR CC≥0.995 or 3. Non-LR r≥0.99 (6pt 2nd order; 7pt 3rd order)	Flagging not appropriate. Must correct problem - no samples analyzed until ICAL passes.	Analyst/Supervisor	VOC-8260
GC/MS	ICV	Immediately following ICAL	Project analytes within 20% of true value	Correct problem and verify second source standard. Rerun ICV. Repeat ICAL if reanalysis fails.	Analyst/Supervisor	VOC-8260
GC/MS	Tune	Prior to ICAL and at beginning of each 12 hour period	Specific Ion Criteria in SOP	Retune instrument and verify	Analyst/Supervisor	VOC-8260

QAPP Worksheet #24a: Analytical Instrument Calibration Table (ALS Environmental)

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference[1]
GC/MS	CCV	Prior to ICAL and at beginning of each 12 hour period	1. Minimum RFs as per SOP (Table 4 of method 8260C). 2. %Difference/Drift for target compounds and surrogates: ≤20%D. 3. EICP area within -50% to 100% of ICAL midpoint standard. 4. Internal standards must have retention time ± 30 seconds from retention time of the midpoint standard in the ICAL. Non-detect samples may be reported with a high-bias CCV.	Correct problem then rerun CCV. If that fails, then repeat ICAL. Reanalyze samples since last acceptable CCV. Results may not be reported without a valid CCV. Flagging is only appropriate in cases where the samples cannot be reanalyzed. DOD project manager must be notified PRIOR to reporting samples with an unacceptable CCV.	Analyst/Supervisor	VOC-8260
GC/MS	RRT	With each sample	RRT of each target analyte within 0.06 RRT units	Correct problem and rerun ICAL	Analyst/Supervisor	VOC-8260

QAPP Worksheet #24a: Analytical Instrument Calibration Table (ALS Environmental)

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference[1]
GC/MS	ICAL	Prior to sample analysis	RSD for RFs for CCCs<30% and 1. each target<15% or 2. LR CC≥0.995 or 3. Non-LR r≥0.99 (6pt 2nd order; 7pt 3rd order) RFs ≥ 0.050	Flagging not appropriate. Must correct problem - no samples analyzed until ICAL passes.	Analyst/Supervisor	SOC-8270
GC/MS	ICV	Immediately following ICAL	Project analytes within 20% of true value	Correct problem and verify second source standard. Rerun ICV. Repeat ICAL if reanalysis fails.	Analyst/Supervisor	SOC-8270
GC/MS	Tune	Prior to ICAL and at beginning of each 12 hour period	Specific Ion Criteria in SOP	Retune instrument and verify	Analyst/Supervisor	SOC-8270

QAPP Worksheet #24a: Analytical Instrument Calibration Table (ALS Environmental)

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference[1]
GC/MS	CCV	Prior to ICAL and at beginning of each 12 hour period	1. Minimum RFs as per SOP (Table 4 of method 8270D). 2. %Difference/Drift for target compounds and surrogates: ≤20%D. 3. EICP area within -50% to 100% of ICAL midpoint standard. 4. Internal standards must have retention time ± 30 seconds from retention time of the midpoint standard in the ICAL. Non-detect samples may be reported with a high-bias CCV.	Correct problem then rerun CCV. If that fails, then repeat ICAL. Reanalyze samples since last acceptable CCV. Results may not be reported without a valid CCV. Flagging is only appropriate in cases where the samples cannot be reanalyzed. DOD project manager must be notified PRIOR to reporting samples with an unacceptable CCV.	Analyst/Supervisor	SOC-8270

QAPP Worksheet #24a: Analytical Instrument Calibration Table (ALS Environmental)

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference[1]
GC/MS	Breakdown Check	At the beginning of each 12-hour period, prior to analysis of samples	Degradation ≤20% for DDT. Benzidine and pentachlorophenol should be present at their normal responses and should not exceed a tailing factor or 2.	Correct the problem and repeat breakdown check.	Analyst/Supervisor	SOC-8270
GC/MS	RRT	With each sample	RRT of each target analyte within 0.06 RRT units.	Correct problem and rerun ICAL.	Analyst/Supervisor	SOC-8270
GC/ECD	ICAL	Prior to sample analysis	RSD for each analyte <20% or CC≥0.995 or Non-LR r≥0.99 (6pt 2nd order; 7pt 3rd order)	Flagging not appropriate. Must correct problem - no samples analyzed until ICAL passes.	Analyst/Supervisor	SOC-8081
GC/ECD	ICV	Immediately following ICAL	Project analytes within 20% of true value.	Correct problem and verify second source standard. Rerun ICV. Repeat ICAL if reanalysis fails.	Analyst/Supervisor	SOC-8081

QAPP Worksheet #24a: Analytical Instrument Calibration Table (ALS Environmental)

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference[1]
GC/ECD	CCV	Prior to sample analysis, after every 10 field samples, and at the end of each analysis sequence	%Difference/Drift for target compounds and surrogates: ≤20%D. Non-detect samples may be reported with a high-bias CCV.	Analyst/Supervisor	SOC-8081	SOC-8081
GC/ECD	Breakdown Check	At the beginning of each 12-hour period, prior to analysis of samples	Degradation ≤15% for both DDT and Endrin	Correct problem then repeat breakdown check.	Analyst/ Supervisor	SOC-8081
Instrument	Calibration Procedure	Frequency	Acceptance Criteria	Corrective Action (CA)	Title/position responsible for Corrective Action	SOP Reference
ICP	ICAL	Each analytical sequence - 3 Standards and a Blank	cc ≥ 0.998	Recalibrate	Analyst/Supervisor	MET-200.7/6010C

QAPP Worksheet #24a: Analytical Instrument Calibration Table (ALS Environmental)

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference[1]
ICP	ICV	Once after each ICAL, prior to beginning a sample run	Analytes must agree within 10% of the expected value	Correct problem and verify second source standard. Rerun ICV. If that fails, correct problem and repeat ICAL.	Analyst/Supervisor	MET-200.7/6010C
ICP	CCV	Every 10 samples and at the end of the analytical sequence	Analytes must agree within 10% of the expected value	Correct problem, rerun CCV. If that fails, then repeat ICAL. Reanalyze samples since the last acceptable CCV.	Analyst/Supervisor	MET-200.7/6010C
ICP	High Level Check Standard	Daily	Analytes must agree within 10% of the expected value	Correct problem, reanalyze	Analyst/Supervisor	MET-200.7/6010C
ICP	MRL Standard	Beginning of daily run	80-120%	Correct problem, reanalyze	Analyst/Supervisor	MET-200.7/6010C

QAPP Worksheet #24a: Analytical Instrument Calibration Table (ALS Environmental)

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference[1]
ICP	Calibration Blank	Before beginning a sample run, after every 10 samples, and at the end of the analysis sequence	No analytes detected > LOQ	Correct problem. Re-prep and reanalyze calibration blank. Samples following the last acceptable calibration blank must be reanalyzed except samples <LOQ.	Analyst/Supervisor	MET-200.7/6010C
CVAA	ICAL	Each analytical sequence (5 standards)	Correlation coefficient of calibration curve ≥0.995	Correct problem, repeat ICAL	Analyst/Supervisor	MET-7470/245.1 and MET-7471/245.5
CVAA	ICV	Once after each ICAL, prior to beginning a sample run	Analytes must agree within 10% of the expected value	Correct problem and verify second source standard. Rerun ICV. If that fails, correct problem and repeat ICAL.	Analyst/Supervisor	MET-7470/245.1 and MET-7471/245.5
CVAA	CCV	Every 10 samples and at the end of the analytical sequence	Analyte must agree within 20% of the expected value	Correct problem, rerun CCV. If that fails, then repeat ICAL. Reanalyze samples since the last acceptable CCV.	Analyst/Supervisor	MET-7470/245.1 and MET-7471/245.5

QAPP Worksheet #24a: Analytical Instrument Calibration Table (ALS Environmental)

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference[1]
CVAA	Calibration Blank	Before beginning a sample run, after every 10 samples, and at the end of the analysis sequence	No analytes detected > LOQ	Correct problem. Re-prep and reanalyze calibration blank. Samples following the last acceptable calibration blank must be reanalyzed.	Analyst/Supervisor	MET-7470/245.1 and MET-7471/245.5
GC/FID	ICAL	Prior to sample analysis	RSD for each analyte <20% or CC≥0.995 or Non-LR r≥0.99 (6pt 2nd order; 7pt 3rd order)	Flagging not appropriate. Must correct problem - no samples analyzed until ICAL passes.	Analyst/Supervisor	VOC-8015GRO SOC-8015-DRO
GC/FID	ICV	Immediately following ICAL	Project analytes within 20% of true value.	Correct problem and verify second source standard. Rerun ICV. Repeat ICAL if reanalysis fails.	Analyst/Supervisor	VOC-8015GRO SOC-8015-DRO

QAPP Worksheet #24a: Analytical Instrument Calibration Table (ALS Environmental)

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference[1]
GC/FID	CCV	Prior to sample analysis, after every 10 field samples, and at the end of each analysis sequence	%Difference/Drift for target compounds and surrogates: ≤20%D Non-detect samples may be reported with a high-bias CCV	Correct problem then rerun CCV. If that fails, then repeat ICAL. Reanalyze samples since last acceptable CCV. Results may not be reported without a valid CCV. Flagging is only appropriate in cases where the samples cannot be reanalyzed. DOD project manager must be notified PRIOR to reporting samples with an unacceptable CCV.	Analyst/Supervisor	VOC-8015GRO SOC-8015-DRO
Cleveland Open Cup	Thermometer – see Worksheet 25					GEN-OCIGN

QAPP Worksheet #24a: Analytical Instrument Calibration Table (ALS Environmental)

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference[1]
Pensky Martens Closed Cup	Thermometer – see Worksheet 25					GEN-CCIGN
pH Meter	ICAL	Daily	Must pass ICV	Recalibrate	Analyst/Supervisor	GEN-9045C
pH Meter	ICV	Once after each ICAL, prior to beginning a sample run	pH 7 within 0.05 units of true value	Correct problem and repeat ICAL	Analyst/Supervisor	GEN-9045C
pH Meter	ICAL	Daily when range is needed	Must pass ICV	Recalibrate	Analyst/Supervisor	GEN-9045C
pH Meter	ICV	Once after each ICAL, prior to beginning a sample run	pH 10 within 0.05 units of true value	Correct problem and repeat ICAL	Analyst/Supervisor	GEN-9045C
pH Meter	ICAL	Daily when range is needed	Must pass ICV	Recalibrate	Analyst/Supervisor	GEN-9045C
pH Meter	ICV	Once after each ICAL, prior to beginning a sample run	pH 4 within 0.05 units of true value	Correct problem and repeat ICAL	Analyst/Supervisor	GEN-9045C

QAPP Worksheet #24a: Analytical Instrument Calibration Table (ALS Environmental)

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference[1]
pH Meter	CCV	Every 10 samples and at the end of the analytical sequence	Analytes must agree within 10% of the expected value.	Correct problem, rerun CCV. If that fails, then repeat ICAL. Reanalyze samples since the last acceptable CCV.	Analyst/Supervisor	GEN-9045C
IC/UVVIS	ICAL	Prior to sample analysis	CC > 0.999	Correct problem then repeat ICAL	Analyst/Supervisor	GEN-7199
IC/UVVIS	ICV	After each ICAL	90-110% Recovery	Correct problem and verify second source standard. Rerun ICV. If that fails, correct problem and repeat ICAL.	Analyst/Supervisor	GEN-7199
IC/UVVIS	CCV		90-110% Recovery	Correct problem, rerun CCV. If that fails, then repeat ICAL. Reanalyze samples since the last acceptable CCV.	Analyst/Supervisor	GEN-7199

QAPP Worksheet #24a: Analytical Instrument Calibration Table (ALS Environmental)

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference[1]
GC	ICAL	Prior to sample analysis	%RSD≤20%; if %RSD>20, use linear regression and r^2≥0.99	Correct problem then repeat ICAL	GC Analyst	1A-EPH
GC	ICV	After each ICAL	+/- 25 % for the total carbon ranges and +/- 30 % for individual compounds	Correct problem and verify second source standard. Rerun ICV. If that fails, correct problem and repeat ICAL.	GC Analyst	1A-EPH
GC	CCV	At the beginning of each 24 hour period, after every 20 samples, and at the end of each analytical sequence.	+/- 25 % for the total carbon ranges and +/- 30 % for individual compounds	Correct problem, rerun CCV. If that fails, then repeat ICAL. Reanalyze all samples since the last acceptable CCV. If reanalysis is not possible qualify samples accordingly.	GC Analyst	1A-EPH

[1] Refer to Worksheet #23 for a complete reference to relevant analytical SOPs.

QAPP Worksheet #24b: Analytical Instrument Calibration Table (Accutest Laboratories)

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference[1]
HP 5890/5970 HP 6890/5973 Agilent 6890/5975	Initial Multi point with verification Continuing Calibration Verification	As Required Daily	CCC < 30% RSD, SPCC meet min RF, target compounds ≤15% RSD, or Corr Coeff R ≥ 0.99 ≤ 20 % Diff, SPCC meet min RF	Instrument maintenance, standard, inspection, recalibration	Laboratory Analyst	EMS 8260B
HP 5890/5970 HP 6890/5973 Agilent 6890/5975	Initial Multi point with verification Continuing Calibration Verification	As Required Daily	Target compounds meet min RF and , ≤ 20% RSD, or Correlation Coefficient R ≥ 0.99 ≤ 20 % Diff, meet min RF	Instrument maintenance, standard, inspection, recalibration	Laboratory Analyst	EMS 8270D
HP 5890, 6890 Dual ECD	Initial Multi point with verification Continuing Calibration Verification	As Required Daily	≤ 20% RSD ≤ 20% Diff	Instrument maintenance, standard, inspection, recalibration	Laboratory Analyst	EGC 8081B
Thermo 6500 ICP	Initial Blank + 3 non zero std's ICV CCV	Daily Beginning of run, every 10 samples and end of run	Correlation Coefficient R ≥ 0.998 ≤ 10% Diff ≤ 10% Diff	Instrument maintenance, standard, inspection, recalibration	Laboratory Analyst	EMA227

QAPP Worksheet #24b: Analytical Instrument Calibration Table (Accutest Laboratories)

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference[1]
Leeman Hydra II AA Leeman Hydra AA	Initial Blank + 5 non zero std's ICV CCV	Daily Beginning of run Beginning of run, every 10 samples and end of run	Correlation Coefficient R ≥ 0.995 ≤ 10% Diff ≤ 20% Diff	Instrument maintenance, standard, inspection, recalibration	Laboratory Analyst	EMA215 EMA228
HP 6890 PID/FID	Initial Multi point with verification Continuing Calibration Verification	As Required Daily	≤ 20% RSD ≤ 20% Diff	Instrument maintenance, standard, inspection, recalibration	Laboratory Analyst	EGCDRO8015C
HP 6890 FID	Initial Multi point with verification Continuing Calibration Verification	As Required Daily	≤ 20% RSD ≤ 20% Diff	Instrument maintenance, standard, inspection, recalibration	Laboratory Analyst	EGCGRO8015C
IC/UVVIS	ICAL	Prior to sample analysis	CC > 0.999	Correct problem then repeat ICAL	Laboratory Analyst	EGN291-04 EGN292-11
	CCV	At the beginning of the analytical sequence; after each 10 field samples; at the end of the analytical sequence	90-110% Recovery	Correct problem, rerun CCV Reanalyze samples since the last acceptable CCV	Laboratory Analyst	

QAPP Worksheet #24b: Analytical Instrument Calibration Table (Accutest Laboratories)

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference[1]
GC/FID	Initial 5 Point Calibration (ICAL)	Prior to sample analysis	RSD $\leq$ 25%	Correct problem then repeat ICAL	Laboratory Analyst	EGCNJEPH-04
	Continuing Calibration (CCV)	Daily or every 20 samples, whichever is more frequent	Each Range $\leq$25% Each compound $\leq$30%	Rerun initial calibration, reanalyze samples associated with failing CCV	Laboratory Analyst	

[1] Specify the appropriate reference letter or number from the Analytical SOP References table (Worksheet #23).

QAPP Worksheet #25a: Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table (ALS Environmental)

Instrument / Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference[1]
GC/MS	Check pressure and gas supply daily. System Bake	N/A	Initial/ Continuing Calibration	Initial Startup	Same as Initial Calibration and Continuing Calibration Verification	Same as Initial Calibration and Continuing Calibration Verification	Analyst/ Supervisor	VOC-8260
	Clean Source		BFB Tune	As needed	Same as tune criteria	Same as tune criteria		
	Change in-line filters, septa, gold seal, injection port liner as needed, cut column as needed, change trap as needed.		Sequence QC		Same as Accuracy Criteria	Same as Accuracy Criteria		

QAPP Worksheet #25a: Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table (ALS Environmental)

Instrument / Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference[1]
GC/MS	Check pressure and gas supply daily	N/A	Initial/ Continuing Calibration	Initial Startup	Same as Initial Calibration and Continuing Calibration Verification	Same as Initial Calibration and Continuing Calibration Verification	Analyst/ Supervisor	SOC-8270
	Clean Source		DFTPP Tune	As needed	Same as tune criteria	Same as tune criteria		
	System baking		Sequence QC		Same as Accuracy Criteria	Same as Accuracy Criteria		
	Change glass insert/sleeve, o-rings, septa, injection port liner as needed, cut column as needed, clean autosampler syringe, change trap as needed.							

QAPP Worksheet #25a: Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table (ALS Environmental)

Instrument / Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference[1]
GC/ECD	Check pressure and gas supply daily. System Bake	N/A	Initial/ Continuing Calibration	Initial Startup	Same as Initial Calibration and Continuing Calibration Verification	Same as Initial Calibration and Continuing Calibration Verification	Analyst/ Supervisor	SOC-8081
	Change glass insert, single sleeve gooseneck injection port liner as needed, change septa, cut column as needed.		Sequence QC	As needed	Same as Accuracy Criteria	Same as Accuracy Criteria		
ICP-AES	Clean plasma torch; clean filters; clean spray and nebulizer chambers; replace pump tubing	N/A	Torch, filters, nebulizer chamber, pump, pump tubing	Perform as needed	Must meet initial and/or continuing calibration criteria	Repeat maintenance activity or remove from service	Analyst / Lab Area Supervisor	MET-200.7/6010C

QAPP Worksheet #25a: Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table (ALS Environmental)

Instrument / Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference[1]
CVAA	Clean or replace dehydrator tubing and sample mixing coil tubing; replace sample probe; replace pump tubing; clean optical cell.	N/A	Tubing, sample probe, optical cell	Perform as needed	Must meet initial and/or continuing calibration criteria	Repeat maintenance activity or remove from service	Analyst / Lab Area Supervisor	MET-7470A/245.1 MET-7471B/245.5
GC/FID	Check pressure and gas supply daily. System Bake	N/A	Initial/ Continuing Calibration	Initial Startup	Same as Initial Calibration and Continuing Calibration Verification	Same as Initial Calibration and Continuing Calibration Verification	Analyst/ Supervisor	VOC-8015GRO

QAPP Worksheet #25a: Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table (ALS Environmental)

Instrument / Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference[1]
	Change glass insert, single sleeve gooseneck injection port liner as needed, change septa, cut column as needed, change trap as needed.		Sequence QC	As needed	Same as Accuracy Criteria	Same as Accuracy Criteria		SOC-8015-DRO
Pensky Martens Closed Cup	Thermometer verification	N/A	Verify against a NIST traceable thermometer	Annually	Within 0.5 °C	Apply correction factor or replace thermometer	Analyst / Lab Area Supervisor	GEN-CCIGN
Cleveland Open Cup	Thermometer verification	N/A	Verify against a NIST traceable thermometer	Annually	Within 0.5 °C	Apply correction factor or replace thermometer	Analyst / Lab Area Supervisor	GEN-OCIGN
pH Meter	Clean electrode, membrane junction	N/A	Examine for scratches, deposits, clogs	Perform as needed	Must meet initial and/or continuing calibration criteria	Repeat maintenance activity or remove from service.	Analyst / Lab Area Supervisor	GEN-9040/SM4500H+B GEN-9045C

QAPP Worksheet #25a: Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table (ALS Environmental)

Instrument / Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference[1]
pH Meter	Replace filling solution	N/A	Filling solution	Weekly	Must meet initial and/or continuing calibration criteria	Repeat maintenance activity or remove from service	Analyst / Lab Area Supervisor	GEN-9040/SM4500H+B GEN-9045C
IC/UVVIS	Change column bed supports	NA	Change column bed supports	Monthly or as needed	Must meet initial and/or continuing calibration criteria	Repeat maintenance activity or remove from service	Analyst/ Supervisor	GEN-7199
IC/UVVIS	Clean column	NA	Clean column	Monthly or as needed	Must meet initial and/or continuing calibration criteria	Repeat maintenance activity or remove from service	Analyst/ Supervisor	GEN-7199
IC/UVVIS	Change column	NA	Change column	Every 6 months or as needed	Must meet initial and/or continuing calibration criteria	Repeat maintenance activity or remove from service	Analyst/ Supervisor	GEN-7199
IC/UVVIS	Change tubing	NA	Change tubing	Annually or as needed	Must meet initial and/or continuing calibration criteria	Repeat maintenance activity or remove from service	Analyst/ Supervisor	GEN-7199

QAPP Worksheet #25a: Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table (ALS Environmental)

Instrument / Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference[1]
GC	Check pressure and gas supply	EPH	Check pressure and gas supply	Daily	Refer to SOP 1A-EPH Appendix A	Replace gas tanks	GC Analyst	1A-EPH
GC	Clean Injection port	EPH	Initial Calibration, Initial Calibration Verification, Continuing Calibration Verification	As needed	Must meet initial and/or continuing calibration criteria	Repeat maintenance activity or remove from service	GC Analyst	1A-EPH
GC	Change septa	EPH	Initial Calibration, Initial Calibration Verification, Continuing Calibration Verification	As needed	Must meet initial and/or continuing calibration criteria	Repeat maintenance activity or remove from service	GC Analyst	1A-EPH
GC	Change column	EPH	Initial Calibration, Initial Calibration Verification, Continuing Calibration Verification	As needed	Must meet initial and/or continuing calibration criteria	Repeat maintenance activity or remove from service	GC Analyst	1A-EPH

[1] Refer to Worksheet #23 for a complete reference to relevant analytical SOPs.

QAPP Worksheet #25b: Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table (Accutest Laboratories)

Instrument / Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference[1]
HP 5890/5970 HP 6890/5973 Agilent 6890/5975	Bake Purge tube, trap, transfer line, clip column	N/A	Leak test, column and injection port inspection, source insulator integrity	Daily or as needed	Passing BFB and CCV, passing internal standards response	Perform maintenance, check standards, recalibrate	Laboratory Analyst	EMS 8260B
HP 5890/5970 HP 6890/5973 Agilent 6890/5975	Replace septa, clean injection port, clip replace column	N/A	Leak test, column and injection port inspection, source insulator integrity	Daily or as needed	Passing DFTPP and CCV, passing internal standards response	Perform maintenance, check standards, recalibrate	Laboratory Analyst	EMS 8270D
HP 5890, 6890 Dual ECD	Replace septa, clean injection port, clip replace column	N/A	Leak test, column and injection port inspection	Daily or as needed	Passing DDT and Endrin breakdown, passing CCV	Perform maintenance, check standards, recalibrate	Laboratory Analyst	EGC 8081B

QAPP Worksheet #25b: Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table (Accutest Laboratories)

Instrument / Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference[1]
Thermo 6500 ICP	Torch, nebulizer, spray chamber, autosampler, pump tubing maintenance	N/A	Check connections, flush lines, clean nebulizer	Daily or as needed	Passing calibration	Perform maintenance, check standards, recalibrate	Laboratory Analyst	EMA 207
Leeman Hydra II AA Leeman Hydra AA	Pump tubing, absorption cell and lens cleaning	N/A	Check connections, flush sample lines	Daily or as needed	Passing calibration	Perform maintenance, check standards, recalibrate	Laboratory Analyst	EMA 055 EMA 072
HP 6890 PID/FID	Replace septa, clean injection port, clip replace column Bake Purge tube, trap, transfer line, clip column	N/A	Leak test, column and injection port inspection	Daily or as needed	Passing CCV	Perform maintenance, check standards, recalibrate	Laboratory Analyst	EGCDRO8015C EGCNJEPH-04
IC/UVVIS	Clean column	Hexavalent Chromium	Clean column	As needed	Must meet initial and/or continuing calibration criteria	Repeat maintenance activity or remove from service	Laboratory Analyst	EGN291-04, EGN292-11

QAPP Worksheet #25b: Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table (Accutest Laboratories)

Instrument / Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference[1]
	Change column	Hexavalent Chromium	Change column	As needed	Must meet initial and/or continuing calibration criteria	Repeat maintenance activity or remove from service		
	Change in line filter	Hexavalent Chromium	Change in line filter	Every 100 injections	Must meet initial and/or continuing calibration criteria	Repeat maintenance activity or remove from service		
	Change pump seals	Hexavalent Chromium	Change pump seals	As needed, when leaking or pressure problems observed	Must meet initial and/or continuing calibration criteria	Repeat maintenance activity or remove from service		
	Change guard Column Frit	Hexavalent Chromium	Change guard Column Frit	Every 300 - 400 injections	Must meet initial and/or continuing calibration criteria	Repeat maintenance activity or remove from service		

[1] Specify the appropriate reference letter or number from the Analytical SOP References table (Worksheet #23).

QAPP Worksheet #26 & 27: Sample Handling, Custody, and Disposal

Sampling Organization: Parsons
Laboratory: ALS Environmental and Accutest Laboratories
Method of sample delivery (shipper/carrier): Federal Express or UPS
Number of days from reporting until sample disposal: 30 days, unless otherwise requested by the client

Activity	Organization and Title or Position of Person Responsible for the Activity	Standard Operating Procedure Reference
Sample labeling	Parsons	See Field Sampling Plan (FSP)
Chain-of-custody form completion	Parsons	See FSP
Packaging	Parsons	See FSP
Shipping coordination	Parsons Field Team Leader	See FSP
Sample receipt, inspection, & log-in	ALS Environmental and Accutest Laboratories	SMO-SPLDISr4 (ALS) and EMS002-32 (Accutest)
Sample custody and storage	ALS Environmental and Accutest Laboratories	SMO-SPLDISr4 (ALS) and ESM001-08 (Accutest)
Sample disposal	ALS Environmental and Accutest Laboratories	SMO-SPLDISr4 (ALS) and EHS004-03 (Accutest)

QAPP Worksheet #28.1a: Laboratory QC Samples Table (ALS Environmental)

Matrix: Water
Analytical Group: VOCs + 15 highest TICs
Analytical Method/SOP: SW 8260C/SOP VOC-8260

QC Sample	Number/Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
Method Blank	One per batch of up to 20 samples	Reprep and reanalyze the method blank and samples processed with the contaminated blank. If reanalysis cannot be performed, sample data associated with the failed MB must be qualified (B-flag) and explained in the case narrative	Analyst / Supervisor	Accuracy/Sensitivity	No analytes detected > ½ LOQ, 1/10 the amount measured in any sample, or 1/10 the regulatory limit, whichever is greater. For common laboratory contaminants, no analytes detected > LOQ. Samples < LOD may be reported with failed MB
LCS containing target analytes	One per batch of up to 20 samples	Correct problem, reprep and reanalyze LCS and samples in associated batch for failed analytes. If reanalysis cannot be performed, sample data associated with the failed LCS must be qualified (Q-flag) and explained in the case narrative	Analyst / Supervisor	Accuracy/Bias	QC acceptance criteria specified in Table 15. Samples <LOD may be reported with an LCS greater than its high recovery limit

QAPP Worksheet #28.1a: Laboratory QC Samples Table (ALS Environmental)

Matrix: Water
Analytical Group: VOCs + 15 highest TICs
Analytical Method/SOP: SW 8260C/SOP VOC-8260

QC Sample	Number/Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
Surrogate spike	Field and QC samples	Correct problem then reprep and reanalyze failed samples for failed surrogates in the associated preparatory batch, if sufficient sample material is available. If obvious chromatographic interference with surrogate is present, or historical results verify interference, reanalysis may not be necessary. If surrogates are diluted more than 10 times, report with flag	Analyst / Supervisor	Accuracy/Bias	See worksheet 15.1a.
Matrix Spike/Matrix Spike Duplicate, spiking solution shall contain target analytes	One pair per 12-hour window or 20-sample batch, whichever is more frequent	Recovery - assume matrix interference if LCS is acceptable. Apply J-Flag to parent sample	Analyst / Supervisor	Accuracy/Bias/Precision	Recovery QC Acceptance Criteria same as LCS. RPD ≤30% between MS and MSD

QAPP Worksheet #28.1a: Laboratory QC Samples Table (ALS Environmental)

Matrix: Water
Analytical Group: VOCs + 15 highest TICs
Analytical Method/SOP: SW 8260C/SOP VOC-8260

QC Sample	Number/Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
		RPD - Examine chromatogram for interferences. Examine sample for possible heterogeneity. J-Flag parent sample and narrate			
Internal Standards Verification	Every field sample, standard, and QC sample	Inspect mass spectrometer and GC for malfunctions. Reanalysis of samples analyzed while system was malfunctioning is mandatory. If corrective action fails in field samples, apply Q-flag to analytes associated with the non-compliant IS	Analyst / Supervisor	Accuracy/Bias	Retention time ± 30 seconds from retention time of the midpoint standard in the ICAL; EICP area within -50% to 100% of ICAL midpoint standard

QAPP Worksheet #28.1a: Laboratory QC Samples Table (ALS Environmental)

Matrix: Water
Analytical Group: Waste Characterization _TCLP RCRA VOCs
Analytical Method/SOP: SW 8260C/1311/ SOP VOC-8260/MET-TZHE

QC Sample	Number/Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
Method Blank	One per batch of up to 20 samples. Carried through leaching procedure, digestion, and analysis	Reprep and reanalyze the method blank and samples processed with the contaminated blank. If reanalysis cannot be performed, sample data associated with the failed MB must be qualified (B-flag) and explained in the case narrative	Analyst / Supervisor	Accuracy/Sensitivity	No analytes detected > ½ LOQ, 1/10 the amount measured in any sample, or 1/10 the regulatory limit, whichever is greater. For common laboratory contaminants, no analytes detected > LOQ. Samples < LOD may be reported with failed MB
LCS containing target analytes	One per batch of up to 20 samples. Does not undergo leaching procedure	Correct problem, reprep and reanalyze LCS and samples in associated batch for failed analytes. If reanalysis cannot	Analyst / Supervisor	Accuracy/Bias	QC acceptance criteria specified in Table 15. Samples <LOD may be reported with an LCS greater than its high recovery limit.

QAPP Worksheet #28.1a: Laboratory QC Samples Table (ALS Environmental)

Matrix: Water
Analytical Group: Waste Characterization _TCLP RCRA VOCs
Analytical Method/SOP: SW 8260C/1311/ SOP VOC-8260/MET-TZHE

QC Sample	Number/Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
		be performed, sample data associated with the failed LCS must be qualified (Q-flag) and explained in the case narrative			
Surrogate spike	Field and QC samples. Surrogate spiked at instrument	Correct problem then reprep and reanalyze failed samples for failed surrogates in the associated preparatory batch, if sufficient sample material is available. If obvious chromatographic interference with surrogate is present, or	Analyst / Supervisor	Accuracy/Bias	See worksheet 15.1a

QAPP Worksheet #28.1a: Laboratory QC Samples Table (ALS Environmental)

Matrix: Water
Analytical Group: Waste Characterization _TCLP RCRA VOCs
Analytical Method/SOP: SW 8260C/1311/ SOP VOC-8260/MET-TZHE

QC Sample	Number/Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
		historical results verify interference, reanalysis may not be necessary. If surrogates are diluted more than 10 times, report with flag			
Matrix Spike/Matrix Spike Duplicate	One pair per 12-hour window or 20-sample batch, whichever is more frequent. Does not undergo leaching procedure	Recovery - assume matrix interference if LCS is acceptable. Apply J-Flag to parent sample. RPD - Examine chromatogram for interferences. Examine sample for possible heterogeneity. J-Flag parent	Analyst / Supervisor	Accuracy/Bias/Precision	Recovery QC Acceptance Criteria same as LCS. RPD ≤30% between MS and MSD

QAPP Worksheet #28.1a: Laboratory QC Samples Table (ALS Environmental)

Matrix: Water
Analytical Group: Waste Characterization _TCLP RCRA VOCs
Analytical Method/SOP: SW 8260C/1311/ SOP VOC-8260/MET-TZHE

QC Sample	Number/Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
		sample and narrate			
Internal Standards Verification	Every field sample, standard, and QC sample	Inspect mass spectrometer and GC for malfunctions. Reanalysis of samples analyzed while system was malfunctioning is mandatory. If corrective action fails in field samples, apply Q-flag to analytes associated with the non-compliant IS	Analyst / Supervisor	Accuracy/Bias	Retention time ± 30 seconds from retention time of the midpoint standard in the ICAL; EICP area within -50% to 100% of ICAL midpoint standard

QAPP Worksheet #28.1a: Laboratory QC Samples Table (ALS Environmental)

Matrix: Water
Analytical Group: SVOCs
Analytical Method/SOP: SW 8270D/3510C/SOP SOC-8270/EXT-3510C

QC Sample	Number/Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
Method Blank	One per batch of up to 20 samples	Reprep and reanalyze the method blank and samples processed with the contaminated blank. If reanalysis cannot be performed, sample data associated with the failed MB must be qualified (B-flag) and explained in the case narrative	Analyst / Supervisor	Accuracy/Sensitivity	No analytes detected > ½ LOQ, 1/10 the amount measured in any sample, or 1/10 the regulatory limit, whichever is greater. For common laboratory contaminants, no analytes detected > LOQ. Samples < LOD may be reported with failed MB
LCS containing target analytes	One per batch of up to 20 samples	Correct problem, reprep and reanalyze LCS and samples in associated batch for failed analytes. If reanalysis cannot be performed, sample data associated with the failed LCS must be qualified (Q-flag) and explained in the case narrative	Analyst / Supervisor	Accuracy/Bias	QC acceptance criteria specified in Table 15. Samples <LOD may be reported with an LCS greater than its high recovery limit

QAPP Worksheet #28.1a: Laboratory QC Samples Table (ALS Environmental)

Matrix: Water
Analytical Group: SVOCs
Analytical Method/SOP: SW 8270D/3510C/SOP SOC-8270/EXT-3510C

QC Sample	Number/Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
Surrogate spike	Field and QC samples	Correct problem then reprep and reanalyze failed samples for failed surrogates in the associated preparatory batch, if sufficient sample material is available. If obvious chromatographic interference with surrogate is present, or historical results verify interference, reanalysis may not be necessary. If surrogates are diluted more than 10 times, report with flag	Analyst / Supervisor	Accuracy/Bias	See worksheet 15.1a
Matrix Spike/Matrix Spike Duplicate	One pair per 12-hour window or 20-sample batch, whichever is more frequent	Recovery - assume matrix interference if LCS is acceptable. Apply J-Flag to parent sample.	Analyst / Supervisor	Accuracy/Bias/ Precision	Recovery QC Acceptance Criteria same as LCS. RPD ≤30% between MS and MSD

QAPP Worksheet #28.1a: Laboratory QC Samples Table (ALS Environmental)

Matrix: Water
Analytical Group: SVOCs
Analytical Method/SOP: SW 8270D/3510C/SOP SOC-8270/EXT-3510C

QC Sample	Number/Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
		RPD - Examine chromatogram for interferences. Examine sample for possible heterogeneity. J-Flag parent sample and narrate			
Internal Standards Verification	Every field sample, standard, and QC sample	Inspect mass spectrometer and GC for malfunctions. Reanalysis of samples analyzed while system was malfunctioning is mandatory. If corrective action fails in field samples, apply Q-flag to analytes associated with the non-compliant IS	Analyst / Supervisor	Accuracy/Bias	Retention time ± 30 seconds from retention time of the midpoint standard in the ICAL; EICP area within -50% to 100% of ICAL midpoint standard

QAPP Worksheet #28.1a: Laboratory QC Samples Table (ALS Environmental)

Matrix: Water
Analytical Group: Pesticides
Analytical Method/SOP: SW 8081B/3510C/SOP SOC-8081/EXT-3510C

QC Sample	Number/Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
Method Blank	One per batch of up to 20 samples	Reprep and reanalyze the method blank and samples processed with the contaminated blank. If reanalysis cannot be performed, sample data associated with the failed MB must be qualified (B-flag) and explained in the case narrative	Analyst / Supervisor	Accuracy/Sensitivity	No analytes detected > ½ LOQ, 1/10 the amount measured in any sample, or 1/10 the regulatory limit, whichever is greater. Samples < LOD may be reported with failed MB
LCS containing target analytes	One per batch of up to 20 samples	Correct problem, reprep and reanalyze LCS and samples in associated batch for failed analytes. If reanalysis cannot be performed, sample data associated with the failed LCS must be qualified (Q-flag) and explained in the case narrative	Analyst / Supervisor	Accuracy/Bias	QC acceptance criteria specified in Table 15. Samples <LOD may be reported with an LCS greater than its high recovery limit

QAPP Worksheet #28.1a: Laboratory QC Samples Table (ALS Environmental)

Matrix: Water
Analytical Group: Pesticides
Analytical Method/SOP: SW 8081B/3510C/SOP SOC-8081/EXT-3510C

QC Sample	Number/Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
Surrogate spike	Field and QC samples	Correct problem then reprep and reanalyze failed samples for failed surrogates in the associated preparatory batch, if sufficient sample material is available. If obvious chromatographic interference with surrogate is present, or historical results verify interference, reanalysis may not be necessary. If surrogates are diluted more than 10 times, report with flag	Analyst / Supervisor	Accuracy/Bias	See worksheet 15.1a
Matrix Spike/Matrix Spike Duplicate	One pair per prep batch or 20 samples, whichever is more frequent	Recovery - assume matrix interference if LCS is acceptable. Apply J-Flag to parent sample.	Analyst / Supervisor	Accuracy/Bias/Precision	Recovery QC Acceptance Criteria same as LCS. RPD ≤30% between MS and MSD

QAPP Worksheet #28.1a: Laboratory QC Samples Table (ALS Environmental)

Matrix: Water
Analytical Group: Pesticides
Analytical Method/SOP: SW 8081B/3510C/SOP SOC-8081/EXT-3510C

QC Sample	Number/Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
		RPD - Examine chromatogram for interferences. Examine sample for possible heterogeneity. J-Flag parent sample and narrate			

QAPP Worksheet #28.1a: Laboratory QC Samples Table (ALS Environmental)

Matrix: Water
Analytical Group: Metals
Analytical Method/SOP: SW-846 6010C/SOP MET-200.7/6010C/MET-3010

QC Sample	Number/Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
Method Blank	One per batch of up to 20 samples	Reprep and reanalyze the method blank and samples processed with the contaminated blank. If reanalysis cannot be performed, sample data associated with the failed MB must be qualified (B-flag) and explained in the case narrative	Analyst / Supervisor	Accuracy/Sensitivity	No analytes detected > ½ LOQ, 1/10 the amount measured in any sample, or 1/10 the regulatory limit, whichever is greater. For common laboratory contaminants, no analytes detected > LOQ. Samples < LOD may be reported with failed MB
LCS containing target analytes	One per batch of up to 20 samples	Correct problem, reprep and reanalyze LCS and samples in associated batch for failed analytes. If reanalysis cannot be performed, sample data associated with the failed LCS must be qualified (Q-flag) and explained in the case narrative	Analyst / Supervisor	Accuracy/Bias	QC acceptance criteria specified in Table 15. Samples <LOD may be reported with an LCS greater than its high recovery limit

QAPP Worksheet #28.1a: Laboratory QC Samples Table (ALS Environmental)

Matrix: Water
Analytical Group: Metals
Analytical Method/SOP: SW-846 6010C/SOP MET-200.7/6010C/MET-3010

QC Sample	Number/Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
Serial Dilution	One is performed for each preparation batch with sample concentration(s) > 50x DL	Qualify the results	Analyst/ Supervisor	Accuracy/Bias	The five-fold dilution result must agree within ± 10% of the original sample result
Post Digestion Spike	One is performed when serial dilution fails or analyte concentration(s) in samples < 50x DL	Run associate sample in the preparatory batch by method of standard additions or qualify results	Analyst/ Supervisor	Accuracy/Precision	The result must agree within ± 25% of expected result
MS/MSD	One is performed for each batch of 20 samples	Examine results of LCS. If both the LCS and MS/MSD are unacceptable, re-prepare and analyze the associated samples and QC, otherwise J-Flag parent sample and narrate	Analyst/ Supervisor	Accuracy/Bias/Precision	Recovery acceptance criteria specified in Table 15. RPD ≤ 20 between MS and MSD

QAPP Worksheet #28.1a: Laboratory QC Samples Table (ALS Environmental)

Matrix: Water
Analytical Group: Waste Characterization _TCLP RCRA Metals
Analytical Method/SOP: SW 6010C/3010A/1311/ SOP MET-200.7/6010C/MET-3010A/MET-TCLP

QC Sample	Number/Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
Method Blank	One per batch of up to 20 samples, carried through leaching procedure, digestion, and analysis	Reprep and reanalyze the method blank and samples processed with the contaminated blank. If reanalysis cannot be performed, sample data associated with the failed MB must be qualified (B-flag) and explained in the case narrative	Analyst / Supervisor	Accuracy/Sensitivity	No analytes detected > ½ LOQ, 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. Samples < LOD may be reported with failed MB
LCS containing target analytes	One per batch of up to 20 samples. Does not undergo leaching procedure	Correct problem, reprep and reanalyze LCS and samples in associated batch for failed analytes. If reanalysis cannot be performed, sample data	Analyst / Supervisor	Accuracy/Bias	QC acceptance criteria specified in Table 15. Samples <LOD may be reported with an LCS greater than its high recovery limit

QAPP Worksheet #28.1a: Laboratory QC Samples Table (ALS Environmental)

Matrix: Water
Analytical Group: Waste Characterization _TCLP RCRA Metals
Analytical Method/SOP: SW 6010C/3010A/1311/ SOP MET-200.7/6010C/MET-3010A/MET-TCLP

QC Sample	Number/Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
		associated with the failed LCS must be qualified (Q-flag) and explained in the case narrative			
Serial Dilution	One is performed for each preparation batch with sample concentration(s) > 50x LOD	Qualify the results	Analyst/ Supervisor	Accuracy/Bias	The five-fold dilution result must agree within ± 10% of the original sample result
Post Digestion Spike	One is performed when serial dilution fails or analyte concentration(s) in samples < 50x LOD	Run associate sample in the preparatory batch by method of standard additions or qualify results	Analyst/ Supervisor	Accuracy/Precision	The result must agree within ± 25% of expected result
MS/MSD	One is performed for each batch of 20 samples. Spiked after leaching procedure and prior to	Examine results of LCS. If both the LCS and MS/MSD are unacceptable, re-prepare and analyze the	Analyst/ Supervisor	Accuracy/Bias/Precision	Recovery acceptance criteria specified in Table 15. RPD ≤ 20 between MS and MSD

QAPP Worksheet #28.1a: Laboratory QC Samples Table (ALS Environmental)

Matrix: Water
Analytical Group: Waste Characterization _TCLP RCRA Metals
Analytical Method/SOP: SW 6010C/3010A/1311/ SOP MET-200.7/6010C/MET-3010A/MET-TCLP

QC Sample	Number/Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
	preservation and digestion	associated samples and QC, otherwise J-Flag parent sample and narrate			

QAPP Worksheet #28.1a: Laboratory QC Samples Table (ALS Environmental)

Matrix: Water
Analytical Group: Metals (Mercury)
Analytical Method/SOP: SW-846 7470A/SOP MET-7470A/245.1

QC Sample	Number/Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
Method Blank	One per batch of up to 20 samples	Reprep and reanalyze the method blank and samples processed with the contaminated blank. If reanalysis cannot be performed, sample data associated with the failed MB must be qualified (B-flag) and explained in the case narrative	Analyst / Supervisor	Accuracy/Sensitivity	No analytes detected > ½ LOQ, 1/10 the amount measured in any sample, or 1/10 the regulatory limit, whichever is greater. Samples < LOD may be reported with failed MB
LCS containing target analytes	One per batch of up to 20 samples	Correct problem, reprep and reanalyze LCS and samples in associated batch for failed analytes. If reanalysis cannot be performed, sample data associated with the failed LCS must be qualified (Q-flag)	Analyst / Supervisor	Accuracy/Bias	QC acceptance criteria specified in Table 15. Samples <LOD may be reported with an LCS greater than its high recovery limit

QAPP Worksheet #28.1a: Laboratory QC Samples Table (ALS Environmental)

Matrix: Water
Analytical Group: Metals (Mercury)
Analytical Method/SOP: SW-846 7470A/SOP MET-7470A/245.1

QC Sample	Number/Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
		and explained in the case narrative			
MS/MSD	One is performed for each batch of 20 samples	Examine results of LCS. If both the LCS and MS/MSD are unacceptable, re-prepare and analyze the associated samples and QC, otherwise J-Flag parent sample and narrate	Analyst/ Supervisor	Accuracy/Bias/Precision	Recovery acceptance criteria specified in Table 15. RPD ≤ 20 between MS and MSD

QAPP Worksheet #28.1a: Laboratory QC Samples Table (ALS Environmental)

Matrix: Water
Analytical Group: Waste Characterization _TCLP RCRA Metals (Mercury)
Analytical Method/SOP: SW-846 7470A/1311/SOP MET-7470A/245.1/MET-TCLP

QC Sample	Number/Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
Method Blank	One per batch of up to 20 samples, carried through leaching procedure, digestion, and analysis	Reprep and reanalyze the method blank and samples processed with the contaminated blank. If reanalysis cannot be performed, sample data associated with the failed MB must be qualified (B-flag) and explained in the case narrative	Analyst / Supervisor	Accuracy/Sensitivity	No analytes detected > ½ LOQ, 1/10 the amount measured in any sample, or 1/10 the regulatory limit, whichever is greater. Samples < LOD may be reported with failed MB
LCS containing target analytes	One per batch of up to 20 samples. Does not undergo leaching procedure	Correct problem, reprep and reanalyze LCS and samples in associated batch for failed analytes. If reanalysis cannot be performed, sample data associated with the failed LCS must be qualified (Q-flag) and explained in the case narrative	Analyst / Supervisor	Accuracy/Bias	QC acceptance criteria specified in Table 15. Samples <LOD may be reported with an LCS greater than its high recovery limit

QAPP Worksheet #28.1a: Laboratory QC Samples Table (ALS Environmental)

Matrix: Water
Analytical Group: Waste Characterization _TCLP RCRA Metals (Mercury)
Analytical Method/SOP: SW-846 7470A/1311/SOP MET-7470A/245.1/MET-TCLP

QC Sample	Number/Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
MS/MSD	One is performed for each batch of 20 samples, spiked after leaching procedure and prior to preservation and digestion	Examine results of LCS. If both the LCS and MS/MSD are unacceptable, re-prepare and analyze the associated samples and QC, otherwise J-Flag parent sample and narrate	Analyst/ Laboratory Area Supervisor	Accuracy/Bias/Precision	Recovery acceptance criteria specified in Table 15. RPD ≤ 20 between MS and MSD

QAPP Worksheet #28.1a: Laboratory QC Samples Table (ALS Environmental)

Matrix: Water
Analytical Group: Total Petroleum Hydrocarbons
Analytical Method/SOP: SW 8015C/SOP VOC-8015GRO

QC Sample	Number/Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
Method Blank	One per batch of up to 20 samples	Reprep and reanalyze the method blank and samples processed with the contaminated blank. If reanalysis cannot be performed, sample data associated with the failed MB must be qualified (B-flag) and explained in the case narrative	Analyst / Supervisor	Accuracy/Sensitivity	Total GRO not detected ½ >LOQ, 1/10 the amount measured in any sample, or 1/10 the regulatory limit, whichever is greater. Samples < LOD may be reported with failed MB
LCS containing target analytes	One per batch of up to 20 samples	Correct problem, reprep and reanalyze LCS and samples in associated batch for failed analytes. If reanalysis cannot be performed, sample data associated with the failed LCS must be qualified (Q-flag) and explained in the case narrative	Analyst / Supervisor	Accuracy/Bias	QC acceptance criteria specified in Table 15. Samples <LOD may be reported with an LCS greater than its high recovery limit

QAPP Worksheet #28.1a: Laboratory QC Samples Table (ALS Environmental)

Matrix: Water
Analytical Group: Total Petroleum Hydrocarbons
Analytical Method/SOP: SW 8015C/SOP VOC-8015GRO

QC Sample	Number/Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
Surrogate spike	Field and QC samples	Correct problem then reprep and reanalyze failed samples for failed surrogates in the associated preparatory batch, if sufficient sample material is available. If obvious chromatographic interference with surrogate is present, or historical results verify interference, reanalysis may not be necessary. If surrogates are diluted more than 10 times, report with flag	Analyst / Supervisor	Accuracy/Bias	See worksheet 15.1a
Matrix Spike/Matrix Spike Duplicate	One pair per prep batch or 20 samples, whichever is more frequent	Recovery - assume matrix interference if LCS is acceptable. Apply J-Flag to parent sample.	Analyst / Supervisor	Accuracy/Bias/Precision	Recovery QC Acceptance Criteria same as LCS. RPD ≤30% between MS and MSD

QAPP Worksheet #28.1a: Laboratory QC Samples Table (ALS Environmental)

Matrix: Water
Analytical Group: Total Petroleum Hydrocarbons
Analytical Method/SOP: SW 8015C/SOP VOC-8015GRO

QC Sample	Number/Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
		RPD - Examine chromatogram for interferences. Examine sample for possible heterogeneity. J-Flag parent sample and narrate			

QAPP Worksheet #28.1a: Laboratory QC Samples Table (ALS Environmental)

Matrix: Water
Analytical Group: Total Petroleum Hydrocarbons
Analytical Method/SOP: SW-846 8015C/3510C/SOP SOC-8015-DRO/EXT-3510C

QC Sample	Number/Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
Method Blank	One per batch of up to 20 samples	Reprep and reanalyze the method blank and samples processed with the contaminated blank. If reanalysis cannot be performed, sample data associated with the failed MB must be qualified (B-flag) and explained in the case narrative		Accuracy/Sensitivity	Total DRO not detected ½ >LOQ, 1/10 the amount measured in any sample, or 1/10 the regulatory limit, whichever is greater. Samples < LOD may be reported with failed MB
LCS containing target analytes	One per batch of up to 20 samples	Correct problem, reprep and reanalyze LCS and samples in associated batch for failed analytes. If reanalysis cannot be performed, sample data associated with the failed LCS must be qualified (Q-flag)	Analyst / Supervisor	Accuracy/Bias	QC acceptance criteria specified in Table 15. Samples <LOD may be reported with an LCS greater than its high recovery limit

QAPP Worksheet #28.1a: Laboratory QC Samples Table (ALS Environmental)

Matrix: Water
Analytical Group: Total Petroleum Hydrocarbons
Analytical Method/SOP: SW-846 8015C/3510C/SOP SOC-8015-DRO/EXT-3510C

QC Sample	Number/Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
		and explained in the case narrative.			
Surrogate spike	Field and QC samples	Correct problem then reprep and reanalyze failed samples for failed surrogates in the associated preparatory batch, if sufficient sample material is available. If obvious chromatographic interference with surrogate is present, or historical results verify interference, reanalysis may not be necessary. If surrogates are diluted more than 10 times, report with flag	Analyst / Supervisor	Accuracy/Bias	See worksheet 15.1a

QAPP Worksheet #28.1a: Laboratory QC Samples Table (ALS Environmental)

Matrix: Water
Analytical Group: Total Petroleum Hydrocarbons
Analytical Method/SOP: SW-846 8015C/3510C/SOP SOC-8015-DRO/EXT-3510C

QC Sample	Number/Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
Matrix Spike/Matrix Spike Duplicate	One pair per prep batch or 20 samples, whichever is more frequent	Recovery - assume matrix interference if LCS is acceptable. Apply J-Flag to parent sample. RPD - Examine chromatogram for interferences. Examine sample for possible heterogeneity. J-Flag parent sample and narrate	Analyst / Supervisor	Accuracy/Bias/Precision	Recovery QC Acceptance Criteria same as LCS. RPD ≤30% between MS and MSD

QAPP Worksheet #28.1a: Laboratory QC Samples Table (ALS Environmental)

Matrix: Water
Analytical Group: Ignitability
Analytical Method/SOP: SW 1010A/SOP GEN-CCIGN

QC Sample	Number/Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
LCS/LCSD	Daily	Correct problem, reprep and reanalyze LCS and samples in associated batch for failed analytes. If reanalysis cannot be performed, sample data associated with the failed LCS must be qualified (Q-flag) and explained in the case narrative	Analyst / Supervisor	Accuracy/Bias	p-xylene flash within 24.5-29.9 °C
Sample Duplicate	One for every 10 samples or daily, whichever is more frequent	Repeat sample and duplicate if possible	Analyst / Supervisor	Precision	RPD ≤ 10

QAPP Worksheet #28.1a: Laboratory QC Samples Table (ALS Environmental)

Matrix: Water
Analytical Group: Corrosivity
Analytical Method/SOP: SW 9040C/SOP GEN-9040C/SM4500H+B

QC Sample	Number/Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
Duplicate	One is performed for each batch of 20 samples	If unacceptable, re-prepare and reanalyze, otherwise J-flag parent sample and narrate	Analyst/ Supervisor	Precision	Results between Parent Sample and Duplicate within 0.3 pH unit

QAPP Worksheet #28.1a: Laboratory QC Samples Table (ALS Environmental)

Matrix: Groundwater
Analytical Group: Hexavalent Chromium
Analytical Method/SOP: SW-846 7199

QC Sample	Number/Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
Method Blank	One is performed for each batch of 20 samples	Reclean, reanalyze and/or qualify the data	Analyst/Supervisor	Bias/Contamination	No target compounds should be >1/2 LOQ
MS	One is performed for each batch of 20 samples	If LCS acceptable, may report with qualifier and note outliers in the case narrative	Analyst/Supervisor	Accuracy/Bias	70-130% of True Value
LCS	One is performed for each batch of 20 samples	Evaluate, reanalyze batch if possible. If the LCS recoveries are high and the sample results are <LOQ narrate	Analyst/Supervisor	Accuracy/Bias	70-130% of True Value
DUP (or MSD)	One is performed for each batch of 20 samples	Repeat sample and duplicate unless obvious or historical interferences or lack of volume	Analyst/Supervisor	Precision	RPD<20%; +/- LOQ if results are <4x LOQ

QAPP Worksheet #28.1a: Laboratory QC Samples Table (ALS Environmental)

Matrix: Groundwater
Analytical Group: NJ EPH
Analytical Method/SOP: NJ EPH/ 1A-EPH

QC Sample	Number/ Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	
Method Blank	1 per batch of 20 or fewer samples	Reclean, reanalyze and/or qualify the data	GC Analyst	Bias/Contamination	
LCS	1 per batch of 20 or fewer samples	Evaluate, reanalyze batch if possible. If the LCS recoveries are high and the sample results are <QL narrate.	GC Analyst	Accuracy/Bias	
MS	1 per batch of 20 or fewer samples	If LCS acceptable, may report with qualifier and note outliers in the case narrative	GC Analyst	Accuracy/ Bias	
DUP(or MSD)	1 per batch of 20 or fewer samples	Repeat sample and duplicate unless obvious or historical interferences or lack of volume. Qualify result accordingly.	GC Analyst	Precision	
Surrogates (o-terphenyl and 1-chlorooctadecane)	Surrogate compounds added to every sample	Re-extract and re-analyze if possible. If not possible qualify accordingly.	GC Analyst	Accuracy/Bias	

QAPP Worksheet #28.1b: Laboratory QC Samples Table (Accutest Laboratories)

Matrix: **Aqueous**
Analytical Group: **Volatile Organics**
Concentration Level: **Low**
Sampling SOP: **SW846 8260B/ EMS8260B-21**

QC Sample:	Frequency/Number	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank	Each batch not to exceed 20 samples	Reanalyze entire batch	Assigned Lab Analyst	Accuracy/ Sensitivity	Less than 1/2 of LOQ and less than LOQ for lab common contanminants
LCS	Each batch not to exceed 20 samples	Reanalyze entire batch	Assigned Lab Analyst	Accuracy/Bias	See worksheet 15.1b.
MS	1 per 20 samples	Investigate possible matrix effect. Record in case narrative.	Assigned Lab Analyst	Accuracy/Bias	See worksheet 15.1b.
MSD	1 per 20 samples	Investigate possible matrix effect. Record in case narrative	Assigned Lab Analyst	Precision	See worksheet 15.1b.
Surrogate	Every sample and QC	Reextract and reanalyze sample	Assigned Lab Analyst	Accuracy/Bias	See worksheet 15.1b.
Internal Standard	Every sample and QC	Reanalyze sample	Assigned Lab Analyst	Accuracy/Bias	-50 - + 200% of the mid-point of ICAL standards

QAPP Worksheet #28.1b: Laboratory QC Samples Table (Accutest Laboratories)

Matrix: **Aqueous**
Analytical Group: **Semivolatile Organics**
Concentration Level: **Low**
Sampling SOP: **SW846 8270D/ EMS8270D-03**

QC Sample:	Frequency/Number	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank	Each batch not to exceed 20 samples	Reextract and reanalyze entire batch	Assigned Lab Analyst	Accuracy/ Sensitivity	Less than1/2 of LOQ and less than LOQ for lab common contanminants
LCS	Each batch not to exceed 20 samples	Reextract and reanalyze entire batch	Assigned Lab Analyst	Accuracy/Bias	See worksheet 15.1b.
MS	1 per 20 samples	Investigate possible matrix effect. Record in case narrative.	Assigned Lab Analyst	Accuracy/Bias	See worksheet 15.1b.
MSD	1 per 20 samples	Investigate possible matrix effect. Record in case narrative	Assigned Lab Analyst	Precision	See worksheet 15.1b.
Surrogate	Every sample and QC	Reextract and reanalyze sample	Assigned Lab Analyst	Accuracy/Bias	See worksheet 15.1b.
Internal Standard	Every sample and QC	Reanalyze sample	Assigned Lab Analyst	Accuracy/Bias	-50 - + 200% of the mid-point of ICAL standards

QAPP Worksheet #28.1b: Laboratory QC Samples Table (Accutest Laboratories)

Matrix: **Aqueous**
Analytical Group: **Pesticides**
Concentration Level: **Low**
Sampling SOP: **SW846 8081B/ EGC8081B-05**

QC Sample:	Frequency/Number	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank	Each batch not to exceed 20 samples	Reextract and reanalyze entire batch	Assigned Lab Analyst	Accuracy/ Sensitivity	Less than 1/2 of LOQ
LCS	Each batch not to exceed 20 samples	Reextract and reanalyze entire batch	Assigned Lab Analyst	Accuracy/Bias	See worksheet 15.1b.
MS	1 per 20 samples	Investigate possible matrix effect. Record in case narrative.	Assigned Lab Analyst	Accuracy/Bias	See worksheet 15.1b.
MSD	1 per 20 samples	Investigate possible matrix effect. Record in case narrative	Assigned Lab Analyst	Precision	See worksheet 15.1b.
Surrogate	Every sample and QC	Reextract and reanalyze sample	Assigned Lab Analyst	Accuracy/Bias	See worksheet 15.1b.
Internal Standard	Every sample and QC	Reanalyze sample	Assigned Lab Analyst	Accuracy/Bias	-50 - + 200% of the mid-point of ICAL standards

QAPP Worksheet #28.1b: Laboratory QC Samples Table (Accutest Laboratories)

Matrix: **Aqueous**
Analytical Group: **TPH DRO**
Concentration Level: **Low**
Sampling SOP: **SW846 8015C/ EGCDRO8015C-02**

QC Sample:	Frequency/Number	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank	Each batch not to exceed 20 samples	Reextract and reanalyze entire batch	Assigned Lab Analyst	Accuracy/ Sensitivity	Less than 1/2 LOQ
LCS	Each batch not to exceed 20 samples	Reextract and reanalyze entire batch	Assigned Lab Analyst	Accuracy/Bias	See worksheet 15.1b
MS	1 per 20 samples	Investigate possible matrix effect. Record in case narrative.	Assigned Lab Analyst	Accuracy/Bias	See worksheet 15.1b
MSD	1 per 20 samples	Investigate possible matrix effect. Record in case narrative	Assigned Lab Analyst	Precision	See worksheet 15.1b
Surrogate	Every sample and QC	Reextract and reanalyze sample	Assigned Lab Analyst	Accuracy/Bias	See worksheet 15.1b.

QAPP Worksheet #28.1b: Laboratory QC Samples Table (Accutest Laboratories)

Matrix: **Water**
Analytical Group: **TPH GRO**
Concentration Level: **Low**
Sampling SOP: **SW846 8015C/ EGCGRO8015C-02**

QC Sample:	Frequency/Number	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank	Each batch not to exceed 20 samples	Reextract and reanalyze entire batch	Assigned Lab Analyst	Accuracy/ Sensitivity	Less than 1/2LOQ
LCS	Each batch not to exceed 20 samples	Reextract and reanalyze entire batch	Assigned Lab Analyst	Accuracy/Bias	See worksheet 15.1b.
MS	1 per 20 samples	Investigate possible matrix effect. Record in case narrative.	Assigned Lab Analyst	Accuracy/Bias	See worksheet 15.1b.
MSD	1 per 20 samples	Investigate possible matrix effect. Record in case narrative	Assigned Lab Analyst	Precision	See worksheet 15.1b.
Surrogate	Every sample and QC	Reextract and reanalyze sample	Assigned Lab Analyst	Accuracy/Bias	See worksheet 15.1b.

QAPP Worksheet #28.1b: Laboratory QC Samples Table (Accutest Laboratories)

Matrix: **Water**
Analytical Group: **TAL Metals**
Concentration Level: **Low**
Sampling SOP: **SW846 6010C**
EMA227-03

QC Sample:	Frequency/Number	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)
Method Blank	Each batch not to exceed 20 samples	Re-digest and reanalyze entire batch	Assigned Lab Analyst	Accuracy/ Sensitivity
LCS	Each batch not to exceed 20 samples	Redigest and reanalyze entire batch	Assigned Lab Analyst	Accuracy/Bias
MS	1 per 20 samples	Investigate possible matrix effect. Record in case narrative.	Assigned Lab Analyst	Accuracy/Bias
MSD or Sample Dup	1 per 20 samples	Investigate possible matrix effect. Record in case narrative	Assigned Lab Analyst	Precision
Serial dilution	One is performed for each preparation batch with sample concentration(s) > 50xLOD	Record in case narrative	Assigned Lab Analyst	Accuracy/Bias
Post Digestion Spike	One is performed when serial dilution fails or analyte concentration(s) in samples < 50x LOD	Run associate sample in the preparatory batch by method of standard additions or qualify parent result with "J".	Analyst/ Supervisor	Accuracy/Precision

QAPP Worksheet #28.1b: Laboratory QC Samples Table (Accutest Laboratories)

Matrix: **Water**
Analytical Group: **Mercury**
Concentration Level: **Low**
Sampling SOP: **SW846 7470A**
EMA215-13

QC Sample:	Frequency/Number	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)
Method Blank	Each batch not to exceed 20 samples	Re-digest and reanalyze entire batch	Assigned Lab Analyst	Accuracy/ Sensitivity
LCS	Each batch not to exceed 20 samples	Redigest and reanalyze entire batch	Assigned Lab Analyst	Accuracy/Bias
MS	1 per 20 samples	Investigate possible matrix effect. Record in case narrative.	Assigned Lab Analyst	Accuracy/Bias
MSD or Sample Dup	1 per 20 samples	Investigate possible matrix effect. Record in case narrative	Assigned Lab Analyst	Precision

QAPP Worksheet #28.1b: Laboratory QC Samples Table (Accutest Laboratories)

Matrix: **Water**
Analytical Group: **Hexavalent Chromium**
Concentration Level: **Low**
Sampling SOP: **SW846 7199**

QC Sample:	Frequency/Number	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)
Method Blank	1 per batch of 20 or fewer samples	Correct problem and restart analysis if hold time will not be exceeded, if reanalysis will be outside of hold time continue analysis, check with supervisor for further instructions	Assigned Lab Analyst	Bias/Contamination
MS	1 per batch of 20 or fewer samples	If LCS acceptable, may report with qualifier and note outliers in the case narrative	Assigned Lab Analyst	Accuracy/ Bias
LCS	1 per batch of 20 or fewer samples	Stop analysis, consult with supervisor for further instructions	Assigned Lab Analyst	Accuracy/ Bias
DUP (or MSD)	1 per batch of 20 or fewer samples	Report, note outliers in case narrative.	Assigned Lab Analyst	Precision

QAPP Worksheet #28.1b: Laboratory QC Samples Table (Accutest Laboratories)

Matrix: **Water**
Analytical Group: **Extractable Petroleum Hydrocarbons**
Concentration Level: **Low**
Sampling SOP: **SW846 7199**

QC Sample:	Frequency/Number	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)
Method Blank	1 per batch of 20 or fewer samples	Reextract/ reanalyze entire batch	Analyst	Bias/Contamination
MS	1 per batch of 20 or fewer samples	If LCS acceptable, may report with qualifier and note outliers in the case narrative	Analyst	Accuracy/ Bias
LCS	1 per batch of 20 or fewer samples	Reextract/ reanalyze entire batch	Analyst	Accuracy/Bias
LCSD	1 per batch of 20 or fewer samples	Reextract/ reanalyze entire batch	Analyst	Accuracy/Bias
DUP (or MSD)	1 per batch of 20 or fewer samples	May report with qualifier and note outliers in the case narrative	Analyst	Precision
Surogate	Every sample/QC sample	Reextract/ reanalyze sample	Analyst	Accuracy/Bias

QAPP Worksheet #28.2a: Laboratory QC Samples Table (ALS Environmental)

Matrix: Soil
Analytical Group: VOCs + 15 highest TICs
Analytical Method/SOP: SW 8260C/5035/ SOP VOC-8260C/VOC-5035

QC Sample	Number/Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
Method Blank	One per batch of up to 20 samples	Reprep and reanalyze the method blank and samples processed with the contaminated blank. If reanalysis cannot be performed, sample data associated with the failed MB must be qualified (B-flag) and explained in the case narrative	Analyst / Supervisor	Accuracy/Sensitivity	No analytes detected > ½LOQ, 1/10 the amount measured in any sample, or 1/10 the regulatory limit, whichever is greater. For common laboratory contaminants, no analytes detected > LOQ. Samples < LOD may be reported with failed MB
LCS containing target analytes	One per batch of up to 20 samples	Correct problem, reprep and reanalyze LCS and samples in associated batch for failed analytes. If reanalysis cannot be performed, sample data associated with the failed LCS must be qualified (Q-flag) and explained in the case narrative	Analyst / Supervisor	Accuracy/Bias	QC acceptance criteria specified in Table 15. Samples <LOD may be reported with an LCS greater than its high recovery limit
Surrogate spike	Field and QC samples	Correct problem then reprep and reanalyze	Analyst / Supervisor	Accuracy/Bias	See worksheet 15.2a

QAPP Worksheet #28.2a: Laboratory QC Samples Table (ALS Environmental)

Matrix: Soil
Analytical Group: VOCs + 15 highest TICs
Analytical Method/SOP: SW 8260C/5035/ SOP VOC-8260C/VOC-5035

QC Sample	Number/Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
		failed samples for failed surrogates in the associated preparatory batch, if sufficient sample material is available. If obvious chromatographic interference with surrogate is present, or historical results verify interference, reanalysis may not be necessary. If surrogates are diluted more than 10 times, report with flag			
Matrix Spike/Matrix Spike Duplicate, containing target analytes	One pair per 12-hour window or 20-sample batch, whichever is more frequent	Recovery - assume matrix interference if LCS is acceptable. Apply J-Flag to parent sample RPD - Examine chromatogram for interferences. Examine	Analyst / Supervisor	Accuracy/Bias/Precision	Recovery QC Acceptance Criteria same as LCS. RPD ≤30% between MS and MSD

QAPP Worksheet #28.2a: Laboratory QC Samples Table (ALS Environmental)

Matrix: Soil
Analytical Group: VOCs + 15 highest TICs
Analytical Method/SOP: SW 8260C/5035/ SOP VOC-8260C/VOC-5035

QC Sample	Number/Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
		sample for possible heterogeneity. J-Flag parent sample and narrate			
Internal Standards Verification	Every field sample, standard, and QC sample	Inspect mass spectrometer and GC for malfunctions. Reanalysis of samples analyzed while system was malfunctioning is mandatory. If corrective action fails in field samples, apply Q-flag to analytes associated with the non-compliant IS	Analyst / Supervisor	Accuracy/Bias	Retention time ± 30 seconds from retention time of the midpoint standard in the ICAL; EICP area within -50% to 100% of ICAL midpoint standard

QAPP Worksheet #28.2a: Laboratory QC Samples Table (ALS Environmental)

Matrix: Soil
Analytical Group: Waste Characterization _TCLP RCRA VOCs
Analytical Method/SOP: SW 8260C/1311/SOP VOC-8260/MET-TZHE

QC Sample	Number/Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
Method Blank	One per batch of up to 20 samples, carried through leaching procedure, digestion, and analysis	Reprep and reanalyze the method blank and samples processed with the contaminated blank. If reanalysis cannot be performed, sample data associated with the failed MB must be qualified (B-flag) and explained in the case narrative	Analyst / Supervisor	Accuracy/Sensitivity	No analytes detected > ½LOQ, 1/10 the amount measured in any sample, or 1/10 the regulatory limit, whichever is greater. For common laboratory contaminants, no analytes detected > LOQ. Samples < LOD may be reported with failed MB
LCS containing target analytes	One per batch of up to 20 samples. Does not undergo leaching procedur3	Correct problem, reprep and reanalyze LCS and samples in associated batch for failed analytes. If reanalysis cannot be performed, sample data associated with the failed LCS must be qualified (Q-flag) and explained in the case narrative	Analyst / Supervisor	Accuracy/Bias	QC acceptance criteria specified in Table 15. Samples <LOD may be reported with an LCS greater than its high recovery limit
Surrogate spike	Field and QC samples. Surrogate	Correct problem then reprep and reanalyze	Analyst / Supervisor	Accuracy/Bias	See worksheet 15.2a

QAPP Worksheet #28.2a: Laboratory QC Samples Table (ALS Environmental)

Matrix: Soil
Analytical Group: Waste Characterization _TCLP RCRA VOCs
Analytical Method/SOP: SW 8260C/1311/SOP VOC-8260/MET-TZHE

QC Sample	Number/Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
	spiked at instrument	failed samples for failed surrogates in the associated preparatory batch, if sufficient sample material is available. If obvious chromatographic interference with surrogate is present, or historical results verify interference, reanalysis may not be necessary. If surrogates are diluted more than 10 times, report with flag			
Matrix Spike/Matrix Spike Duplicate, containing target analytes	One pair per 12-hour window or 20-sample batch, whichever is more frequent. Does not undergo leaching procedure	Recovery - assume matrix interference if LCS is acceptable. Apply J-Flag to parent sample. RPD - Examine chromatogram for interferences. Examine	Analyst / Supervisor	Accuracy/Bias/Precision	Recovery QC Acceptance Criteria same as LCS. RPD ≤30% between MS and MSD

QAPP Worksheet #28.2a: Laboratory QC Samples Table (ALS Environmental)

Matrix: Soil
Analytical Group: Waste Characterization _TCLP RCRA VOCs
Analytical Method/SOP: SW 8260C/1311/SOP VOC-8260/MET-TZHE

QC Sample	Number/Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
		sample for possible heterogeneity. J-Flag parent sample and narrate			
Internal Standards Verification	Every field sample, standard, and QC sample	Inspect mass spectrometer and GC for malfunctions. Reanalysis of samples analyzed while system was malfunctioning is mandatory. If corrective action fails in field samples, apply Q-flag to analytes associated with the non-compliant IS	Analyst / Supervisor	Accuracy/Bias	Retention time ± 30 seconds from retention time of the midpoint standard in the ICAL; EICP area within -50% to 100% of ICAL midpoint standard

QAPP Worksheet #28.2a: Laboratory QC Samples Table (ALS Environmental)

Matrix: Soil
Analytical Group: Metals
Analytical Method/SOP: SW 6010C/3050B/ SOP MET-200.7/6010C/MET-3050B

QC Sample	Number/Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
Method Blank	One per batch of up to 20 samples	Reprep and reanalyze the method blank and samples processed with the contaminated blank. If reanalysis cannot be performed, sample data associated with the failed MB must be qualified (B-flag) and explained in the case narrative	Analyst / Supervisor	Accuracy/Sensitivity	No analytes detected > ½LOQ, 1/10 the amount measured in any sample, or 1/10 the regulatory limit, whichever is greater. For common laboratory contaminants, no analytes detected > LOQ. Samples < LOD may be reported with failed MB
LCS containing target analytes	One per batch of up to 20 samples	Correct problem, reprep and reanalyze LCS and samples in associated batch for failed analytes. If reanalysis cannot be performed, sample data associated with the failed LCS must be qualified (Q-flag) and explained in the case narrative	Analyst / Supervisor	Accuracy/Bias	QC acceptance criteria specified in Table 15. Samples <LOD may be reported with an LCS greater than its high recovery limit
Serial Dilution	One is performed for each preparation	Qualify the results.	Analyst/ Laboratory	Accuracy/Bias	The five-fold dilution result must agree within

QAPP Worksheet #28.2a: Laboratory QC Samples Table (ALS Environmental)

Matrix: Soil
Analytical Group: Metals
Analytical Method/SOP: SW 6010C/3050B/ SOP MET-200.7/6010C/MET-3050B

QC Sample	Number/Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
	batch with sample concentration(s) > 50x LOD		Area Supervisor		± 10% of the original sample result
Post Digestion Spike	One is performed when serial dilution fails or analyte concentration(s) in samples < 50x LOD	Run associate sample in the preparatory batch by method of standard additions or qualify results	Analyst/ Laboratory Area Supervisor	Accuracy/Bias	The result must agree within ± 25% of expected result
MS/MSD, containing target analytes	One is performed for each batch of 20 samples	Examine results of LCS. If both the LCS and MS/MSD are unacceptable, re-prepare and analyze the associated samples and QC, otherwise J-Flag parent sample and narrate	Analyst/ Laboratory Area Supervisor	Accuracy/Bias/Precision	Recovery acceptance criteria specified in Table 15. RPD ≤ 20 between MS and MSD

QAPP Worksheet #28.2a: Laboratory QC Samples Table (ALS Environmental)

Matrix: Soil
Analytical Group: Metals (Mercury)
Analytical Method/SOP: SW-846 7471B/SOP MET-7471B/245.5

QC Sample	Number/Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
Method Blank	One per batch of up to 20 samples	Reprep and reanalyze the method blank and samples processed with the contaminated blank. If reanalysis cannot be performed, sample data associated with the failed MB must be qualified (B-flag) and explained in the case narrative	Analyst / Supervisor	Accuracy/Sensitivity	No analytes detected > ½LOQ, 1/10 the amount measured in any sample, or 1/10 the regulatory limit, whichever is greater. Samples < LOD may be reported with failed MB
LCS containing target analytes	One per batch of up to 20 samples	Correct problem, reprep and reanalyze LCS and samples in associated batch for failed analytes. If reanalysis cannot be performed, sample data associated with the failed LCS must be qualified (Q-flag) and explained in the case narrative	Analyst / Supervisor	Accuracy/Bias	QC acceptance criteria specified in Table 15. Samples <LOD may be reported with an LCS greater than its high recovery limit
MS/MSD, containing target	One is performed for each batch of 20	Examine results of LCS. If both the LCS and	Analyst/	Accuracy/Bias/Precision	Recovery acceptance criteria specified in

QAPP Worksheet #28.2a: Laboratory QC Samples Table (ALS Environmental)

Matrix: Soil
Analytical Group: Metals (Mercury)
Analytical Method/SOP: SW-846 7471B/SOP MET-7471B/245.5

QC Sample	Number/Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
analytes	samples	MS/MSD are unacceptable, re-prepare and analyze the associated samples and QC, otherwise J-flag parent sample and narrate	Supervisor		Table 15. RPD ≤ 20 between MS and MSD

QAPP Worksheet #28.2a: Laboratory QC Samples Table (ALS Environmental)

Matrix: Soil
Analytical Group: Waste Characterization _TCLP RCRA Metals
Analytical Method/SOP: SW 6010C/1311/SOP MET-200.7/6010C/MET-TCLP

QC Sample	Number/Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
Method Blank	One per batch of up to 20 samples, carried through leaching procedure, digestion, and analysis	Reprep and reanalyze the method blank and samples processed with the contaminated blank. If reanalysis cannot be performed, sample data associated with the failed MB must be qualified (B-flag) and explained in the case narrative	Analyst / Supervisor	Accuracy/Sensitivity	No analytes detected > ½LOQ, 1/10 the amount measured in any sample, or 1/10 the regulatory limit, whichever is greater. For common laboratory contaminants, no analytes detected > LOQ. Samples < LOD may be reported with failed MB
LCS containing target analytes	One per batch of up to 20 samples. Does not undergo leaching procedure	Correct problem, reprep and reanalyze LCS and samples in associated batch for failed analytes. If reanalysis cannot be performed, sample data associated with the failed LCS must be qualified (Q-flag) and explained in the case narrative	Analyst / Supervisor	Accuracy/Bias	QC acceptance criteria specified in Table 15. Samples <LOD may be reported with an LCS greater than its high recovery limit
Serial Dilution	One is performed for each preparation	Qualify the results.	Analyst/ Laboratory	Accuracy/Bias	The five-fold dilution result must agree within

QAPP Worksheet #28.2a: Laboratory QC Samples Table (ALS Environmental)

Matrix: Soil
Analytical Group: Waste Characterization _TCLP RCRA Metals
Analytical Method/SOP: SW 6010C/1311/SOP MET-200.7/6010C/MET-TCLP

QC Sample	Number/Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
	batch with sample concentration(s) > 50x LOD		Area Supervisor		± 10% of the original sample result.
Post Digestion Spike	One is performed when serial dilution fails or analyte concentration(s) in samples < 50x LOD	Run associate sample in the preparatory batch by method of standard additions or qualify results	Analyst/ Laboratory Area Supervisor	Accuracy/Bias	The result must agree within ± 25% of expected result
MS/MSD, containing target analytes	One is performed for each batch of 20 samples. Spiked after leaching procedure and prior to preservation and digestion	Examine results of LCS. If both the LCS and MS/MSD are unacceptable, re-prepare and analyze the associated samples and QC, otherwise J-Flag parent sample and narrate	Analyst/ Laboratory Area Supervisor	Accuracy/Bias/Precision	Recovery acceptance criteria specified in Table 15. RPD ≤ 20 between MS and MSD

QAPP Worksheet #28.2a: Laboratory QC Samples Table (ALS Environmental)

Matrix: Soil
Analytical Group: Waste Characterization _TCLP RCRA Metals (Mercury)
Analytical Method/SOP: SW 7471B/1311/SOP MET-7471B/245.5/MET-TCLP

QC Sample	Number/Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
Method Blank	One per batch of up to 20 samples, carried through leaching procedure, digestion, and analysis	Reprep and reanalyze the method blank and samples processed with the contaminated blank. If reanalysis cannot be performed, sample data associated with the failed MB must be qualified (B-flag) and explained in the case narrative	Analyst / Supervisor	Accuracy/Sensitivity	No analytes detected > ½LOQ, 1/10 the amount measured in any sample, or 1/10 the regulatory limit, whichever is greater. Samples < LOD may be reported with failed MB
LCS containing target analytes	One per batch of up to 20 samples. Does not undergo leaching procedure	Correct problem, reprep and reanalyze LCS and samples in associated batch for failed analytes. If reanalysis cannot be performed, sample data associated with the failed LCS must be qualified (Q-flag) and explained in the case narrative	Analyst / Supervisor	Accuracy/Bias	QC acceptance criteria specified in Table 15. Samples <LOD may be reported with an LCS greater than its high recovery limit

QAPP Worksheet #28.2a: Laboratory QC Samples Table (ALS Environmental)

Matrix: Soil
Analytical Group: Waste Characterization _TCLP RCRA Metals (Mercury)
Analytical Method/SOP: SW 7471B/1311/SOP MET-7471B/245.5/MET-TCLP

QC Sample	Number/Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
MS/MSD, containing target analytes	One is performed for each batch of 20 samples. Spiked at digestion. Spiked after leaching procedure and prior to preservation and digestion	Examine results of LCS. If both the LCS and MS/MSD are unacceptable, re-prepare and analyze the associated samples and QC, otherwise J-Flag parent sample and narrate	Analyst/ Laboratory Area Supervisor	Accuracy/Bias/Precision	Recovery acceptance criteria specified in Table 15. RPD ≤ 20 between MS and MSD

QAPP Worksheet #28.2a: Laboratory QC Samples Table (ALS Environmental)

Matrix: Soil
Analytical Group: Ignitability
Analytical Method/SOP: SW 1010A Mod/SOP GEN-OCIGN

QC Sample	Number/Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
Sample Duplicate	One for every 10 samples or daily, whichever is more frequent	Repeat sample and duplicate if possible	Analyst / Supervisor	Precision	RPD ≤ 10

QAPP Worksheet #28.2a: Laboratory QC Samples Table (ALS Environmental)

Matrix: Soil
Analytical Group: Corrosivity
Analytical Method/SOP: SW 9045D/SOP GEN-9045C

QC Sample	Number/Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
Duplicate	One is performed for each batch of 20 samples	If unacceptable, re-prepare and reanalyze, otherwise J-Flag parent sample and narrate	Analyst/ Supervisor	Precision	Results between Parent Sample and Duplicate within 0.3 pH units

QAPP Worksheet #28.2a: Laboratory QC Samples Table (ALS Environmental)

Matrix: Soil
Analytical Group: Hexavalent Chromium
Analytical Method/SOP: SW-846 7199

QC Sample	Number/Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
Method Blank	One is performed for each batch of 20 samples	Reclean, reanalyze and/or qualify the data	Analyst/ Supervisor	Bias/Contamination	No target compounds should be >1/2 LOQ
MS-Soluble	One is performed for each batch of 20 samples	Redigest entire batch unless spike is diluted out (sample result > 4x spike concentration). If redigest fails, contact client about possible matrix investigations. If samples are out of holdig time, redigest and report both sets of data. If insufficient sample is available to redigest, flag. Flag results associated with out of control matrix spike	Analyst/ Supervisor	Accuracy/ Bias	75-125% of True Value
MS-Soluble	One is performed for each batch of 20 samples	Redigest entire batch unless spike is diluted out (sample result > 4x spike concentration). If redigest fails, contact	Analyst/ Supervisor	Accuracy/ Bias	75-125% of True Value

QAPP Worksheet #28.2a: Laboratory QC Samples Table (ALS Environmental)

Matrix: Soil
Analytical Group: Hexavalent Chromium
Analytical Method/SOP: SW-846 7199

QC Sample	Number/Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
		client about possible matrix investigations If samples are out of holdig time, redigest and report both sets of data. If insufficient sample is available to redigest, flag. Flag results associated with out of control matrix spike			
LCS-Insoluble	One is performed for each batch of 20 samples	Redigest if possible. If samples are out of holdig time, redigest and report both sets of data. If insufficient sample is available to redigest, flag. If the LCS recoveries are high and the sample results are <LOQ narrate	Analyst/ Supervisor	Accuracy/ Bias	82-120% of True Value

QAPP Worksheet #28.2a: Laboratory QC Samples Table (ALS Environmental)

Matrix: Soil
Analytical Group: Hexavalent Chromium
Analytical Method/SOP: SW-846 7199

QC Sample	Number/Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
DUP (or MSD)	One is performed for each batch of 20 samples	Repeat sample and duplicate unless obvious or historical interferences or lack of volume	Analyst/ Supervisor	Precision	RPD<20%; +/- RL if <4xLOQ
Post Digestion Matrix Spike	One is performed for each batch of 20 samples	If MS also failed, no action beyond CA for MS	Analyst/ Supervisor	Bias	85-115% of True Value

QAPP Worksheet #28.2a: Laboratory QC Samples Table (ALS Environmental)

Matrix: Soil
Analytical Group: EPH
Analytical Method/SOP: NJ EPH / 1A-EPH

QC Sample	Number/ Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
Method Blank	1 per batch of 20 or fewer samples	Reclean, reanalyze and/or qualify the data	GC Analyst	Bias/Contamination	No target compounds should be >1/2 QL
LCS	1 per batch of 20 or fewer samples	Evaluate, reanalyze batch if possible. If the LCS recoveries are high and the sample results are <QL narrate.	GC Analyst	Accuracy/Bias	40-140 % of true value for individual compounds[1]
MS	1 per batch of 20 or fewer samples	If LCS acceptable, may report with qualifier and note outliers in the case narrative	GC Analyst	Accuracy/ Bias	40-140 % of true value for individual compounds[1]
DUP(or MSD)	1 per batch of 20 or fewer samples	Repeat sample and duplicate unless obvious or historical interferences or lack of volume. Qualify result accordingly.	GC Analyst	Precision	RPD<40%; +/- RL if <4xLOQ

QAPP Worksheet #28.2a: Laboratory QC Samples Table (ALS Environmental)

Matrix: Soil
Analytical Group: EPH
Analytical Method/SOP: NJ EPH / 1A-EPH

QC Sample	Number/ Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
Surrogates (o-terphenyl, 1-chlorooctadecane, 2-bromonaphthalene, 2-fluorobiphenyl)	Surrogate compounds added to every sample	Re-extract and re-analyze if possible. If not possible qualify accordingly.	GC Analyst	Accuracy/Bias	40-140 % of true value

QAPP Worksheet #28.2b: Laboratory QC Samples Table (Accutest Laboratories)

Matrix: **Soil**
Analytical Group: **Volatile Organics**
Concentration Level: **Low**
Sampling SOP: **SW846 8260B**
EMS8260B-21

QC Sample:	Frequency/Number	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank	Each batch not to exceed 20 samples	Reanalyze entire batch	Assigned Lab Analyst	Accuracy/ Sensitivity	Less than ½ of LOQ or <LOQ for lab common contanminants
LCS	Each batch not to exceed 20 samples	Reanalyze entire batch	Assigned Lab Analyst	Accuracy/Bias	See worksheet 15.2b
MS	1 per 20 samples	Investigate possible matrix effect. Record in case narrative	Assigned Lab Analyst	Accuracy/Bias	See worksheet 15.2b
MSD	1 per 20 samples	Investigate possible matrix effect. Record in case narrative	Assigned Lab Analyst	Precision	See worksheet 15.2b
Surrogate	Every sample and QC	Reextract and reanalyze sample	Assigned Lab Analyst	Accuracy/Bias	See worksheet 15.2b
Internal Standard	Every sample and QC	Reanalyze sample	Assigned Lab Analyst	Accuracy/Bias	-50 - + 200% of the midpoint of the ICAL standard

QAPP Worksheet #28.2b: Laboratory QC Samples Table (Accutest Laboratories)

Matrix: **Soil**
Analytical Group: **TAL Metals**
Concentration Level: **Low**
Sampling SOP: **SW846 6010C**
EMA227-03

QC Sample:	Frequency/Number	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank	Each batch not to exceed 20 samples	Re-digest and reanalyze entire batch	Assigned Lab Analyst	Accuracy/ Sensitivity	Less than 1/2 LOQ or <LOQ for lab common contanminants
LCS	Each batch not to exceed 20 samples	Redigest and reanalyze entire batch	Assigned Lab Analyst	Accuracy/Bias	See worksheet 15.2b.
MS	1 per 20 samples	Investigate possible matrix effect. Record in case narrative	Assigned Lab Analyst	Accuracy/Bias	See worksheet 15.2b%
MSD or Sample Dup	1 per 20 samples	Investigate possible matrix effect. Record in case narrative	Assigned Lab Analyst	Precision	See worksheet 15.2b. RPD < 20% for duplicate values greater than or equal to 5 times the LOQ
Serial dilution	Only applicable for samples with concentrations > 50 x LOD.	Record in case narrative	Assigned Lab Analyst	Accuracy/Bias	Within 10% of the original measurement

QAPP Worksheet #28.2b: Laboratory QC Samples Table (Accutest Laboratories)

Matrix: **Soil**
Analytical Group: **Volatile Organics**
Concentration Level: **Low**
Sampling SOP: **SW846 8260B**
EMS8260B-21

QC Sample:	Frequency/Number	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Post Digestion Spike	When dilution test fails or analyte concentration in all samples < 50 x LOD	Flag the parent sample with "J".	Assigned Lab Analyst	Accuracy/Bias	Within 75 – 125%R

QAPP Worksheet #28.2b: Laboratory QC Samples Table (Accutest Laboratories)

Matrix: **Soil**
Analytical Group: **Mercury**
Concentration Level: **Low**
Sampling SOP: **SW846 7471B**
EMA228-04

QC Sample:	Frequency/Number	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank	Each batch not to exceed 20 samples	Re-digest and reanalyze entire batch	Assigned Lab Analyst	Accuracy/ Sensitivity	Less than 1/2 LOQ

QAPP Worksheet #28.2b: Laboratory QC Samples Table (Accutest Laboratories)

Matrix: **Soil**
Analytical Group: **Mercury**
Concentration Level: **Low**
Sampling SOP: **SW846 7471B**
EMA228-04

QC Sample:	Frequency/Number	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
LCS	Each batch not to exceed 20 samples	Redigest and reanalyze entire batch	Assigned Lab Analyst	Accuracy/Bias	See worksheet 15.2b
MS	1 per 20 samples	Investigate possible matrix effect. Record in case narrative	Assigned Lab Analyst	Accuracy/Bias	See worksheet 15.2b
MSD or Sample Dup	1 per 20 samples	Investigate possible matrix effect. Record in case narrative	Assigned Lab Analyst	Precision	See worksheet 15.2b; RPD < 20% for duplicate values greater than or equal to 5 times the LOQ

QAPP Worksheet #28.2b: Laboratory QC Samples Table (Accutest Laboratories)

Matrix: Soil
Analytical Group: Hexavalent Chromium
Analytical Method/SOP: SW-846 7199

QC Sample	Number/ Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
Method Blank	1 per batch of 20 or fewer samples	Correct problem and restart analysis if hold time will not be exceeded, if reanalysis will be outside of hold time continue analysis, check with supervisor for further instructions	Analyst	Bias/Contamination	No target compounds should be >1/2 LOQ
MS-Soluble	1 per batch of 20 or fewer samples	Notify supervisor/manager immediately. Redigest /Reanalyze entire batch. Contact client about possible matrix investigations. Perform additional tests to determine the nature of interference. Flag results associated with out of control matrix spike	Analyst	Accuracy/ Bias	75-125% of True Value
MS-Insoluble	1 per batch of 20 or fewer samples	Notify supervisor/manager immediately. Redigest /Reanalyze entire batch. Contact client about possible matrix investigations. Perform additional tests to	Analyst	Accuracy/ Bias	75-125% of True Value

QAPP Worksheet #28.2b: Laboratory QC Samples Table (Accutest Laboratories)

Matrix: Soil
Analytical Group: Hexavalent Chromium
Analytical Method/SOP: SW-846 7199

QC Sample	Number/ Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
		determine the nature of interference. Flag results associated with out of control matrix spike			
LCS-Soluble	1 per batch of 20 or fewer samples	Redigest if possible. If samples are out of holding time, redigest and report both sets of data. If insufficient sample is available to redigest, flag	Analyst	Accuracy/ Bias	80-120% of True Value
LCS-Insoluble	1 per batch of 20 or fewer samples	Redigest if possible. If samples are out of holding time, redigest and report both sets of data. If insufficient sample is available to redigest, flag	Analyst	Accuracy/ Bias	80-120% of True Value
DUP (or MSD)	1 per batch of 20 or fewer samples	Repeat sample and duplicate unless obvious or historical interferences or lack of volume	Analyst	Precision	RPD<20%; +/- RL if <4xLOQ
Post Digestion Matrix Spike	1 per batch of 20 or fewer samples	If MS also failed, no action beyond CA for MS	Analyst	Bias	85-115% of True Value

QAPP Worksheet #28.2b: Laboratory QC Samples Table (Accutest Laboratories)

Matrix: Soil
Analytical Group: Extractable Petroleum Hydrocarbons
Concentration Level: Low
Sampling SOP: NJDEP EGCNJEPH-04

QC Sample:	Number/ Frequency	Corrective Action	Title/position of person responsible for corrective action	Data Quality Indicator	Method/SOP Acceptance Criteria
Method Blank	1 per batch of 20 or fewer samples	Reextract/ reanalyze entire batch	Analyst	Bias/Contamination	NJDEP EPH / MB $\leq$ 5X MDL
MS	1 per batch of 20 or fewer samples	If LCS acceptable, may report with qualifier and note outliers in the case narrative	Analyst	Accuracy/ Bias	NJDEP EPH / 40-140% R
LCS	1 per batch of 20 or fewer samples	Reextract/ reanalyze entire batch	Analyst	Accuracy/Bias	NJDEP EPH / 40- 40% R
LCSD	1 per batch of 20 or fewer samples	Reextract/ reanalyze entire batch	Analyst	Accuracy/Bias	NJDEP EPH / 40 -140% R RPD $\leq$ 25
DUP(or MSD)	1 per batch of 20 or fewer samples	May report with qualifier and note outliers in the case narrative	Analyst	Precision	NJDEP EPH / RPD $\leq$ 50%
Surrogate	Every sample/QC sample	Reextract/ reanalyze sample	Analyst	Accuracy/Bias	NJDEP EPH / 40-140% R

QAPP Worksheet #29: Project Documents and Records

Sample Collection and Field Records			
Record	**Generation**	**Verification**	**Storage location/archival**
Field logbook or data collection sheets	Field Task Lead, Parsons	Field Team Member, Parsons	Project File/Parsons
Chain-of-Custody Forms	Sampler, Parsons	Site Manager, Parsons	Project File/Parsons
Air Bills	Sampler, Parsons	Site Manager, Parsons	Project File/Parsons
Contractor Daily QC Reports	Field Task Lead, Parsons	Project Chemist, Parsons	Project File/Parsons
Deviations	Field Task Lead, Parsons	Project Chemist, Parsons	Project File/Parsons
Corrective Action Reports from the field team	Field Task Lead, Parsons	Project Manager, Parsons	Project File/Parsons
Correspondence	Various Project Team Members	Various Project Team Members	Project File/Parsons

QAPP Worksheet #31, 32 & 33: Assessments and Corrective Action

Assessments:

Assessment Type	Responsible Party & Organization	Number/Frequency	Estimated Dates	Assessment Deliverable	Deliverable due date
Non-Conformance Report from the field	Field Team Lead/Parsons	When there is an issue	Within 48 hours from the occurrence	Non-Conformance Report and Corrective Action Report	Will submit to USACE within 30 days from the occurrence
Daily Report and DQCR Verification	Field Team Lead or Member and Project Chemist/Parsons	At the end of each sampling day	Each sampling day	Upon the complete review by Parsons Project Manager	Will be submitted as requested
Non-Conformance Report from the lab	QC Manager of ALS Laboratories and Accutest Laboratories	When there is an issue	Within 48 hours from the occurrence	Non-Conformance Report and Corrective Action Report	Will submit to USACE within 30 days from the occurrence
Laboratory Analysis Data Validation	Parsons data validator	Each data package	Labs will submit data package 21 calendar days from sample receiving day. Parsons will complete data validation 14 calendar days from data package receipt date.	Data validation report	Included in the Draft Reports

QAPP Worksheet #34: Data Verification and Validation Inputs

Item	Description	Verification (completeness)	Validation (conformance to specifications)
Planning Documents/Records			
1	Approved Quality Assurance Project Plan (QAPP)	**X**	
2	Contract	**X**	
4	Field Standard Operating Procedures (SOPs)	**X**	
5	Laboratory SOPs	**X**	
Field Records			
6	Field logbooks	**X**	**X**
7	Equipment calibration records	**X**	**X**
8	Chain-of-Custody Forms	**X**	**X**
9	Relevant Correspondence	**X**	**X**
10	Change orders/deviations, when applicable	**X**	**X**
11	Field corrective action reports, when applicable	**X**	**X**
Analytical Data Package			
12	Cover sheet (laboratory identifying information)	**X**	**X**
13	Case narrative	**X**	**X**
14	Internal laboratory chain-of-custody	**X**	**X**
15	Sample receipt records	**X**	**X**
16	Sample chronology (i.e., dates and times of receipt, preparation, & analysis)	**X**	**X**
17	Communication records	**X**	**X**
18	Detection Limit (DL)/Limit of Detection (LOD)/Limit of Quantitation (LOQ) establishment and verification	**X**	**X**
19	Standards Traceability	**X**	**X**
20	Instrument calibration records	**X**	**X**
21	Definition of laboratory qualifiers	**X**	**X**
22	Results reporting forms	**X**	**X**
23	QC sample results	**X**	**X**
24	Corrective action reports, when applicable	**X**	**X**
25	Raw data	**X**	**X**
26	Electronic data deliverable	**X**	**X**

QAPP Worksheet #35: Data Verification Procedures

Records Reviewed	Requirement Documents	Process Description	Responsible Person, Organization
Field logbook	UFP-QAPP (see SAP)	Verify that records are present and complete for each day of field activities. Verify that planned samples including field QC samples were collected and sample IDs 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 measurement was performed and results are documented.	Daily – Parsons Field Team Lead At conclusion of field activities – Parsons Project Manager
Chain-of-custody forms	UFP-QAPP (see SAP)	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 required signatures and dates are present. Check for transcription errors.	Daily – Parsons sampler At conclusion of field activities – Parsons Project Chemist
Laboratory Deliverable	UFP-QAPP	Verify that the laboratory deliverable contains 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 collected samples. Review the narrative to ensure QC exceptions are described. Check for evidence that any required notifications were provided to project personnel as specified in the QAPP. Verify that necessary signatures and dates are present.	Before release – Lab Project Manager, ALS and Accutest Upon receipt – Parsons data validator
Corrective Action Reports	UFP-QAPP	For any non-compliance noted, verify that corrective action was implemented according to plan.	Parsons Project Chemist

QAPP Worksheet #36: Data Validation Procedures

Data Validators: Parsons

Analytical Group/Method:	Chemical Analyses
Data deliverable requirements:	Level IV data packages and EDDs
Analytical specifications:	Per UFP-QAPP and DoD QSM version 4.2
Measurement performance criteria:	Per UFP-QAPP
Percent of data packages to be validated:	RI data -100% validation; Long Term Monitoring Data – minimum of 1 report per sampling event or 33% of the data throughout the project, whichever is less, will be validated. Remaining data will be verified based on Level III data packages; Waste Characterization related data will not be validated or verified.
Percent of raw data reviewed:	Validation will be done by reviewing raw data packages.
Percent of results to be recalculated:	10% of each data package which require data validation
Validation procedure:	Per UFP-QAPP, DoD QSM version 4.2, National Function Guidance, as listed order
Data validation codes:	See table below
Electronic validation program/version:	ERPIMS 6.0/ERPToolsX. Combined Sample/Test/Result Table, Performance Table, Frequency Table

Data Validation Codes and Definitions:

Data Validation Codes	Definitions
U	Analyte was not detected and is reported as less than the Limit of Detection (LOD). The LOD has been adjusted for any dilution or concentration of the sample.
B	Blank contamination. The recorded result is associated with a contaminated blank.
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
UJ	The analyte was not detected above the reported sample LOQ. However, the reported LOQ is approximate and may or may not represent the actual LOQ necessary to accurately and precisely measure the analyte in the sample.
R	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Labs will report concentrations down to the Detection Limit (DL) and flag any results between DL and LOQ with "J". Non-detected will be reported as <LOD, per DoD QSM version 4.2.

QAPP Worksheet #37: Data Usability Assessment

Identify personnel (organization and position/title) responsible for participating in the data usability assessment:
Project Manager: Chris Greene
Project Chemist: Sandra de las Fuentes

Describe how the usability assessment will be documented: Upon the completion of data validation, a data validation report will be prepared and be included as part of Draft Report to be submitted to USACE.

Summarize the data usability assessment process including statistics, equations, and computer algorithms that will be used to analyze the data:

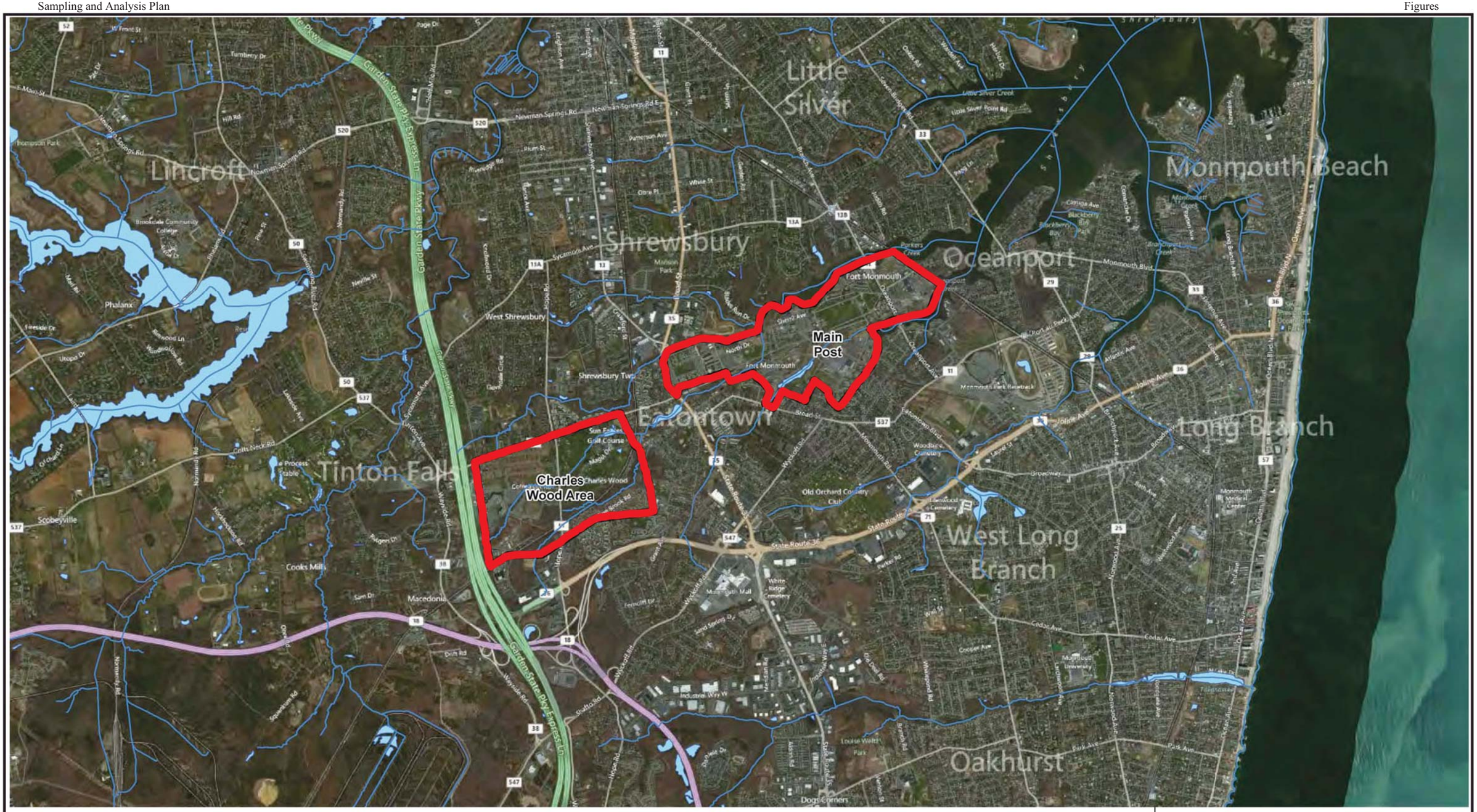
Step 1	**Review the project's objectives and sampling activities** Review the actual sampling activities to make sure they are compliant with Field Sampling Plan, RI/FS Work Plan, and UFP-QAPP.
Step 2	**Review the data validation outputs** Review data validation reports. Perform basic calculations and summarize the data (using maps, tables, etc.). Look for patterns, trends, in the lab reported results and field water quality measurements. Review deviations from planned activities (e.g., number and locations of samples, holding time exceedances, damaged samples, and SOP/UFP-QAPP deviations) and determine their impacts on the data usability. Evaluate implications of unacceptable lab and field QC sample results.
Step 3	**Document data usability and draw conclusions** Determine if the data can be used as intended, considering implications of deviations and corrective actions. Discuss data validation codes and impact to the data usability. Compare to historical data for each well. Prepare the data usability summary report which may be in the form of text and/or a table.

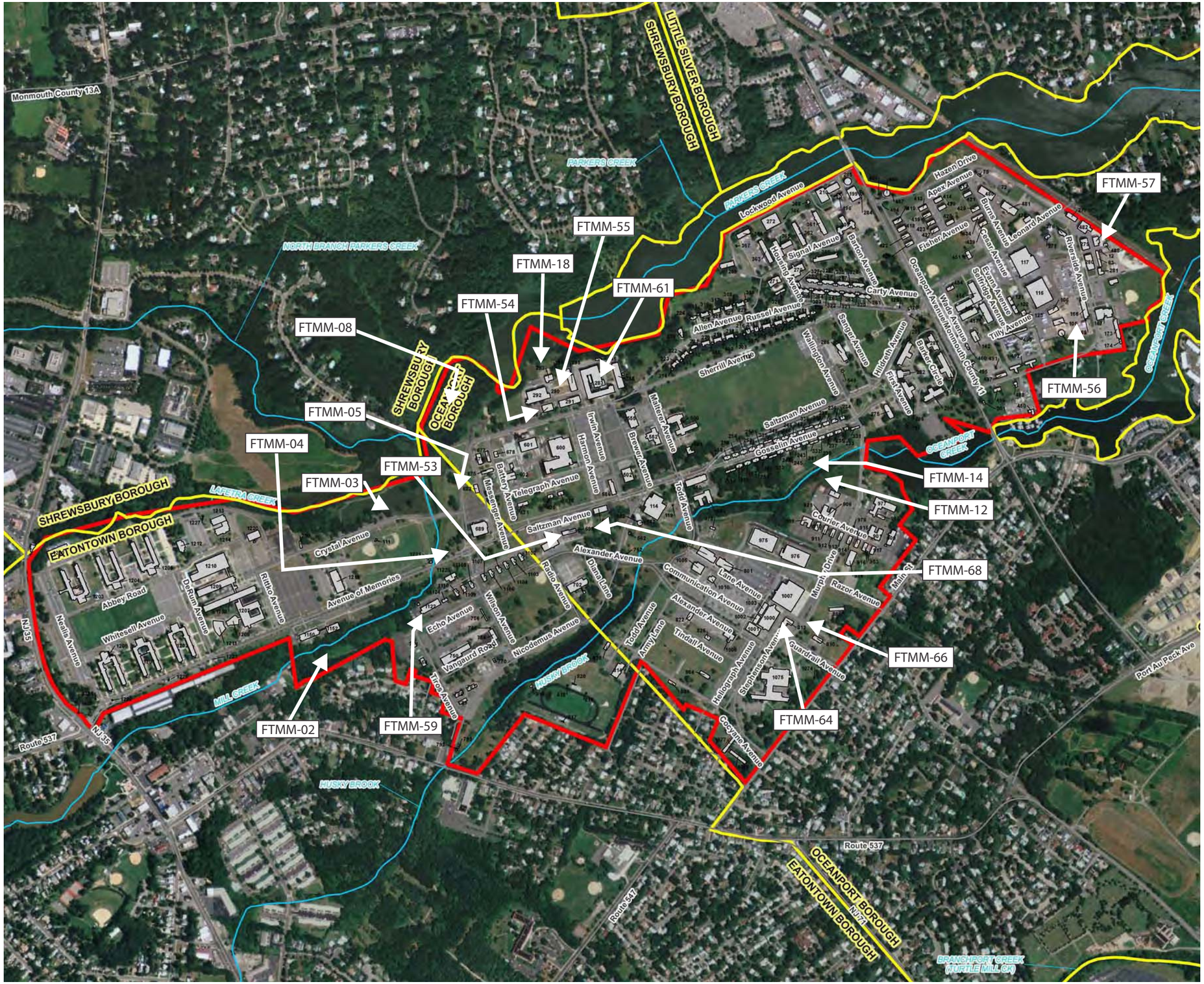
FIGURES

Figure 1.1 Fort Monmouth Location

Figure 1.2 Main Post Layout

Figure 1.3 Charles Wood Area Layout


Main Post
Charles Wood Area
Lincroft
Little Silver
Monmouth Beach
Shrewsbury
Oceanport
Fort Monmouth
West Shrewsbury
Eatontown
Tinton Falls
Long Branch
West Long Branch
Oakhurst
Phalanx
Scobeyville
Cooks Mills
Macedonia
Dogs Corners
Garden State Pkwy
Garden State Pkwy Express Ln
Newman Springs Rd
Sycamore Ave
Broad St
Monmouth Blvd
Joline Ave
Atlantic Ave
Ocean Blvd
Brookdale Community College
Thompson Park
Sun Forest Golf Course
Old Orchard Country Club
Monmouth Mall
Monmouth University
Monmouth Medical Center
Louise Walsh Park
Deep Cut Gardens
Tatum Park
Parkers Creek
Blackberry Bog Park
Shadow Lake
Little Silver Creek
Little Silver Point Rd
Shrewsbury River
Oceanport Creek
Deep Run
Tinton Falls Lake
Swimming River Reservoir
Process Table
Fort Monmouth Recreation Center
Woodland Cemetery
Lawwood Cemetery
White Ridge Cemetery
Louise Walsh Park
Monmouth Park Racetrack
Fort Monmouth Golf Course
Fort Monmouth Recreation Center
Fort Monmouth Museum
Fort Monmouth Chapel
Fort Monmouth Post Office
Fort Monmouth Commissary
Fort Monmouth Exchange
Fort Monmouth Barracks
Fort Monmouth Housing
Fort Monmouth Housing
Fort Monmouth Housing



LEGEND

- Water Feature
- Road Centerline
- Building
- Municipal Boundary
- Installation Boundary

Note: Aerial photography (0.5-meter resolution) was obtained from ESRI ArcOnline USA Imagery Map Services.

N

Scale:

0 450 900 1,800 Feet

Source: Shaw Environmental, Inc., 2011.

PARSONS 401 Diamond NW Huntsville AL, 35806	Fort Monmouth New Jersey
Main Post Layout	
DATE: November 7, 2012	FIGURE NUMBER: Figure 1.2
PROJECT NUMBER: 748810.01000	CREATED BY: MA

Source: Shaw Environmental Inc., 2011.

LEGEND

- Road Centerline
- Water Feature
- Building
- Municipal Boundary
- Installation Boundary

Note: Aerial photography (0.5-meter resolution) was obtained from ESRI ArcOnline USA Imagery Map Services.

N

Scale:
0 290 580 1,160
Feet

PARSONS 401 Diamond NW Huntsville AL, 35806	Fort Monmouth New Jersey

Charles Wood Area Layout

DATE: November 7, 2012	FIGURE NUMBER: Figure 1.3
PROJECT NUMBER: 748810.01000	CREATED BY: MA

APPENDICES

Appendix A Field Procedure SOPs

Appendix B Field Forms

Appendix C Laboratory Certifications and SOPs

APPENDIX A
FIELD PROCEDURE SOPS

LIST OF FIELD PROCEDURE SOPS

1 Site Reconnaissance, Preparation, and Restoration Procedures A-3
2 Equipment Decontamination A-4
3 Groundwater Field Measurements A-5
4 Groundwater Monitoring with Low-Flow Purging and Sampling A-7
5 Groundwater Sampling with Passive Diffusion Bag Samplers A-13
6 Soil Sampling A-16
7 Monitoring Well Installation and Development A-18
8 Slug Tests A-22

SOP #1 – SITE RECONNAISSANCE, PREPARATION, AND RESTORATION PROCEDURES

1.1 SITE ACCESS

Parsons will obtain any required security badges for Parsons and subcontractor personnel working on this project, as well as any vehicle passes that are required. In addition, Parsons will also provide FTMM with a minimum of one week notice prior to requiring access to any secure sites. However, there may be instances where one week notice is not feasible given project-specific requirements; these will be addressed on a case-by-case basis and as much notice as possible will be provided to FTMM.

1.2 UTILITY LOCATION

Areas designated for intrusive activities will be assessed for the presence of underground utilities. Parsons will request utility maps from FTMM for those areas to be investigated. In addition, New Jersey One Call will be contacted at least three days prior to intrusive activities to obtain a routine ticket for utility location. New Jersey One Call ticket requests will be made by calling 800-272-1000 or by placing a request online at http://www.nj1-call.org/index.aspx. Based on the type of investigation, additional methods to identify utilities may be used including geophysical survey, hand probes, and line tracing.

1.3 ESTABLISHMENT OF DECONTAMINATION AREA

A centralized decontamination area will be established in an area designated by FTMM for drilling rigs and equipment. The decontamination area will be large enough to allow storage of cleaned equipment and materials prior to use, as well as to stage drums of decontamination waste. The decontamination area will be lined with heavy-gauge plastic sheeting, and designed with a collection system to capture decontamination waters and steam condensate. Solid wastes will be accumulated in United States (U.S) Department of Transportation (DOT) approved 55-gallon drums or 5-gallon buckets with lids and subsequently transported to a waste storage area designated by FTMM. Smaller decontamination areas for portable equipment will be provided as necessary. These locations will include basins, tubs, or buckets to capture decontamination fluids.

1.4 SITE RESTORATION

Each work site or sampling location will be returned to its original condition when possible. Efforts will be made to minimize impacts to work sites and sampling locations, particularly those in or near sensitive environments such as wetlands. Following the completion of work at a site; drums, trash, and other waste generated from the work process will be removed. Decontamination and/or purge water and soil cuttings will be transported to the designated locations as described in Section 5 of the Field Sampling Plan. Site restoration will also consist of repair of tire ruts and installation of topsoil and an appropriate seed mix when necessary.

SOP #2 – EQUIPMENT DECONTAMINATION

Equipment that may directly or indirectly contact samples will be decontaminated in a designated decontamination area. This includes auger flights, direct push rods, sampling devices, and instruments, such as slugs and sounders. In addition, care will be taken to prevent the sample from coming into contact with potentially contaminating substances, such as tape, oil, engine exhaust, corroded surfaces, and dirt.

2.1 DRILLING EQUIPMENT

In order to decontaminate large pieces of equipment, the external surfaces of equipment will be washed with high-pressure water and, if necessary, scrubbed until visible dirt, grime, grease, oil, loose paint, rust flakes, etc. have been removed. The equipment will then be rinsed with potable water. The inside surfaces of casing, drill rod, and auger flights will also be washed as described above after use at each individual borehole.

2.2 DIRECT PUSH AND SOIL SAMPLING DEVICES

The following procedure will be used to decontaminate soil sampling and drilling devices, such as split spoons and direct-push rods that can be hand-manipulated. For sampling and smaller drilling devices equipment decontamination will be in accordance with Section 2.4.2 of the NJDEP Field Sampling Procedures Manual (NJDEP 2005) which includes scrubbing the equipment with a solution of potable water and Alconox or equivalent laboratory-grade detergent. Then rinse the equipment with copious quantities of potable water followed by distilled water. Air dry the equipment on a clean surface or rack elevated above the ground surface. If the sampling device will not be used immediately after being decontaminated, it will be wrapped in oil-free aluminum foil, or placed in a closed stainless steel or glass container.

2.3 GROUNDWATER MONITORING EQUIPMENT

Due to the sensitive nature of instruments that measure water quality parameters, these devices will be decontaminated with potable or distilled water only. Procedures for decontaminating bladder pumps are included in SOP #4 – Groundwater Sampling with Low-Flow Purging and Sampling.

SOP #3 – GROUNDWATER FIELD MEASUREMENTS

3.1 EQUIPMENT

A water quality meter with a flow-through cell will be used to obtain information on groundwater parameters in the field. The following parameters will be measured with a combination water quality meter and flow-through cell:

- pH;
- Conductivity;
- Dissolved Oxygen (DO);
- Turbidity;
- Oxygen reduction potential (ORP); and
- Temperature.

Turbidity measurements may also be collected with a stand-alone meter, such as a Lamotte® or similar.

An oil-water interface probe will be used to measure static water levels.

A Mini-Rae or equivalent photoionization detector (PID) will be used to monitor ambient air conditions near wellheads.

3.2 EQUIPMENT CALIBRATION AND QUALITY CONTROL

The water quality meters will be calibrated daily. At least two buffer solutions that bracket the probable sample pH (e.g., 7.0 and 9.0) or an "auto-calibration solution" will be used. The PID will be recalibrated daily. The calibration gas required for the PID will originate from the same source. At the end of operation, equipment will be checked prior to recalibration. Troubleshooting will be in accordance with manufacturer's recommendations. A NJDEP Certified Laboratory Low-flow Groundwater Calibration Procedures Checklist Form and Field Calibration Logsheet Form are included in **Appendix B** of the SAP.

3.3 EQUIPMENT MAINTENANCE AND DECONTAMINATION

Field measurement equipment will be decontaminated according to the specifications in SOP #2, Equipment Decontamination, prior to any measurement activities and will be protected from contamination until ready for use.

3.4 FIELD MONITORING MEASUREMENTS

3.4.1 pH, Conductivity, DO, Turbidity, ORP, and Temperature

The pH, conductivity, DO, ORP, turbidity, and temperature will be measured using direct reading meters and a flow-through cell and following the requirements for low-flow purge and sampling described in the NJDEP Field Sampling Procedures Manual. During well purging using the low-flow purge and sample method, discharge from the pump will be routed through the flow-through cell in which the direct reading meter probes will be installed. Measurements of these parameters will be made throughout well purging (every five or six minutes as appropriate) and immediately prior to sample collection. Measurements will be recorded in the

Low-Flow Purge and Sampling (LFPS) Record included in **Appendix B** of the SAP. Additional details are also provided in SOP #4 – Groundwater Monitoring with Low-Flow Purging and Sampling. LFPS field monitoring measurements will be conducted under Parsons certification by the NJ Office of Quality Assurance.

3.4.2 Groundwater Level Measurements

3.4.2.1 Static water-level measurements will be measured using an oil-water interface probe after wells have been installed and developed and their water levels have recovered completely. Any conditions (e.g., barometric pressure) that may affect water levels will be recorded in the field log. Groundwater level measurements will be recorded in either the logbook or the Groundwater Measurements Record form included in **Appendix B** of the SAP.

3.4.2.2 The following procedure will be used to measure the water levels:

1) Loosen well plugs sealing wells with low hydraulic conductivities prior to the initiation of sampling to allow the well to equilibrate. Well plugs should not be left loose for periods longer than one work day (will not be left open overnight), when site activities are terminated for scheduled breaks, or if there is a threat of heavy rain. Caution should also be taken during periods of rain to secure expansion plugs in roadway completions to prevent surface run-off from entering the well;

2) Inspect the exterior of the well to determine if there is any evidence of the security being breached (e.g., as evidenced by damaged or missing plugs or locks, etc.), or evidence of excessive debris accumulation. If the security of the well has been compromised, record this information and notify the FTL. Remove any excessive debris before the well is opened;

3) Open the protective outer cover of the monitoring well. Do not open any protective covering that is covered with standing water until the water has been removed. Remove any debris that may have accumulated around the riser near the well plug. If water is present in a road box enclosure above the top of the riser and well plug, do not open the well until water has been removed. Once the top of the well is free of standing water and debris, remove the well plug;

4) Immediately after opening the well, monitor the headspace above the top of the casing for health and safety purposes with a PID instrument that measures volatile organic compounds. Record the data in the field log;

5) Water-level measurements will be collected with an oil-water interface probe or water level indicator. The oil/water interface probe will have two distinct tones that differentiate between water and non-aqueous phase liquid (NAPL). The probe will be used to determine the distance between the established point of reference (usually a V-notch or indelible mark on the well riser) and the surface of the standing water and free product (if present) in the well. The probe will also be lowered to the bottom of the well to screen for the presence of dense NAPL and to gauge the total depth of the well;

6) Groundwater level (and thickness of NAPL, if present) shall be measured to the nearest 0.01 foot. Two or more sequential measurements shall be taken at each location until two measurements agree to within ± 0.01 foot; and

7) Decontaminate the oil/water interface probe according to the specifications in SOP #2 – Equipment Decontamination.

SOP #4 – GROUNDWATER MONITORING WITH LOW-FLOW PURGING AND SAMPLING

4.1 INTRODUCTION

4.1.1 This SOP has been prepared in accordance with methods outlined in Section 6.9.2.2 of the NJDEP Field Sampling Procedures Manual (NJDEP 2005).

4.1.2 Prior to going to the site, the FTL shall prepare a detailed list of the wells that will be sampled as part of the proposed program. Additionally, the team leader should prepare a comprehensive list of the sample fractions that are planned to be collected as part of the field effort. Finally, the team leader should contact supporting contractors (e.g., laboratories, data management firms, etc.) to arrange for, and schedule the delivery of, necessary field supplies and sample bottles.

4.1.3 Prior to going to the site, each sampling team member will be provided with a summary of monitoring well information to be used to determine the placement of the pump intake. Specific information that will be provided to each sampling team member includes (1) the depth to the top of the well screen; (2) the total length of the screen; and (3), if applicable, the depth to any zone to be targeted during the sampling.

4.1.4 Additionally, details of historic groundwater sampling operations for a well are useful as these may affect the selection of sampling equipment and approach. Such information may include prior depths to groundwater, previous pumping rates or pump settings, previous depth to pump intake, and chemical characteristics of the water found in the well. Based upon historical groundwater data, the sequence of well sampling will take place from the least contaminated to the most contaminated wells. In addition, wells located in the intertidal zone will be sampled during low tide events.

4.1.5 Information describing well location, using site-specific or topographic maps, GPS coordinates, and/or descriptions tied directly to prominent field markers, is helpful as these allow personnel unfamiliar with the site to find wells. Such positional information or maps are also valuable under severe weather conditions.

4.2 WATER LEVEL MEASUREMENTS

A water level measurement will be taken in accordance with SOP #3 – Groundwater Field Measurements, immediately after the well is opened. For shallow wells screened across the water table, the water level will be used to determine the required depth to the pump intake (mid-point of the saturated screen length). A second water level measurement will be obtained after the pump has been installed and the water level has equilibrated. If non-aqueous phase liquid (NAPL) is detected during well gauging, an SOP will be prepared for sampling groundwater from wells with NAPL.

4.3 WELL PURGING

The well must be purged prior to sampling to ensure that a representative sample of groundwater is obtained from the water-bearing unit. If the well has been previously sampled in accordance with this SOP, then the depth to the pump or tubing intake and the pumping rates should be duplicated to the maximum extent practical during subsequent sampling events. The following describes the monitoring well purging procedure for low-flow sampling, which is in

accordance with Section 6.9.2.2 of the New Jersey Department of Environmental Protection Field Sampling Procedures Manual (NJDEP 2005):

1) Using the specific details of well construction and a recent water level measurement for shallow wells, determine the depth to the mid-point of the saturated well screen. Record this value on the sampling record. For tidally-influenced shallow wells, use the mean water level over a tidal cycle;

2) Wells will be purged with a bladder pump containing a Teflon® bladder and associated controllers and Teflon®-lined tubing. Polyethylene tubing and bladders may be used when organics are not a target analyte. The inside diameter (ID) of tubing should be no greater than three-eighths of an inch (3/8-in). Quarter-inch (1/4-in) tubing is preferred. Larger tubing diameters reduce flow velocity resulting in a corresponding increase of pump speeds to maintain flow;

3) Attach necessary tubing and supporting rope to the bladder pump and very slowly lower the unit until the pump intake is located approximately at the mid-point of the saturated well screen. The required depth may be attained by measuring the length of supporting rope required, taking into account the pump length. Because the rope may stretch, be sure to apply the necessary tension when making this measurement. Record the depth to the pump intake on the sampling record form;

4) After allowing several minutes for the water level to equilibrate, slowly lower the oil-water interface probe into the well until it contacts the waters surface. Record the water level on the sampling record;

5) If the well has been previously sampled under low-flow conditions, begin purging at the rate known to induce minimal drawdown (less than or equal to 0.3 foot). Otherwise, begin purging the well at the minimum pumping rate. Slowly increase the pumping rate to a level that does not cause the well to drawdown more than 0.3 foot. Never increase the pumping rate to a level in excess of 500 mL/min. If the drawdown approaches or exceeds 0.3 foot, reduce the pumping rate until the drawdown recovers to a level of 0.3 foot or less. Record the stabilized flow rate, drawdown, and time and continue purging at step 5;

   If the drawdown exceeds 0.3 foot, reduce the flow rate of the pump to the minimum practical rate (for example, 0.1 liter per minute). If the drawdown exceeds 0.3 foot but remains stable at the minimum flow rate, then record the flow rate, the stabilized drawdown, and the time. Continue purging at step 5;

   If the drawdown does not stabilize at the minimum practical flow rate of the pumping system, then de-water the well to a depth of 2 feet above the top of the well screen for wells screened below the static water level. Every reasonable effort will be made to avoid pumping shallow wells to dryness. However, if a well has been pumped to near dryness at a rate less than 0.5 mL/min, the well should be allowed to recover completely before sampling. Samples may be collected even though purging criteria were not satisfied. Proceed to the next section (Sampling) as soon as the water level has recovered sufficiently to collect the required sample volumes. The pump should be left undisturbed in the well during this recovery period to minimize the turbidity of the water samples;

6) Once an acceptable drawdown rate is established and maintained, begin monitoring designated indicator field parameters at 5- to 6-minute intervals with a flow-through cell. Key parameters are pH, ORP (or Eh), DO, specific conductance, temperature, and turbidity. Continue to note and record any changes to the drawdown and pumping rate. Indicator field parameter measurements will be documented on a Low-Flow Purge and Sampling (LFPS) Record included in **Appendix B** of the SAP; and

7) Indicator field parameters have stabilized when three consecutive readings, taken at 3- to 5-minute intervals, satisfy the following criteria:

Temperature	± 3%
pH	± 0.1 unit
Specific Conductance	± 3%
ORP	± 10 millivolts
DO	± 10%
Turbidity	± 10% for values greater than 10 NTUs, or ± 1 NTU for values below 10 NTUs

If stability has not been achieved after FOUR hours of purging the Field Sampling Procedures Manual allows one of three options: 1) continue purging until stabilization occurs, no matter how long it takes; 2) discontinue purging, do not collect a sample and document the attempts to reach stabilization; or 3) discontinue purging, collect a sample and document the attempts to reach stabilization. The selected action will vary on a case-by-case basis. In the event that stability has not been achieved, the field sampling leader will call the Project Manager and/or Technical Director to discuss the stabilization results and a decision on which action to chose will be based on professional judgment.

4.4 SAMPLING

The following procedure will be followed for the collection of groundwater samples:

1) Measure and record the indicator parameters immediately prior to beginning the collection of samples;

2) Record comments pertinent to the color and any obvious odors associated with the water;

3) Arrange and label necessary sample bottles and ensure that preservatives are added, as required. Labeling must include a unique sample number, date of sampling, the initials of the sampling personnel, and the identity of the sample fraction. Additionally, provide any information pertinent to the preservation materials or chemicals used in the sample;

4) Make sure that the sampling tubing remains completely filled during sampling and that the water does not descend back into the well. A check valve will help to keep the tube completely filled with water. Minimize turbulence when filling sample containers, especially VOCs, by allowing the liquid to run gently down the inside of the bottle. Fill the labeled sample bottles in the following order:

   a. Volatile Organic Compounds;

b. Semi-Volatile Organic Compounds;
c. Metals; and
d. Pesticides\PCBs.

5) Immediately seal each sample and place it on ice in a cooler to maintain sample integrity. Do not allow the samples to freeze, as the bottles may break;

6) Once sampling is completed, recover sampling equipment and decontaminate or set aside for subsequent decontamination. Bladders will be disposed and tubing will not be decontaminated but, rather, dedicated to the well;

7) Close and secure the well site. Clean up and remove any debris left from the sampling event. Be sure that wastes are properly containerized and labeled;

8) Review sampling records. Ensure that necessary data is completed. Add additional information as may be needed; and

9) Periodically transport the collected samples to the centralized logistics area, where samples are packed and shipped, along with a Chain-of-Custody form, to the laboratory.

4.5 EQUIPMENT DECONTAMINATION PROCEDURES

4.5.1 General Decontamination Procedure

Decontamination of field sampling equipment will follow the procedures set forth in SOP # 2 – Equipment Decontamination, which is in accordance with Section 2.4.2 of the NJDEP Field Sampling Procedures Manual (NJDEP 2005).

4.5.2 Decontamination Procedure for Bladder Pumps

1) Dispose of the bladder. Place the pump assembly in a bucket or small containment vessel. Using a brush, thoroughly wash surfaces;

2) Wash exterior of the bladder housing and steel check valves with dedicated brush and detergent solution;

3) With the bladder assembly inverted, pour clean detergent solution through the lower ball valve into the bladder, filling it approximately one-half full of liquid. While sealing both ends, vigorously agitate the liquid in the bladder. Make sure that the detergent solution contacts both upper and lower ball valves. Drain the solution through the upper ball valve;

4) Pour clean rinse water (potable tap water) over the exterior of the bladder housing. Then, pour clean rinse water into the inverted bladder housing, filling it approximately half full. Covering both ends, agitate the housing, then drain the rinse water through the top ball. Repeat until there is no evidence of soap bubbles, with a minimum of 3 repetitions;

5) Using a container of distilled/deionized water, rinse the inside and outside of the bladder assembly, wetting surfaces;

6) Rinse the bladder assembly with distilled/deionized water from a spray bottle. Make sure that both check valve assemblies are thoroughly wetted;

7) Spray the inside of the bladder assembly and the inside and outside of both steel ball valve assemblies with a small amount of 10% nitric acid diluted with distilled or deionized water from a spray bottle;

8) If metals are a target analyte, follow step 7) with a distilled or deionized water rinse;

9) If organics are a target analyte, following step 7) spray the inside of the bladder assembly and the inside and outside of both steel ball valve assemblies with a small amount of acetone or methanol from a spray bottle;

10) Allow the bladder assembly to air dry;

11) Reassemble the bladder pumps and wrap in aluminum foil; and

12) Waste rinse and wash liquids will be captured, containerized, and managed according to procedures identified in Section 5 of the SAP.

SOP #5 – GROUNDWATER SAMPLING WITH PASSIVE DIFFUSION BAG (PDB) SAMPLERS

5.1 INTRODUCTION

Passive diffusion bags (PDB) will be the preferred method of groundwater sampling when VOCs are the only target analytes and non-aqueous phase liquid is not present in the well. This SOP has been prepared in accordance with methods outlined in Section 6.9.2.5.1 of the New Jersey Department of Environmental Protection Field Sampling Procedures Manual (NJDEP 2005).

5.2 EQUIPMENT

An EQUILIBRATOR™ brand PDB sampler manufactured by EON Products, Inc. or similar device will be used for no-purge, diffusion sampling for volatile organic compounds (VOCs). The PDB is 18 inches in length, 1.5 inches in diameter, and consists of a semi-permeable low-density polyethylene (LDPE) membrane housed in a protective mesh (Figure 1). The membrane will be filled with deionized water prior to deployment within the screened interval of the monitoring well. VOCs in the groundwater diffuse into the sampler until the concentration gradient equilibrates between the water in the formation and the sampler. Once the sampler is retrieved after a minimum deployment of two weeks, the contents are transferred into volatile organic analysis (VOA) vials for VOC analysis.

Figure 1
The Equilibrator™ PDB

5.3 TETHER PREPARATION

5.3.1 Low-stretch braided, polyester rope will be used as a tether line which will be permanently connected to a stainless steel ring on the underside of a specialized well cap. The other end of the tether will be connected to a snap connector that will allow quick connection and disconnection to the PDB.

5.3.2 The length of the tether will be calculated such that the midpoint of the PDB is positioned at the desired interval which is typically the mid-point of the saturated screened interval, but may be adjusted higher or lower if targeting low-density or high-density compounds. Extreme care must be taken to ensure that no part of the PDB will be exposed above the water table during the equilibration period.

5.3.3 The tether length will be calculated using a water level indicator and the following procedure:

1) The bottom of the monitoring well will be sounded, and the depth from the top of casing will be recorded;
2) Six inches will be subtracted from this number to account for the end cap with the resulting number being equivalent to the depth of the bottom of the screen;
3) Depending on the desired deployment depth, the corresponding number of feet will then be subtracted from the depth to the bottom of the screen. For example, if the

midpoint of the PDB is to be deployed three feet from the bottom of the screened interval, three feet will be subtracted from the "depth to bottom of screen" number;

4) Nine inches will then be subtracted to account for half the length of the PDB; and

5) Finally, the length of any additional hardware used to assemble the tethers (e.g., snap connectors) will be factored into the tether length calculation.

5.4 PDB DEPLOYMENT

A new PDB will be removed from the manufacturer's packaging, and the end cap will be removed in order to fill the PDB membrane with 350 mL of deionized water. The membrane will then be sealed by re-inserting the end cap. A source blank of deionized water will be submitted for laboratory analysis to ensure that it is contaminant free. A stainless steel weight holder will be slipped over the top of the PDB's protective mesh and secured with cable ties and a stainless steel weight will be hung from the end to ensure that the PDB remains vertical and does not float upwards in the water column. The PDB will be deployed for a minimum of two weeks, but is designed to remain in a monitoring well for extended periods of time. As such, when a PDB is retrieved for sampling, a new PDB will be deployed at that time and will remain in the monitoring well until the next sampling event. The manufacturer specifies that this is acceptable for annual monitoring.

5.5 WATER LEVEL MEASUREMENT AND SAMPLE COLLECTION

5.5.1 Water level measurements will be collected in accordance with SOP #3 – Groundwater Field Measurements. A decontaminated oil-water interface probe will be lowered into the well with the PDB still in place in order to collect a static measurement. The total depth of the well will be sounded after the PDB has been removed from the well.

Figure 2
VOC Sample Collection

5.5.2 Following water level measurement, the PDB will be removed from the well and unclasped from the tether. The membrane will be punctured with a small "straw" and sample vials will be filled via the straw as depicted in Figure 2. Once the sample has been collected, the PDB will be disposed of and a new PDB will be attached to the tether and deployed for the subsequent monitoring event.

5.5.3 Standard sample handling protocol will be followed as outlined below:

1) Record comments pertinent to the color and any obvious odors associated with the water;

2) Arrange and label necessary sample bottles and ensure that preservatives are added, as required. Labeling must include a unique sample number, date of sampling, the initials of the sampling personnel, and the identity of the sample fraction. Additionally, provide any information pertinent to the preservation materials or chemicals used in the sample;

3) Immediately seal each sample and place it on ice in a cooler to maintain sample integrity;

4) Close and secure the well site. Clean up and remove any debris left from the sampling event. Be sure that wastes are properly containerized and labeled;

5) Review sampling records. Ensure that necessary data is completed. Add additional information as may be needed; and

6) Periodically transport the collected samples to the centralized logistics area, where samples are packed and shipped, along with a Chain-of-Custody form, to the laboratory.

5.6 DECONTAMINATION PROCEDURES

Decontamination of field sampling equipment will follow the procedures set forth in SOP # 2 – Equipment Decontamination. Because the PDBs are disposed of after one use, the water level indicator is the only instrument that will require decontamination.

SOP #6 – SOIL SAMPLING

6.1 EQUIPMENT

6.1.1 Direct Push Sampling

Direct push sampling involves advancing a sampling probe by direct hydraulic pressure or by using a slide or rotary hammer. Soil samples are collected from a 4- or 5-foot long acetate sleeves used to line the inside of probe rod. After removing the sleeve from the probe rod, the sleeve is split/cut to expose the sample. (Refer to SOP #7 regarding start of subsurface work.)

6.1.2 Split-Spoon Sampling

When soil samples collected using HSA drilling techniques are to be submitted for laboratory analysis, they are collected using a decontaminated, stainless steel, continuous drive, modified split-spoon samplers, or equivalent. These samplers are 24 inches in length and have an OD of 3 inches. The sample is obtained by driving the sampler a distance of 24 inches into undisturbed soil with a 140-pound hammer, using a free falling a distance of 30 inches. The number of hammer blows for seating the spoon and for the penetration test is then recorded for each 6 inches of penetration on the drill log (e.g., 5/7/8/9). The standard penetration test result (N) is obtained by adding the second and third figures (e.g., 7 + 8 = 15 blows per foot).

6.2 SOIL FIELD SCREENING PROCEDURES

Field screening will be used to help assess locations where contamination is most likely to be present. As soon as the split-spoon or acetate liner is opened, the soil core shall be screened for organic vapors using a PID or FID in accordance with the following procedure:

1) Partially fill (one-third to one-half) a clean jar or clean ziplock bag with the sample to be screened. The total capacity of the jar or bag may not be less than eight ounces (app. 250ml), but the container should not be so large as to allow vapor diffusion and stratification effects to significantly affect the sample;

2) Samples collected from a split-spoon will be transferred to the jar or bag for headspace analysis immediately after opening the split-spoon. Samples collected from an excavation or soil pile will be collected from freshly uncovered soil;

3) Jars will be quickly covered with clean aluminum foil or a jar lid; screw tops or thick rubber bands will be used to tightly seal the jar. Ziplock bags will be quickly sealed shut;

4) Headspace vapors will be allowed to develop in the container for at least 10 minutes but no longer than one hour. Containers will be shaken or agitated for 15 seconds at the beginning and end of the headspace development period to assist volatilization. Temperatures of the headspace will be warmed to at least 40°F (approximately 5°C) with instruments calibrated for the temperature used;

5) Insert the sampling probe to approximately one-half the headspace depth. The container opening will be minimized and care will be taken to avoid the uptake of water droplets and soil particulates;

6) Record the highest meter reading (norm y occurring between two and five seconds after probe insertion). If erratic meter response occurs at high organic vapor concentrations or conditions of elevated headspace moisture, a note to that effect will accompany the headspace data;

7) Calibration of PID and FID field instruments will follow the manufacturer's operations manual; and

8) Field-screening results will be documented in the field record or log book.

6.3 SAMPLE COLLECTION FOR LABORATORY ANALYSIS

Soil samples will be collected in accordance with the following procedures:

1) Samples will be collected with disposable or clean tools that have been decontaminated. Samples for analysis of VOCs shall be collected with Encore™ samplers (or equivalent). Samples will NOT be collected from aliquots used for headspace screening;

2) After samples designated for VOC analysis have been collected, the remaining sample fraction shall be homogenized in a stainless steel vessel. The soil should be scraped from the sides, corners and bottom of the vessel, rolled into the middle of the decontaminated stainless steel bowl or tray (or in-situ hole) and mixed. The soil should then be quartered (divided into 4) and moved to the sides of the bowl/tray/hole. Each quarter should then be mixed individually, and then rolled to the center of the bowl/tray/hole and mixed with the entire sample again. These steps of quartering the soil, mixing individually and then mixing the entire sample again should be repeated at least twice. Once a consistent physical appearance over the homogenized soil has been obtained, the soil should be transferred into the appropriate sample container using the decontaminated stainless steel spoon or spatula;

3) Disposable gloves will be worn and changed between sample collections;

4) Soil samples will be placed in pre-labeled containers in the order of volatility;

5) Containers will be quickly and adequately sealed, and rims will be cleaned before tightening lids; and

6) Samples will be placed on wet ice to preserve to 4°C (refer to Worksheets 19a and 19b of the QAPP for sample containers and preservation methods).

SOP #7 – MONITORING WELL INSTALLATION AND DEVELOPMENT

7.1 GENERAL DRILLING PROCEDURES

7.1.1 Drilling activities shall conform to Appendix 6.1, Monitoring Well Construction and Installation, of the New Jersey Department of Environmental Protection Field Sampling Procedures Manual (NJDEP 2005) and shall be supervised by a qualified geologist or engineer. Well permits will be obtained from the NJDEP Division of Water Supply Bureau of Water Systems and Well Permitting by the NJ-licensed driller, and the NJ-licensed driller will perform drilling/well installation and well development activities.

7.1.2 The location of borings shall be coordinated with FTMM before drilling commences. Utility location will be in accordance with SOP #1 – Site Reconnaissance, Preparation, and Restoration Procedures. Proposed well and soil boring locations will be adjusted if a location is not considered safe by utility locator services or by other methods (e.g. magnetometer). Subsurface work will start by hand auger at well and soil boring locations considered safe, but which are in proximity to a subsurface utility. Once a proposed well soil boring location has been hand augered to five feet, the location will be considered safe for powered drilling tools.

7.1.3 Drilling shall be performed using a truck-mounted drill rig using hollow stem auger (HSA) techniques. If unexpected site conditions (i.e., the presence of dense NAPL) dictate the need for alternative drilling methods, an addendum to this SOP will be prepared. The drill rig shall be cleaned and decontaminated in accordance with the procedure in SOP #2, Equipment Decontamination. The drill rig shall not leak any fluids that may enter the borehole or contaminate equipment placed in the hole. The use of rags or absorbent materials to absorb leaking fluids is unacceptable.

7.1.4 Vertical boreholes shall be straight and plumb. The position of the drill components at the start of drilling will be checked with a bubble level to ensure that boreholes begin in a plumb position. During drilling, factors that could affect the verticality of the borehole such as excessive speed of drilling or excessive down pressure on the drill string shall be noted and corrected. When drilling boreholes through more than one water-bearing zone or aquifer, the contractor shall take measures to prevent cross-connection or cross-contamination of these zones or aquifers.

7.1.5 A log of drilling activities shall be kept in a bound field notebook. Information in the log book shall include location, time on site, personnel and equipment present, down time, materials used, samples collected, measurements taken, and any other observations or information that would be necessary to reconstruct field activities at a later date. The drilling supervisor shall complete a daily drilling log at the end of each day of drilling.

7.2 BOREHOLE LOGGING

7.2.1 Borehole lithology will be logged from split spoon samples. The frequency of samples will be based on the goals of the project and the conceptual site model for a specific area. If numerous borings are scoped for an area and the stratigraphy is well known, then one split spoon per 5-ft auger flight will be collected. However, if the stratigraphy is not well defined or the depth to a specific unit (e.g., a confining unit) requires targeting, then continuous sampling would be appropriate.

The lithology in boreholes shall be logged in the field notebook or in a Soil Boring Log (**Appendix B** of the SAP). The boring log shall document the following information for each boring: (1) boring or well identification (this identification shall be unique, and not been used previously at the installation); (2) purpose of the boring (e.g., soil sampling, monitoring well); (3) location in relation to an easily identifiable landmark; (4) names of drilling contractor and logger; (5) start and finish dates and times; (6) drilling method; (7) types of drilling fluids and depths at which they were used; (8) diameters of surface casing, casing type, and methods of installation; (9) depth at which saturated conditions were first encountered; (10) lithologic descriptions and depths of lithologic boundaries; (11) sampling-interval depths; (12) zones of caving or heaving; (13) depth at which drilling fluid was lost and the amount lost; (14) changes in drilling fluid properties; (15) drilling rate; and (16) drilling rig reactions, such as chatter, rod drops, and bouncing.

7.2.2 Additional information to be recorded includes the depth to the water table, caving or sloughing of the borehole, changes in drilling rate, depths of laboratory samples, presence of organic materials, presence of fractures or voids in consolidated materials, and other noteworthy observations or conditions such as the locations of geologic boundaries.

7.2.3 Unconsolidated samples for lithologic description shall be obtained continuously or as specifically stated in the Work Plan. Lithologic descriptions of unconsolidated materials encountered in the boreholes shall generally be described in accordance with American Society for Testing and Materials (ASTM) D-2488-90 Standard Practice for Description and Identification of Soils (Visual-Manual Procedure) (ASTM, 1990). Descriptive information to be recorded in the field shall include: (1) identification of the predominant particles size and range of particle sizes; (2) percent of gravel, sand, fines, or the combination of the three; (3) description of grading and sorting of coarse particles; (4) particle angularity and shape; and (5) maximum particle size or dimension. Plasticity of fines description shall include: (1) moisture content (dry, wet, or moist); (2) consistency of fine-grained soils; (3) structure of consolidated materials; and (4) cementation (weak, moderate, or strong).

7.2.4 Cuttings shall be examined for evidence of contamination and materials that are suspected to be contaminated because of color, odor, or organic vapor monitor readings shall be containerized in labeled 55-gallon drums.

7.3 MONITORING WELL CONSTRUCTION

Following completion of drilling, the well will be constructed using the following guidelines:

7.3.1 **Well Casings and Screen** - The well casings and screen will be 2-inch ID, flush joint, threaded, schedule 40 polyvinyl chloride (PVC) (Type 1, Grade 1 in accordance with ASTM D1784) with a threaded PVC plug. The screen sections will be ten feet in length with 0.01-inch openings (10-slot). The screen shall be free of any ink or printing. If the depth to water is less than two feet, then the monitoring well screen should begin at a depth of two feet below land surface in order to allow proper placement of the filter pack above the screen, filter pack seal, and the surface seal.

7.3.2 **Vent Caps** - A PVC vent cap shall be provided for the riser.

7.3.3 **Sand Pack/Grout Seal** - The filter pack surrounding the well screen will be a clean, inert, siliceous material with a uniformity coefficient that does not exceed 2.5. The sand pack will extend above the well screen no more than five feet and may be graded from coarser to finer (going upward) to minimize penetration of the overlying grout.

7.3.4 **Grout Seal** - The grout mixture will extend above the filter pack to the surface and shall be a mixture of Type I Portland Cement (1-94 lb. bag) and potable water (approximately 7 gallons) in appropriate quantity to fill the borehole.

7.3.5 **Concrete Surface Seal** - The concrete surface seal must be constructed with dimensions of 2 x 2 feet square and a thickness of one foot. The concrete will be placed in a 2 x 2-foot form around the base of the protective casing at ground surface. The surface seal must also be constructed to prevent ponding of rainwater or irrigation water around the well and surface water from entering the well.

7.3.6 **Protective Cover** - Monitoring wells will be finished either to the ground surface (installed with water-tight flush-mounted traffic and/or manhole covers) or above ground surface (installed with watertight fittings and a protective steel casing). The flush-mounted covers should be installed as far above grade as possible without creating a hazard to foot or vehicle traffic. The well riser pipe will be flush-mounted to ground level and installed inside of a manhole casing when inside residential neighborhoods, places of business, or within areas of heavy traffic. Well riser pipes and protective covers will be completed above grade in undeveloped and wooded areas.

7.3.7 **Well Identification** - A padlock or other specialized lock (keyed alike for wells onsite) will be provided and will permanently mark each well with the well number, date installed, site name, top-of-casing elevation and ground elevation.

7.3.8 A Well Construction Detail form (**Appendix B** of the SAP) shall be completed for each permanent and temporary monitoring well installed. It shall include the following information: (1) well identification (this shall be identical to the boring identification described); (2) drilling method; (3) installation date(s); (4) elevations of ground surface and the measuring point notch; (5) total boring depth; (6) lengths and descriptions of the screen and casing; (7) lengths and descriptions of the filter pack, bentonite seal, casing grout, and any back-filled material; (8) elevation of water surface before and immediately after development; and (9) summary of the material penetrated by the boring.

7.3.9 A "Monitoring Well Certification – Form A – As-Built Certification" will be completed by the licensed driller.

7.4 MONITORING WELL DEVELOPMENT

7.4.1 Wells installed using HSA methods shall not be developed for 24 hours after installation. Development removes sediment from inside the well casing and flushes fines from the portion of the formation adjacent to the screen. Development shall be accomplished using a bailer or pump and surge blocks as needed. Development shall be continued until a turbid-free discharge is achieved per the NJDEP Field Sampling Procedures Manual (the turbidity goal is less than 10 NTUs, but this may not always be achievable).

7.4.2 During development, turbidity, specific conductivity, temperature, and pH will be measured with direct reading meters. Development will be complete when the well has been developed to a turbid-free discharge.

7.4.3 Development shall continue until the water is turbid-free (the turbidity goal is less than 10 NTUs, but this may not always be achievable) or until up to five casing volumes of water has been removed, or until the well has been bailed or pumped dry twice. A well development form is provided in **Appendix B** of the SAP.

7.5 WELL SURVEY

A New Jersey-licensed surveyor will survey the location of the well and the elevation of the top of the innermost casing to the nearest 0.01 foot. A "Groundwater Monitoring Well Certification – Form B – Location Information" will be completed by the licensed surveyor.

SOP #8 – SLUG TESTS

This procedure is applicable to determine the horizontal hydraulic conductivity of distinct geologic horizons under in situ conditions. This procedure can be used for unconfined or confined aquifers.

8.1 METHOD SUMMARY

A slug test involves the instantaneous injection or withdrawal of a volume or slug of water or solid cylinder of known volume. This is accomplished by displacing a known volume of water from a well and measuring the artificial fluctuation of the groundwater level.

8.2 EQUIPMENT

The following equipment will be needed to perform slug tests:

- Electronic water level meter;
- Pressure transducer/data logger;
- Field log book and indelible dark-ink pens;
- Watch/clock;
- Laptop computer with data logger software installed;
- Bailer or slug; and
- Container for purged water.

8.3 OFFICE/PRE-MOBILIZATION PROCEDURE

The following tasks will be performed prior to mobilization:

- Procure necessary equipment following project procurement requirements;
- Review the operator's manual provided with the electronic data logger and transducer;
- If using a laptop computer for the test, install necessary software;
- Test the pressure transducer and data logger to be sure it is functional; and
- Ensure equipment batteries are fully charged and replacements are available.

8.4 ORDER OF FIELD PROCEDURES

1) When the slug test is performed using an electronic data logger and pressure transducer, data will be stored internally or on the computer hard drive or diskettes. The field notebook should be used to record:
   - Site ID;
   - Location of test (Well ID);
   - Date and time;
   - Initial depth to water measured from the top of the well casing;
   - Total depth of well;

- Well conditions (note damage or other deficiencies);
- Description (i.e., size and volume) of slug or bailer used for the test;
- Test method (falling or rising head test);
- Description of other field equipment used in the test;
- Comments and observations; and
- Start and stop time of the test.

2) Decontaminate the water level meter, transducer, and cable;

3) Measure and record the static water level by measuring the depth to water periodically for several minutes and taking the average of the readings. Test wells in order from least contaminated to most contaminated, if this information is known;

4) Before beginning the slug test, information will be recorded and entered into the electronic data logger. The type of information may vary depending on the model used. Consult the operator's manual for the proper data entry sequence to be used. Most data loggers should provide an option for recording data on a log or linear scale. Optimally, the data logger will be programmed to record data on a log scale. If only linear data recording is available, the data logger should be programmed to record at a minimum of once per second;

5) Install the transducer and cable in the well to a depth below the target drawdown estimated for the test but at least 1 foot from the bottom of the well. Be sure the depth of submergence is within the design range stamped on the transducer. If applicable, protect the transducer cables from shape edges of the well casing. Secure the transducer cable to the well to keep the transducer at a constant depth;

6) Connect the transducer cable to the data logger or computer;

7) Slowly lower a bailer into the well so that it is fully submerged but just below the water surface (for rising head test). Be careful not to move the pressure transducer during this step;

8) Allow the water level and temperature of the transducer to stabilize in the well;

9) Immediately prior (several seconds) to starting the test - start the data logger. The data logger must be started before the slug is added or removed from the well;

10) "Instantaneously" remove the bailer from the well by using a quick and smooth motion (rising head test). Ensure that the bailer does not leak water into the well when it is removed from the well casing. If the bailer leaks when it is withdrawn, restart the test at step #7;

11) Another method to conduct the test is to introduce a solid cylinder of known volume to displace and raise the water level (falling head test). Once the water level stabilizes, restart the data logger and remove the slug for a rising head test;

12) Continue measuring and recording water-level/time measurements until the water level returns to equilibrium conditions or a sufficient number of readings have been made to clearly show a trend on a semi-log plot of time versus depth;

13) Retrieve slug (if applicable) and remove the pressure transducer;

14) Decontaminate equipment and properly dispose of investigation-derived waste;

15) Download and print data for the project file as soon as possible; and

16) The time required for a slug test to be completed is a function of the volume of the slug, the hydraulic conductivity of the formation, and the type of well completion. The volume of the slug should be large enough that a sufficient number of water level measurements can be made before the water level returns to equilibrium conditions. The length of the test may range from several minutes to several hours.

8.5 QUALITY ASSURANCE/QUALITY CONTROL

Each well should be tested at least twice to compare and validate the test results.

APPENDIX B
FIELD FORMS

- Low-Flow Groundwater Calibration Procedures Checklist Form;
- Field Calibration Log Sheet;
- Groundwater Measurements Record;
- Low-flow Purge and Sampling (LFPS) Record - Groundwater;
- Soil Boring Log;
- Well Construction Detail (Single Cased – Road Box);
- Well Development Report;
- Slug Test Form;
- Chain of Custody Form – ALS;
- Chain of Custody Form – Accutest; and
- Waste Generation Form.

LOW-FLOW GROUNDWATER CALIBRATION PROCEDURES CHECKLIST FORM

1. ORDERING EQUIPMENT (FIELD TEAM LEADER/ANALYST INITIAL HERE: _____)

- ❑ Pine Environmental Calibration Statement
- ❑ YSI 6820/6920 or equivalent
  - ❑ Membrane DO sensor
- ❑ Standards
  - ❑ pH: 4.0, 10.0, 7.0
  - ❑ 1 Specific Conductivity standard for daily calibration
  - ❑ ORP
  - ❑ Turbidity: 0.0 and _____(=<100.0) NTU
  - ❑ ***If sampling more than 20 wells*:** Second Source Turbidity Standard (N/A)
- ❑ Certificates of Analysis for all Standards
- ❑ DI water

2. QUALITY CONTROL PRIOR TO MOBILIZATION (ANALYST INITIAL HERE: _____)

- ❑ Verify that YSI has membrane DO sensor
- ❑ Verify that all standards are within the appropriate ranges (discard and replace out of range standards)
- ❑ Check the expiration dates on all standards (discard and replace expired standards)
- ❑ If storing any standards, label with DATE RECEIVED and DATE OPENED (N/A)
- ❑ Verify inclusion of Pine Environmental Calibration Statement
- ❑ pH Calibration: 4.0, 10.0 (pass / fail)
  - ❑ pH verification: 7.0 (pass / fail)
- ❑ Turbidity Calibration: 0.0 NTU and _____ NTU (pass / fail)
- ❑ Conductivity Calibration: 5 point calibration (pass / fail)
- ❑ Redox Calibration (pass / fail)
- ❑ Scan Pine documentation into lab calibration files (\\somersetfs01\Projects\NJDEP Lab Certification\Quality Assurance\Calibration Logs). Save by "YSI Serial No_Project Name_Date" (ex: 00F1381AA_Keasbey_010111).

3. DAILY FIELD CALIBRATIONS (ANALYST INITIAL HERE: _____)

- ❑ Calibrate the YSI for specific conductivity (1-point calibration)
- ❑ Calibrate the YSI for pH (4.0 and 10.0 standards)
- ❑ Verify the pH calibration using the 7.0 standard
- ❑ Calibrate the YSI for Dissolved Oxygen (air calibration)
- ❑ Calibrate the YSI for ORP
- ❑ Calibrate the YSI for Turbidity (0 NTU and =<100 NTU)

4. CONTINUING CALIBRATION VERIFICATIONS (ANALYST INITIAL HERE: _____)

- ❑ Every three hours, verify the pH calibration using the 7.0 standard (date/time: _____)
- ❑ Every three hours, verify the pH calibration using the 7.0 standard (date/time: _____)
- ❑ Every three hours, verify the pH calibration using the 7.0 standard (date/time: _____)
- ❑ After sampling 20 wells, analyze and record a second source QC turbidity standard (date: _____)

5. RECORD-KEEPING (FIELD TEAM LEADER/ANALYST INITIAL HERE: _____)

- ❑ Place rental calibration certificates in lab file cabinet
- ❑ Complete and place this form in lab file cabinet
- ❑ Scan and save all field calibration log forms to \\somersetfs01\Projects\NJDEP Lab Certification\Quality Assurance\Calibration Logs\Field

Last Updated: 10/8/2012

PARSONS

FIELD CALIBRATION LOG SHEET

Site: _____

Personnel: _____

Date: _____ **Start Time:** _____ **End Time:** _____

Probe Serial No.		Meter	
DO		Make:	
pH		Model:	
Spec. Cond.		Serial No.:	
ORP		Pine Serial No.:	
Turbidity			

Dissolved Oxygen Calibration		Turbidity Calibration and Verification		ORP Calibration	
		Standard	Initial Reading → Meter Reset to	Standard	Initial Reading → Meter Reset to
Water Temp (°C)		**0 NTU**		**240 mV**	
Bar. Pres. (mm Hg)		Lot No.:		Lot No.:	
Initial Saturation (%)		Exp. Date:			
Initial Reading (mg/L)		**100 / 126 NTU**		Exp. Date:	
Meter Reset to (mg/L)		Lot No.:			
O_2 Saturation (%)		Exp. Date:			

Specific Conductance Calibration

	Concentration	Initial Reading	Reset to	Temperature	Lot No. and Exp. Date
Standard #1					

pH Calibration

Buffer	Temperature	Initial Reading	mV	Meter Reset To	Lot No. and Exp. Date
4.0					
10.0					
7.0 check				NA	

7.0 Buffer Check (Every 3 hours after initial calibration; must be w/in ± 0.2 pH units of 7.0)

Time	Temperature	Initial Reading	mV	Meter Reset To	Lot No. and Exp. Date
				NA	
				NA	
				NA	
				NA	

Groundwater Measurements Record

CLIENT: USACE
PROJECT NAME: Fort Monmouth
PROJECT LOCATION:
PROJECT NUMBER:

DATE:
INSPECTOR:
CREW:
WEATHER:

Liquid Indicator:

Note: all depths measured from marked location on riser

Well ID	Time	Depth to NAPL	Depth to Water	Depth Bottom of Well	Casing Stickup Above Ground Surface	Comments

LOW FLOW PURGE AND SAMPLING (LFPS) RECORD - GROUNDWATER

PARSONS	CLIENT:	WELL # :

SAMPLING INFORMATION

SAMPLING DEVICE: _____

SAMPLE NAME (ID): _____

SAMPLE PARAMETER	TIME	CONTAINER	COLOR	TURBIDITY	COMMENTS

QA\QC SAMPLES:

DUPLICATE SAMPLE COLLECTED: YES or NO

DUPLICATE SAMPLE NAME (ID): _____

MS/MSD SAMPLE COLLECTED: YES or NO

MS / MSD SAMPLE NAME (ID): _____

PURGING AND SAMPLING COMMENTS:

INVESTIGATION DERIVED WASTE (IDW):

Date:									
Volume Transfered to Drum:									
Drum Number:									

PARSONS

Page __1___ of _____

Soil Boring Log

CLIENT: USACE	**INSPECTOR:**	**BORING/WELL NO:**
PROJECT NAME: Fort Monmouth	**DRILLER:**	**LOCATION DESCRIPTION**
PROJECT LOCATION:	**WEATHER:**	
PROJECT NUMBER:	**CONTRACTOR:**	
GROUNDWATER OBSERVATIONS	**RIG TYPE:**	**LOCATION PLAN**
	DATE/TIME START:	Oceanport, New Jersey
WATER LEVEL:	**DATE/TIME FINISH:**	
DATE:	**WEIGHT OF HAMMER:**	
TIME:	**DROP OF HAMMER:**	
MEAS. FROM:	**TYPE OF HAMMER:**	

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0							
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							

Remarks:

Sample Types	Consistency vs. Blowcount / Foot	
S – Split-Spoon	Granular (Sand & Gravel) / Fine Grained (Silt & Clay)	and - 35-50%
U – Undisturbed Tube	V. Loose: 0-4 Dense: 30-50 V. Soft: <2 Stiff: 8-15	some - 20-35%
C – Rock Core	Loose: 4-10 V. Dense:: >50 Soft: 2-4 V. Stiff: 15-30	little - 10-20%
A – Auger Cuttings	M. Dense: 10-30 M. Stiff: 4-8 Hard: > 30	trace - <10%
		moisture, density, color, gradation

1

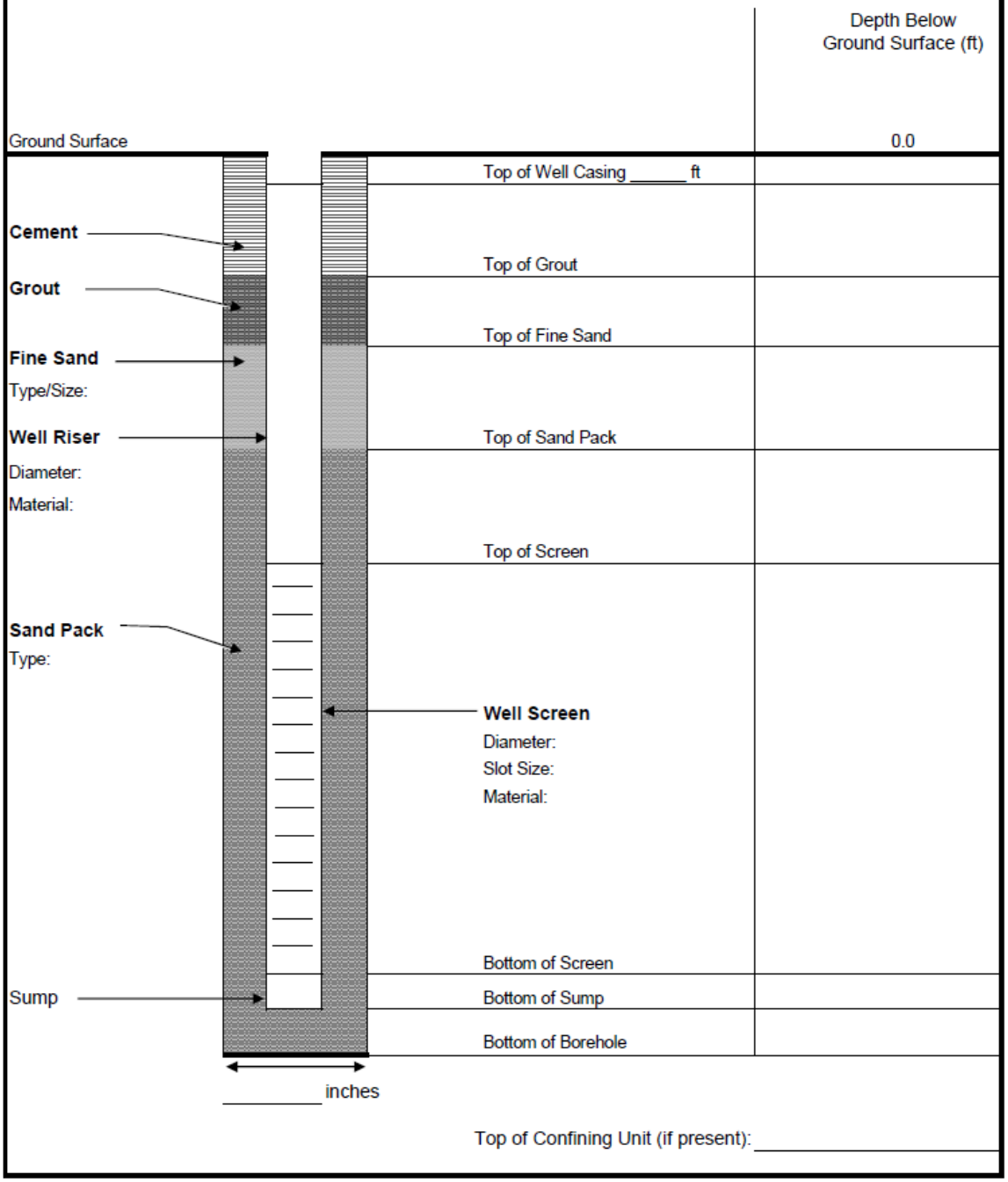
PARSONS

Well Construction Detail (Single Cased - Road Box)

Client: USACE

Well ID: NJBWA Permit No.

Date Well Installed: Location:



1

PARSONS

Page _____ of _____

WELL DEVELOPMENT REPORT

CLIENT: USACE	WELL ID:
PROJECT NAME: Fort Monmouth	DATE:
LOCATION:	PROJECT NO. :

DRILLING METHOD (s):	INSPECTOR:
PUMP METHOD (s):	CONTRACTOR:
SURGE METHOD (s):	CREW:
INSTALLATION DATE:	START DEVELOPMENT DATE:
	END DEVELOPMENT DATE:

WATER DEPTH (TOC): _____ ft	INSTALLED POW DEPTH(TOC): _____ ft
WELL DIA. (ID CASING): _____ ft	MEASURED POW DEPTH(TOC): _____ ft
BORING DIAMETER: _____ ft	SILT THICKNESS: _____ ft
	POW AFTER DEVELOPMENT: _____ ft

DIAMETER FACTORS (GAL/FT):

DIAMETER (IN):	2	3	4	5	6	7	8	9	10	11	12
GALLONS/ FT:	0.163	0.367	0.654	1.02	1.47	2.00	2.61	3.30	4.08	4.93	5.87

STANDING VOLUME INSIDE WELL = WATER COLUMN X WELL DIAMETER FACTOR = _____ GAL. = A

STANDING WATER IN ANNULAR SPACE =
WATER COL. BELOW SEAL(ft) X (BORING DIAM. FACTOR - WELL DIAM. FACTOR) X 0.3 = GAL. = B

SINGLE STANDING WATER VOLUME = A + B = ... GAL. = C

MINIMUM VOLUME TO BE REMOVED = 5 X C . . . . . GALS.

ACTIVITY	START TIME	END TIME	ELAPSED TIME	GALLONS REMOVED	pH (std)	CONDUCTIVITY (_____)	TEMP (____)	COLOR	TURBIDITY (ntu)	OTHER
TOTALS/FINAL										

COMMENTS:

1

SLUG TEST FORM

PARSONS | CLIENT: USACE | WELL:

PROJECT: Fort Monmouth
AREA:
SOP NO.:

INSPECTOR:
TEST DATE:
CHECKED BY:

WELL AND AQUIFER INFORMATION

WELL POINT (installed):
WELL CASING INNER DIAMETER:
BOREHOLE DIAMETER:
STATIC DEPTH TO WATER:
SCREENED INTERVAL - FROM:
TO:
(all depths measured from TOC, or taken from installation detail)

WELL SCREEN SLOT SIZE:
AQUIFER THICKNESS:
PRODUCT PRESENT (Y/N?)

TEST EQUIPMENT SPECIFICATIONS

DATA LOGGER BRAND:
INSTRUMENT MODEL:
TRANSDUCER BRAND:

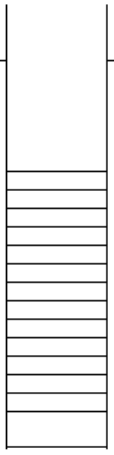
TRANSDUCER RATING (PSI):
SLUG/BAILER DIMENSIONS:
SLUG/BAILER VOLUME:

TEST INFORMATION

REFERENCE VALUE:
TRANSDUCER MODE: SURFACE LEVEL or TOC
STATIC WATER (START):
START TIME:
END TIME:
STATIC WATER (END):
ELAPSED TIME:

DATA LOGGER TEST NUMBER:
TRANSDUCER DEPTH:
TRANSDUCER - LINEARITY:
- SCALE:
- OFFSET:
- DELAY:
SAT. SCREEEN LENGTH:

NOTES:

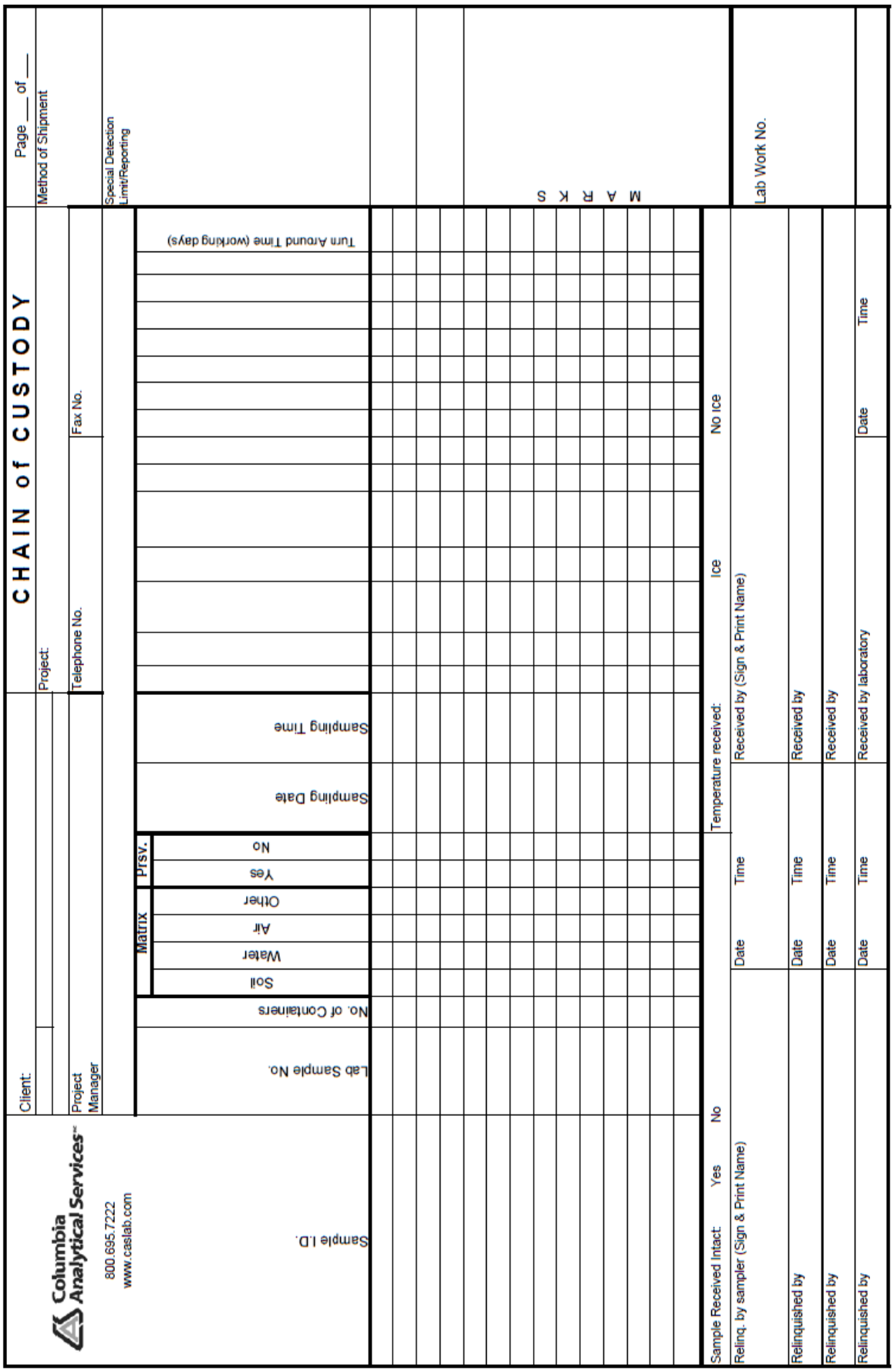


TOP OF PVC RISER: 0.00 ft
GROUND SURFACE
TOP OF SCREEN:
BOTTOM OF SCREEN:
POINT OF WELL:

(ALL DEPTHS RELATIVE TO THE TOP OF PVC CASING)

COMMENTS:
CONVERSION: 2.3O667 FEET OF WATER FOR EACH PSI
YOU MUST RESET THE REFERENCE VALUE PRIOR TO BEGINNING EACH TEST!

1


CHAIN of CUSTODY
Page ___ of ___
Columbia Analytical Services
800.695.7222
www.caslab.com
Client:
Project:
Project Manager
Telephone No.
Fax No.
Method of Shipment
Special Detection Limit/Reporting
Sample I.D.
Lab Sample No.
No. of Containers
Matrix
Soil
Water
Air
Other
Prsv.
Yes
No
Sampling Date
Sampling Time
Turn Around Time (working days)
M A R K S
Lab Work No.
Sample Received Intact: Yes No
Temperature received: Ice No ice
Relinq. by sampler (Sign & Print Name)
Received by (Sign & Print Name)
Relinquished by
Received by
Relinquished by
Received by
Relinquished by
Received by laboratory
Date
Time

ACCUTEST LABORATORIES

CHAIN OF CUSTODY

PAGE ___ OF ___

2235 Route 130, Dayton, NJ 08810
TEL. 732-329-0200 FAX: 732-329-3499/3480
www.accutest.com

FED-EX Tracking #	Bottle Order Control #
Accutest Quote #	Accutest Job #

Client / Reporting Information	Project Information	Billing Information (If different from Report to)
Company Name	Project Name:	
Street Address	Street	
City State Zip	City State	Company Name
Project Contact E-mail	Project #	Street Address
Phone # Fax #	Client Purchase Order #	City State Zip
Sampler(s) Name(s) Phone #	Project Manager	Attention:

Requested Analysis (see TEST CODE sheet)

Matrix Codes

DW - Drinking Water
GW - Ground Water
WW - Water
SW - Surface Water
SO - Soil
SL- Sludge
SED-Sediment
OI - Oil
LIQ - Other Liquid
AIR - Air
SOL - Other Solid
WP - Wipe
FB-Field Blank
EB-Equipment Blank
RB- Rinse Blank
TB-Trip Blank

Accutest Sample #	Field ID / Point of Collection	MEOH/DI Vial #	Collection Date	Collection Time	Sampled by	Matrix	# of bottles	Number of preserved Bottles: HCl	NaOH	HNO3	H2SO4	NONE	DI Water	MEOH	ENCORE	LAB USE ONLY

Turnaround Time (Business days)

Approved By (Accutest PM): / Date:

- ☐ Std. 10 Business Days
- ☐ 5 Day RUSH
- ☐ 3 Day EMERGENCY
- ☐ 2 Day EMERGENCY
- ☐ 1 Day EMERGENCY
- ☐ other _____

Emergency & Rush T/A data available VIA Lablink

Data Deliverable Information

- ☐ Commercial "A" (Level 1)
- ☐ Commercial "B" (Level 2)
- ☐ FULLT1 (Level 3+4)
- ☐ NJ Reduced
- ☐ Commercial "C"
- ☐ NYASP Category A
- ☐ NYASP Category B
- ☐ State Forms
- ☐ EDD Format _____
- ☐ Other _____

Commercial "A" = Results Only
Commercial "B" = Results + QC Summary
NJ Reduced = Results + QC Summary + Partial Raw data

Comments / Special Instructions

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1		1	2		2
3		3	4		4
5		5			

Custody Seal # ☐ Intact ☐ Not Intact | Preserved where applicable ☐ | On Ice ☐ | Cooler Temp.

Remedial Investigation / Feasibility Study / Decision Documents
Fort Monmouth, Oceanport,
Monmouth County, New Jersey

Waste Generation Form

Date _____

Waste Type _____

Container (circle one) Drum Rolloff Other

Size/Type _____

Container ID# _____

Location _____

Suspected Hazardous Waste or from Chromium Area Yes No

If yes, provide explaination: _____

_____

Process Generating Waste (circle one) Drilling Excavation PPE Sampling Spill Cleanup Other

If other, Please describe: _____

_____

Submitted By: _____

Date: _____

PARSONS

APPENDIX C
LABORATORY CERTIFICATIONS AND SOPS

Laboratory Certifications and SOPs are attached as a CD.

PERRY JOHNSON LABORATORY ACCREDITATION, INC.

Certificate of Accreditation

Perry Johnson Laboratory Accreditation, Inc. has assessed the Laboratory of:

Columbia Analytical Services

1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623

(Hereinafter called the Organization) and hereby declares that Organization has met the requirements of ISO/IEC 17025:2005 "General Requirements for the competence of Testing and Calibration Laboratories" and the DoD Quality Systems Manual for Environmental Laboratories Version 4.1 4/22/2009 and is accredited is accordance with the:

United States Department of Defense
Environmental Laboratory Accreditation Program
(DoD-ELAP)

This accreditation demonstrates technical competence for the defined scope:

Environmental Testing

(As detailed in the supplement)

Accreditation claims for such testing and/or calibration services shall only be made from addresses referenced within this certificate. This Accreditation is granted subject to the system rules governing the Accreditation referred to above, and the Organization hereby covenants with the Accreditation body's duty to observe and comply with the said rules.

For PJLA:

Initial Accreditation Date:	*Issue Date:*	*Accreditation No.:*	*Certificate No.:*
January 22, 2010	April 7, 2012	65817	L12-48

Tracy Szerszen
President/Operations Manager

Perry Johnson Laboratory
Accreditation, Inc. (PJLA)
755 W. Big Beaver, Suite 1325
Troy, Michigan 48084

The validity of this certificate is maintained through ongoing assessments based on a continuous accreditation cycle. The validity of this certificate should be confirmed through the PJLA website: www.pjlabs.com

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Certificate of Accreditation: Supplement

ISO/IEC 17025:2005 and DoD-ELAP

Columbia Analytical Services

1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14609
Lisa Reyes Phone: 585-288-5380

Accreditation is granted to the facility to perform the following testing:

Matrix	Standard/Method	Technology	Analyte
Aqueous	(CAS SOP) GEN-TICW	UV-VIS	Total inorganic carbon
Aqueous	EPA 1631	CVAFS	Mercury
Aqueous	EPA 1664A	Gravimetric	Oil and grease
Aqueous	EPA 1664A	Gravimetric	Total petroleum hydrocarbons
Aqueous	EPA 218.6	IC-UV	Chromium, Hexavalent
Aqueous	EPA 245.1	CVAA	Mercury
Aqueous	EPA 300.0	IC	Chloride
Aqueous	EPA 300.0	IC	Fluoride
Aqueous	EPA 300.0	IC	Nitrate
Aqueous	EPA 300.0	IC	Sulfate
Aqueous	EPA 351.2	UV-VIS	Nitrogen, total Kjeldahl
Aqueous	EPA 353.2	UV-VIS	Nitrite as N
Aqueous	EPA 410.4	UV-VIS	Chemical oxygen demand
Aqueous	EPA 7470A	CVAA	Mercury
Aqueous	EPA 8151A	GC-ECD	Dinoseb
Aqueous	EPA 8260C	GC-MS-SIM	1,1-Dichloroethene
Aqueous	EPA 8260C	GC-MS-SIM	1,2-Dichlorobenzene
Aqueous	EPA 8260C	GC-MS-SIM	1,2-Dichloroethane
Aqueous	EPA 8260C	GC-MS-SIM	1,4-Dioxane
Aqueous	EPA 8260C	GC-MS-SIM	Carbon tetrachloride
Aqueous	EPA 8260C	GC-MS-SIM	Dichloromethane
Aqueous	EPA 8260C	GC-MS-SIM	Ethylbenzene
Aqueous	EPA 8260C	GC-MS-SIM	m- + p-Xylene
Aqueous	EPA 8260C	GC-MS-SIM	o-Xylene
Aqueous	EPA 8260C	GC-MS-SIM	Tetrachloroethene
Aqueous	EPA 8260C	GC-MS-SIM	Trichloroethene
Aqueous	EPA 8260C	GC-MS-SIM	Vinyl chloride
Aqueous	EPA 8260C	GC-MS-SIM	Xylenes, total
Aqueous	EPA 8310	HPLC-UV/FLUOR	Acenaphthene
Aqueous	EPA 8310	HPLC-UV/FLUOR	Acenaphthylene
Aqueous	EPA 8310	HPLC-UV/FLUOR	Anthracene
Aqueous	EPA 8310	HPLC-UV/FLUOR	Benzo(a)antracene
Aqueous	EPA 8310	HPLC-UV/FLUOR	Benzo(a)pyrene

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Matrix	Standard/Method	Technology	Analyte
Aqueous	EPA 8310	HPLC-UV/FLUOR	Benzo(b)fluoranthene
Aqueous	EPA 8310	HPLC-UV/FLUOR	Benzo(g,h,i)perylene
Aqueous	EPA 8310	HPLC-UV/FLUOR	Benzo(k)fluoranthene
Aqueous	EPA 8310	HPLC-UV/FLUOR	Chrysene
Aqueous	EPA 8310	HPLC-UV/FLUOR	Dibenzo(a,h)anthracene
Aqueous	EPA 8310	HPLC-UV/FLUOR	Fluoranthene
Aqueous	EPA 8310	HPLC-UV/FLUOR	Fluorene
Aqueous	EPA 8310	HPLC-UV/FLUOR	Indeno(1,2,3-cd)pyrene
Aqueous	EPA 8310	HPLC-UV/FLUOR	Naphthalene
Aqueous	EPA 8310	HPLC-UV/FLUOR	Phenanthrene
Aqueous	EPA 8310	HPLC-UV/FLUOR	Pyrene
Aqueous	EPA 9040B, C	POT	pH
Aqueous	EPA 9060, A	UV-VIS	Total organic carbon
Aqueous	EPA 9066	UV-VIS	Phenolics, total
Aqueous	RSK-175	GC-FID	Ethane
Aqueous	RSK-175	GC-FID	Ethylene
Aqueous	RSK-175	GC-FID	Methane
Aqueous	RSK-175	GC-FID	Propane
Aqueous	RSK-175	GC-FID	Acetylene
Aqueous	SM 2320B	Titration	Alkalinity, total, carbonate, and bicarbonate
Aqueous	SM 2340C	Titration	Hardness, total
Solids	(CAS SOP) GEN-351.2	UV-VIS	Nitrogen, total Kjeldahl
Solids	(CAS SOP) GEN-420.4/9066	UV-VIS	Phenolics, total
Solids	EPA Lloyd Kahn	UV-VIS	Total organic carbon
Solids	EPA 300.0	IC	Chloride
Solids	EPA 300.0	IC	Fluoride
Solids	EPA 300.0	IC	Nitrate
Solids	EPA 300.0	IC	Sulfate
Solids	EPA 7471B	CVAA	Mercury
Solids	EPA 8330A	HPLC-UV	1,3,5-Trinitrobenzene
Solids	EPA 8330A	HPLC-UV	1,3-Dinitrobenzene
Solids	EPA 8330A	HPLC-UV	2,4,6-Trinitrotoluene
Solids	EPA 8330A	HPLC-UV	2,4-Dinitrotoluene

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ISO/IEC 17025:2005 and DoD-ELAP

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Accreditation is granted to the facility to perform the following testing:

Matrix	Standard/Method	Technology	Analyte
Solids	EPA 8330A	HPLC-UV	2,6-Dinitrotoluene
Solids	EPA 8330A	HPLC-UV	2-Amino-4,6-dinitrotoluene
Solids	EPA 8330A	HPLC-UV	2-Nitrotoluene
Solids	EPA 8330A	HPLC-UV	3-Nitrotoluene
Solids	EPA 8330A	HPLC-UV	4-Amino-2,6-dinitrotoluene
Solids	EPA 8330A	HPLC-UV	4-Nitrotoluene
Solids	EPA 8330A	HPLC-UV	HMX
Solids	EPA 8330A	HPLC-UV	Nitrobenzene
Solids	EPA 8330A	HPLC-UV	RDX
Solids	EPA 8330A	HPLC-UV	Tetryl
Solids	EPA 9045C, D	POT	pH
Solids	SM 5220B	Titration	Chemical oxygen demand
Aqueous/Solids	EPA 1010A	Pensky Martin	Ignitability
Aqueous/Solids	EPA 353.2	UV-VIS	Nitrate/nitrite as N
Aqueous/Solids	EPA 6010C	ICP-AES	Aluminum
Aqueous/Solids	EPA 6010C	ICP-AES	Antimony
Aqueous/Solids	EPA 6010C	ICP-AES	Arsenic
Aqueous/Solids	EPA 6010C	ICP-AES	Barium
Aqueous/Solids	EPA 6010C	ICP-AES	Beryllium
Aqueous/Solids	EPA 6010C	ICP-AES	Boron
Aqueous/Solids	EPA 6010C	ICP-AES	Cadmium
Aqueous/Solids	EPA 6010C	ICP-AES	Calcium
Aqueous/Solids	EPA 6010C	ICP-AES	Chromium
Aqueous/Solids	EPA 6010C	ICP-AES	Cobalt
Aqueous/Solids	EPA 6010C	ICP-AES	Copper
Aqueous/Solids	EPA 6010C	ICP-AES	Iron
Aqueous/Solids	EPA 6010C	ICP-AES	Lead
Aqueous/Solids	EPA 6010C	ICP-AES	Magnesium
Aqueous/Solids	EPA 6010C	ICP-AES	Manganese
Aqueous/Solids	EPA 6010C	ICP-AES	Nickel
Aqueous/Solids	EPA 6010C	ICP-AES	Potassium
Aqueous/Solids	EPA 6010C	ICP-AES	Selenium
Aqueous/Solids	EPA 6010C	ICP-AES	Silver

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Lisa Reyes Phone: 585-288-5380

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Matrix	Standard/Method	Technology	Analyte
Aqueous/Solids	EPA 6010C	ICP-AES	Sodium
Aqueous/Solids	EPA 6010C	ICP-AES	Thallium
Aqueous/Solids	EPA 6010C	ICP-AES	Tin
Aqueous/Solids	EPA 6010C	ICP-AES	Vanadium
Aqueous/Solids	EPA 6010C	ICP-AES	Zinc
Aqueous/Solids	EPA 6020A	ICP-MS	Arsenic
Aqueous/Solids	EPA 6020A	ICP-MS	Antimony
Aqueous/Solids	EPA 6020A	ICP-MS	Barium
Aqueous/Solids	EPA 6020A	ICP-MS	Beryllium
Aqueous/Solids	EPA 6020A	ICP-MS	Cadmium
Aqueous/Solids	EPA 6020A	ICP-MS	Chromium
Aqueous/Solids	EPA 6020A	ICP-MS	Cobalt
Aqueous/Solids	EPA 6020A	ICP-MS	Copper
Aqueous/Solids	EPA 6020A	ICP-MS	Lead
Aqueous/Solids	EPA 6020A	ICP-MS	Manganese
Aqueous/Solids	EPA 6020A	ICP-MS	Nickel
Aqueous/Solids	EPA 6020A	ICP-MS	Selenium
Aqueous/Solids	EPA 6020A	ICP-MS	Silver
Aqueous/Solids	EPA 6020A	ICP-MS	Thallium
Aqueous/Solids	EPA 6020A	ICP-MS	Vanadium
Aqueous/Solids	EPA 6020A	ICP-MS	Zinc
Aqueous/Solids	EPA 680	GC-MS	Monochlorobiphenyls, Total
Aqueous/Solids	EPA 680	GC-MS	Dichlorobiphenyls, Total
Aqueous/Solids	EPA 680	GC-MS	Trichlorobiphenyls, Total
Aqueous/Solids	EPA 680	GC-MS	Tetrachlorobiphenyls, Total
Aqueous/Solids	EPA 680	GC-MS	Pentachlorobiphenyls, Total
Aqueous/Solids	EPA 680	GC-MS	Hexachlorobiphenyls, Total
Aqueous/Solids	EPA 680	GC-MS	Heptachlorobiphenyls, Total
Aqueous/Solids	EPA 680	GC-MS	Octachlorobiphenyls, Total
Aqueous/Solids	EPA 680	GC-MS	Nonachlorobiphenyls, Total
Aqueous/Solids	EPA 680	GC-MS	Decachlorobiphenyls, Total
Aqueous/Solids	EPA 6850	HPLC-MS	Perchlorate

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Columbia Analytical Services

1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14609
Lisa Reyes Phone: 585-288-5380

Accreditation is granted to the facility to perform the following testing:

Matrix	Standard/Method	Technology	Analyte
Aqueous/Solids	EPA 7196A	UV-VIS	Chromium, hexavalent
Aqueous/Solids	EPA 7199	IC-UV	Chromium, hexavalent
Aqueous/Solids	EPA 8015C	GC-FID	Gasoline range organics
Aqueous/Solids	EPA 8015C	GC-FID	Diesel range organics
Aqueous/Solids	EPA 8081B	GC-ECD	4,4'-DDD
Aqueous/Solids	EPA 8081B	GC-ECD	4,4'-DDE
Aqueous/Solids	EPA 8081B	GC-ECD	4,4'-DDT
Aqueous/Solids	EPA 8081B	GC-ECD	Aldrin
Aqueous/Solids	EPA 8081B	GC-ECD	α-BHC
Aqueous/Solids	EPA 8081B	GC-ECD	Alpha-chlordane
Aqueous/Solids	EPA 8081B	GC-ECD	β-BHC
Aqueous/Solids	EPA 8081B	GC-ECD	Chlordane, technical
Aqueous/Solids	EPA 8081B	GC-ECD	δ-BHC
Aqueous/Solids	EPA 8081B	GC-ECD	Dieldrin
Aqueous/Solids	EPA 8081B	GC-ECD	Endosulfan I
Aqueous/Solids	EPA 8081B	GC-ECD	Endosulfan II
Aqueous/Solids	EPA 8081B	GC-ECD	Endosulfan sulfate
Aqueous/Solids	EPA 8081B	GC-ECD	Endrin
Aqueous/Solids	EPA 8081B	GC-ECD	Endrin aldehyde
Aqueous/Solids	EPA 8081B	GC-ECD	Endrin ketone
Aqueous/Solids	EPA 8081B	GC-ECD	γ-BHC (Lindane)
Aqueous/Solids	EPA 8081B	GC-ECD	γ-Chlordane
Aqueous/Solids	EPA 8081B	GC-ECD	Heptachlor
Aqueous/Solids	EPA 8081B	GC-ECD	Heptachlor epoxide
Aqueous/Solids	EPA 8081B	GC-ECD	Hexachlorobenzene
Aqueous/Solids	EPA 8081B	GC-ECD	Methoxychlor
Aqueous/Solids	EPA 8081B	GC-ECD	Toxaphene
Aqueous/Solids	EPA 8082A	GC-ECD	PCB 1016
Aqueous/Solids	EPA 8082A	GC-ECD	PCB 1221
Aqueous/Solids	EPA 8082A	GC-ECD	PCB 1232
Aqueous/Solids	EPA 8082A	GC-ECD	PCB 1242
Aqueous/Solids	EPA 8082A	GC-ECD	PCB 1248
Aqueous/Solids	EPA 8082A	GC-ECD	PCB 1254

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ISO/IEC 17025:2005 and DoD-ELAP

Columbia Analytical Services

1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14609
Lisa Reyes Phone: 585-288-5380

Accreditation is granted to the facility to perform the following testing:

Matrix	Standard/Method	Technology	Analyte
Aqueous/Solids	EPA 8082A	GC-ECD	PCB 1260
Aqueous/Solids	EPA 8082A	GC-ECD	PCB 1268
Aqueous/Solids	EPA 8151A	GC-ECD	2,4-D
Aqueous/Solids	EPA 8151A	GC-ECD	Dicamba
Aqueous/Solids	EPA 8151A	GC-ECD	2,4,5-T
Aqueous/Solids	EPA 8151A	GC-ECD	2,4,5-TP
Aqueous/Solids	EPA 8151A	GC-ECD	Pentachlorophenol (PCP)
Aqueous/Solids	EPA 8260C	GC-MS	1,1,1,2-Tetrachloroethane
Aqueous/Solids	EPA 8260C	GC-MS	1,1,1-Trichloroethane
Aqueous/Solids	EPA 8260C	GC-MS	1,1,2,2-Tetrachloroethane
Aqueous/Solids	EPA 8260C	GC-MS	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)
Aqueous/Solids	EPA 8260C	GC-MS	1,1,2-Trichloroethane
Aqueous/Solids	EPA 8260C	GC-MS	1,1-Dichloroethane
Aqueous/Solids	EPA 8260C	GC-MS	1,1-Dichloroethene
Aqueous/Solids	EPA 8260C	GC-MS	1,1-Dichloropropene
Aqueous/Solids	EPA 8260C	GC-MS	1,2,3-Trichlorobenzene
Aqueous/Solids	EPA 8260C	GC-MS	1,2,3-Trichloropropane
Aqueous/Solids	EPA 8260C	GC-MS	1,2,4-Trichlorobenzene
Aqueous/Solids	EPA 8260C	GC-MS	1,2,4-Trimethylbenzene
Aqueous/Solids	EPA 8260C	GC-MS	1,2-Dibromo-3-chloropropane
Aqueous/Solids	EPA 8260C	GC-MS	1,2-Dibromoethane
Aqueous/Solids	EPA 8260C	GC-MS	1,2-Dichloro-1,1,2,2-tetrafluoroethane (Freon-114)
Aqueous/Solids	EPA 8260C	GC-MS	1,2-Dichloro-1,1,2-trifluoroethane (Freon 123a)
Aqueous/Solids	EPA 8260C	GC-MS	1,2-Dichlorobenzene
Aqueous/Solids	EPA 8260C	GC-MS	1,2-Dichloroethane
Aqueous/Solids	EPA 8260C	GC-MS	1,2-Dichloroethene, total
Aqueous/Solids	EPA 8260C	GC-MS	1,2-Dichloropropane
Aqueous/Solids	EPA 8260C	GC-MS	1,3,5-Trimethylbenzene
Aqueous/Solids	EPA 8260C	GC-MS	1,3-Dichlorobenzene
Aqueous/Solids	EPA 8260C	GC-MS	1,3-Dichloropropane
Aqueous/Solids	EPA 8260C	GC-MS	1,4-Dichlorobenzene
Aqueous/Solids	EPA 8260C	GC-MS	1,4-Dioxane

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Columbia Analytical Services

1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14609
Lisa Reyes Phone: 585-288-5380

Accreditation is granted to the facility to perform the following testing:

Matrix	Standard/Method	Technology	Analyte
Aqueous/Solids	EPA 8260C	GC-MS	2,2-Dichloro-1,1,1-trifluoroethane (Freon 123)
Aqueous/Solids	EPA 8260C	GC-MS	2,2-Dichloropropane
Aqueous/Solids	EPA 8260C	GC-MS	2-Butanone (MEK)
Aqueous/Solids	EPA 8260C	GC-MS	2-Chloro-1,3-butadiene
Aqueous/Solids	EPA 8260C	GC-MS	2-Chloroethylvinyl ether
Aqueous/Solids	EPA 8260C	GC-MS	2-Chlorotoluene
Aqueous/Solids	EPA 8260C	GC-MS	2-Hexanone
Aqueous/Solids	EPA 8260C	GC-MS	2-Methyl-1-propanol (Isobutlyl alcohol)
Aqueous/Solids	EPA 8260C	GC-MS	2-Methyl-2-propanol (Tertbutyl alcohol)
Aqueous/Solids	EPA 8260C	GC-MS	2-Nitropropane
Aqueous/Solids	EPA 8260C	GC-MS	2-Propanol
Aqueous/Solids	EPA 8260C	GC-MS	3-Chloro-1-propene (Allyl chloride)
Aqueous/Solids	EPA 8260C	GC-MS	4-Chlorotoluene
Aqueous/Solids	EPA 8260C	GC-MS	4-Ethyltoluene
Aqueous/Solids	EPA 8260C	GC-MS	4-Isopropyltoluene
Aqueous/Solids	EPA 8260C	GC-MS	4-Methyl-2-pentanone (MIBK)
Aqueous/Solids	EPA 8260C	GC-MS	Acetone
Aqueous/Solids	EPA 8260C	GC-MS	Acetonitrile
Aqueous/Solids	EPA 8260C	GC-MS	Acrolein
Aqueous/Solids	EPA 8260C	GC-MS	Acrylonitrile
Aqueous/Solids	EPA 8260C	GC-MS	Benzene
Aqueous/Solids	EPA 8260C	GC-MS	Benzyl chloride
Aqueous/Solids	EPA 8260C	GC-MS	Bromobenzene
Aqueous/Solids	EPA 8260C	GC-MS	Bromochloromethane
Aqueous/Solids	EPA 8260C	GC-MS	Bromodichloromethane
Aqueous/Solids	EPA 8260C	GC-MS	Bromoform
Aqueous/Solids	EPA 8260C	GC-MS	Bromomethane
Aqueous/Solids	EPA 8260C	GC-MS	Carbon disulfide
Aqueous/Solids	EPA 8260C	GC-MS	Carbon tetrachloride
Aqueous/Solids	EPA 8260C	GC-MS	Chlorobenzene
Aqueous/Solids	EPA 8260C	GC-MS	Chloroethane
Aqueous/Solids	EPA 8260C	GC-MS	Chloroform
Aqueous/Solids	EPA 8260C	GC-MS	Chloromethane

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Accreditation is granted to the facility to perform the following testing:

Matrix	Standard/Method	Technology	Analyte
Aqueous/Solids	EPA 8260C	GC-MS	cis-1,2-Dichloroethene
Aqueous/Solids	EPA 8260C	GC-MS	cis-1,3-Dichloropropene
Aqueous/Solids	EPA 8260C	GC-MS	Cyclohexane
Aqueous/Solids	EPA 8260C	GC-MS	Cyclohexanone
Aqueous/Solids	EPA 8260C	GC-MS	Dibromochloromethane
Aqueous/Solids	EPA 8260C	GC-MS	Dibromomethane
Aqueous/Solids	EPA 8260C	GC-MS	Dichlorodifluoromethane (Freon 12)
Aqueous/Solids	EPA 8260C	GC-MS	Dichlorofluoromethane (Freon 21)
Aqueous/Solids	EPA 8260C	GC-MS	Dichloromethane
Aqueous/Solids	EPA 8260C	GC-MS	Diethyl ether
Aqueous/Solids	EPA 8260C	GC-MS	Diisopropyl ether
Aqueous/Solids	EPA 8260C	GC-MS	Ethyl methacrylate
Aqueous/Solids	EPA 8260C	GC-MS	Ethyl tert-butyl ether
Aqueous/Solids	EPA 8260C	GC-MS	Ethylbenzene
Aqueous/Solids	EPA 8260C	GC-MS	Hexachlorobutadiene
Aqueous/Solids	EPA 8260C	GC-MS	Iodomethane
Aqueous/Solids	EPA 8260C	GC-MS	Isopropylbenzene
Aqueous/Solids	EPA 8260C	GC-MS	m- + p-Xylene
Aqueous/Solids	EPA 8260C	GC-MS	Methacrylonitrile
Aqueous/Solids	EPA 8260C	GC-MS	Methyl acetate
Aqueous/Solids	EPA 8260C	GC-MS	Methyl methacrylate
Aqueous/Solids	EPA 8260C	GC-MS	Methylcyclohexane
Aqueous/Solids	EPA 8260C	GC-MS	Methyl-tert-butyl ether (MTBE)
Aqueous/Solids	EPA 8260C	GC-MS	Napthalene
Aqueous/Solids	EPA 8260C	GC-MS	N-butylacetate
Aqueous/Solids	EPA 8260C	GC-MS	N-butylbenzene
Aqueous/Solids	EPA 8260C	GC-MS	N-heptane
Aqueous/Solids	EPA 8260C	GC-MS	N-propylbenzene
Aqueous/Solids	EPA 8260C	GC-MS	o-Xylene
Aqueous/Solids	EPA 8260C	GC-MS	Propionitrile
Aqueous/Solids	EPA 8260C	GC-MS	sec-butylbenzene
Aqueous/Solids	EPA 8260C	GC-MS	Styrene
Aqueous/Solids	EPA 8260C	GC-MS	tert-amyl methyl ether

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Matrix	Standard/Method	Technology	Analyte
Aqueous/Solids	EPA 8260C	GC-MS	tert-butylbenzene
Aqueous/Solids	EPA 8260C	GC-MS	Tetra hydrofuran
Aqueous/Solids	EPA 8260C	GC-MS	Tetrachloroethene
Aqueous/Solids	EPA 8260C	GC-MS	Toluene
Aqueous/Solids	EPA 8260C	GC-MS	trans-1,2-Dichloroethene
Aqueous/Solids	EPA 8260C	GC-MS	trans-1,3-Dichloropropene
Aqueous/Solids	EPA 8260C	GC-MS	trans-1,4-Dichloro-2-butene
Aqueous/Solids	EPA 8260C	GC-MS	Trichloroethene
Aqueous/Solids	EPA 8260C	GC-MS	Trichlorofluoromethane (Freon 11)
Aqueous/Solids	EPA 8260C	GC-MS	Vinyl acetate
Aqueous/Solids	EPA 8260C	GC-MS	Vinyl chloride
Aqueous/Solids	EPA 8260C	GC-MS	Xylenes, total
Aqueous/Solids	EPA 8270D	GC-MS	1,2,4,5-Tetrachlorobenzene
Aqueous/Solids	EPA 8270D	GC-MS	1,2,4-Trichlorobenzene
Aqueous/Solids	EPA 8270D	GC-MS	1,2-Dichlorobenzene
Aqueous/Solids	EPA 8270D	GC-MS	1,2-Diphenylhydrazine
Aqueous/Solids	EPA 8270D	GC-MS	1,3,5-Trinitrobenzene
Aqueous/Solids	EPA 8270D	GC-MS	1,3-Dichlorobenzene
Aqueous/Solids	EPA 8270D	GC-MS	1,3-Dinitrobenzene
Aqueous/Solids	EPA 8270D	GC-MS	1,4-Dichlorobenzene
Aqueous/Solids	EPA 8270D	GC-MS	1,4-Dioxane
Aqueous/Solids	EPA 8270D	GC-MS	1,4-Naphthoquinone
Aqueous/Solids	EPA 8270D	GC-MS	1-Methyl-2-pyrrolidinone
Aqueous/Solids	EPA 8270D	GC-MS	1-Methylnaphthalene
Aqueous/Solids	EPA 8270D	GC-MS	1-Naphthylamine
Aqueous/Solids	EPA 8270D	GC-MS	2,3,4,6-Tetrachlorophenol
Aqueous/Solids	EPA 8270D	GC-MS	2,4,5-Trichlorophenol
Aqueous/Solids	EPA 8270D	GC-MS	2,4,6-Trichlorophenol
Aqueous/Solids	EPA 8270D	GC-MS	2,4-Dichlorophenol
Aqueous/Solids	EPA 8270D	GC-MS	2,4-Dimethylphenol
Aqueous/Solids	EPA 8270D	GC-MS	2,4-Dinitrophenol
Aqueous/Solids	EPA 8270D	GC-MS	2,4-Dinitrotoluene
Aqueous/Solids	EPA 8270D	GC-MS	2,6-Dichlorophenol

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Columbia Analytical Services

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Accreditation is granted to the facility to perform the following testing:

Matrix	Standard/Method	Technology	Analyte
Aqueous/Solids	EPA 8270D	GC-MS	2,6-Dinitrotoluene
Aqueous/Solids	EPA 8270D	GC-MS	2-Acetylaminofluorene
Aqueous/Solids	EPA 8270D	GC-MS	2-Chloronaphthalene
Aqueous/Solids	EPA 8270D	GC-MS	2-Chlorophenol
Aqueous/Solids	EPA 8270D	GC-MS	2-Methyl-5-nitroaniline (5-Nitro-o-toluidine)
Aqueous/Solids	EPA 8270D	GC-MS	2-Methylnaphthalene
Aqueous/Solids	EPA 8270D	GC-MS	2-Methylphenol
Aqueous/Solids	EPA 8270D	GC-MS	2-Naphthylamine
Aqueous/Solids	EPA 8270D	GC-MS	2-Nitroaniline
Aqueous/Solids	EPA 8270D	GC-MS	2-Nitrophenol
Aqueous/Solids	EPA 8270D	GC-MS	2-Picoline
Aqueous/Solids	EPA 8270D	GC-MS	3,3'-Dichlorobenzidine
Aqueous/Solids	EPA 8270D	GC-MS	3,3'-Dimethylbenzidine
Aqueous/Solids	EPA 8270D	GC-MS	3+4-Methylphenol
Aqueous/Solids	EPA 8270D	GC-MS	3-Methylcholanthrene
Aqueous/Solids	EPA 8270D	GC-MS	3-Nitroaniline
Aqueous/Solids	EPA 8270D	GC-MS	4,6-Dinitro-2-methylphenol
Aqueous/Solids	EPA 8270D	GC-MS	4-Aminobiphenyl
Aqueous/Solids	EPA 8270D	GC-MS	4-Bromophenyl-phenylether
Aqueous/Solids	EPA 8270D	GC-MS	4-Chloro-3-methylphenol
Aqueous/Solids	EPA 8270D	GC-MS	4-Chloroaniline
Aqueous/Solids	EPA 8270D	GC-MS	4-Chlorophenyl-phenylether
Aqueous/Solids	EPA 8270D	GC-MS	4-Nitroaniline
Aqueous/Solids	EPA 8270D	GC-MS	4-Nitrophenol
Aqueous/Solids	EPA 8270D	GC-MS	4-Nitroquinoline-1-oxide
Aqueous/Solids	EPA 8270D	GC-MS	7,12-Dimethylbenz(a)anthracene
Aqueous/Solids	EPA 8270D	GC-MS	α,α-Dimethylphenethylamine
Aqueous/Solids	EPA 8270D	GC-MS	Acenaphthene
Aqueous/Solids	EPA 8270D	GC-MS	Acenaphthylene
Aqueous/Solids	EPA 8270D	GC-MS	Acetophenone
Aqueous/Solids	EPA 8270D	GC-MS	Aniline
Aqueous/Solids	EPA 8270D	GC-MS	Anthracene
Aqueous/Solids	EPA 8270D	GC-MS	Aramite

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Columbia Analytical Services

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Accreditation is granted to the facility to perform the following testing:

Matrix	Standard/Method	Technology	Analyte
Aqueous/Solids	EPA 8270D	GC-MS	Atrazine
Aqueous/Solids	EPA 8270D	GC-MS	Benzaldehyde
Aqueous/Solids	EPA 8270D	GC-MS	Benzidine
Aqueous/Solids	EPA 8270D	GC-MS	Benzo(a)anthracene
Aqueous/Solids	EPA 8270D	GC-MS	Benzo(a)pyrene
Aqueous/Solids	EPA 8270D	GC-MS	Benzo(b)fluoranthene
Aqueous/Solids	EPA 8270D	GC-MS	Benzo(g,h,i)perylene
Aqueous/Solids	EPA 8270D	GC-MS	Benzo(k)fluoranthene
Aqueous/Solids	EPA 8270D	GC-MS	Benzoic acid
Aqueous/Solids	EPA 8270D	GC-MS	Benzyl alcohol
Aqueous/Solids	EPA 8270D	GC-MS	Biphenyl
Aqueous/Solids	EPA 8270D	GC-MS	Bis(1-chloroisopropyl)ether
Aqueous/Solids	EPA 8270D	GC-MS	Bis(-2-chloroethoxy)methane
Aqueous/Solids	EPA 8270D	GC-MS	Bis(2-chloroethyl)ether
Aqueous/Solids	EPA 8270D	GC-MS	Bis(2-ethylhexyl)phthalate
Aqueous/Solids	EPA 8270D	GC-MS	Butyl benzyl phthalate
Aqueous/Solids	EPA 8270D	GC-MS	Caprolactam
Aqueous/Solids	EPA 8270D	GC-MS	Carbazole
Aqueous/Solids	EPA 8270D	GC-MS	Chlorobenzilate
Aqueous/Solids	EPA 8270D	GC-MS	Chrysene
Aqueous/Solids	EPA 8270D	GC-MS	Cyclohexane, isothiocyanato-
Aqueous/Solids	EPA 8270D	GC-MS	Diallate
Aqueous/Solids	EPA 8270D	GC-MS	Dibenzo(a,h)anthracene
Aqueous/Solids	EPA 8270D	GC-MS	Dibenzofuran
Aqueous/Solids	EPA 8270D	GC-MS	Diethylphthalate
Aqueous/Solids	EPA 8270D	GC-MS	Dimethoate
Aqueous/Solids	EPA 8270D	GC-MS	Dimethyl phthalate
Aqueous/Solids	EPA 8270D	GC-MS	Di-n-butylphthalate
Aqueous/Solids	EPA 8270D	GC-MS	Di-n-octyl phthalate
Aqueous/Solids	EPA 8270D	GC-MS	Dinoseb
Aqueous/Solids	EPA 8270D	GC-MS	Diphenylamine
Aqueous/Solids	EPA 8270D	GC-MS	Disulfoton
Aqueous/Solids	EPA 8270D	GC-MS	Ethyl methanesulfonate

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Matrix	Standard/Method	Technology	Analyte
Aqueous/Solids	EPA 8270D	GC-MS	Fluoranthene
Aqueous/Solids	EPA 8270D	GC-MS	Fluorene
Aqueous/Solids	EPA 8270D	GC-MS	Hexachlorobenzene
Aqueous/Solids	EPA 8270D	GC-MS	Hexachlorobutadiene
Aqueous/Solids	EPA 8270D	GC-MS	Hexachlorocyclopentadiene
Aqueous/Solids	EPA 8270D	GC-MS	Hexachloroethane
Aqueous/Solids	EPA 8270D	GC-MS	Hexachlorophene
Aqueous/Solids	EPA 8270D	GC-MS	Hexachloropropene
Aqueous/Solids	EPA 8270D	GC-MS	Indeno(1,2,3-cd)pyrene
Aqueous/Solids	EPA 8270D	GC-MS	Isodrin
Aqueous/Solids	EPA 8270D	GC-MS	Isophorone
Aqueous/Solids	EPA 8270D	GC-MS	Isosafrole
Aqueous/Solids	EPA 8270D	GC-MS	Methapyrilene
Aqueous/Solids	EPA 8270D	GC-MS	Methyl methanesulfonate
Aqueous/Solids	EPA 8270D	GC-MS	Methyl parathion
Aqueous/Solids	EPA 8270D	GC-MS	Naphthalene
Aqueous/Solids	EPA 8270D	GC-MS	Nitrobenzene
Aqueous/Solids	EPA 8270D	GC-MS	N-nitrosodiethylamine
Aqueous/Solids	EPA 8270D	GC-MS	N-nitrosodimethylamine
Aqueous/Solids	EPA 8270D	GC-MS	N-nitrosodi-n-butylamine
Aqueous/Solids	EPA 8270D	GC-MS	N-nitroso-di-n-propylamine
Aqueous/Solids	EPA 8270D	GC-MS	N-nitrosodiphenylamine
Aqueous/Solids	EPA 8270D	GC-MS	N-nitrosomethylethylamine
Aqueous/Solids	EPA 8270D	GC-MS	N-nitrosomorpholine
Aqueous/Solids	EPA 8270D	GC-MS	N-nitrosopiperidine
Aqueous/Solids	EPA 8270D	GC-MS	N-nitrosopyrolidine
Aqueous/Solids	EPA 8270D	GC-MS	Octachlorostyrene
Aqueous/Solids	EPA 8270D	GC-MS	o,o,o-triethyl phosphorothioate
Aqueous/Solids	EPA 8270D	GC-MS	o-toluidine
Aqueous/Solids	EPA 8270D	GC-MS	Parathion (ethyl)
Aqueous/Solids	EPA 8270D	GC-MS	p-dimethylaminoazobenzene
Aqueous/Solids	EPA 8270D	GC-MS	Pentachlorobenzene
Aqueous/Solids	EPA 8270D	GC-MS	Pentachloroethane

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Matrix	Standard/Method	Technology	Analyte
Aqueous/Solids	EPA 8270D	GC-MS	Pentachloronitrobenzene
Aqueous/Solids	EPA 8270D	GC-MS	Pentachlorophenol
Aqueous/Solids	EPA 8270D	GC-MS	Phenacetin
Aqueous/Solids	EPA 8270D	GC-MS	Phenanthrene
Aqueous/Solids	EPA 8270D	GC-MS	Phenol
Aqueous/Solids	EPA 8270D	GC-MS	Phorate
Aqueous/Solids	EPA 8270D	GC-MS	Phthalimide
Aqueous/Solids	EPA 8270D	GC-MS	Pyrene
Aqueous/Solids	EPA 8270D	GC-MS	Pyridine
Aqueous/Solids	EPA 8270D	GC-MS	Safrole
Aqueous/Solids	EPA 8270D	GC-MS	Sulfotepp
Aqueous/Solids	EPA 8270D	GC-MS	Thionazin
Aqueous/Solids	EPA 8270D	GC-MS-LL	1,4-Dioxane
Aqueous/Solids	EPA 8270D	GC-MS-LL	1-Methylnaphthalene
Aqueous/Solids	EPA 8270D	GC-MS-LL	2-Methylnaphthalene
Aqueous/Solids	EPA 8270D	GC-MS-LL	Acenaphthene
Aqueous/Solids	EPA 8270D	GC-MS-LL	Acenaphthylene
Aqueous/Solids	EPA 8270D	GC-MS-LL	Anthracene
Aqueous/Solids	EPA 8270D	GC-MS-LL	Benzo(a)anthracene
Aqueous/Solids	EPA 8270D	GC-MS-LL	Benzo(a)pyrene
Aqueous/Solids	EPA 8270D	GC-MS-LL	Benzo(b)fluoranthene
Aqueous/Solids	EPA 8270D	GC-MS-LL	Benzo(g,h,i)perylene
Aqueous/Solids	EPA 8270D	GC-MS-LL	Benzo(k)fluoranthene
Aqueous/Solids	EPA 8270D	GC-MS-LL	Bis(2-ethylhexyl)phthalate
Aqueous/Solids	EPA 8270D	GC-MS-LL	Butyl benzyl phthalate
Aqueous/Solids	EPA 8270D	GC-MS-LL	Carbazole
Aqueous/Solids	EPA 8270D	GC-MS-LL	Chrysene
Aqueous/Solids	EPA 8270D	GC-MS-LL	Dibenzo(a,h)anthracene
Aqueous/Solids	EPA 8270D	GC-MS-LL	Dibenzofuran
Aqueous/Solids	EPA 8270D	GC-MS-LL	Diethyl phthalate
Aqueous/Solids	EPA 8270D	GC-MS-LL	Dimethyl phthalate
Aqueous/Solids	EPA 8270D	GC-MS-LL	Di-n-butyl phthalate
Aqueous/Solids	EPA 8270D	GC-MS-LL	Di-n-octyl phthalate

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Matrix	Standard/Method	Technology	Analyte
Aqueous/Solids	EPA 8270D	GC-MS-LL	Fluoranthene
Aqueous/Solids	EPA 8270D	GC-MS-LL	Fluorene
Aqueous/Solids	EPA 8270D	GC-MS-LL	Hexachlorobenzene
Aqueous/Solids	EPA 8270D	GC-MS-LL	Indeno(1,2,3-cd)pyrene
Aqueous/Solids	EPA 8270D	GC-MS-LL	Naphthalene
Aqueous/Solids	EPA 8270D	GC-MS-LL	Nitrobenzene
Aqueous/Solids	EPA 8270D	GC-MS-LL	Octachlorostyrene
Aqueous/Solids	EPA 8270D	GC-MS-LL	Phenanthrene
Aqueous/Solids	EPA 8270D	GC-MS-LL	Pyrene
Aqueous/Solids	EPA 8270D	GC-MS-LL	Pyridine
Aqueous/Solids	EPA 9012A, B	UV-VIS	Cyanide, total
Aqueous/Solids	EPA 9034	Titration	Sulfide, acid soluble
Aqueous/Solids	EPA 9056A	IC	Bromide
Aqueous/Solids	EPA 9056A	IC	Chloride
Aqueous/Solids	EPA 9056A	IC	Fluoride
Aqueous/Solids	EPA 9056A	IC	Nitrate as Nitrogen
Aqueous/Solids	EPA 9056A	IC	Nitrite as Nitrogen
Aqueous/Solids	EPA 9056A	IC	Sulfate
Aqueous/Solids	GEN-AVS	Titrimetric	Acid Volatile Sulfide
Aqueous/Solids	EPA 8330B	HPLC	1,3,5-Trinitrobenzene
Aqueous/Solids	EPA 8330B	HPLC	1,3-Dinitrobenzene
Aqueous/Solids	EPA 8330B	HPLC	2,4,6-Trinitrotoluene (TNT)
Aqueous/Solids	EPA 8330B	HPLC	2,4-Dinitrotoluene
Aqueous/Solids	EPA 8330B	HPLC	2,6-Dinitrotoluene
Aqueous/Solids	EPA 8330B	HPLC	2-Amino 4,6-Dinitrotoluene
Aqueous/Solids	EPA 8330B	HPLC	2-Nitrotoluene
Aqueous/Solids	EPA 8330B	HPLC	3,5-Dinitroaniline
Aqueous/Solids	EPA 8330B	HPLC	3-Nitrotoluene
Aqueous/Solids	EPA 8330B	HPLC	4-Amino 2,6-Dinitrotoluene
Aqueous/Solids	EPA 8330B	HPLC	4-Nitrotoluene
Aqueous/Solids	EPA 8330B	HPLC	Hexahydro 1,3,5-Trinitro 1,3,5-Triazine
Aqueous/Solids	EPA 8330B	HPLC	Methyl 2,4,6 Trinitrophenylnitramine
Aqueous/Solids	EPA 8330B	HPLC	Nitrobenzene
Aqueous/Solids	EPA 8330B	HPLC	Nitroglycerin

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ISO/IEC 17025:2005 and DoD-ELAP

Columbia Analytical Services

1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14609
Lisa Reyes Phone: 585-288-5380

Accreditation is granted to the facility to perform the following testing:

Matrix	Standard/Method	Technology	Analyte
Aqueous/Solids	EPA 8330B	HPLC	Octahydro 1.3.5.7 Tetranitro 1,3,5,7 Tetraz
Aqueous/Solids	EPA 8330B	HPLC	Pentaerythritol Tetranitrate (PETN)
Aqueous/Solids	HPLC-METACID	HPLC	Acetic Acid
Aqueous/Solids	HPLC-METACID	HPLC	Butanoic Acid (Butyric Acid)
Aqueous/Solids	HPLC-METACID	HPLC	Lactic Acid
Aqueous/Solids	HPLC-METACID	HPLC	Propionic Acid
Aqueous/Solids	HPLC-METACID	HPLC	Pyruvic Acid

Matrix	Standard/Method	Technology	Analyte
Aqueous	EPA 3010A	Acid Digestion	Metals prep
Aqueous	EPA 3510C	SF Extraction	Semivolatiles, pesticides, PCBs, DRO
Aqueous	EPA 5030B	P&T	Volatiles
Solids	EPA 3050B	Acid Digestion	Metals prep
Solids	EPA 3060A	Digestion	Hexavalent chromium digestion
Solids	EPA 3541	SOX Extraction	Semivolatiles, pesticides, PCBs, DRO
Solids	EPA 5035	P&T closed	Volatiles
Aqueous/Solids	EPA 1311	TCLP	Physical Extraction
Aqueous/Solids	EPA 1312	SPLP	Physical Extraction
Aqueous/Solids	EPA 3620B	Florisil Cleanup	Semivolatiles, pesticides, PCBs
Aqueous/Solids	EPA 3660B	Sulfur Cleanup	Semivolatiles, pesticides, PCBs
Aqueous/Solids	EPA 3665A	Sulfuric Acid Cleanup	PCBs
Aqueous/Solids	EPA 9012A, B	Distillation	Cyanide
Aqueous/Solids	EPA 9030B	Distillation	Sulfide, acid soluble

State of New Jersey
Department of Environmental Protection

Certifies That

Columbia Analytical Services, Inc.

Laboratory Certification ID # NY004

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 2009 TNI Standard approved by the

The NELAC Institute

Expiration Date June 30, 2013

NJDEP is a NELAP Recognized Accreditation Body

Joseph F. Aiello, Manager
Office of Quality Assurance

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.

New Jersey Department of Environmental Protection

National Environmental Laboratory Accreditation Program

ANNUAL CERTIFIED PARAMETER LIST AND CURRENT STATUS

Effective as of 07/01/2012 until 06/30/2013

Laboratory Name: COLUMBIA ANALYTICAL SERVICES, INC. Laboratory Number: NY004 Activity ID: NLC120001
1565 JEFFERSON RD
BLDG 300 STE 360
ROCHESTER, NY 14623

Category: SDW06 -- Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	SDW06.01010	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Bromoform
Certified	Yes	NY	SDW06.01020	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Chloroform
Certified	Yes	NY	SDW06.01030	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dibromochloromethane
Certified	Yes	NY	SDW06.01040	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Bromodichloromethane
Certified	Yes	NY	SDW06.02010	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Benzene
Certified	Yes	NY	SDW06.02020	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Carbon tetrachloride
Certified	Yes	NY	SDW06.02030	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Chlorobenzene
Certified	Yes	NY	SDW06.02040	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichlorobenzene (1,2-)
Certified	Yes	NY	SDW06.02050	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichlorobenzene (1,3-)
Certified	Yes	NY	SDW06.02060	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichlorobenzene (1,4-)
Certified	Yes	NY	SDW06.02070	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichloroethane (1,1-)
Certified	Yes	NY	SDW06.02080	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichloroethane (1,2-)
Certified	Yes	NY	SDW06.02090	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichloroethene (cis-1,2-)
Certified	Yes	NY	SDW06.02100	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichloroethene (trans-1,2-)
Certified	Yes	NY	SDW06.02110	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Methylene chloride (Dichloromethane)
Certified	Yes	NY	SDW06.02120	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichloropropane (1,2-)
Certified	Yes	NY	SDW06.02130	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Ethylbenzene
Certified	Yes	NY	SDW06.02140	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Methyl tert-butyl ether
Certified	Yes	NY	SDW06.02160	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Styrene
Certified	Yes	NY	SDW06.02170	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Tetrachloroethane (1,1,2,2-)
Certified	Yes	NY	SDW06.02180	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Tetrachloroethene
Certified	Yes	NY	SDW06.02190	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Trichloroethane (1,1,1-)
Certified	Yes	NY	SDW06.02200	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Trichloroethene
Certified	Yes	NY	SDW06.02210	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Toluene
Certified	Yes	NY	SDW06.02220	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Trichlorobenzene (1,2,4-)
Certified	Yes	NY	SDW06.02230	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichloroethene (1,1-)
Certified	Yes	NY	SDW06.02240	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Trichloroethane (1,1,2-)
Certified	Yes	NY	SDW06.02250	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Vinyl chloride
Certified	Yes	NY	SDW06.02260	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Xylenes (total)
Certified	Yes	NY	SDW06.03010	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Bromobenzene
Certified	Yes	NY	SDW06.03020	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Bromochloromethane

KEY: AE = Air and Emissions, BT = Biological Tissues, DW = Drinking Water, NPW = Non-Potable Water, SCM = Solid and Chemical Materials

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1565 JEFFERSON RD
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ROCHESTER, NY 14623

Category: SDW06 -- Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	SDW06.03030	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Bromomethane
Certified	Yes	NY	SDW06.03040	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Butyl benzene (n-)
Certified	Yes	NY	SDW06.03050	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Sec-butylbenzene
Certified	Yes	NY	SDW06.03060	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Tert-butylbenzene
Certified	Yes	NY	SDW06.03070	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Chloroethane
Certified	Yes	NY	SDW06.03080	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Chloromethane
Certified	Yes	NY	SDW06.03090	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Chlorotoluene (2-)
Certified	Yes	NY	SDW06.03100	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Chlorotoluene (4-)
Certified	Yes	NY	SDW06.03130	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dibromomethane
Certified	Yes	NY	SDW06.03140	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichlorodifluoromethane
Certified	Yes	NY	SDW06.03150	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichloropropane (1,3-)
Certified	Yes	NY	SDW06.03160	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichloropropane (2,2-)
Certified	Yes	NY	SDW06.03170	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichloropropene (1,1-)
Certified	Yes	NY	SDW06.03180	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichloropropene (cis-1,3-)
Certified	Yes	NY	SDW06.03190	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichloropropene (trans-1,3-)
Certified	Yes	NY	SDW06.03200	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Hexachlorobutadiene (1,3-)
Certified	Yes	NY	SDW06.03210	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Isopropylbenzene
Certified	Yes	NY	SDW06.03220	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Isopropyltoluene (4-)
Certified	Yes	NY	SDW06.03230	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Propylbenzene (n-)
Certified	Yes	NY	SDW06.03240	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Tetrachloroethane (1,1,1,2-)
Certified	Yes	NY	SDW06.03250	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Trichlorobenzene (1,2,3-)
Certified	Yes	NY	SDW06.03260	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Trichlorofluoromethane
Certified	Yes	NY	SDW06.03270	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Trichloropropane (1,2,3-)
Certified	Yes	NY	SDW06.03280	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Trimethylbenzene (1,2,4-)
Certified	Yes	NY	SDW06.03300	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Trimethylbenzene (1,3,5-)

Category: SHW02 -- Characteristics of Hazardous Waste

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	SHW02.03000	NPW	Aqueous Waste, Potentiometric	[SW-846 9040C] [SW-846 9040B]	Corrosivity - pH waste, >20% water

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Category: SHW03 -- Analyze-Immediately Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	SHW03.01000	NPW	Aqueous, Electrometric	[SW-846 9040C] [SW-846 9040B]	pH

Category: SHW04 -- Inorganic Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	SHW04.01000	NPW	Acid Digestion/Surface and Groundwater, ICP, FLAA	[SW-846 3005A]	Metals, Total Rec and Dissolved
Certified	Yes	NY	SHW04.01500	NPW	Acid Digestion/Aqueous Samples, ICP, FLAA	[SW-846 3010A]	Metals, Total
Certified	Yes	NY	SHW04.02000	NPW	Acid Digestion For GFAA, Aqueous	[SW-846 3020A]	Metals
Certified	Yes	NY	SHW04.33000	NPW	AA, Manual Cold Vapor	[SW-846 7470A]	Mercury - liquid waste
Certified	Yes	NY	SHW04.47300	NPW	ICP/MS	[SW-846 6020]	Uranium

Category: SHW05 -- Organic Parameters, Prep. / Screening

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	SHW05.01000	NPW	Separatory Funnel Extraction	[SW-846 3510C]	Semivolatile organics
Certified	Yes	NY	SHW05.02000	NPW	Continuous Liquid-Liquid Extraction	[SW-846 3520C]	Semivolatile organics
Certified	Yes	NY	SHW05.02100	NPW	Solid Phase Extraction (SPE)	[SW-846 3535A]	Semivolatile organics
Certified	Yes	NY	SHW05.07000	NPW	Purge & Trap Aqueous	[SW-846 5030B]	Volatile organics

Category: SHW06 -- Organic Parameters, Chromatography

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	SHW06.02010	NPW	Microextraction, GC, ECD	[SW-846 8011]	Dibromoethane (1,2-) (EDB)
Certified	Yes	NY	SHW06.02020	NPW	Microextraction, GC, ECD	[SW-846 8011]	Dibromo-3-chloropropane (1,2-)
Certified	Yes	NY	SHW06.03062	NPW	GC, Direct Injection or Heated P & T, FID	[SW-846 8015C]	Diisopropyl Ether [DIPE]
Certified	Yes	NY	SHW06.03090	NPW	GC, Direct Injection or P & T, FID	[SW-846 8015C]	Iso-butyl alcohol
Certified	Yes	NY	SHW06.03778	NPW	GC, Direct Injection or P & T, FID	[SW-846 8015B] [SW-846 8015C]	Ethyl alcohol

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1565 JEFFERSON RD
BLDG 300 STE 360
ROCHESTER, NY 14623

Category: SHW06 -- Organic Parameters, Chromatography

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	SHW06.05030	NPW	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Dichlorobenzene (1,2-)
Certified	Yes	NY	SHW06.05040	NPW	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Dichlorobenzene (1,3-)
Certified	Yes	NY	SHW06.05050	NPW	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Dichlorobenzene (1,4-)
Certified	Yes	NY	SHW06.05110	NPW	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Bromodichloromethane
Certified	Yes	NY	SHW06.05120	NPW	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Bromoform
Certified	Yes	NY	SHW06.05130	NPW	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Bromomethane
Certified	Yes	NY	SHW06.05140	NPW	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Carbon tetrachloride
Certified	Yes	NY	SHW06.05150	NPW	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Chloroethane
Certified	Yes	NY	SHW06.05160	NPW	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Chloroform
Certified	Yes	NY	SHW06.05170	NPW	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Chloromethane
Certified	Yes	NY	SHW06.05180	NPW	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Dichloropropene (trans-1,3-)
Certified	Yes	NY	SHW06.05190	NPW	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Dibromochloromethane
Certified	Yes	NY	SHW06.05200	NPW	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Dichlorodifluoromethane
Certified	Yes	NY	SHW06.05210	NPW	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Dichloroethane (1,1-)
Certified	Yes	NY	SHW06.05220	NPW	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Dichloroethane (1,2-)
Certified	Yes	NY	SHW06.05230	NPW	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Dichloroethene (1,1-)
Certified	Yes	NY	SHW06.05240	NPW	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Dichloroethene (cis-1,2-)
Certified	Yes	NY	SHW06.05250	NPW	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Dichloroethene (trans-1,2-)
Certified	Yes	NY	SHW06.05260	NPW	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Dichloropropane (1,2-)
Certified	Yes	NY	SHW06.05270	NPW	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Dichloropropene (cis-1,3-)
Certified	Yes	NY	SHW06.05280	NPW	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Methylene chloride (Dichloromethane)
Certified	Yes	NY	SHW06.05290	NPW	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Tetrachloroethane (1,1,2,2-)
Certified	Yes	NY	SHW06.05300	NPW	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Tetrachloroethene
Certified	Yes	NY	SHW06.05310	NPW	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Trichloroethane (1,1,1-)
Certified	Yes	NY	SHW06.05320	NPW	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Trichloroethane (1,1,2-)
Certified	Yes	NY	SHW06.05330	NPW	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Trichloroethene
Certified	Yes	NY	SHW06.05340	NPW	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Trichlorofluoromethane
Certified	Yes	NY	SHW06.05350	NPW	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Vinyl chloride
Certified	Yes	NY	SHW06.05370	NPW	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Chloroethyl vinyl ether (2-)
Certified	Yes	NY	SHW06.12201	NPW	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A] [SW-846 8081B]	Hexachlorobenzene
Certified	Yes	NY	SHW06.23030	NPW	GC, Extraction, ECD, Capillary	[SW-846 8151A]	Dinoseb
Certified	Yes	NY	SHW06.23100	NPW	GC, Headspace, FID	[OTHER J. Chrom. Sci. RSK-175]	Ethane

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Certified	Yes	NY	SHW06.23105	NPW	GC, Headspace, FID	[OTHER J. Chrom. Sci. RSK-175]	Ethene
Certified	Yes	NY	SHW06.23110	NPW	GC, Headspace, FID	[OTHER J. Chrom. Sci. RSK-175]	Methane
Certified	Yes	NY	SHW06.23115	NPW	GC, Headspace, FID	[OTHER J. Chrom. Sci. RSK-175]	Propane
Certified	Yes	NY	SHW06.24110	NPW	Extraction, HPLC	[SW-846 8310]	Acenaphthene
Certified	Yes	NY	SHW06.24120	NPW	Extraction, HPLC	[SW-846 8310]	Acenaphthylene
Certified	Yes	NY	SHW06.24130	NPW	Extraction, HPLC	[SW-846 8310]	Anthracene
Certified	Yes	NY	SHW06.24140	NPW	Extraction, HPLC	[SW-846 8310]	Benzo(a)anthracene
Certified	Yes	NY	SHW06.24150	NPW	Extraction, HPLC	[SW-846 8310]	Benzo(a)pyrene
Certified	Yes	NY	SHW06.24160	NPW	Extraction, HPLC	[SW-846 8310]	Benzo(b)fluoranthene
Certified	Yes	NY	SHW06.24170	NPW	Extraction, HPLC	[SW-846 8310]	Benzo(ghi)perylene
Certified	Yes	NY	SHW06.24180	NPW	Extraction, HPLC	[SW-846 8310]	Benzo(k)fluoranthene
Certified	Yes	NY	SHW06.24190	NPW	Extraction, HPLC	[SW-846 8310]	Chrysene
Certified	Yes	NY	SHW06.24200	NPW	Extraction, HPLC	[SW-846 8310]	Dibenzo(a,h)anthracene
Certified	Yes	NY	SHW06.24210	NPW	Extraction, HPLC	[SW-846 8310]	Fluoranthene
Certified	Yes	NY	SHW06.24220	NPW	Extraction, HPLC	[SW-846 8310]	Fluorene
Certified	Yes	NY	SHW06.24230	NPW	Extraction, HPLC	[SW-846 8310]	Indeno(1,2,3-cd)pyrene
Certified	Yes	NY	SHW06.24240	NPW	Extraction, HPLC	[SW-846 8310]	Naphthalene
Certified	Yes	NY	SHW06.24250	NPW	Extraction, HPLC	[SW-846 8310]	Phenanthrene
Certified	Yes	NY	SHW06.24260	NPW	Extraction, HPLC	[SW-846 8310]	Pyrene

Category: SHW07 -- Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	SHW07.04087	NPW	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	tert-Amylmethyl ether [TAME]
Certified	Yes	NY	SHW07.04257	NPW	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Diisopropyl Ether [DIPE]
Certified	Yes	NY	SHW07.04364	NPW	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Ethyl-tert-butyl Ether [ETBE]

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Category: SHW09 -- Miscellaneous Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	SHW09.19000	NPW	Infrared Spectrometry or FID	[SW-846 9060, Rev. 0, 9/86]	Total organic carbon (TOC)

Category: WPP02 -- Inorg. Parameters, Nutrients and Demands

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	WPP02.01500	NPW	Electrometric or Color Titration	[SM 2320 B]	Alkalinity as CaCO3
Certified	Yes	NY	WPP02.04000	NPW	Automated Phenate	[EPA 350.2 + .1]	Ammonia
Certified	Yes	NY	WPP02.05000	NPW	Dissolved Oxygen Depletion	[SM 5210 B]	Biochemical oxygen demand
Certified	Yes	NY	WPP02.06000	NPW	ICP	[EPA 200.7]	Boron
Certified	Yes	NY	WPP02.07100	NPW	Ion Chromatography	[EPA 300.0]	Bromide
Certified	Yes	NY	WPP02.08000	NPW	Digestion, ICP	[EPA 200.7]	Calcium
Certified	Yes	NY	WPP02.09500	NPW	Dissolved Oxygen Depletion, Nitrification Inhibition	[SM 5210 B]	Carbonaceous BOD (CBOD)
Certified	Yes	NY	WPP02.10500	NPW	Spectrophotometric Manual/Auto	[EPA 410.4]	Chemical oxygen demand
Certified	Yes	NY	WPP02.12500	NPW	Colorimetric, Automated (Ferricyanide)	[SM 4500-Cl E]	Chloride
Certified	Yes	NY	WPP02.12600	NPW	Ion Chromatography	[EPA 300.0]	Chloride
Applied	No	NY	WPP02.12850	NPW	Spectrophotometric	[SM 10200H 1 + 2]	Chlorophyll
Certified	Yes	NY	WPP02.13500	NPW	Colorimetric (Platinum-Cobalt)	[SM 2120 B]	Color
Certified	Yes	NY	WPP02.15500	NPW	Distillation, Spectrophotometric (Auto)	[EPA 335.4]	Cyanide
Applied	No	NY	WPP02.16110	NPW	Flow Injection, Gas Diffusion, Amperometry	[ASTM D7237-10]	Free Cyanide
Certified	Yes	NY	WPP02.18100	NPW	Ion Chromatography	[EPA 300.0]	Fluoride
Certified	Yes	NY	WPP02.19000	NPW	Titrimetric, EDTA	[SM 2340 C]	Hardness - total as CaCO3
Certified	Yes	NY	WPP02.20100	NPW	Ca + Mg Carbonates, ICP	[EPA 200.7]	Hardness - total as CaCO3
Certified	Yes	NY	WPP02.22500	NPW	Digestion, Distillation, Semiautomated Digestor	[EPA 351.2]	Kjeldahl nitrogen - total
Certified	Yes	NY	WPP02.24000	NPW	Digestion, ICP	[EPA 200.7]	Magnesium
Certified	Yes	NY	WPP02.26100	NPW	Ion Chromatography	[EPA 300.0]	Nitrate
Certified	Yes	NY	WPP02.27000	NPW	Cadmium Reduction, Automated	[EPA 353.2]	Nitrate - nitrite
Certified	Yes	NY	WPP02.28600	NPW	Ion Chromatography	[EPA 300.0]	Nitrite
Certified	Yes	NY	WPP02.29100	NPW	Gravimetric, Hexane Extractable Material-LL	[EPA 1664A]	Oil & grease - hem-LL
Certified	Yes	NY	WPP02.29150	NPW	Gravimetric, Hexane Extractable Material-SPE	[EPA 1664A]	Oil & grease - hem-SPE
Certified	Yes	NY	WPP02.29200	NPW	Gravimetric, Silica Gel Treated-Hem	[EPA 1664A]	Oil & grease - sgt-non polar

KEY: AE = Air and Emissions, BT = Biological Tissues, DW = Drinking Water, NPW = Non-Potable Water, SCM = Solid and Chemical Materials

New Jersey Department of Environmental Protection

National Environmental Laboratory Accreditation Program

ANNUAL CERTIFIED PARAMETER LIST AND CURRENT STATUS

Effective as of 07/01/2012 until 06/30/2013

Laboratory Name: COLUMBIA ANALYTICAL SERVICES, INC. Laboratory Number: NY004 Activity ID: NLC120001
1565 JEFFERSON RD
BLDG 300 STE 360
ROCHESTER, NY 14623

Category: WPP02 -- Inorg. Parameters, Nutrients and Demands

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	WPP02.29250	NPW	Gravimetric, Silica Gel Treated-Hem-SPE	[EPA 1664A]	Oil & grease - non polar
Certified	Yes	NY	WPP02.30000	NPW	Combustion or Oxidation	[SM 5310 B, C or D]	Total organic carbon (TOC)
Certified	Yes	NY	WPP02.30500	NPW	Total Kjeldahl-N Minus Ammonia-N	[EPA 351.1,.2, .3,.4 - 350.1 .2 .3]	Organic nitrogen
Certified	Yes	NY	WPP02.31000	NPW	Ascorbic Acid, Automated	[EPA 365.1]	Orthophosphate
Certified	Yes	NY	WPP02.33000	NPW	Manual Distillation, Colorimetric Auto	[USER DEFINED EPA 420.4]	Phenols
Certified	Yes	NY	WPP02.35000	NPW	Auto Ascorbic Acid Reduction	[EPA 365.2 + .1]	Phosphorus (total)
Certified	Yes	NY	WPP02.36500	NPW	Digestion, ICP	[EPA 200.7]	Potassium
Certified	Yes	NY	WPP02.38000	NPW	Gravimetric, 103-105 Degrees C	[SM 2540 B]	Residue - total
Certified	Yes	NY	WPP02.38500	NPW	Gravimetric, 180 Degrees C	[SM 2540 C]	Residue - filterable (TDS)
Certified	Yes	NY	WPP02.39000	NPW	Gravimetric, 103-105 Degrees C, Post Washing	[SM 2540 D]	Residue - nonfilterable (TSS)
Certified	Yes	NY	WPP02.39500	NPW	Volumetric (Imhoff Cone) or Gravimetric	[SM 2540 F]	Residue - settleable
Applied	No	NY	WPP02.40000	NPW	Gravimetric, 550 Degrees C	[EPA 160.4]	Residue - volatile
Applied	No	NY	WPP02.40100	NPW	Gravimetric, 500 Degrees C	[SM 2540 G SM 18th Ed.]	Total, fixed, and volatile solids (SQAR)
Applied	No	NY	WPP02.40200	NPW	Gravimetric, 550 Degrees C	[USGS I-3767]	Volatile total suspended solids (VTSS)
Certified	Yes	NY	WPP02.42000	NPW	0.45u Filtration + Auto Molybdosilicate	[USGS I-2700-85]	Silica - dissolved
Certified	Yes	NY	WPP02.44000	NPW	Digestion, ICP	[EPA 200.7]	Sodium
Certified	Yes	NY	WPP02.45500	NPW	Wheatstone Bridge	[EPA 120.1]	Specific conductance
Certified	Yes	NY	WPP02.47100	NPW	Ion Chromatography	[EPA 300.0]	Sulfate
Certified	Yes	NY	WPP02.47500	NPW	Titrimetric, Iodine	[SM 4500-S E or F]	Sulfides
Applied	No	NY	WPP02.48110	NPW	Flocculation, Methylene Blue, Calculation	[SM 4500-S2- C+D.3.b.2+F (18th Ed.)]	Un-dissociated Hydrogen sulfide
Certified	Yes	NY	WPP02.48500	NPW	Colorimetric (Methylene Blue)	[SM 5540 C]	Surfactants
Certified	Yes	NY	WPP02.50000	NPW	Nephelometric	[EPA 180.1]	Turbidity

Category: WPP03 -- Analyze-Immediately Inorganic Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	WPP03.04000	NPW	DPD-FAS	[SM 4500-Cl F]	Chlorine
Certified	Yes	NJ	WPP03.07000	NPW	Winkler, Azide Modification	[SM 4500-O C]	Oxygen (dissolved)
Certified	Yes	NJ	WPP03.08000	NPW	Electrode	[SM 4500-O G]	Oxygen (dissolved)
Certified	Yes	NY	WPP03.09000	NPW	Electrometric	[SM 4500-H B]	pH

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1565 JEFFERSON RD
BLDG 300 STE 360
ROCHESTER, NY 14623

Category: WPP03 -- Analyze-Immediately Inorganic Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	WPP03.14000	NPW	Thermometric	[SM 2550 B]	Temperature

Category: WPP04 -- Inorganic Parameters, Metals

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	WPP04.02000	NPW	Digestion, ICP	[EPA 200.7]	Aluminum
Certified	Yes	NY	WPP04.04500	NPW	Digestion, ICP	[EPA 200.7]	Antimony
Certified	Yes	NY	WPP04.04600	NPW	ICP/MS	[EPA 200.8]	Antimony
Certified	Yes	NY	WPP04.05000	NPW	Digestion, AA Furnace	[SM 3113 B]	Arsenic
Certified	Yes	NY	WPP04.05600	NPW	Digestion, ICP	[EPA 200.7]	Arsenic
Certified	Yes	NY	WPP04.05700	NPW	ICP/MS	[EPA 200.8]	Arsenic
Certified	Yes	NY	WPP04.08000	NPW	Digestion, ICP	[EPA 200.7]	Barium
Certified	Yes	NY	WPP04.08200	NPW	ICP/MS	[EPA 200.8]	Barium
Certified	Yes	NY	WPP04.11000	NPW	Digestion, ICP	[EPA 200.7]	Beryllium
Certified	Yes	NY	WPP04.11100	NPW	ICP/MS	[EPA 200.8]	Beryllium
Certified	Yes	NY	WPP04.13500	NPW	Digestion, ICP	[EPA 200.7]	Cadmium
Certified	Yes	NY	WPP04.13600	NPW	ICP/MS	[EPA 200.8]	Cadmium
Certified	Yes	NY	WPP04.15000	NPW	0.45u Filter, Colorimetric DPC	[SM 3500-Cr D]	Chromium (VI)
Certified	Yes	NY	WPP04.15100	NPW	0.45u Filter, Ion Chromatography	[EPA 218.6]	Chromium (VI)
Certified	Yes	NY	WPP04.18000	NPW	Digestion, ICP	[EPA 200.7]	Chromium
Certified	Yes	NY	WPP04.18100	NPW	ICP/MS	[EPA 200.8]	Chromium
Certified	Yes	NY	WPP04.19500	NPW	Digestion, ICP	[EPA 200.7]	Cobalt
Certified	Yes	NY	WPP04.19600	NPW	ICP/MS	[EPA 200.8]	Cobalt
Certified	Yes	NY	WPP04.21500	NPW	Digestion, ICP	[EPA 200.7]	Copper
Certified	Yes	NY	WPP04.21600	NPW	ICP/MS	[EPA 200.8]	Copper
Certified	Yes	NY	WPP04.26500	NPW	Digestion, ICP	[EPA 200.7]	Iron
Applied	No	NY	WPP04.27001	NPW	Digestion, Colorimetric (Phenanthroline)	[SM 3500-Fe D (18/19th ed)] [SM 3500-Fe B (20th ed)]	Iron, Ferrous
Certified	Yes	NY	WPP04.27500	NPW	Digestion, AA Furnace	[SM 3113 B]	Lead
Certified	Yes	NY	WPP04.28000	NPW	Digestion, ICP	[EPA 200.7]	Lead
Certified	Yes	NY	WPP04.28100	NPW	ICP/MS	[EPA 200.8]	Lead

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1565 JEFFERSON RD
BLDG 300 STE 360
ROCHESTER, NY 14623

Category: WPP04 -- Inorganic Parameters, Metals

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	WPP04.31000	NPW	Digestion, ICP	[EPA 200.7]	Manganese
Certified	Yes	NY	WPP04.31100	NPW	ICP/MS	[EPA 200.8]	Manganese
Certified	Yes	NY	WPP04.33000	NPW	Manual Cold Vapor	[EPA 245.1]	Mercury
Certified	Yes	NY	WPP04.33200	NPW	Purge & Trap Atomic Fluorescence	[EPA 1631E]	Mercury
Certified	Yes	NY	WPP04.33500	NPW	Automated Cold Vapor	[EPA 245.2]	Mercury
Certified	Yes	NY	WPP04.35000	NPW	Digestion, ICP	[EPA 200.7]	Molybdenum
Certified	Yes	NY	WPP04.35200	NPW	ICP/MS	[EPA 200.8]	Molybdenum
Certified	Yes	NY	WPP04.37500	NPW	Digestion, ICP	[EPA 200.7]	Nickel
Certified	Yes	NY	WPP04.37600	NPW	ICP/MS	[EPA 200.8]	Nickel
Certified	Yes	NY	WPP04.45000	NPW	Digestion, AA Furnace	[SM 3113 B]	Selenium
Certified	Yes	NY	WPP04.45500	NPW	Digestion, ICP	[EPA 200.7]	Selenium
Certified	Yes	NY	WPP04.45600	NPW	ICP/MS	[EPA 200.8]	Selenium
Certified	Yes	NY	WPP04.48000	NPW	Digestion, ICP	[EPA 200.7]	Silver
Certified	Yes	NY	WPP04.48200	NPW	ICP/MS	[EPA 200.8]	Silver
Certified	Yes	NY	WPP04.49500	NPW	Digestion, AA Furnace	[EPA 279.2]	Thallium
Certified	Yes	NY	WPP04.50000	NPW	Digestion, ICP	[EPA 200.7]	Thallium
Certified	Yes	NY	WPP04.50100	NPW	ICP/MS	[EPA 200.8]	Thallium
Certified	Yes	NY	WPP04.51100	NPW	Digestion, ICP	[EPA 200.7]	Tin
Certified	Yes	NY	WPP04.52050	NPW	Digestion, ICP	[EPA 200.7]	Titanium
Certified	Yes	NY	WPP04.54000	NPW	Digestion, ICP	[EPA 200.7]	Vanadium
Certified	Yes	NY	WPP04.54100	NPW	ICP/MS	[EPA 200.8]	Vanadium
Certified	Yes	NY	WPP04.56500	NPW	Digestion, ICP	[EPA 200.7]	Zinc
Certified	Yes	NY	WPP04.56600	NPW	ICP/MS	[EPA 200.8]	Zinc

Category: WPP05 -- Organic Parameters, Chromatography

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	WPP05.01010	NPW	Purge & Trap, GC (HECD)	[EPA 601]	Bromodichloromethane
Certified	Yes	NY	WPP05.01020	NPW	Purge & Trap, GC (HECD)	[EPA 601]	Bromoform
Certified	Yes	NY	WPP05.01030	NPW	Purge & Trap, GC (HECD)	[EPA 601]	Bromomethane

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1565 JEFFERSON RD
BLDG 300 STE 360
ROCHESTER, NY 14623

Category: WPP05 -- Organic Parameters, Chromatography

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	WPP05.01040	NPW	Purge & Trap, GC (HECD)	[EPA 601]	Carbon tetrachloride
Certified	Yes	NY	WPP05.01050	NPW	Purge & Trap, GC (HECD)	[EPA 601]	Chlorobenzene
Certified	Yes	NY	WPP05.01060	NPW	Purge & Trap, GC (HECD)	[EPA 601]	Chloroethane
Certified	Yes	NY	WPP05.01070	NPW	Purge & Trap, GC (HECD)	[EPA 601]	Chloroethyl vinyl ether (2-)
Certified	Yes	NY	WPP05.01080	NPW	Purge & Trap, GC (HECD)	[EPA 601]	Chloroform
Certified	Yes	NY	WPP05.01090	NPW	Purge & Trap, GC (HECD)	[EPA 601]	Chloromethane
Certified	Yes	NY	WPP05.01100	NPW	Purge & Trap, GC (HECD)	[EPA 601]	Dibromochloromethane
Certified	Yes	NY	WPP05.01110	NPW	Purge & Trap, GC (HECD)	[EPA 601]	Dichlorobenzene (1,2-)
Certified	Yes	NY	WPP05.01120	NPW	Purge & Trap, GC (HECD)	[EPA 601]	Dichlorobenzene (1,3-)
Certified	Yes	NY	WPP05.01130	NPW	Purge & Trap, GC (HECD)	[EPA 601]	Dichlorobenzene (1,4-)
Certified	Yes	NY	WPP05.01140	NPW	Purge & Trap, GC (HECD)	[EPA 601]	Dichlorodifluoromethane
Certified	Yes	NY	WPP05.01150	NPW	Purge & Trap, GC (HECD)	[EPA 601]	Dichloroethane (1,1-)
Certified	Yes	NY	WPP05.01160	NPW	Purge & Trap, GC (HECD)	[EPA 601]	Dichloroethane (1,2-)
Certified	Yes	NY	WPP05.01170	NPW	Purge & Trap, GC (HECD)	[EPA 601]	Dichloroethene (1,1-)
Certified	Yes	NY	WPP05.01180	NPW	Purge & Trap, GC (HECD)	[EPA 601]	Dichloroethene (trans-1,2-)
Certified	Yes	NY	WPP05.01190	NPW	Purge & Trap, GC (HECD)	[EPA 601]	Dichloropropane (1,2-)
Certified	Yes	NY	WPP05.01200	NPW	Purge & Trap, GC (HECD)	[EPA 601]	Dichloropropene (cis-1,3-)
Certified	Yes	NY	WPP05.01210	NPW	Purge & Trap, GC (HECD)	[EPA 601]	Dichloropropene (trans-1,3-)
Certified	Yes	NY	WPP05.01220	NPW	Purge & Trap, GC (HECD)	[EPA 601]	Methylene chloride (Dichloromethane)
Certified	Yes	NY	WPP05.01230	NPW	Purge & Trap, GC (HECD)	[EPA 601]	Tetrachloroethane (1,1,2,2-)
Certified	Yes	NY	WPP05.01240	NPW	Purge & Trap, GC (HECD)	[EPA 601]	Tetrachloroethene
Certified	Yes	NY	WPP05.01250	NPW	Purge & Trap, GC (HECD)	[EPA 601]	Trichloroethane (1,1,1-)
Certified	Yes	NY	WPP05.01260	NPW	Purge & Trap, GC (HECD)	[EPA 601]	Trichloroethane (1,1,2-)
Certified	Yes	NY	WPP05.01270	NPW	Purge & Trap, GC (HECD)	[EPA 601]	Trichloroethene
Certified	Yes	NY	WPP05.01280	NPW	Purge & Trap, GC (HECD)	[EPA 601]	Trichlorofluoromethane
Certified	Yes	NY	WPP05.01290	NPW	Purge & Trap, GC (HECD)	[EPA 601]	Vinyl chloride
Certified	Yes	NY	WPP05.02010	NPW	Purge & Trap, GC (PID)	[EPA 602]	Benzene
Certified	Yes	NY	WPP05.02030	NPW	Purge & Trap, GC (PID)	[EPA 602]	Dichlorobenzene (1,2-)
Certified	Yes	NY	WPP05.02040	NPW	Purge & Trap, GC (PID)	[EPA 602]	Dichlorobenzene (1,3-)
Certified	Yes	NY	WPP05.02050	NPW	Purge & Trap, GC (PID)	[EPA 602]	Dichlorobenzene (1,4-)
Certified	Yes	NY	WPP05.02060	NPW	Purge & Trap, GC (PID)	[EPA 602]	Ethylbenzene
Certified	Yes	NY	WPP05.02070	NPW	Purge & Trap, GC (PID)	[EPA 602]	Toluene

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Laboratory Name: COLUMBIA ANALYTICAL SERVICES, INC. Laboratory Number: NY004 Activity ID: NLC120001
1565 JEFFERSON RD
BLDG 300 STE 360
ROCHESTER, NY 14623

Category: WPP05 -- Organic Parameters, Chromatography

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	WPP05.02080	NPW	Purge & Trap, GC (PID)	[EPA 602]	Xylenes (total)
Certified	Yes	NY	WPP05.09010	NPW	Extract/GC (ECD)	[EPA 608]	Aldrin
Certified	Yes	NY	WPP05.09020	NPW	Extract/GC (ECD)	[EPA 608]	Alpha BHC
Certified	Yes	NY	WPP05.09030	NPW	Extract/GC (ECD)	[EPA 608]	Beta BHC
Certified	Yes	NY	WPP05.09040	NPW	Extract/GC (ECD)	[EPA 608]	Delta BHC
Certified	Yes	NY	WPP05.09050	NPW	Extract/GC (ECD)	[EPA 608]	Lindane (gamma BHC)
Certified	Yes	NY	WPP05.09060	NPW	Extract/GC (ECD)	[EPA 608]	Chlordane
Certified	Yes	NY	WPP05.09070	NPW	Extract/GC (ECD)	[EPA 608]	DDD (4,4'-)
Certified	Yes	NY	WPP05.09080	NPW	Extract/GC (ECD)	[EPA 608]	DDE (4,4'-)
Certified	Yes	NY	WPP05.09090	NPW	Extract/GC (ECD)	[EPA 608]	DDT (4,4'-)
Certified	Yes	NY	WPP05.09100	NPW	Extract/GC (ECD)	[EPA 608]	Dieldrin
Certified	Yes	NY	WPP05.09110	NPW	Extract/GC (ECD)	[EPA 608]	Endosulfan I
Certified	Yes	NY	WPP05.09120	NPW	Extract/GC (ECD)	[EPA 608]	Endosulfan II
Certified	Yes	NY	WPP05.09130	NPW	Extract/GC (ECD)	[EPA 608]	Endosulfan sulfate
Certified	Yes	NY	WPP05.09140	NPW	Extract/GC (ECD)	[EPA 608]	Endrin
Certified	Yes	NY	WPP05.09150	NPW	Extract/GC (ECD)	[EPA 608]	Endrin aldehyde
Certified	Yes	NY	WPP05.09170	NPW	Extract/GC (ECD)	[EPA 608]	Heptachlor
Certified	Yes	NY	WPP05.09180	NPW	Extract/GC (ECD)	[EPA 608]	Heptachlor epoxide
Certified	Yes	NY	WPP05.09190	NPW	Extract/GC (ECD)	[EPA 608]	Methoxychlor
Certified	Yes	NY	WPP05.09200	NPW	Extract/GC (ECD)	[EPA 608]	Toxaphene
Certified	Yes	NY	WPP05.11010	NPW	Extract/GC (ECD)	[EPA 608]	PCB 1016
Certified	Yes	NY	WPP05.11020	NPW	Extract/GC (ECD)	[EPA 608]	PCB 1221
Certified	Yes	NY	WPP05.11030	NPW	Extract/GC (ECD)	[EPA 608]	PCB 1232
Certified	Yes	NY	WPP05.11040	NPW	Extract/GC (ECD)	[EPA 608]	PCB 1242
Certified	Yes	NY	WPP05.11050	NPW	Extract/GC (ECD)	[EPA 608]	PCB 1248
Certified	Yes	NY	WPP05.11060	NPW	Extract/GC (ECD)	[EPA 608]	PCB 1254
Certified	Yes	NY	WPP05.11070	NPW	Extract/GC (ECD)	[EPA 608]	PCB 1260
Certified	Yes	NY	WPP05.13010	NPW	Extract/HPLC (UV/Fluorescence)	[EPA 610]	Acenaphthene
Certified	Yes	NY	WPP05.13020	NPW	Extract/HPLC (UV/Fluorescence)	[EPA 610]	Acenaphthylene
Certified	Yes	NY	WPP05.13030	NPW	Extract/HPLC (UV/Fluorescence)	[EPA 610]	Anthracene
Certified	Yes	NY	WPP05.13040	NPW	Extract/HPLC (UV/Fluorescence)	[EPA 610]	Benzo(a)anthracene
Certified	Yes	NY	WPP05.13050	NPW	Extract/HPLC (UV/Fluorescence)	[EPA 610]	Benzo(a)pyrene

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Category: WPP05 -- Organic Parameters, Chromatography

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Certified	Yes	NY	WPP05.13060	NPW	Extract/HPLC (UV/Fluorescence)	[EPA 610]	Benzo(b)fluoranthene
Certified	Yes	NY	WPP05.13070	NPW	Extract/HPLC (UV/Fluorescence)	[EPA 610]	Benzo(ghi)perylene
Certified	Yes	NY	WPP05.13080	NPW	Extract/HPLC (UV/Fluorescence)	[EPA 610]	Benzo(k)fluoranthene
Certified	Yes	NY	WPP05.13090	NPW	Extract/HPLC (UV/Fluorescence)	[EPA 610]	Chrysene
Certified	Yes	NY	WPP05.13100	NPW	Extract/HPLC (UV/Fluorescence)	[EPA 610]	Dibenzo(a,h)anthracene
Certified	Yes	NY	WPP05.13110	NPW	Extract/HPLC (UV/Fluorescence)	[EPA 610]	Fluoranthene
Certified	Yes	NY	WPP05.13120	NPW	Extract/HPLC (UV/Fluorescence)	[EPA 610]	Fluorene
Certified	Yes	NY	WPP05.13130	NPW	Extract/HPLC (UV/Fluorescence)	[EPA 610]	Indeno(1,2,3-cd)pyrene
Certified	Yes	NY	WPP05.13140	NPW	Extract/HPLC (UV/Fluorescence)	[EPA 610]	Naphthalene
Certified	Yes	NY	WPP05.13150	NPW	Extract/HPLC (UV/Fluorescence)	[EPA 610]	Phenanthrene
Certified	Yes	NY	WPP05.13160	NPW	Extract/HPLC (UV/Fluorescence)	[EPA 610]	Pyrene

Category: WPP06 -- Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	WPP06.02007	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Acrolein
Certified	Yes	NY	WPP06.02009	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Acrylonitrile
Certified	Yes	NY	WPP06.02010	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Benzene
Certified	Yes	NY	WPP06.02020	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Bromodichloromethane
Certified	Yes	NY	WPP06.02030	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Bromoform
Certified	Yes	NY	WPP06.02040	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Bromomethane
Certified	Yes	NY	WPP06.02050	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Carbon tetrachloride
Certified	Yes	NY	WPP06.02060	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Chlorobenzene
Certified	Yes	NY	WPP06.02070	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Chloroethane
Certified	Yes	NY	WPP06.02080	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Chloroethyl vinyl ether (2-)
Certified	Yes	NY	WPP06.02090	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Chloroform
Certified	Yes	NY	WPP06.02100	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Chloromethane
Certified	Yes	NY	WPP06.02110	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dibromochloromethane
Certified	Yes	NY	WPP06.02120	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichlorobenzene (1,2-)
Certified	Yes	NY	WPP06.02130	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichlorobenzene (1,3-)

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New Jersey Department of Environmental Protection

National Environmental Laboratory Accreditation Program

ANNUAL CERTIFIED PARAMETER LIST AND CURRENT STATUS

Effective as of 07/01/2012 until 06/30/2013

Laboratory Name: COLUMBIA ANALYTICAL SERVICES, INC. Laboratory Number: NY004 Activity ID: NLC120001
1565 JEFFERSON RD
BLDG 300 STE 360
ROCHESTER, NY 14623

Category: WPP06 -- Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	WPP06.02140	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichlorobenzene (1,4-)
Certified	Yes	NY	WPP06.02145	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichlorodifluoromethane
Certified	Yes	NY	WPP06.02150	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichloroethane (1,1-)
Certified	Yes	NY	WPP06.02160	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichloroethane (1,2-)
Certified	Yes	NY	WPP06.02170	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichloroethene (1,1-)
Certified	Yes	NY	WPP06.02175	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichloroethene (cis-1,2-)
Certified	Yes	NY	WPP06.02180	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichloroethene (trans-1,2-)
Certified	Yes	NY	WPP06.02190	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichloropropane (1,2-)
Certified	Yes	NY	WPP06.02200	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichloropropene (cis-1,3-)
Certified	Yes	NY	WPP06.02210	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichloropropene (trans-1,3-)
Certified	Yes	NY	WPP06.02220	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Ethylbenzene
Certified	Yes	NY	WPP06.02230	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Methylene chloride (Dichloromethane)
Certified	Yes	NY	WPP06.02238	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Styrene
Certified	Yes	NY	WPP06.02240	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Tetrachloroethane (1,1,2,2-)
Certified	Yes	NY	WPP06.02250	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Tetrachloroethene
Certified	Yes	NY	WPP06.02260	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Toluene
Certified	Yes	NY	WPP06.02270	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Trichloroethane (1,1,1-)
Certified	Yes	NY	WPP06.02280	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Trichloroethane (1,1,2-)
Certified	Yes	NY	WPP06.02290	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Trichloroethene
Certified	Yes	NY	WPP06.02300	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Trichlorofluoromethane
Certified	Yes	NY	WPP06.02310	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Vinyl chloride
Certified	Yes	NY	WPP06.02312	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Xylenes (total)
Certified	Yes	NJ	WPP06.02314	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Xylene (m-)
Certified	Yes	NJ	WPP06.02315	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Xylene (o-)
Certified	Yes	NJ	WPP06.02316	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Xylene (p-)
Certified	Yes	NJ	WPP06.02317	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Xylene (m- + p-)
Certified	Yes	NY	WPP06.03010	NPW	Extract, GC/MS	[EPA 625]	Acenaphthene
Certified	Yes	NY	WPP06.03020	NPW	Extract, GC/MS	[EPA 625]	Acenaphthylene
Certified	Yes	NY	WPP06.03030	NPW	Extract, GC/MS	[EPA 625]	Anthracene
Certified	Yes	NY	WPP06.03040	NPW	Extract, GC/MS	[EPA 625]	Benzo(a)anthracene
Certified	Yes	NY	WPP06.03050	NPW	Extract, GC/MS	[EPA 625]	Benzo(b)fluoranthene
Certified	Yes	NY	WPP06.03060	NPW	Extract, GC/MS	[EPA 625]	Benzo(k)fluoranthene

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New Jersey Department of Environmental Protection

National Environmental Laboratory Accreditation Program

ANNUAL CERTIFIED PARAMETER LIST AND CURRENT STATUS

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Laboratory Name: COLUMBIA ANALYTICAL SERVICES, INC. Laboratory Number: NY004 Activity ID: NLC120001
1565 JEFFERSON RD
BLDG 300 STE 360
ROCHESTER, NY 14623

Category; WPP06 -- Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	WPP06.03070	NPW	Extract, GC/MS	[EPA 625]	Benzo(a)pyrene
Certified	Yes	NY	WPP06.03080	NPW	Extract, GC/MS	[EPA 625]	Benzo(ghi)perylene
Certified	Yes	NY	WPP06.03090	NPW	Extract, GC/MS	[EPA 625]	Butyl benzyl phthalate
Certified	Yes	NY	WPP06.03100	NPW	Extract, GC/MS	[EPA 625]	Bis (2-chloroethyl) ether
Certified	Yes	NY	WPP06.03110	NPW	Extract, GC/MS	[EPA 625]	Bis (2-chloroethoxy) methane
Certified	Yes	NY	WPP06.03120	NPW	Extract, GC/MS	[EPA 625]	Bis (2-ethylhexyl) phthalate
Certified	Yes	NY	WPP06.03130	NPW	Extract, GC/MS	[EPA 625]	Bis (2-chloroisopropyl) ether
Certified	Yes	NY	WPP06.03140	NPW	Extract, GC/MS	[EPA 625]	Bromophenyl-phenyl ether (4-)
Certified	Yes	NY	WPP06.03150	NPW	Extract, GC/MS	[EPA 625]	Chloronaphthalene (2-)
Certified	Yes	NY	WPP06.03160	NPW	Extract, GC/MS	[EPA 625]	Chlorophenyl-phenyl ether (4-)
Certified	Yes	NY	WPP06.03170	NPW	Extract, GC/MS	[EPA 625]	Chrysene
Certified	Yes	NY	WPP06.03180	NPW	Extract, GC/MS	[EPA 625]	Dibenzo(a,h)anthracene
Certified	Yes	NY	WPP06.03190	NPW	Extract, GC/MS	[EPA 625]	Di-n-butyl phthalate
Certified	Yes	NY	WPP06.03230	NPW	Extract, GC/MS	[EPA 625]	Dichlorobenzidine (3,3'-)
Certified	Yes	NY	WPP06.03240	NPW	Extract, GC/MS	[EPA 625]	Diethyl phthalate
Certified	Yes	NY	WPP06.03250	NPW	Extract, GC/MS	[EPA 625]	Dimethyl phthalate
Certified	Yes	NY	WPP06.03260	NPW	Extract, GC/MS	[EPA 625]	Dinitrotoluene (2,4-)
Certified	Yes	NY	WPP06.03270	NPW	Extract, GC/MS	[EPA 625]	Dinitrotoluene (2,6-)
Certified	Yes	NY	WPP06.03280	NPW	Extract, GC/MS	[EPA 625]	Di-n-octyl phthalate
Certified	Yes	NY	WPP06.03290	NPW	Extract, GC/MS	[EPA 625]	Fluoranthene
Certified	Yes	NY	WPP06.03300	NPW	Extract, GC/MS	[EPA 625]	Fluorene
Certified	Yes	NY	WPP06.03310	NPW	Extract, GC/MS	[EPA 625]	Hexachlorobenzene
Certified	Yes	NY	WPP06.03320	NPW	Extract, GC/MS	[EPA 625]	Hexachlorobutadiene (1,3-)
Certified	Yes	NY	WPP06.03330	NPW	Extract, GC/MS	[EPA 625]	Hexachloroethane
Certified	Yes	NY	WPP06.03340	NPW	Extract, GC/MS	[EPA 625]	Indeno(1,2,3-cd)pyrene
Certified	Yes	NY	WPP06.03350	NPW	Extract, GC/MS	[EPA 625]	Isophorone
Certified	Yes	NY	WPP06.03360	NPW	Extract, GC/MS	[EPA 625]	Naphthalene
Certified	Yes	NY	WPP06.03370	NPW	Extract, GC/MS	[EPA 625]	Nitrobenzene
Certified	Yes	NY	WPP06.03380	NPW	Extract, GC/MS	[EPA 625]	N-Nitroso-di-n-propylamine
Certified	Yes	NY	WPP06.03390	NPW	Extract, GC/MS	[EPA 625]	Phenanthrene
Certified	Yes	NY	WPP06.03400	NPW	Extract, GC/MS	[EPA 625]	Pyrene
Certified	Yes	NY	WPP06.03410	NPW	Extract, GC/MS	[EPA 625]	Trichlorobenzene (1,2,4-)

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Laboratory Name: COLUMBIA ANALYTICAL SERVICES, INC. Laboratory Number: NY004 Activity ID: NLC120001
1565 JEFFERSON RD
BLDG 300 STE 360
ROCHESTER, NY 14623

Category: WPP06 -- Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	WPP06.03420	NPW	Extract, GC/MS	[EPA 625]	Methyl phenol (4-chloro-3-)
Certified	Yes	NY	WPP06.03430	NPW	Extract, GC/MS	[EPA 625]	Chlorophenol (2-)
Certified	Yes	NY	WPP06.03440	NPW	Extract, GC/MS	[EPA 625]	Dichlorophenol (2,4-)
Certified	Yes	NY	WPP06.03450	NPW	Extract, GC/MS	[EPA 625]	Dimethylphenol (2,4-)
Certified	Yes	NY	WPP06.03460	NPW	Extract, GC/MS	[EPA 625]	Dinitrophenol (2,4-)
Certified	Yes	NY	WPP06.03470	NPW	Extract, GC/MS	[EPA 625]	Dinitrophenol (2-methyl-4,6-)
Certified	Yes	NY	WPP06.03480	NPW	Extract, GC/MS	[EPA 625]	Nitrophenol (2-)
Certified	Yes	NY	WPP06.03490	NPW	Extract, GC/MS	[EPA 625]	Nitrophenol (4-)
Certified	Yes	NY	WPP06.03500	NPW	Extract, GC/MS	[EPA 625]	Pentachlorophenol
Certified	Yes	NY	WPP06.03510	NPW	Extract, GC/MS	[EPA 625]	Phenol
Certified	Yes	NY	WPP06.03518	NPW	Extract, GC/MS	[EPA 625]	Trichlorophenol (2,4,5-)
Certified	Yes	NY	WPP06.03520	NPW	Extract, GC/MS	[EPA 625]	Trichlorophenol (2,4,6-)
Certified	Yes	NY	WPP06.03580	NPW	Extract, GC/MS	[EPA 625]	Benzidine
Certified	Yes	NY	WPP06.03660	NPW	Extract, GC/MS	[EPA 625]	Hexachlorocyclopentadiene
Certified	Yes	NY	WPP06.03680	NPW	Extract, GC/MS	[EPA 625]	N-Nitrosodimethylamine
Certified	Yes	NY	WPP06.03690	NPW	Extract, GC/MS	[EPA 625]	N-Nitrosodiphenylamine
Certified	Yes	NY	WPP06.03720	NPW	Extract, GC/MS	[EPA 625]	Pyridine

Category: SHW04 -- Inorganic Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	SHW04.05000	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Aluminum
Certified	Yes	NY	SHW04.06500	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Antimony
Certified	Yes	NY	SHW04.07000	NPW, SCM	ICP/MS	[SW-846 6020] [SW-846 6020A]	Antimony
Certified	Yes	NY	SHW04.09000	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Arsenic
Certified	Yes	NY	SHW04.09500	NPW, SCM	ICP/MS	[SW-846 6020] [SW-846 6020A]	Arsenic
Certified	Yes	NY	SHW04.11100	NPW, SCM	AA, Graphite Furnace	[SW-846 7060A] [SW-846 7010]	Arsenic
Certified	Yes	NY	SHW04.11500	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Barium
Certified	Yes	NY	SHW04.12000	NPW, SCM	ICP/MS	[SW-846 6020] [SW-846 6020A]	Barium
Certified	Yes	NY	SHW04.13500	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Beryllium

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Laboratory Name: COLUMBIA ANALYTICAL SERVICES, INC. Laboratory Number: NY004 Activity ID: NLC120001
1565 JEFFERSON RD
BLDG 300 STE 360
ROCHESTER, NY 14623

Category: SHW04 -- Inorganic Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	SHW04.14000	NPW, SCM	ICP/MS	[SW-846 6020] [SW-846 6020A]	Beryllium
Certified	Yes	NY	SHW04.15100	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Boron
Certified	Yes	NY	SHW04.15500	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Cadmium
Certified	Yes	NY	SHW04.16000	NPW, SCM	ICP/MS	[SW-846 6020] [SW-846 6020A]	Cadmium
Certified	Yes	NY	SHW04.17500	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Calcium
Certified	Yes	NY	SHW04.18500	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Chromium
Certified	Yes	NY	SHW04.19000	NPW, SCM	ICP/MS	[SW-846 6020] [SW-846 6020A]	Chromium
Certified	Yes	NY	SHW04.21000	NPW, SCM	Colorimetric	[SW-846 7196A]	Chromium (VI)
Certified	Yes	NY	SHW04.22100	NPW, SCM	Ion Chromatography	[SW-846 7199]	Chromium (VI)
Certified	Yes	NY	SHW04.22500	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Cobalt
Certified	Yes	NY	SHW04.23000	NPW, SCM	ICP/MS	[SW-846 6020] [SW-846 6020A]	Cobalt
Certified	Yes	NY	SHW04.24500	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Copper
Certified	Yes	NY	SHW04.25000	NPW, SCM	ICP/MS	[SW-846 6020] [SW-846 6020A]	Copper
Certified	Yes	NY	SHW04.26000	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Iron
Certified	Yes	NY	SHW04.27500	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Lead
Certified	Yes	NY	SHW04.28000	NPW, SCM	ICP/MS	[SW-846 6020] [SW-846 6020A]	Lead
Certified	Yes	NY	SHW04.29000	NPW, SCM	AA, Graphite Furnace	[SW-846 7421] [SW-846 7010]	Lead
Certified	Yes	NY	SHW04.30500	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Magnesium
Certified	Yes	NY	SHW04.31500	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Manganese
Certified	Yes	NY	SHW04.31600	NPW, SCM	ICP/MS	[SW-846 6020] [SW-846 6020A]	Manganese
Certified	Yes	NY	SHW04.34000	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Molybdenum
Certified	Yes	NY	SHW04.34005	NPW, SCM	ICP/MS	[SW-846 6020] [SW-846 6020A]	Molybdenum
Certified	Yes	NY	SHW04.35500	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Nickel
Certified	Yes	NY	SHW04.36000	NPW, SCM	ICP/MS	[SW-846 6020] [SW-846 6020A]	Nickel
Certified	Yes	NY	SHW04.38000	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Potassium
Certified	Yes	NY	SHW04.39000	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Selenium
Certified	Yes	NY	SHW04.39500	NPW, SCM	AA, Graphite Furnace	[SW-846 7740] [SW-846 7010]	Selenium
Certified	Yes	NY	SHW04.40600	NPW, SCM	ICP/MS	[SW-846 6020] [SW-846 6020A]	Selenium
Certified	Yes	NY	SHW04.41000	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Silver
Certified	Yes	NY	SHW04.41500	NPW, SCM	ICP/MS	[SW-846 6020] [SW-846 6020A]	Silver
Certified	Yes	NY	SHW04.43000	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Sodium
Certified	Yes	NY	SHW04.44000	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Strontium

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Laboratory Name: COLUMBIA ANALYTICAL SERVICES, INC. Laboratory Number: NY004 Activity ID: NLC120001
1565 JEFFERSON RD
BLDG 300 STE 360
ROCHESTER, NY 14623

Category: SHW04 -- Inorganic Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	SHW04.45000	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Thallium
Certified	Yes	NY	SHW04.45500	NPW, SCM	ICP/MS	[SW-846 6020] [SW-846 6020A]	Thallium
Certified	Yes	NY	SHW04.46500	NPW, SCM	AA, Graphite Furnace	[SW-846 7841] [SW-846 7010]	Thallium
Certified	Yes	NY	SHW04.47100	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Tin
Certified	Yes	NY	SHW04.47145	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Titanium
Certified	Yes	NY	SHW04.47500	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Vanadium
Certified	Yes	NY	SHW04.47505	NPW, SCM	ICP/MS	[SW-846 6020] [SW-846 6020A]	Vanadium
Certified	Yes	NY	SHW04.49000	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Zinc
Certified	Yes	NY	SHW04.49500	NPW, SCM	ICP/MS	[SW-846 6020] [SW-846 6020A]	Zinc

Category: SHW06 -- Organic Parameters, Chromatography

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	SHW06.05010	NPW, SCM	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Benzene
Certified	Yes	NY	SHW06.05020	NPW, SCM	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Chlorobenzene
Certified	Yes	NY	SHW06.05060	NPW, SCM	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Ethylbenzene
Certified	Yes	NY	SHW06.05070	NPW, SCM	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Toluene
Certified	Yes	NY	SHW06.05080	NPW, SCM	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Xylene (o-)
Certified	Yes	NY	SHW06.05090	NPW, SCM	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Xylene (m-)
Certified	Yes	NY	SHW06.05100	NPW, SCM	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Xylene (p-)
Certified	Yes	NY	SHW06.05105	NPW, SCM	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Xylenes (total)
Certified	Yes	NY	SHW06.05360	NPW, SCM	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Methyl tert-butyl ether
Certified	Yes	NY	SHW06.12010	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A] [SW-846 8081B]	Aldrin
Certified	Yes	NY	SHW06.12020	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A] [SW-846 8081B]	Alpha BHC
Certified	Yes	NY	SHW06.12030	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A] [SW-846 8081B]	Beta BHC
Certified	Yes	NY	SHW06.12040	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A] [SW-846 8081B]	Delta BHC
Certified	Yes	NY	SHW06.12050	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A] [SW-846 8081B]	Lindane (gamma BHC)
Certified	Yes	NY	SHW06.12060	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A] [SW-846 8081B]	Chlordane (technical)
Certified	Yes	NY	SHW06.12070	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A] [SW-846 8081B]	Chlordane (alpha)
Certified	Yes	NY	SHW06.12080	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A] [SW-846 8081B]	Chlordane (gamma)

KEY: AE = Air and Emissions, BT = Biological Tissues, DW = Drinking Water, NPW = Non-Potable Water, SCM = Solid and Chemical Materials

New Jersey Department of Environmental Protection

National Environmental Laboratory Accreditation Program

ANNUAL CERTIFIED PARAMETER LIST AND CURRENT STATUS

Effective as of 07/01/2012 until 06/30/2013

Laboratory Name: COLUMBIA ANALYTICAL SERVICES, INC. Laboratory Number: NY004 Activity ID: NLC120001
1565 JEFFERSON RD
BLDG 300 STE 360
ROCHESTER, NY 14623

Category: SHW06 -- Organic Parameters, Chromatography

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	SHW06.12090	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A] [SW-846 8081B]	DDD (4,4'-)
Certified	Yes	NY	SHW06.12100	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A] [SW-846 8081B]	DDE (4,4'-)
Certified	Yes	NY	SHW06.12110	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A] [SW-846 8081B]	DDT (4,4'-)
Certified	Yes	NY	SHW06.12120	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A] [SW-846 8081B]	Dieldrin
Certified	Yes	NY	SHW06.12130	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A] [SW-846 8081B]	Endosulfan I
Certified	Yes	NY	SHW06.12140	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A] [SW-846 8081B]	Endosulfan II
Certified	Yes	NY	SHW06.12150	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A] [SW-846 8081B]	Endosulfan sulfate
Certified	Yes	NY	SHW06.12160	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A] [SW-846 8081B]	Endrin
Certified	Yes	NY	SHW06.12170	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A] [SW-846 8081B]	Endrin aldehyde
Certified	Yes	NY	SHW06.12180	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A] [SW-846 8081B]	Endrin ketone
Certified	Yes	NY	SHW06.12190	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A] [SW-846 8081B]	Heptachlor
Certified	Yes	NY	SHW06.12200	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A] [SW-846 8081B]	Heptachlor epoxide
Certified	Yes	NY	SHW06.12210	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A] [SW-846 8081B]	Methoxychlor
Certified	Yes	NY	SHW06.12220	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A] [SW-846 8081B]	Toxaphene
Certified	Yes	NY	SHW06.13110	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8082] [SW-846 8082A]	PCB 1016
Certified	Yes	NY	SHW06.13120	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8082] [SW-846 8082A]	PCB 1221
Certified	Yes	NY	SHW06.13130	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8082] [SW-846 8082A]	PCB 1232
Certified	Yes	NY	SHW06.13140	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8082] [SW-846 8082A]	PCB 1242
Certified	Yes	NY	SHW06.13150	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8082] [SW-846 8082A]	PCB 1248
Certified	Yes	NY	SHW06.13160	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8082] [SW-846 8082A]	PCB 1254
Certified	Yes	NY	SHW06.13170	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8082] [SW-846 8082A]	PCB 1260
Certified	Yes	NY	SHW06.13175	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8082] [SW-846 8082A]	PCB-1262
Certified	Yes	NY	SHW06.13180	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8082] [SW-846 8082A]	PCB-1268
Certified	Yes	NY	SHW06.23020	NPW, SCM	GC, Extraction, ECD, Capillary	[SW-846 8151A]	Dicamba
Applied	No	NY	SHW06.23021	NPW, SCM	GC, Extraction, ECD, Capillary	[SW-846 8151A]	Dichlorprop
Certified	Yes	NY	SHW06.23040	NPW, SCM	GC, Extraction, ECD, Capillary	[SW-846 8151A]	D (2,4-)
Applied	No	NY	SHW06.23041	NPW, SCM	GC, Extraction, ECD, Capillary	[SW-846 8151A]	DB (2,4-)
Certified	Yes	NY	SHW06.23050	NPW, SCM	GC, Extraction, ECD, Capillary	[SW-846 8151A]	T (2,4,5-)
Certified	Yes	NY	SHW06.23060	NPW, SCM	GC, Extraction, ECD, Capillary	[SW-846 8151A]	TP (2,4,5-) (Silvex)
Applied	No	NY	SHW06.23063	NPW, SCM	GC, Extraction, ECD, Capillary	[SW-846 8151A]	MCPA
Applied	No	NY	SHW06.23064	NPW, SCM	GC, Extraction, ECD, Capillary	[SW-846 8151A]	MCPP
Certified	Yes	NY	SHW06.23066	NPW, SCM	GC, Extraction, ECD, Capillary	[SW-846 8151A]	Pentachlorophenol

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New Jersey Department of Environmental Protection

National Environmental Laboratory Accreditation Program

ANNUAL CERTIFIED PARAMETER LIST AND CURRENT STATUS

Effective as of 07/01/2012 until 06/30/2013

Laboratory Name: COLUMBIA ANALYTICAL SERVICES, INC. Laboratory Number: NY004 Activity ID: NLC120001
1565 JEFFERSON RD
BLDG 300 STE 360
ROCHESTER, NY 14623

Category: SHW06 -- Organic Parameters, Chromatography

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Applied	No	NY	SHW06.23070	NPW, SCM	GC, Extraction, ECD, Capillary	[SW-846 8151A]	Picloram
Certified	Yes	NY	SHW06.25030	NPW, SCM	HPLC, Extraction, Derivatization	[SW-846 8315A]	Formaldehyde
Certified	Yes	NY	SHW06.28010	NPW, SCM	HPLC, UV Detector	[SW-846 8330] [SW-846 8330A] [SW-846 8330B]	HMX
Certified	Yes	NY	SHW06.28020	NPW, SCM	HPLC, UV Detector	[SW-846 8330] [SW-846 8330A] [SW-846 8330B]	RDX
Certified	Yes	NY	SHW06.28030	NPW, SCM	HPLC, UV Detector	[SW-846 8330] [SW-846 8330A] [SW-846 8330B]	Trinitrobenzene (1,3,5-)
Certified	Yes	NY	SHW06.28040	NPW, SCM	HPLC, UV Detector	[SW-846 8330] [SW-846 8330A] [SW-846 8330B]	Dinitrobenzene (1,3-)
Certified	Yes	NY	SHW06.28045	NPW, SCM	HPLC, UV Detector	[SW-846 8330] [SW-846 8330A] [SW-846 8330B]	PETN
Certified	Yes	NY	SHW06.28050	NPW, SCM	HPLC, UV Detector	[SW-846 8330] [SW-846 8330A] [SW-846 8330B]	Tetryl
Certified	Yes	NY	SHW06.28060	NPW, SCM	HPLC, UV Detector	[SW-846 8330] [SW-846 8330A] [SW-846 8330B]	Nitrobenzene
Certified	Yes	NY	SHW06.28070	NPW, SCM	HPLC, UV Detector	[SW-846 8330] [SW-846 8330A] [SW-846 8330B]	Trinitrotoluene (2,4,6-)
Certified	Yes	NY	SHW06.28080	NPW, SCM	HPLC, UV Detector	[SW-846 8330] [SW-846 8330A] [SW-846 8330B]	Dinitrotoluene (4-amino-2,6-)
Certified	Yes	NY	SHW06.28090	NPW, SCM	HPLC, UV Detector	[SW-846 8330] [SW-846 8330A] [SW-846 8330B]	Dinitrotoluene (2-amino-4,6-)
Certified	Yes	NY	SHW06.28100	NPW, SCM	HPLC, UV Detector	[SW-846 8330] [SW-846 8330A] [SW-846 8330B]	Dinitrotoluene (2,4-)
Certified	Yes	NY	SHW06.28110	NPW, SCM	HPLC, UV Detector	[SW-846 8330] [SW-846 8330A] [SW-846 8330B]	Dinitrotoluene (2,6-)
Certified	Yes	NY	SHW06.28120	NPW, SCM	HPLC, UV Detector	[SW-846 8330] [SW-846 8330A] [SW-846 8330B]	Nitrotoluene (2-)
Certified	Yes	NY	SHW06.28130	NPW, SCM	HPLC, UV Detector	[SW-846 8330] [SW-846 8330A] [SW-846 8330B]	Nitrotoluene (3-)
Certified	Yes	NY	SHW06.28140	NPW, SCM	HPLC, UV Detector	[SW-846 8330] [SW-846 8330A] [SW-846 8330B]	Nitrotoluene (4-)
Certified	Yes	NY	SHW06.29100	NPW, SCM	HPLC, UV Detector	[SW-846 8330] [SW-846 8330A] [SW-846 8330B]	Nitroglycerine

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New Jersey Department of Environmental Protection

National Environmental Laboratory Accreditation Program

ANNUAL CERTIFIED PARAMETER LIST AND CURRENT STATUS

Effective as of 07/01/2012 until 06/30/2013

Laboratory Name: COLUMBIA ANALYTICAL SERVICES, INC. Laboratory Number: NY004 Activity ID: NLC120001
1565 JEFFERSON RD
BLDG 300 STE 360
ROCHESTER, NY 14623

Category: SHW07 -- Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	SHW07.04010	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Benzene
Certified	Yes	NY	SHW07.04011	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Bromobenzene
Certified	Yes	NY	SHW07.04012	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Butyl benzene (n-)
Certified	Yes	NY	SHW07.04013	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Sec-butylbenzene
Certified	Yes	NY	SHW07.04014	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Tert-butylbenzene
Certified	Yes	NY	SHW07.04016	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Benzyl chloride
Certified	Yes	NY	SHW07.04020	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Chlorobenzene
Certified	Yes	NY	SHW07.04022	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Chlorotoluene (2-)
Certified	Yes	NY	SHW07.04023	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Chlorotoluene (4-)
Certified	Yes	NY	SHW07.04030	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Dichlorobenzene (1,2-)
Certified	Yes	NY	SHW07.04040	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Dichlorobenzene (1,3-)
Certified	Yes	NY	SHW07.04050	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Dichlorobenzene (1,4-)
Certified	Yes	NY	SHW07.04060	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Ethylbenzene
Certified	Yes	NY	SHW07.04065	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Isopropylbenzene
Certified	Yes	NY	SHW07.04067	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Propylbenzene (n-)
Certified	Yes	NY	SHW07.04070	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Toluene
Certified	Yes	NY	SHW07.04071	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Isopropyltoluene (4-)
Certified	Yes	NY	SHW07.04072	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Trichlorobenzene (1,2,3-)
Certified	Yes	NY	SHW07.04073	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Trimethylbenzene (1,2,4-)
Certified	Yes	NY	SHW07.04074	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Trimethylbenzene (1,3,5-)
Certified	Yes	NY	SHW07.04077	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Toluidine (2-) (2-Methylaniline)
Certified	Yes	NY	SHW07.04080	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Xylenes (total)
Certified	Yes	NY	SHW07.04081	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260C] [SW-846 8260B]	Xylene (m-)
Certified	Yes	NY	SHW07.04082	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260C] [SW-846 8260B]	Xylene (o-)
Certified	Yes	NY	SHW07.04083	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260C] [SW-846 8260B]	Xylene (p-)
Certified	Yes	NY	SHW07.04088	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Allyl chloride
Certified	Yes	NY	SHW07.04089	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Bromochloromethane
Certified	Yes	NY	SHW07.04090	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Bromodichloromethane
Certified	Yes	NY	SHW07.04100	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Bromoform
Certified	Yes	NY	SHW07.04110	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Bromomethane
Certified	Yes	NY	SHW07.04111	NPW, SCM	GC/MS, P&T, or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Cyclohexane
Applied	No	NY	SHW07.04112	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Cyclohexanone

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Laboratory Name: COLUMBIA ANALYTICAL SERVICES, INC. Laboratory Number: NY004 Activity ID: NLC120001
1565 JEFFERSON RD
BLDG 300 STE 360
ROCHESTER, NY 14623

Category: SHW07 -- Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	SHW07.04115	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Butadiene (2-chloro-1,3-)
Certified	Yes	NY	SHW07.04120	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Carbon tetrachloride
Certified	Yes	NY	SHW07.04130	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Chloroethane
Certified	Yes	NY	SHW07.04140	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Chloroethyl vinyl ether (2-)
Certified	Yes	NY	SHW07.04150	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Chloroform
Certified	Yes	NY	SHW07.04160	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Chloromethane
Certified	Yes	NY	SHW07.04165	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Diethyl ether (Ethyl ether)
Certified	Yes	NY	SHW07.04170	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Dichloropropene (trans-1,3-)
Certified	Yes	NY	SHW07.04180	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Dibromochloromethane
Certified	Yes	NY	SHW07.04185	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Dibromoethane (1,2-) (EDB)
Certified	Yes	NY	SHW07.04186	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Dibromomethane
Certified	Yes	NY	SHW07.04187	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Dibromo-3-chloropropane (1,2-)
Certified	Yes	NY	SHW07.04190	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Dichlorodifluoromethane
Certified	Yes	NY	SHW07.04200	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Dichloroethane (1,1-)
Certified	Yes	NY	SHW07.04210	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Dichloroethane (1,2-)
Certified	Yes	NY	SHW07.04220	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Dichloroethene (1,1-)
Certified	Yes	NY	SHW07.04230	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Dichloroethene (trans-1,2-)
Certified	Yes	NY	SHW07.04235	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Dichloroethene (cis-1,2-)
Certified	Yes	NY	SHW07.04240	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Dichloropropane (1,2-)
Certified	Yes	NY	SHW07.04241	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Dichloropropane (1,3-)
Certified	Yes	NY	SHW07.04242	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Dichloropropane (2,2-)
Certified	Yes	NY	SHW07.04249	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Dichloropropene (1,1-)
Certified	Yes	NY	SHW07.04250	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Dichloropropene (cis-1,3-)
Certified	Yes	NY	SHW07.04255	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Dichloro-2-butene (trans-1,4-)
Certified	Yes	NY	SHW07.04258	NPW, SCM	GC/MS, P&T, or Direct Injection, Capillary	[SW-846 8260C] [SW-846 8260B]	Butanol (1-)
Certified	Yes	NY	SHW07.04260	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Methylene chloride (Dichloromethane)
Certified	Yes	NY	SHW07.04265	NPW, SCM	GC/MS, P&T, or Direct Injection, Capillary	[SW-846 8260C] [SW-846 8260B]	Nitropropane (2-)
Certified	Yes	NY	SHW07.04270	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Tetrachloroethane (1,1,2,2-)
Certified	Yes	NY	SHW07.04280	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Tetrachloroethene
Applied	No	NY	SHW07.04282	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Tetrahydrofuran
Certified	Yes	NY	SHW07.04290	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Trichloroethane (1,1,1-)
Certified	Yes	NY	SHW07.04300	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Trichloroethane (1,1,2-)

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New Jersey Department of Environmental Protection

National Environmental Laboratory Accreditation Program

ANNUAL CERTIFIED PARAMETER LIST AND CURRENT STATUS

Effective as of 07/01/2012 until 06/30/2013

Laboratory Name: COLUMBIA ANALYTICAL SERVICES, INC. Laboratory Number: NY004 Activity ID: NLC120001
1565 JEFFERSON RD
BLDG 300 STE 360
ROCHESTER, NY 14623

Category: SHW07 -- Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	SHW07.04310	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Trichloroethene
Certified	Yes	NY	SHW07.04320	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Trichlorofluoromethane
Certified	Yes	NY	SHW07.04322	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Trichloro (1,1,2-) trifluoroethane (1,2,2-)
Certified	Yes	NY	SHW07.04325	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Trichloropropane (1,2,3-)
Certified	Yes	NY	SHW07.04327	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Vinyl acetate
Certified	Yes	NY	SHW07.04330	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Vinyl chloride
Certified	Yes	NY	SHW07.04340	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Acetone
Certified	Yes	NY	SHW07.04350	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Carbon disulfide
Certified	Yes	NY	SHW07.04360	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Butanone (2-)
Certified	Yes	NY	SHW07.04365	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Ethyl acetate
Certified	Yes	NY	SHW07.04367	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Ethyl methacrylate
Certified	Yes	NY	SHW07.04370	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Hexanone (2-)
Certified	Yes	NY	SHW07.04371	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Methacrylonitrile
Certified	Yes	NY	SHW07.04373	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Methyl methacrylate
Certified	Yes	NY	SHW07.04374	NPW, SCM	GC/MS, P&T, or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Methyl acetate
Certified	Yes	NY	SHW07.04375	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Methyl iodide
Certified	Yes	NY	SHW07.04376	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Iso-butyl alcohol
Certified	Yes	NY	SHW07.04377	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Isopropanol
Certified	Yes	NY	SHW07.04380	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Pentanone (4-methyl-2-) (MIBK)
Certified	Yes	NY	SHW07.04385	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Propionitrile
Certified	Yes	NY	SHW07.04390	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Methyl tert-butyl ether
Certified	Yes	NY	SHW07.04395	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Tert-butyl alcohol
Certified	Yes	NY	SHW07.04398	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Acetonitrile
Certified	Yes	NY	SHW07.04400	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Acrolein
Certified	Yes	NY	SHW07.04410	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Acrylonitrile
Applied	No	NY	SHW07.04420	NPW, SCM	GC/MS, P&T, or Direct Injection, Capillary	[SW-846 8260B]	Heptane (n-)
Certified	Yes	NY	SHW07.04500	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Hexachlorobutadiene (1,3-)
Certified	Yes	NY	SHW07.04535	NPW, SCM	GC/MS, P&T, or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Methylcyclohexane
Certified	Yes	NY	SHW07.04540	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Naphthalene
Certified	Yes	NY	SHW07.04550	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Styrene
Certified	Yes	NY	SHW07.04560	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Tetrachloroethane (1,1,1,2-)
Certified	Yes	NY	SHW07.04570	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Trichlorobenzene (1,2,4-)

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1565 JEFFERSON RD
BLDG 300 STE 360
ROCHESTER, NY 14623

Category: SHW07 -- Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	SHW07.04590	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B] [SW-846 8260C]	Dioxane (1,4-)
Applied	No	NY	SHW07.04660	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Alpha - terpineol
Certified	Yes	NY	SHW07.04665	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Acetophenone
Certified	Yes	NY	SHW07.04670	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Acetylaminofluorene (2-)
Certified	Yes	NY	SHW07.04675	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Aminobiphenyl (4-)
Certified	Yes	NY	SHW07.04702	NPW, SCM	GC/MS, Extract, or Direct Injection, Capillary	[SW-846 8270C] [SW-846 8270D]	Biphenyl (1,1'-)
Certified	Yes	NY	SHW07.04705	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Chlorobenzilate
Certified	Yes	NY	SHW07.04755	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dichlorophenol (2,6-)
Certified	Yes	NY	SHW07.04760	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dimethoate
Certified	Yes	NY	SHW07.04767	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dimethylaminoazobenzene
Certified	Yes	NY	SHW07.04770	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dimethylbenz(a)anthracene (7,12-)
Certified	Yes	NY	SHW07.04775	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dimethyl benzidine (3,3-)
Certified	Yes	NY	SHW07.04780	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dinitrobenzene (1,3-)
Certified	Yes	NY	SHW07.04785	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dinoseb
Certified	Yes	NY	SHW07.04790	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Disulfoton
Certified	Yes	NY	SHW07.04810	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Isodrin
Certified	Yes	NY	SHW07.04830	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Methanesulfonate (Ethyl-)
Certified	Yes	NY	SHW07.04835	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Methanesulfonate (Methyl-)
Certified	Yes	NY	SHW07.04840	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Methapyrilene
Certified	Yes	NY	SHW07.04845	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Methylcholanthrene (3-)
Certified	Yes	NY	SHW07.04850	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Napthoquinone (1,4-)
Certified	Yes	NY	SHW07.04855	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Napththylamine (1-)
Certified	Yes	NY	SHW07.04860	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Napththylamine (2-)
Certified	Yes	NY	SHW07.04870	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	N-Nitroso-di-n-butylamine
Certified	Yes	NY	SHW07.04875	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	N-Nitrosomorpholine
Certified	Yes	NY	SHW07.04880	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	N-Nitrosopiperidine
Certified	Yes	NY	SHW07.04885	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Parathion
Certified	Yes	NY	SHW07.04890	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Parathion methyl
Certified	Yes	NY	SHW07.04895	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Pentachlorobenzene
Applied	No	NY	SHW07.04900	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Pentachloroethane
Certified	Yes	NY	SHW07.04905	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Pentachloronitrobenzene
Certified	Yes	NY	SHW07.04910	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Phenacetin

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Laboratory Name: COLUMBIA ANALYTICAL SERVICES, INC. Laboratory Number: NY004 Activity ID: NLC120001
1565 JEFFERSON RD
BLDG 300 STE 360
ROCHESTER, NY 14623

Category: SHW07 -- Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	SHW07.04915	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Phenylenediamine (1,4-)
Applied	No	NY	SHW07.04920	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Phenylethylamine (alpha, alpha-Dimethyl)
Certified	Yes	NY	SHW07.04925	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Phorate
Certified	Yes	NY	SHW07.04930	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Phosphorothioate (O,O,O-triethyl)
Certified	Yes	NY	SHW07.04935	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Phosphorothioate (O,O-diethyl-O-2-pyrazinyl) [Thionazin]
Certified	Yes	NY	SHW07.04940	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Picoline (2-)
Certified	Yes	NY	SHW07.04945	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Pronamide
Certified	Yes	NY	SHW07.04950	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Quinoline -1-Oxide (4-Nitro)
Certified	Yes	NY	SHW07.04955	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Safrole
Certified	Yes	NY	SHW07.04975	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Tetrachlorobenzene (1,2,4,5-)
Certified	Yes	NY	SHW07.04980	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Tetrachlorophenol (2,3,4,6-)
Certified	Yes	NY	SHW07.04985	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Toluidine (2-) (2-Methylaniline)
Certified	Yes	NY	SHW07.04990	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Toluidine (5-nitro-2-)
Certified	Yes	NY	SHW07.04995	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Trinitrobenzene (1,3,5-)
Certified	Yes	NY	SHW07.05004	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	N-Nitrosodiethylamine
Certified	Yes	NY	SHW07.05005	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	N-Nitrosodimethylamine
Certified	Yes	NY	SHW07.05006	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	N-Nitroso-di-n-propylamine
Certified	Yes	NY	SHW07.05010	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	N-Nitrosodiphenylamine
Certified	Yes	NY	SHW07.05011	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	N-Nitrosomethylethylamine
Certified	Yes	NY	SHW07.05012	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	N-Nitrosopyrrolidine
Certified	Yes	NY	SHW07.05020	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Diphenylamine
Certified	Yes	NY	SHW07.05030	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Carbazole
Certified	Yes	NY	SHW07.05038	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Benzidine
Certified	Yes	NY	SHW07.05040	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dichlorobenzidine (3,3'-)
Certified	Yes	NY	SHW07.05045	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Diphenylhydrazine (1,2-)
Certified	Yes	NY	SHW07.05048	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Aniline
Certified	Yes	NY	SHW07.05050	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Chloroaniline (4-)
Certified	Yes	NY	SHW07.05060	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Nitroaniline (2-)
Certified	Yes	NY	SHW07.05062	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Nitroaniline (3-)
Certified	Yes	NY	SHW07.05063	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Nitroaniline (4-)
Certified	Yes	NY	SHW07.05070	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Chloronaphthalene (2-)

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BLDG 300 STE 360
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Category: SHW07 – Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	SHW07.05080	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Hexachlorobenzene
Certified	Yes	NY	SHW07.05090	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Hexachlorobutadiene (1,3-)
Certified	Yes	NY	SHW07.05100	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Hexachlorocyclopentadiene
Certified	Yes	NY	SHW07.05110	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Hexachloroethane
Certified	Yes	NY	SHW07.05115	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Hexachloropropene
Certified	Yes	NY	SHW07.05120	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Trichlorobenzene (1,2,4-)
Certified	Yes	NY	SHW07.05130	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Bis (2-chloroethoxy) methane
Certified	Yes	NY	SHW07.05132	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Bis (2-chloroethyl) ether
Certified	Yes	NY	SHW07.05140	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Bis (2-chloroisopropyl) ether
Certified	Yes	NY	SHW07.05150	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Chlorophenyl-phenyl ether (4-)
Certified	Yes	NY	SHW07.05160	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Bromophenyl-phenyl ether (4-)
Applied	No	NY	SHW07.05165	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary		Dioxane (1,4-)
Certified	Yes	NY	SHW07.05170	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dinitrotoluene (2,4-)
Certified	Yes	NY	SHW07.05180	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dinitrotoluene (2,6-)
Certified	Yes	NY	SHW07.05190	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Isophorone
Certified	Yes	NY	SHW07.05200	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Nitrobenzene
Certified	Yes	NY	SHW07.05210	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Butyl benzyl phthalate
Certified	Yes	NY	SHW07.05220	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Bis (2-ethylhexyl) phthalate
Certified	Yes	NY	SHW07.05230	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Diethyl phthalate
Certified	Yes	NY	SHW07.05240	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dimethyl phthalate
Certified	Yes	NY	SHW07.05250	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Di-n-butyl phthalate
Certified	Yes	NY	SHW07.05260	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Di-n-octyl phthalate
Certified	Yes	NY	SHW07.05270	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Acenaphthene
Certified	Yes	NY	SHW07.05280	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Anthracene
Certified	Yes	NY	SHW07.05290	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Acenaphthylene
Certified	Yes	NY	SHW07.05300	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Benzo(a)anthracene
Certified	Yes	NY	SHW07.05310	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Benzo(a)pyrene
Certified	Yes	NY	SHW07.05320	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Benzo(b)fluoranthene
Certified	Yes	NY	SHW07.05330	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Benzo(ghi)perylene
Certified	Yes	NY	SHW07.05340	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Benzo(k)fluoranthene
Certified	Yes	NY	SHW07.05350	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Chrysene
Certified	Yes	NY	SHW07.05360	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dibenzo(a,h)anthracene

KEY: AE = Air and Emissions, BT = Biological Tissues, DW = Drinking Water, NPW = Non-Potable Water, SCM = Solid and Chemical Materials

New Jersey Department of Environmental Protection

National Environmental Laboratory Accreditation Program

ANNUAL CERTIFIED PARAMETER LIST AND CURRENT STATUS

Effective as of 07/01/2012 until 06/30/2013

Laboratory Name: COLUMBIA ANALYTICAL SERVICES, INC. Laboratory Number: NY004 Activity ID: NLC120001
1565 JEFFERSON RD
BLDG 300 STE 360
ROCHESTER, NY 14623

Category: SHW07 -- Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	SHW07.05370	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Fluoranthene
Certified	Yes	NY	SHW07.05380	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Fluorene
Certified	Yes	NY	SHW07.05390	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Indeno(1,2,3-cd)pyrene
Applied	No	NY	SHW07.05395	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Methylnaphthalene (1-)
Certified	Yes	NY	SHW07.05400	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Methylnaphthalene (2-)
Certified	Yes	NY	SHW07.05410	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Naphthalene
Certified	Yes	NY	SHW07.05420	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Phenanthrene
Certified	Yes	NY	SHW07.05430	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Pyrene
Certified	Yes	NY	SHW07.05440	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Methyl phenol (4-chloro-3-)
Certified	Yes	NY	SHW07.05450	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Chlorophenol (2-)
Certified	Yes	NY	SHW07.05460	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dichlorophenol (2,4-)
Certified	Yes	NY	SHW07.05470	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dimethylphenol (2,4-)
Certified	Yes	NY	SHW07.05480	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dinitrophenol (2,4-)
Certified	Yes	NY	SHW07.05490	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dinitrophenol (2-methyl-4,6-)
Certified	Yes	NY	SHW07.05500	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Methylphenol (2-)
Certified	Yes	NY	SHW07.05510	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Methylphenol (4-)
Certified	Yes	NY	SHW07.05520	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Nitrophenol (2-)
Certified	Yes	NY	SHW07.05530	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Nitrophenol (4-)
Certified	Yes	NY	SHW07.05540	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Pentachlorophenol
Certified	Yes	NY	SHW07.05550	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Phenol
Certified	Yes	NY	SHW07.05560	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Trichlorophenol (2,4,5-)
Certified	Yes	NY	SHW07.05570	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Trichlorophenol (2,4,6-)
Certified	Yes	NY	SHW07.05590	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Methylphenol (3-)
Certified	Yes	NY	SHW07.05600	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dibenzofuran
Certified	Yes	NY	SHW07.05691	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dichlorobenzene (1,2-)
Certified	Yes	NY	SHW07.05692	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dichlorobenzene (1,3-)
Certified	Yes	NY	SHW07.05700	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dichlorobenzene (1,4-)
Certified	Yes	NY	SHW07.05705	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Benzaldehyde
Certified	Yes	NY	SHW07.05710	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Benzoic acid
Certified	Yes	NY	SHW07.05720	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Benzyl alcohol
Certified	Yes	NY	SHW07.05750	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Pyridine
Certified	Yes	NY	SHW07.05765	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Caprolactam

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New Jersey Department of Environmental Protection

National Environmental Laboratory Accreditation Program

ANNUAL CERTIFIED PARAMETER LIST AND CURRENT STATUS

Effective as of 07/01/2012 until 06/30/2013

Laboratory Name: COLUMBIA ANALYTICAL SERVICES, INC. Laboratory Number: NY004 Activity ID: NLC120001
1565 JEFFERSON RD
BLDG 300 STE 360
ROCHESTER, NY 14623

Category: SHW07 -- Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	SHW07.05990	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Atrazine
Certified	Yes	NY	SHW07.07578	NPW, SCM	GC/MS/SIM, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Acenaphthene
Certified	Yes	NY	SHW07.07580	NPW, SCM	GC/MS/SIM, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Acenaphthylene
Certified	Yes	NY	SHW07.07582	NPW, SCM	GC/MS/SIM, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Anthracene
Certified	Yes	NY	SHW07.07584	NPW, SCM	GC/MS/SIM, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Benzo(a)anthracene
Certified	Yes	NY	SHW07.07586	NPW, SCM	GC/MS/SIM, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Benzo(a)pyrene
Certified	Yes	NY	SHW07.07588	NPW, SCM	GC/MS/SIM, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Benzo(b)fluoranthene
Certified	Yes	NY	SHW07.07590	NPW, SCM	GC/MS/SIM, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Benzo(k)fluoranthene
Certified	Yes	NY	SHW07.07592	NPW, SCM	GC/MS/SIM, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Benzo(ghi)perylene
Certified	Yes	NY	SHW07.07593	NPW, SCM	GC/MS/SIM, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Chrysene
Certified	Yes	NY	SHW07.07594	NPW, SCM	GC/MS/SIM, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dibenzo(a,h)anthracene
Certified	Yes	NY	SHW07.07598	NPW, SCM	GC/MS/SIM, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Indeno(1,2,3-cd)pyrene
Certified	Yes	NY	SHW07.07604	NPW, SCM	GC/MS/SIM, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Naphthalene
Certified	Yes	NY	SHW07.07610	NPW, SCM	GC/MS/SIM, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Fluoranthene
Certified	Yes	NY	SHW07.07612	NPW, SCM	GC/MS/SIM, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Fluorene
Certified	Yes	NY	SHW07.07618	NPW, SCM	GC/MS/SIM, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Phenanthrene
Certified	Yes	NY	SHW07.07620	NPW, SCM	GC/MS/SIM, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Pyrene

Category: SHW09 -- Miscellaneous Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	SHW09.05000	NPW, SCM	Colorimetric, Automated	[SW-846 9012B]	Cyanide
Certified	Yes	NY	SHW09.09000	NPW, SCM	Redox Titration	[SW-846 9030B]	Sulfides, acid sol. & insol.
Certified	Yes	NY	SHW09.10100	NPW, SCM	Titration	[SW-846 9034]	Sulfides, acid sol. & insol.
Certified	Yes	NY	SHW09.13050	NPW, SCM	Ion Chromatography	[SW-846 9056] [SW-846 9056A]	Sulfate
Certified	Yes	NY	SHW09.14000	NPW, SCM	Electrometric	[SW-846 9040B, Rev. 2, 1/95]	pH - waste, >20% water
Certified	Yes	NJ	SHW09.15000	NPW, SCM	Wide Range pH Paper	[SW-846 9041A]	pH
Certified	Yes	NY	SHW09.22000	NPW, SCM	Colorimetric, Auto, 4AAP Distillation	[SW-846 9066]	Phenols
Certified	Yes	NY	SHW09.29150	NPW, SCM	Ion Chromatography	[SW-846 9056] [SW-846 9056A]	Nitrite
Certified	Yes	NY	SHW09.30150	NPW, SCM	Ion Chromatography	[SW-846 9056] [SW-846 9056A]	Nitrate

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Laboratory Name: COLUMBIA ANALYTICAL SERVICES, INC. Laboratory Number: NY004 Activity ID: NLC120001
1565 JEFFERSON RD
BLDG 300 STE 360
ROCHESTER, NY 14623

Category: SHW09 -- Miscellaneous Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	SHW09.30250	NPW, SCM	Ion Chromatography	[SW-846 9056] [SW-846 9056A]	Bromide
Certified	Yes	NY	SHW09.33100	NPW, SCM	Ion Chromatography	[SW-846 9056] [SW-846 9056A]	Chloride
Certified	Yes	NY	SHW09.34150	NPW, SCM	Ion Chromatography	[SW-846 9056] [SW-846 9056A]	Fluoride
Certified	Yes	NY	SHW09.34165	NPW, SCM	LC/MS or LC/MS/MS	[SW-846 6850]	Perchlorate

Category: SHW02 -- Characteristics of Hazardous Waste

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	SHW02.01000	SCM	Pensky Martens	[SW-846 1010]	Ignitability
Certified	Yes	NY	SHW02.06900	SCM	TCLP, Toxicity Procedure, ZHE	[SW-846 1311]	Volatile organics
Certified	Yes	NY	SHW02.06950	SCM	TCLP, Toxicity Procedure, Shaker	[SW-846 1311]	Semivolatile organics
Certified	Yes	NY	SHW02.07000	SCM	TCLP, Toxicity Procedure, Shaker	[SW-846 1311]	Metals
Certified	Yes	NY	SHW02.08000	SCM	Synthetic PPT Leachate Procedure	[SW-846 1312]	Metals - organics

Category: SHW04 -- Inorganic Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	SHW04.03000	SCM	Acid Digestion, Soil Sediment & Sludge	[SW-846 3050B]	Metals
Certified	Yes	NY	SHW04.03700	SCM	Chromium VI Digestion	[SW-846 3060A]	Metals
Certified	Yes	NY	SHW04.29500	SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Lithium
Certified	Yes	NY	SHW04.33500	SCM	AA, Manual Cold Vapor	[SW-846 7471A] [SW-846 7471B]	Mercury - solid waste

Category: SHW05 -- Organic Parameters, Prep. / Screening

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	SHW05.03000	SCM	Soxhlet Extraction	[SW-846 3540C]	Semivolatile organics
Certified	Yes	NY	SHW05.04000	SCM	Automatic Soxhlet Extraction	[SW-846 3541]	Semivolatile organics
Certified	Yes	NY	SHW05.05000	SCM	Ultrasonic Extraction	[SW-846 3550B] [SW-846 3550C]	Semivolatile organics

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New Jersey Department of Environmental Protection

National Environmental Laboratory Accreditation Program

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Effective as of 07/01/2012 until 06/30/2013

Laboratory Name: COLUMBIA ANALYTICAL SERVICES, INC. Laboratory Number: NY004 Activity ID: NLC120001
1565 JEFFERSON RD
BLDG 300 STE 360
ROCHESTER, NY 14623

Category: SHW05 -- Organic Parameters, Prep. / Screening

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW05.06000	SCM	Waste Dilution	[SW-846 3580A]	Organics
Certified	Yes	NY	SHW05.07300	SCM	Closed System Purge & Trap	[SW-846 5035L]	Volatile organics - low conc.
Certified	Yes	NY	SHW05.07310	SCM	Methanol Extract, Closed System P & T	[SW-846 5035H]	Volatile organics - high conc.
Certified	Yes	NJ	SHW05.12000	SCM	Cleanup-Florisil	[SW-846 3620B]	Semivolatile organics
Certified	Yes	NJ	SHW05.14000	SCM	Cleanup-Gel Permeation	[SW-846 3640A]	Semivolatile organics
Certified	Yes	NJ	SHW05.16000	SCM	Cleanup-Sulfur Removal	[SW-846 3660B]	Semivolatile organics
Applied	No	NJ	SHW05.17000	SCM	Cleanup-Sulfuric Acid/KMnO4	[SW-846 3665A]	Semivolatile organics

Category: SHW06 -- Organic Parameters, Chromatography

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	SHW06.03170	SCM	GC, Direct Injection, FID	[SW-846 8015C]	Ethylene glycol
Certified	Yes	NY	SHW06.04010	SCM	GC P&T, FID	[SW-846 8015B] [SW-846 8015C]	Gasoline range organic
Certified	Yes	NY	SHW06.04500	SCM	Extraction, GC, FID	[SW-846 8015B] [SW-846 8015C]	Diesel range organic

Category: SHW07 -- Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	SHW07.04680	SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Aramite
Certified	Yes	NY	SHW07.04710	SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Chloronaphthalene (1-)
Certified	Yes	NY	SHW07.04800	SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Hexachlorophene
Certified	Yes	NY	SHW07.04960	SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Sulfotepp

Category: SHW09 -- Miscellaneous Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	SHW09.16000	SCM	Mix with Water or Calcium Chloride	[SW-846 9045C]	pH - soil and waste
Certified	Yes	NY	SHW09.19100	SCM	Pyrolytic	[OTHER Lloyd Kahn]	Total organic carbon (TOC)

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National Environmental Laboratory Accreditation Program

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Laboratory Name: COLUMBIA ANALYTICAL SERVICES, INC. Laboratory Number: NY004 Activity ID: NLC120001
1565 JEFFERSON RD
BLDG 300 STE 360
ROCHESTER, NY 14623

Category: SHW09 -- Miscellaneous Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	SHW09.29000	SCM	Flow-Through Paint Filter, Observation	[SW-846 9095] [SW-846 9095B]	Free liquid

Joseph F. Aiello, Manager

KEY: AE = Air and Emissions, BT = Biological Tissues, DW = Drinking Water, NPW = Non-Potable Water, SCM = Solid and Chemical Materials

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NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2013
Issued April 1, 2012

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. MICHAEL PERRY
COLUMBIA ANALYTICAL SERVICES
1565 JEFFERSON ROAD BUILDING 300, SUITE 360
ROCHESTER, NY 14623

NY Lab Id No: 10145

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2003) for the category ENVIRONMENTAL ANALYSES POTABLE WATER
All approved analytes are listed below:

Drinking Water Bacteriology	
Coliform, Total / E. coli (Qualitative)	SM 18-21 9223B (97) (Colilert)
Drinking Water Metals I	
Arsenic, Total	EPA 200.8 Rev. 5.4
	SM 18-19, 21 3113B (99 & 04)
Barium, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
Cadmium, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
Chromium, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
Copper, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
Iron, Total	EPA 200.7 Rev. 4.4
Lead, Total	EPA 200.8 Rev. 5.4
	SM 18-19, 21 3113B (99 & 04)
Manganese, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
Mercury, Total	EPA 245.1 Rev. 3.0
Selenium, Total	EPA 200.8 Rev. 5.4
	SM 18-19, 21 3113B (99 & 04)
Silver, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
Zinc, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4

Drinking Water Metals II	
Antimony, Total	EPA 200.8 Rev. 5.4
Beryllium, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
Nickel, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
Thallium, Total	EPA 200.8 Rev. 5.4
Drinking Water Metals III	
Sodium, Total	EPA 200.7 Rev. 4.4
Drinking Water Miscellaneous	
Organic Carbon, Total	SM 18-21 5310C (00)
Turbidity	EPA 180.1 Rev. 2.0
UV 254	SM 19-21 5910B
Drinking Water Non-Metals	
Alkalinity	SM 18-21 2320B (97)
Calcium Hardness	EPA 200.7 Rev. 4.4
Chloride	EPA 300.0 Rev. 2.1
	SM 18-21 4500-Cl- E (97)
Color	SM 18-21 2120B (01)
Cyanide	EPA 335.4 Rev. 1.0
Fluoride, Total	EPA 300.0 Rev. 2.1
Nitrate (as N)	EPA 300.0 Rev. 2.1
	EPA 353.2 Rev. 2.0
Nitrite (as N)	EPA 300.0 Rev. 2.1
	EPA 353.2 Rev. 2.0

Serial No.: 45976

Property of the New York State Department of Health. Certificates are valid only at the address shown, must be conspicuously posted, and are printed on secure paper. Continued accreditation depends on successful ongoing participation in the Program. Consumers are urged to call (518) 485-5570 to verify the laboratory's accreditation status.

Page 1 of 3

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NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2013
Issued April 1, 2012

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. MICHAEL PERRY
COLUMBIA ANALYTICAL SERVICES
1565 JEFFERSON ROAD BUILDING 300, SUITE 360
ROCHESTER, NY 14623

NY Lab Id No: 10145

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2003) for the category ENVIRONMENTAL ANALYSES POTABLE WATER
All approved analytes are listed below:

Volatile Halocarbons

1,2,3-Trichloropropane	EPA 524.2
1,2-Dichloroethane	EPA 524.2
1,2-Dichloropropane	EPA 524.2
1,3-Dichloropropane	EPA 524.2
2,2-Dichloropropane	EPA 524.2
Bromochloromethane	EPA 524.2
Bromomethane	EPA 524.2
Carbon tetrachloride	EPA 524.2
Chloroethane	EPA 524.2
Chloromethane	EPA 524.2
cis-1,2-Dichloroethene	EPA 524.2
cis-1,3-Dichloropropene	EPA 524.2
Dibromomethane	EPA 524.2
Dichlorodifluoromethane	EPA 524.2
Methylene chloride	EPA 524.2
Tetrachloroethene	EPA 524.2
trans-1,2-Dichloroethene	EPA 524.2
trans-1,3-Dichloropropene	EPA 524.2
Trichloroethene	EPA 524.2
Trichlorofluoromethane	EPA 524.2
Vinyl chloride	EPA 524.2

Serial No.: 45976

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NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2013
Issued April 02, 2012
Revised October 15, 2012

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. MICHAEL PERRY
COLUMBIA ANALYTICAL SERVICES
1565 JEFFERSON ROAD BUILDING 300, SUITE 360
ROCHESTER, NY 14623

NY Lab Id No: 10145

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2003) for the category ENVIRONMENTAL ANALYSES NON POTABLE WATER
All approved analytes are listed below:

Acrylates	
Acrolein (Propenal)	EPA 624
	EPA 8260B
	EPA 8260C
Acrylonitrile	EPA 624
	EPA 8260B
	EPA 8260C
Ethyl methacrylate	EPA 8260B
	EPA 8260C
Methyl acrylonitrile	EPA 8260B
	EPA 8260C
Methyl methacrylate	EPA 8260B
	EPA 8260C
Amines	
1,2-Diphenylhydrazine	EPA 8270C
	EPA 8270D
1,4-Phenylenediamine	EPA 8270C
	EPA 8270D
1-Naphthylamine	EPA 8270C
	EPA 8270D
2-Naphthylamine	EPA 8270C
	EPA 8270D
2-Nitroaniline	EPA 8270C
	EPA 8270D
3-Nitroaniline	EPA 8270C
	EPA 8270D
Amines	
4-Chloroaniline	EPA 8270C
	EPA 8270D
4-Nitroaniline	EPA 8270C
	EPA 8270D
5-Nitro-o-toluidine	EPA 8270C
	EPA 8270D
Aniline	EPA 8270C
	EPA 8270D
Carbazole	EPA 8270C
	EPA 8270D
Diphenylamine	EPA 8270C
	EPA 8270D
Methapyrilene	EPA 8270C
	EPA 8270D
Pronamide	EPA 8270C
	EPA 8270D
Propionitrile	EPA 8260B
	EPA 8260C
Pyridine	EPA 625
	EPA 8270C
	EPA 8270D
Benzidines	
3,3'-Dichlorobenzidine	EPA 625
	EPA 8270C
	EPA 8270D

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NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2013
Issued April 02, 2012
Revised October 15, 2012

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Benzidines	
3,3'-Dimethylbenzidine	EPA 8270C
	EPA 8270D
Benzidine	EPA 625
	EPA 8270C
	EPA 8270D
Chlorinated Hydrocarbon Pesticides	
4,4'-DDD	EPA 608
	EPA 8081A
	EPA 8081B
4,4'-DDE	EPA 608
	EPA 8081A
	EPA 8081B
4,4'-DDT	EPA 608
	EPA 8081A
	EPA 8081B
Aldrin	EPA 608
	EPA 8081A
	EPA 8081B
alpha-BHC	EPA 608
	EPA 8081A
	EPA 8081B
alpha-Chlordane	EPA 8081A
	EPA 8081B
beta-BHC	EPA 608
	EPA 8081A

Chlorinated Hydrocarbon Pesticides	
beta-BHC	EPA 8081B
Chlordane Total	EPA 608
	EPA 8081A
	EPA 8081B
Chlorobenzilate	EPA 8270C
	EPA 8270D
delta-BHC	EPA 608
	EPA 8081A
	EPA 8081B
Diallate	EPA 8270C
	EPA 8270D
Dieldrin	EPA 608
	EPA 8081A
	EPA 8081B
Endosulfan I	EPA 608
	EPA 8081A
	EPA 8081B
Endosulfan II	EPA 608
	EPA 8081A
	EPA 8081B
Endosulfan sulfate	EPA 608
	EPA 8081A
	EPA 8081B
Endrin	EPA 608
	EPA 8081A

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Chlorinated Hydrocarbon Pesticides	
Endrin	EPA 8081B
Endrin aldehyde	EPA 608
	EPA 8081A
	EPA 8081B
Endrin Ketone	EPA 8081A
	EPA 8081B
gamma-Chlordane	EPA 8081A
	EPA 8081B
Heptachlor	EPA 608
	EPA 8081A
	EPA 8081B
Heptachlor epoxide	EPA 608
	EPA 8081A
	EPA 8081B
Isodrin	EPA 8270C
	EPA 8270D
Kepone	EPA 8081A
	EPA 8081B
Lindane	EPA 608
	EPA 8081A
	EPA 8081B
Methoxychlor	EPA 608
	EPA 8081A
	EPA 8081B
Mirex	EPA 8081B

Chlorinated Hydrocarbon Pesticides	
PCNB	EPA 8270C
	EPA 8270D
Toxaphene	EPA 608
	EPA 8081A
	EPA 8081B
Chlorinated Hydrocarbons	
1,2,3-Trichlorobenzene	EPA 8260B
	EPA 8260C
1,2,4,5-Tetrachlorobenzene	EPA 8270C
	EPA 8270D
1,2,4-Trichlorobenzene	EPA 625
	EPA 8270C
	EPA 8270D
2-Chloronaphthalene	EPA 625
	EPA 8270C
	EPA 8270D
Hexachlorobenzene	EPA 625
	EPA 8081A
	EPA 8081B
	EPA 8270C
	EPA 8270D
Hexachlorobutadiene	EPA 625
	EPA 8270C
	EPA 8270D
Hexachlorocyclopentadiene	EPA 625

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Chlorinated Hydrocarbons	
Hexachlorocyclopentadiene	EPA 8270C
	EPA 8270D
Hexachloroethane	EPA 625
	EPA 8270C
	EPA 8270D
Hexachloropropene	EPA 8270C
	EPA 8270D
Pentachlorobenzene	EPA 8270C
	EPA 8270D
Chlorophenoxy Acid Pesticides	
2,4,5-T	EPA 1978 p.115
	EPA 8151A
2,4,5-TP (Silvex)	EPA 1978 p.115
	EPA 8151A
2,4-D	EPA 1978 p.115
	EPA 8151A
Dicamba	EPA 1978 p.115
	EPA 8151A
Dinoseb	EPA 8151A
	EPA 8270C
	EPA 8270D
Demand	
Biochemical Oxygen Demand	SM 18-21 5210B (01)
Carbonaceous BOD	SM 18-21 5210B (01)
Chemical Oxygen Demand	EPA 410.4 Rev. 2.0
Dissolved Gases	
Acetylene	RSK-175
Ethane	RSK-175
Ethene (Ethylene)	RSK-175
Methane	RSK-175
Propane	RSK-175
Fuel Oxygenates	
Di-isopropyl ether	EPA 8015 B
	EPA 8015C
	EPA 8260B
	EPA 8260C
Ethanol	EPA 8015 B
	EPA 8015C
Methyl tert-butyl ether	EPA 8021B
	EPA 8260B
	EPA 8260C
tert-amyl methyl ether (TAME)	EPA 8260B
	EPA 8260C
tert-butyl alcohol	EPA 8260B
	EPA 8260C
tert-butyl ethyl ether (ETBE)	EPA 8260B
	EPA 8260C
Haloethers	
4-Bromophenylphenyl ether	EPA 625
	EPA 8270C
	EPA 8270D

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Haloethers	
4-Chlorophenylphenyl ether	EPA 625
	EPA 8270C
	EPA 8270D
Bis (2-chloroisopropyl) ether	EPA 625
	EPA 8270C
	EPA 8270D
Bis(2-chloroethoxy)methane	EPA 625
	EPA 8270C
	EPA 8270D
Bis(2-chloroethyl)ether	EPA 625
	EPA 8270C
	EPA 8270D
Low Level Polynuclear Aromatics	
Acenaphthene Low Level	EPA 610
	EPA 8270C
	EPA 8270D
	EPA 8270D SIM
	EPA 8310
Acenaphthylene Low Level	EPA 610
	EPA 8270C
	EPA 8270D
	EPA 8270D SIM
	EPA 8310
Anthracene Low Level	EPA 610
	EPA 8270C

Low Level Polynuclear Aromatics	
Anthracene Low Level	EPA 8270D
	EPA 8270D SIM
	EPA 8310
Benzo(a)anthracene Low Level	EPA 610
	EPA 8270C
	EPA 8270D
	EPA 8270D SIM
	EPA 8310
Benzo(a)pyrene Low Level	EPA 610
	EPA 8270C
	EPA 8270D
	EPA 8270D SIM
	EPA 8310
Benzo(b)fluoranthene Low Level	EPA 610
	EPA 8270C
	EPA 8270D
	EPA 8270D SIM
	EPA 8310
Benzo(g,h,i)perylene Low Level	EPA 610
	EPA 8270C
	EPA 8270D
	EPA 8270D SIM
	EPA 8310
Benzo(k)fluoranthene Low Level	EPA 610
	EPA 8270C

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Low Level Polynuclear Aromatics	
Benzo(k)fluoranthene Low Level	EPA 8270D
	EPA 8270D SIM
	EPA 8310
Chrysene Low Level	EPA 610
	EPA 8270C
	EPA 8270D
	EPA 8270D SIM
	EPA 8310
Dibenzo(a,h)anthracene Low Level	EPA 610
	EPA 8270C
	EPA 8270D
	EPA 8270D SIM
	EPA 8310
Fluoranthene Low Level	EPA 610
	EPA 8270C
	EPA 8270D
	EPA 8270D SIM
	EPA 8310
Fluorene Low Level	EPA 610
	EPA 8270C
	EPA 8270D
	EPA 8270D SIM
	EPA 8310
Indeno(1,2,3-cd)pyrene Low Level	EPA 610
	EPA 8270C

Low Level Polynuclear Aromatics	
Indeno(1,2,3-cd)pyrene Low Level	EPA 8270D
	EPA 8270D SIM
	EPA 8310
Naphthalene Low Level	EPA 610
	EPA 8270C
	EPA 8270D
	EPA 8270D SIM
	EPA 8310
Phenanthrene Low Level	EPA 610
	EPA 8270C
	EPA 8270D
	EPA 8270D SIM
	EPA 8310
Pyrene Low Level	EPA 610
	EPA 8270C
	EPA 8270D
	EPA 8270D SIM
	EPA 8310
Mineral	
Alkalinity	SM 18-21 2320B (97)
Calcium Hardness	EPA 200.7 Rev. 4.4
	SM 18-21 2340B (97)
Chloride	EPA 300.0 Rev. 2.1
	EPA 9056A
	SM 18-21 4500-Cl- E (97)

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Mineral	
Fluoride, Total	EPA 300.0 Rev. 2.1
	EPA 9056A
Hardness, Total	EPA 200.7 Rev. 4.4
	SM 18-21 2340B (97)
	SM 18-21 2340C (97)
Sulfate (as SO4)	EPA 300.0 Rev. 2.1
	EPA 9056A
Nitroaromatics and Isophorone	
1,3,5-Trinitrobenzene	EPA 8270C
	EPA 8270D
	EPA 8330B
1,3-Dinitrobenzene	EPA 8270C
	EPA 8270D
	EPA 8330B
1,4-Naphthoquinone	EPA 8270C
	EPA 8270D
2,4,6-Trinitrotoluene	EPA 8330B
2,4-Dinitrotoluene	EPA 625
	EPA 8270C
	EPA 8270D
	EPA 8330B
2,6-Dinitrotoluene	EPA 625
	EPA 8270C
	EPA 8270D
	EPA 8330B
Nitroaromatics and Isophorone	
2-Amino-4,6-dinitrotoluene	EPA 8330B
2-Nitrotoluene	EPA 8330B
3,5-Dinitroaniline	EPA 8330B
3-Nitrotoluene	EPA 8330B
4-Amino-2,6-dinitrotoluene	EPA 8330B
4-Nitrotoluene	EPA 8330B
Hexahydro-1,3,5-trinitro-1,3,5-triazine	EPA 8330B
Isophorone	EPA 625
	EPA 8270C
	EPA 8270D
Methyl-2,4,6-trinitrophenylnitramine	EPA 8330B
Nitrobenzene	EPA 625
	EPA 8270C
	EPA 8270D
	EPA 8330B
Nitroglycerine	EPA 8330B
Nitroquinoline-1-oxide	EPA 8270D
Octahydro-tetranitro-tetrazocine	EPA 8330B
Pentaerythritol tetranitrate	EPA 8330B
Nitrosoamines	
N-Nitrosodiethylamine	EPA 8270C
	EPA 8270D
N-Nitrosodimethylamine	EPA 625
	EPA 8270C
	EPA 8270D

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Nitrosoamines	
N-Nitrosodi-n-butylamine	EPA 8270C
	EPA 8270D
N-Nitrosodi-n-propylamine	EPA 625
	EPA 8270C
	EPA 8270D
N-Nitrosodiphenylamine	EPA 625
	EPA 8270C
	EPA 8270D
N-nitrosomethylethylamine	EPA 8270D
N-nitrosomorpholine	EPA 8270D
N-nitrosopiperidine	EPA 8270C
	EPA 8270D
N-Nitrosopyrrolidine	EPA 8270C
	EPA 8270D
Nutrient	
Ammonia (as N)	EPA 350.1 Rev. 2.0
Kjeldahl Nitrogen, Total	EPA 351.2 Rev. 2.0
Nitrate (as N)	EPA 300.0 Rev. 2.1
	EPA 353.2 Rev. 2.0
	EPA 9056A
Nitrite (as N)	EPA 300.0 Rev. 2.1
	EPA 353.2 Rev. 2.0
	EPA 9056A
Orthophosphate (as P)	EPA 365.1 Rev. 2.0
Phosphorus, Total	EPA 365.1 Rev. 2.0

Organophosphate Pesticides	
Atrazine	EPA 8270C
	EPA 8270D
Dimethoate	EPA 8270C
	EPA 8270D
Disulfoton	EPA 8270C
	EPA 8270D
Parathion ethyl	EPA 8270C
	EPA 8270D
Parathion methyl	EPA 8270C
	EPA 8270D
Phorate	EPA 8270C
	EPA 8270D
Thionazin	EPA 8270D
Petroleum Hydrocarbons	
Diesel Range Organics	EPA 8015C
Gasoline Range Organics	EPA 8015C
Phthalate Esters	
Benzyl butyl phthalate	EPA 625
	EPA 8270C
	EPA 8270D
Bis(2-ethylhexyl) phthalate	EPA 625
	EPA 8270C
	EPA 8270D
Diethyl phthalate	EPA 625
	EPA 8270C

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Phthalate Esters	
Diethyl phthalate	EPA 8270D
Dimethyl phthalate	EPA 625
	EPA 8270C
	EPA 8270D
Di-n-butyl phthalate	EPA 625
	EPA 8270C
	EPA 8270D
Di-n-octyl phthalate	EPA 625
	EPA 8270C
	EPA 8270D
Polychlorinated Biphenyls	
PCB-1016	EPA 608
	EPA 8082
	EPA 8082A
PCB-1221	EPA 608
	EPA 8082
	EPA 8082A
PCB-1232	EPA 608
	EPA 8082
	EPA 8082A
PCB-1242	EPA 608
	EPA 8082
	EPA 8082A
PCB-1248	EPA 608
	EPA 8082
Polychlorinated Biphenyls	
PCB-1248	EPA 8082A
PCB-1254	EPA 608
	EPA 8082
	EPA 8082A
PCB-1260	EPA 608
	EPA 8082
	EPA 8082A
PCB-1262	EPA 8082
	EPA 8082A
PCB-1268	EPA 8082
	EPA 8082A
Polynuclear Aromatics	
2-Acetylaminofluorene	EPA 8270D
3-Methylcholanthrene	EPA 8270C
	EPA 8270D
7,12-Dimethylbenzyl (a) anthracene	EPA 8270C
	EPA 8270D
Acenaphthene	EPA 625
	EPA 8270C
	EPA 8270D
Acenaphthylene	EPA 625
	EPA 8270C
	EPA 8270D
Anthracene	EPA 625
	EPA 8270C

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Polynuclear Aromatics	
Anthracene	EPA 8270D
Benzo(a)anthracene	EPA 625
	EPA 8270C
	EPA 8270D
Benzo(a)pyrene	EPA 625
	EPA 8270C
	EPA 8270D
Benzo(b)fluoranthene	EPA 625
	EPA 8270C
	EPA 8270D
Benzo(ghi)perylene	EPA 625
	EPA 8270C
	EPA 8270D
Benzo(k)fluoranthene	EPA 625
	EPA 8270C
	EPA 8270D
Chrysene	EPA 625
	EPA 8270C
	EPA 8270D
Dibenzo(a,h)anthracene	EPA 625
	EPA 8270C
	EPA 8270D
Fluoranthene	EPA 625
	EPA 8270C
	EPA 8270D
Polynuclear Aromatics	
Fluorene	EPA 625
	EPA 8270C
	EPA 8270D
Indeno(1,2,3-cd)pyrene	EPA 625
	EPA 8270C
	EPA 8270D
Naphthalene	EPA 625
	EPA 8270C
	EPA 8270D
Phenanthrene	EPA 625
	EPA 8270C
	EPA 8270D
Pyrene	EPA 625
	EPA 8270C
	EPA 8270D
Priority Pollutant Phenols	
2,3,4,6 Tetrachlorophenol	EPA 8270C
	EPA 8270D
2,4,5-Trichlorophenol	EPA 625
	EPA 8270C
	EPA 8270D
2,4,6-Trichlorophenol	EPA 625
	EPA 8270C
	EPA 8270D
2,4-Dichlorophenol	EPA 625

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CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. MICHAEL PERRY
COLUMBIA ANALYTICAL SERVICES
1565 JEFFERSON ROAD BUILDING 300, SUITE 360
ROCHESTER, NY 14623

NY Lab Id No: 10145

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2003) for the category ENVIRONMENTAL ANALYSES NON POTABLE WATER
All approved analytes are listed below:

Priority Pollutant Phenols	
2,4-Dichlorophenol	EPA 8270C
	EPA 8270D
2,4-Dimethylphenol	EPA 625
	EPA 8270C
	EPA 8270D
2,4-Dinitrophenol	EPA 625
	EPA 8270C
	EPA 8270D
2,6-Dichlorophenol	EPA 8270C
	EPA 8270D
2-Chlorophenol	EPA 625
	EPA 8270C
	EPA 8270D
2-Methyl-4,6-dinitrophenol	EPA 625
	EPA 8270C
	EPA 8270D
2-Methylphenol	EPA 8270C
	EPA 8270D
2-Nitrophenol	EPA 625
	EPA 8270C
	EPA 8270D
3-Methylphenol	EPA 8270C
	EPA 8270D
4-Chloro-3-methylphenol	EPA 625
	EPA 8270C
Priority Pollutant Phenols	
4-Chloro-3-methylphenol	EPA 8270D
4-Methylphenol	EPA 8270C
	EPA 8270D
4-Nitrophenol	EPA 625
	EPA 8270C
	EPA 8270D
Cresols, Total	EPA 8270C
	EPA 8270D
Pentachlorophenol	EPA 625
	EPA 8151A
	EPA 8270C
	EPA 8270D
Phenol	EPA 625
	EPA 8270C
	EPA 8270D
Residue	
Settleable Solids	SM 18-21 2540 F (97)
Solids, Total	SM 18-21 2540B (97)
Solids, Total Dissolved	SM 18-21 2540C (97)
Solids, Total Suspended	SM 18-21 2540D (97)
Semi-Volatile Organics	
1,1'-Biphenyl	EPA 8270C
	EPA 8270D
1,2-Dichlorobenzene, Semi-volatile	EPA 8270C
	EPA 8270D

Serial No.: 47587

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NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

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Semi-Volatile Organics	
1,3-Dichlorobenzene, Semi-volatile	EPA 8270C
	EPA 8270D
1,4-Dichlorobenzene, Semi-volatile	EPA 8270C
	EPA 8270D
2-Methylnaphthalene	EPA 8270C
	EPA 8270D
2-Picoline	EPA 8270D
4-Amino biphenyl	EPA 8270C
	EPA 8270D
Acetophenone	EPA 8270C
	EPA 8270D
Benzaldehyde	EPA 8270C
	EPA 8270D
Benzoic Acid	EPA 8270C
	EPA 8270D
Benzyl alcohol	EPA 8270C
	EPA 8270D
Caprolactam	EPA 8270C
	EPA 8270D
Dibenzofuran	EPA 8270C
	EPA 8270D
Ethyl methanesulfonate	EPA 8270C
	EPA 8270D
Isosafrole	EPA 8270C
	EPA 8270D

Semi-Volatile Organics	
Methyl methanesulfonate	EPA 8270C
	EPA 8270D
O,O,O-Triethyl phosphorothioate	EPA 8270C
	EPA 8270D
p-Dimethylaminoazobenzene	EPA 8270C
	EPA 8270D
Phenacetin	EPA 8270C
	EPA 8270D
Safrole	EPA 8270C
	EPA 8270D
Volatile Aromatics	
1,2,4-Trichlorobenzene, Volatile	EPA 8260B
	EPA 8260C
1,2,4-Trimethylbenzene	EPA 8021B
	EPA 8260B
	EPA 8260C
1,2-Dichlorobenzene	EPA 601
	EPA 602
	EPA 624
	EPA 8021B
	EPA 8260B
	EPA 8260C
1,3,5-Trimethylbenzene	EPA 8021B
	EPA 8260B
	EPA 8260C

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Volatile Aromatics	
1,3-Dichlorobenzene	EPA 601
	EPA 602
	EPA 624
	EPA 8021B
	EPA 8260B
	EPA 8260C
1,4-Dichlorobenzene	EPA 601
	EPA 602
	EPA 624
	EPA 8021B
	EPA 8260B
	EPA 8260C
2-Chlorotoluene	EPA 8260C
4-Chlorotoluene	EPA 8260C
Benzene	EPA 602
	EPA 624
	EPA 8021B
	EPA 8260B
	EPA 8260C
Bromobenzene	EPA 8260B
	EPA 8260C
Chlorobenzene	EPA 601
	EPA 624
	EPA 8021B
	EPA 8260B

Volatile Aromatics	
Chlorobenzene	EPA 8260C
Ethyl benzene	EPA 602
	EPA 624
	EPA 8021B
	EPA 8260B
	EPA 8260C
Isopropylbenzene	EPA 8021B
	EPA 8260B
	EPA 8260C
Naphthalene, Volatile	EPA 8260B
	EPA 8260C
n-Butylbenzene	EPA 8021B
	EPA 8260B
	EPA 8260C
n-Propylbenzene	EPA 8021B
	EPA 8260B
	EPA 8260C
p-Isopropyltoluene (P-Cymene)	EPA 8021B
	EPA 8260B
	EPA 8260C
sec-Butylbenzene	EPA 8021B
	EPA 8280B
	EPA 8260C
Styrene	EPA 624
	EPA 8260B

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Volatile Aromatics	
Styrene	EPA 8260C
tert-Butylbenzene	EPA 8260C
Toluene	EPA 602
	EPA 624
	EPA 8021B
	EPA 8260B
	EPA 8260C
Total Xylenes	EPA 602
	EPA 624
	EPA 8021B
	EPA 8260B
	EPA 8260C
Volatile Chlorinated Organics	
Benzyl chloride	EPA 8260B
	EPA 8260C
Volatile Halocarbons	
1,1,1,2-Tetrachloroethane	EPA 8260B
	EPA 8260C
1,1,1-Trichloroethane	EPA 601
	EPA 624
	EPA 8021B
	EPA 8260B
	EPA 8260C
1,1,2,2-Tetrachloroethane	EPA 601
	EPA 624

Volatile Halocarbons	
1,1,2,2-Tetrachloroethane	EPA 8021B
	EPA 8260B
	EPA 8260C
1,1,2-Trichloro-1,2,2-Trifluoroethane	EPA 8260B
	EPA 8260C
1,1,2-Trichloroethane	EPA 601
	EPA 624
	EPA 8021B
	EPA 8260B
	EPA 8260C
1,1-Dichloroethane	EPA 601
	EPA 624
	EPA 8021B
	EPA 8260B
	EPA 8260C
1,1-Dichloroethene	EPA 601
	EPA 624
	EPA 8021B
	EPA 8260B
	EPA 8260C
1,1-Dichloropropene	EPA 8260B
	EPA 8260C
1,2,3-Trichloropropane	EPA 8260B
	EPA 8260C
1,2-Dibromo-3-chloropropane	EPA 8011

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Volatile Halocarbons	
1,2-Dibromo-3-chloropropane	EPA 8260B
	EPA 8260C
1,2-Dibromoethane	EPA 8011
	EPA 8260B
	EPA 8260C
1,2-Dichloro-1,1,2-Trifluoroethane	EPA 8260C
1,2-Dichloroethane	EPA 601
	EPA 624
	EPA 8021B
	EPA 8260B
	EPA 8260C
1,2-Dichloropropane	EPA 601
	EPA 624
	EPA 8021B
	EPA 8260B
	EPA 8260C
1,3-Dichloropropane	EPA 8260B
	EPA 8260C
2,2-Dichloropropane	EPA 8260B
	EPA 8260C
2-Chloro-1,3-butadiene (Chloroprene)	EPA 8260B
	EPA 8260C
2-Chloroethylvinyl ether	EPA 601
	EPA 624
	EPA 8021B

Volatile Halocarbons	
2-Chloroethylvinyl ether	EPA 8260B
	EPA 8260C
3-Chloropropene (Allyl chloride)	EPA 8260B
	EPA 8260C
Bromochloromethane	EPA 8260B
	EPA 8260C
Bromodichloromethane	EPA 601
	EPA 624
	EPA 8021B
	EPA 8260B
	EPA 8260C
Bromoform	EPA 601
	EPA 624
	EPA 8021B
	EPA 8260B
	EPA 8260C
Bromomethane	EPA 601
	EPA 624
	EPA 8021B
	EPA 8260B
	EPA 8260C
Carbon tetrachloride	EPA 601
	EPA 624
	EPA 8021B
	EPA 8260B

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Volatile Halocarbons	
Carbon tetrachloride	EPA 8260C
Chloroethane	EPA 601
	EPA 624
	EPA 8021B
	EPA 8260B
	EPA 8260C
Chloroform	EPA 601
	EPA 624
	EPA 8021B
	EPA 8260B
	EPA 8260C
Chloromethane	EPA 601
	EPA 624
	EPA 8021B
	EPA 8260B
	EPA 8260C
cis-1,2-Dichloroethene	EPA 624
	EPA 8021B
	EPA 8260B
	EPA 8260C
cis-1,3-Dichloropropene	EPA 601
	EPA 624
	EPA 8021B
	EPA 8260B
	EPA 8260C

Volatile Halocarbons	
Dibromochloromethane	EPA 601
	EPA 624
	EPA 8021B
	EPA 8260B
	EPA 8260C
Dibromomethane	EPA 8260B
	EPA 8260C
Dichlorodifluoromethane	EPA 601
	EPA 624
	EPA 8021B
	EPA 8260B
	EPA 8260C
Hexachlorobutadiene, Volatile	EPA 8260B
	EPA 8260C
Methyl iodide	EPA 8260B
	EPA 8260C
Methylene chloride	EPA 601
	EPA 624
	EPA 8021B
	EPA 8260B
	EPA 8260C
Tetrachloroethene	EPA 601
	EPA 624
	EPA 8021B
	EPA 8260B

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Volatile Halocarbons	
Tetrachloroethene	EPA 8260C
trans-1,2-Dichloroethene	EPA 601
	EPA 624
	EPA 8021B
	EPA 8260B
	EPA 8260C
trans-1,3-Dichloropropene	EPA 601
	EPA 624
	EPA 8021B
	EPA 8260B
	EPA 8260C
trans-1,4-Dichloro-2-butene	EPA 8260B
	EPA 8260C
Trichloroethene	EPA 601
	EPA 624
	EPA 8021B
	EPA 8260B
	EPA 8260C
Trichlorofluoromethane	EPA 601
	EPA 624
	EPA 8021B
	EPA 8260B
	EPA 8260C
Vinyl chloride	EPA 601
	EPA 624

Volatile Halocarbons	
Vinyl chloride	EPA 8021B
	EPA 8260B
	EPA 8260C
Volatiles Organics	
1,4-Dioxane	EPA 8260B
	EPA 8260C
2-Butanone (Methylethyl ketone)	EPA 8260B
	EPA 8260C
2-Hexanone	EPA 8260B
	EPA 8260C
2-Nitropropane	EPA 8260B
	EPA 8260C
4-Methyl-2-Pentanone	EPA 8260B
	EPA 8260C
Acetone	EPA 8260B
	EPA 8260C
Acetonitrile	EPA 8260B
	EPA 8260C
Carbon Disulfide	EPA 8260B
	EPA 8260C
Cyclohexane	EPA 8260B
	EPA 8260C
Di-ethyl ether	EPA 8260B
	EPA 8260C
Ethyl Acetate	EPA 8015 B

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Volatiles Organics	
Ethyl Acetate	EPA 8015C
	EPA 8260B
	EPA 8260C
Ethylene Glycol	EPA 8015C
Isobutyl alcohol	EPA 8015 B
	EPA 8015C
	EPA 8260B
	EPA 8260C
Isopropanol	EPA 8260B
	EPA 8260C
Methyl acetate	EPA 8260B
	EPA 8260C
Methyl cyclohexane	EPA 8260B
	EPA 8260C
	EPA 8270D
n-Butanol	EPA 8260B
	EPA 8260C
o-Toluidine	EPA 8260B
	EPA 8260C
	EPA 8270C
	EPA 8270D
Vinyl acetate	EPA 8260B
	EPA 8260C
Wastewater Metals I	
Barium, Total	EPA 200.7 Rev. 4.4
Wastewater Metals I	
Barium, Total	EPA 200.8 Rev. 5.4
	EPA 6010B
	EPA 6010C
	EPA 6020
	EPA 6020A
Cadmium, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
	EPA 6010B
	EPA 6010C
	EPA 6020
	EPA 6020A
Calcium, Total	EPA 200.7 Rev. 4.4
	EPA 6010B
	EPA 6010C
Chromium, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
	EPA 6010B
	EPA 6010C
	EPA 6020
	EPA 6020A
Copper, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
	EPA 6010B
	EPA 6010C
	EPA 6020

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Wastewater Metals I	
Copper, Total	EPA 6020A
Iron, Total	EPA 200.7 Rev. 4.4
	EPA 6010B
	EPA 6010C
Lead, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
	EPA 6010B
	EPA 6010C
	EPA 6020
	EPA 6020A
	EPA 7010
	SM 18-19, 21 3113B (99 & 04)
Magnesium, Total	EPA 200.7 Rev. 4.4
	EPA 6010B
	EPA 6010C
Manganese, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
	EPA 6010B
	EPA 6010C
	EPA 6020
	EPA 6020A
Nickel, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
	EPA 6010B
	EPA 6010C

Wastewater Metals I	
Nickel, Total	EPA 6020
	EPA 6020A
Potassium, Total	EPA 200.7 Rev. 4.4
	EPA 6010B
	EPA 6010C
Silver, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
	EPA 6010B
	EPA 6010C
	EPA 6020
	EPA 6020A
Sodium, Total	EPA 200.7 Rev. 4.4
	EPA 6010B
	EPA 6010C
Strontium, Total	EPA 200.7 Rev. 4.4
	EPA 6010B
	EPA 6010C
Wastewater Metals II	
Aluminum, Total	EPA 200.7 Rev. 4.4
	EPA 6010B
	EPA 6010C
Antimony, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
	EPA 6010B
	EPA 6010C

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Wastewater Metals II	
Antimony, Total	EPA 6020
	EPA 6020A
Arsenic, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
	EPA 6010B
	EPA 6010C
	EPA 6020
	EPA 6020A
	EPA 7010
	EPA 7060A
	SM 18-19, 21 3113B (99 & 04)
Beryllium, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
	EPA 6010B
	EPA 6010C
	EPA 6020
	EPA 6020A
Chromium VI	EPA 218.6 Rev. 3.3
	EPA 7196A
	EPA 7199
	SM 18-19 3500-Cr D
	SM 20-21 3500-Cr B (01)
Mercury, Low Level	EPA 1631E
Mercury, Total	EPA 245.1 Rev. 3.0
	EPA 7470A

Wastewater Metals II	
Selenium, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
	EPA 6010B
	EPA 6010C
	EPA 6020
	EPA 6020A
	EPA 7010
	SM 18-19, 21 3113B (99 & 04)
Vanadium, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
	EPA 6010B
	EPA 6010C
	EPA 6020
	EPA 6020A
Zinc, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
	EPA 6010B
	EPA 6010C
	EPA 6020
	EPA 6020A
Wastewater Metals III	
Cobalt, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
	EPA 6010B
	EPA 6010C

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1565 JEFFERSON ROAD BUILDING 300, SUITE 360
ROCHESTER, NY 14623

NY Lab Id No: 10145

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2003) for the category ENVIRONMENTAL ANALYSES NON POTABLE WATER
All approved analytes are listed below:

Wastewater Metals III	
Cobalt, Total	EPA 6020
	EPA 6020A
Gold, Total	EPA 200.7 Rev. 4.4
Molybdenum, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
	EPA 6010B
	EPA 6010C
	EPA 6020
	EPA 6020A
Palladium, Total	EPA 200.7 Rev. 4.4
Thallium, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
	EPA 279.2 Rev. 1978
	EPA 6010B
	EPA 6010C
	EPA 6020
	EPA 6020A
	EPA 7010
	SM 18-19, 21 3113B (99 & 04)
Tin, Total	EPA 200.7 Rev. 4.4
	EPA 6010B
	EPA 6010C
Titanium, Total	EPA 200.7 Rev. 4.4
	EPA 6010B
	EPA 6010C

Wastewater Metals III	
Uranium (Mass)	EPA 6020
	EPA 6020A
Wastewater Miscellaneous	
Boron, Total	EPA 200.7 Rev. 4.4
	EPA 6010B
	EPA 6010C
Bromide	EPA 300.0 Rev. 2.1
	EPA 9056A
Color	SM 18-21 2120B (01)
Corrosivity	SM 18-19 2330
Cyanide, Total	EPA 335.4 Rev. 1.0
	EPA 9012B
	SM 18-21 4500-CN E (99)
	SM 18-21 4500-CN G (99)
Formaldehyde	EPA 8315
Oil and Grease Total Recoverable (HEM	EPA 1664A
Organic Carbon, Total	EPA 9060
	EPA 9060A
	SM 18-21 5310C (00)
Perchlorate	EPA 6850
Phenols	EPA 420.4 Rev. 1.0
	EPA 9066
Silica, Dissolved	USGS I-2700-85
Specific Conductance	EPA 120.1 Rev. 1982
Sulfide (as S)	EPA 9034

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WADSWORTH CENTER

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Wastewater Miscellaneous

Sulfide (as S)	SM 18 4500-S E
	SM 19-21 4500-S F (00)
Surfactant (MBAS)	SM 18-21 5540C (00)
Total Petroleum Hydrocarbons	EPA 1664A
Turbidity	EPA 180.1 Rev. 2.0

Sample Preparation Methods

EPA 3010A
EPA 3020A
EPA 3510C
EPA 3520C
EPA 3535A
EPA 5030B
EPA 5030C
EPA 9030B

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Acrylates	
Acrolein (Propenal)	EPA 8260B
	EPA 8260C
Acrylonitrile	EPA 8260B
	EPA 8260C
Ethyl methacrylate	EPA 8260B
	EPA 8260C
Methyl acrylonitrile	EPA 8260B
	EPA 8260C
Methyl methacrylate	EPA 8260B
	EPA 8260C
Amines	
1,2-Diphenylhydrazine	EPA 8270C
	EPA 8270D
1,4-Phenylenediamine	EPA 8270C
	EPA 8270D
1-Naphthylamine	EPA 8270C
	EPA 8270D
2-Naphthylamine	EPA 8270C
	EPA 8270D
2-Nitroaniline	EPA 8270C
	EPA 8270D
3-Nitroaniline	EPA 8270C
	EPA 8270D
4-Chloroaniline	EPA 8270C
	EPA 8270D
Amines	
4-Nitroaniline	EPA 8270C
	EPA 8270D
5-Chloro-2-methylaniline	EPA 8270C
	EPA 8270D
5-Nitro-o-toluidine	EPA 8270C
	EPA 8270D
Aniline	EPA 8270C
	EPA 8270D
Carbazole	EPA 8270C
	EPA 8270D
Diphenylamine	EPA 8270C
	EPA 8270D
Methapyrilene	EPA 8270C
	EPA 8270D
Pronamide	EPA 8270C
	EPA 8270D
Benzidines	
3,3'-Dichlorobenzidine	EPA 8270C
	EPA 8270D
3,3'-Dimethylbenzidine	EPA 8270C
	EPA 8270D
Benzidine	EPA 8270C
	EPA 8270D
Characteristic Testing	
Corrosivity	EPA 9045D

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Characteristic Testing	
Free Liquids	EPA 9095B
Ignitability	EPA 1010A
Reactivity	SW-846 Ch7 Sec. 7.3
Synthetic Precipitation Leaching Proc.	EPA 1312
TCLP	EPA 1311

Chlorinated Hydrocarbon Pesticides	
4,4'-DDD	EPA 8081A
	EPA 8081B
4,4'-DDE	EPA 8081A
	EPA 8081B
4,4'-DDT	EPA 8081A
	EPA 8081B
Aldrin	EPA 8081A
	EPA 8081B
alpha-BHC	EPA 8081A
	EPA 8081B
alpha-Chlordane	EPA 8081A
	EPA 8081B
Atrazine	EPA 8270C
	EPA 8270D
beta-BHC	EPA 8081A
	EPA 8081B
Chlordane Total	EPA 8081A
	EPA 8081B
Chlorobenzilate	EPA 8270C

Chlorinated Hydrocarbon Pesticides	
Chlorobenzilate	EPA 8270D
delta-BHC	EPA 8081A
	EPA 8081B
Diallate	EPA 8270C
	EPA 8270D
Dieldrin	EPA 8081A
	EPA 8081B
Endosulfan I	EPA 8081A
	EPA 8081B
Endosulfan II	EPA 8081A
	EPA 8081B
Endosulfan sulfate	EPA 8081A
	EPA 8081B
Endrin	EPA 8081A
	EPA 8081B
Endrin aldehyde	EPA 8081A
	EPA 8081B
Endrin Ketone	EPA 8081A
	EPA 8081B
gamma-Chlordane	EPA 8081A
	EPA 8081B
Heptachlor	EPA 8081A
	EPA 8081B
Heptachlor epoxide	EPA 8081A
	EPA 8081B

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Chlorinated Hydrocarbon Pesticides	
Isodrin	EPA 8270D
Kepone	EPA 8081A
	EPA 8081B
Lindane	EPA 8081A
	EPA 8081B
Methoxychlor	EPA 8081A
	EPA 8081B
Pentachloronitrobenzene	EPA 8270C
	EPA 8270D
Toxaphene	EPA 8081A
	EPA 8081B
Chlorinated Hydrocarbons	
1,2,3-Trichlorobenzene	EPA 8260C
1,2,4,5-Tetrachlorobenzene	EPA 8270C
	EPA 8270D
1,2,4-Trichlorobenzene	EPA 8270C
	EPA 8270D
1-Chloronaphthalene	EPA 8270C
	EPA 8270D
2-Chloronaphthalene	EPA 8270C
	EPA 8270D
Hexachlorobenzene	EPA 8270C
	EPA 8270D
Hexachlorobutadiene	EPA 8270C
	EPA 8270D

Chlorinated Hydrocarbons	
Hexachlorocyclopentadiene	EPA 8270C
	EPA 8270D
Hexachloroethane	EPA 8270C
	EPA 8270D
Hexachlorophene	EPA 8270C
	EPA 8270D
Hexachloropropene	EPA 8270C
	EPA 8270D
Pentachlorobenzene	EPA 8270C
	EPA 8270D
Chlorophenoxy Acid Pesticides	
2,4,5-T	EPA 8151A
2,4,5-TP (Silvex)	EPA 8151A
2,4-D	EPA 8151A
Dicamba	EPA 8151A
Dinoseb	EPA 8270C
	EPA 8270D
Pentachlorophenol	EPA 8151A
Haloethers	
4-Bromophenylphenyl ether	EPA 8270C
	EPA 8270D
4-Chlorophenylphenyl ether	EPA 8270C
	EPA 8270D
Bis (2-chloroisopropyl) ether	EPA 8270C
	EPA 8270D

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Haloethers

Bis(2-chloroethoxy)methane	EPA 8270C
	EPA 8270D
Bis(2-chloroethyl)ether	EPA 8270C
	EPA 8270D

Low Level Polynuclear Aromatic Hydrocarbons

Acenaphthene Low Level	EPA 8270C
	EPA 8270D
	EPA 8270D SIM
Acenaphthylene Low Level	EPA 8270C
	EPA 8270D
	EPA 8270D SIM
Anthracene Low Level	EPA 8270C
	EPA 8270D
	EPA 8270D SIM
Benzo(a)anthracene Low Level	EPA 8270C
	EPA 8270D
	EPA 8270D SIM
Benzo(a)pyrene Low Level	EPA 8270C
	EPA 8270D
	EPA 8270D SIM
Benzo(b)fluoranthene Low Level	EPA 8270C
	EPA 8270D
	EPA 8270D SIM
Benzo(g,h,i)perylene Low Level	EPA 8270C
	EPA 8270D

Low Level Polynuclear Aromatic Hydrocarbons

Benzo(g,h,i)perylene Low Level	EPA 8270D SIM
Benzo(k)fluoranthene Low Level	EPA 8270C
	EPA 8270D
	EPA 8270D SIM
Chrysene Low Level	EPA 8270C
	EPA 8270D
	EPA 8270D SIM
Dibenzo(a,h)anthracene Low Level	EPA 8270C
	EPA 8270D
	EPA 8270D SIM
Fluoranthene Low Level	EPA 8270C
	EPA 8270D
	EPA 8270D SIM
Fluorene Low Level	EPA 8270C
	EPA 8270D
	EPA 8270D SIM
Indeno(1,2,3-cd)pyrene Low Level	EPA 8270C
	EPA 8270D
	EPA 8270D SIM
Naphthalene Low Level	EPA 8270C
	EPA 8270D
	EPA 8270D SIM
Phenanthrene Low Level	EPA 8270C
	EPA 8270D
	EPA 8270D SIM

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Low Level Polynuclear Aromatic Hydrocarbons	
Pyrene Low Level	EPA 8270C
	EPA 8270D
	EPA 8270D SIM
Metals I	
Barium, Total	EPA 6010B
	EPA 6010C
	EPA 6020
	EPA 6020A
Cadmium, Total	EPA 6010B
	EPA 6010C
	EPA 6020
	EPA 6020A
Calcium, Total	EPA 6010B
	EPA 6010C
Chromium, Total	EPA 6010B
	EPA 6010C
	EPA 6020
	EPA 6020A
Copper, Total	EPA 6010B
	EPA 6010C
	EPA 6020
	EPA 6020A
Iron, Total	EPA 6010B
	EPA 6010C
Lead, Total	EPA 6010B

Metals I	
Lead, Total	EPA 6010C
	EPA 6020
	EPA 6020A
	EPA 7010
Magnesium, Total	EPA 6010B
	EPA 6010C
Manganese, Total	EPA 6010B
	EPA 6010C
	EPA 6020
	EPA 6020A
Nickel, Total	EPA 6010B
	EPA 6010C
	EPA 6020
	EPA 6020A
Potassium, Total	EPA 6010B
	EPA 6010C
Silver, Total	EPA 6010B
	EPA 6010C
	EPA 6020
	EPA 6020A
Sodium, Total	EPA 6010B
	EPA 6010C
Strontium, Total	EPA 6010B
	EPA 6010C

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Metals II	
Aluminum, Total	EPA 6010B
	EPA 6010C
Antimony, Total	EPA 6010B
	EPA 6010C
	EPA 6020
	EPA 6020A
Arsenic, Total	EPA 6010B
	EPA 6010C
	EPA 6020
	EPA 6020A
	EPA 7010
	EPA 7060A
Beryllium, Total	EPA 6010B
	EPA 6010C
	EPA 6020
	EPA 6020A
Chromium VI	EPA 7196A
	EPA 7199
Lithium, Total	EPA 6010B
	EPA 6010C
Mercury, Total	EPA 7471A
	EPA 7471B
Selenium, Total	EPA 6010B
	EPA 6010C
	EPA 6020

Metals II	
Selenium, Total	EPA 6020A
	EPA 7010
Vanadium, Total	EPA 6010B
	EPA 6010C
	EPA 6020
	EPA 6020A
Zinc, Total	EPA 6010B
	EPA 6010C
	EPA 6020
	EPA 6020A
Metals III	
Cobalt, Total	EPA 6010B
	EPA 6010C
	EPA 6020
	EPA 6020A
Molybdenum, Total	EPA 6010B
	EPA 6010C
	EPA 6020
	EPA 6020A
Silica, Dissolved	EPA 6010B
	EPA 6010C
Thallium, Total	EPA 6010B
	EPA 6010C
	EPA 6020
	EPA 6020A

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Metals III	
Thallium, Total	EPA 7010
Tin, Total	EPA 6010B
	EPA 6010C
Titanium, Total	EPA 6010C
Minerals	
Bromide	EPA 9056A
Chloride	EPA 9056A
Fluoride, Total	EPA 9056A
Sulfate (as SO4)	EPA 9056A
Miscellaneous	
Boron, Total	EPA 6010B
	EPA 6010C
Cyanide, Total	EPA 9012B
Formaldehyde	EPA 8315
Organic Carbon, Total	Lloyd Kahn Method
Perchlorate	EPA 6850
Phenols	EPA 9066
Sulfide (as S)	EPA 9034
Nitroaromatics and Isophorone	
1,3,5-Trinitrobenzene	EPA 8270C
	EPA 8270D
	EPA 8330
	EPA 8330B
1,3-Dinitrobenzene	EPA 8270C
1,3-Dinitrobenzene	EPA 8270D
	EPA 8330
	EPA 8330B
1,4-Naphthoquinone	EPA 8270C
	EPA 8270D
2,4,6-Trinitrotoluene	EPA 8330
	EPA 8330B
2,4-Dinitrotoluene	EPA 8270C
	EPA 8270D
	EPA 8330
	EPA 8330B
2,6-Dinitrotoluene	EPA 8270C
	EPA 8270D
	EPA 8330
	EPA 8330B
2-Amino-4,6-dinitrotoluene	EPA 8330
	EPA 8330B
2-Nitrotoluene	EPA 8330
	EPA 8330B
3,5-Dinitroaniline	EPA 8330B
3-Nitrotoluene	EPA 8330
	EPA 8330B
4-Amino-2,6-dinitrotoluene	EPA 8330
	EPA 8330B
4-Dimethylaminoazobenzene	EPA 8270C

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Nitroaromatics and Isophorone	
4-Dimethylaminoazobenzene	EPA 8270D
4-Nitrotoluene	EPA 8330
	EPA 8330B
Hexahydro-1,3,5-trinitro-1,3,5-triazine	EPA 8330
	EPA 8330B
Isophorone	EPA 8270C
	EPA 8270D
Methyl-2,4,6-trinitrophenylnitramine	EPA 8330
	EPA 8330B
Nitrobenzene	EPA 8270C
	EPA 8270D
	EPA 8330
	EPA 8330B
Nitroglycerine	EPA 8330B
Nitroquinoline-1-oxide	EPA 8270C
	EPA 8270D
Octahydro-tetranitro-tetrazocine	EPA 8330
	EPA 8330B
Pentaerythritol tetranitrate	EPA 8330B
Pyridine	EPA 8270C
	EPA 8270D
Nitrosoamines	
N-Nitrosodiethylamine	EPA 8270C
	EPA 8270D
N-Nitrosodimethylamine	EPA 8270C

Nitrosoamines	
N-Nitrosodimethylamine	EPA 8270D
N-Nitrosodi-n-butylamine	EPA 8270C
	EPA 8270D
N-Nitrosodi-n-propylamine	EPA 8270C
	EPA 8270D
N-Nitrosodiphenylamine	EPA 8270C
	EPA 8270D
N-nitrosomethylethylamine	EPA 8270C
	EPA 8270D
N-nitrosomorpholine	EPA 8270C
	EPA 8270D
N-nitrosopiperidine	EPA 8270C
	EPA 8270D
N-Nitrosopyrrolidine	EPA 8270C
	EPA 8270D
Nutrients	
Nitrate (as N)	EPA 9056A
Nitrite (as N)	EPA 9056A
Organophosphate Pesticides	
Dimethoate	EPA 8270C
	EPA 8270D
Disulfoton	EPA 8270C
	EPA 8270D
Parathion ethyl	EPA 8270C
	EPA 8270D

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Organophosphate Pesticides	
Parathion methyl	EPA 8270C
	EPA 8270D
Phorate	EPA 8270C
	EPA 8270D
Sulfotepp	EPA 8270C
	EPA 8270D
Thionazin	EPA 8270C
	EPA 8270D
Petroleum Hydrocarbons	
Diesel Range Organics	EPA 8015 B
	EPA 8015C
Gasoline Range Organics	EPA 8015 B
	EPA 8015C
Phthalate Esters	
Benzyl butyl phthalate	EPA 8270C
	EPA 8270D
Bis(2-ethylhexyl) phthalate	EPA 8270C
	EPA 8270D
Diethyl phthalate	EPA 8270C
	EPA 8270D
Dimethyl phthalate	EPA 8270C
	EPA 8270D
Di-n-butyl phthalate	EPA 8270C
	EPA 8270D
Di-n-octyl phthalate	EPA 8270C
Phthalate Esters	
Di-n-octyl phthalate	EPA 8270D
Polychlorinated Biphenyls	
PCB-1016	EPA 8082
	EPA 8082A
PCB-1221	EPA 8082
	EPA 8082A
PCB-1232	EPA 8082
	EPA 8082A
PCB-1242	EPA 8082
	EPA 8082A
PCB-1248	EPA 8082
	EPA 8082A
PCB-1254	EPA 8082
	EPA 8082A
PCB-1260	EPA 8082
	EPA 8082A
PCB-1262	EPA 8082
	EPA 8082A
PCB-1268	EPA 8082
	EPA 8082A
Polynuclear Aromatic Hydrocarbons	
2-Acetylaminofluorene	EPA 8270D
3-Methylcholanthrene	EPA 8270C
	EPA 8270D
7,12-Dimethylbenzyl (a) anthracene	EPA 8270C

Serial No.: 47588

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NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2013
Issued April 02, 2012
Revised October 15, 2012

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. MICHAEL PERRY
COLUMBIA ANALYTICAL SERVICES
1565 JEFFERSON ROAD BUILDING 300, SUITE 360
ROCHESTER, NY 14623

NY Lab Id No: 10145

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2003) for the category ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved analytes are listed below:

Polynuclear Aromatic Hydrocarbons	
7,12-Dimethylbenzyl (a) anthracene	EPA 8270D
Acenaphthene	EPA 8270C
	EPA 8270D
Acenaphthylene	EPA 8270C
	EPA 8270D
Anthracene	EPA 8270C
	EPA 8270D
Benzo(a)anthracene	EPA 8270C
	EPA 8270D
Benzo(a)pyrene	EPA 8270C
	EPA 8270D
Benzo(b)fluoranthene	EPA 8270C
	EPA 8270D
Benzo(ghi)perylene	EPA 8270C
	EPA 8270D
Benzo(k)fluoranthene	EPA 8270C
	EPA 8270D
Chrysene	EPA 8270C
	EPA 8270D
Dibenzo(a,h)anthracene	EPA 8270C
	EPA 8270D
Fluoranthene	EPA 8270C
	EPA 8270D
Fluorene	EPA 8270C
	EPA 8270D

Polynuclear Aromatic Hydrocarbons	
Indeno(1,2,3-cd)pyrene	EPA 8270C
	EPA 8270D
Naphthalene	EPA 8270C
	EPA 8270D
Phenanthrene	EPA 8270C
	EPA 8270D
Pyrene	EPA 8270C
	EPA 8270D
Priority Pollutant Phenols	
2,3,4,6 Tetrachlorophenol	EPA 8270C
	EPA 8270D
2,4,5-Trichlorophenol	EPA 8270C
	EPA 8270D
2,4,6-Trichlorophenol	EPA 8270C
	EPA 8270D
2,4-Dichlorophenol	EPA 8270C
	EPA 8270D
2,4-Dimethylphenol	EPA 8270C
	EPA 8270D
2,4-Dinitrophenol	EPA 8270C
	EPA 8270D
2,6-Dichlorophenol	EPA 8270C
	EPA 8270D
2-Chlorophenol	EPA 8270C
	EPA 8270D

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Priority Pollutant Phenols	
2-Methyl-4,6-dinitrophenol	EPA 8270C
	EPA 8270D
2-Methylphenol	EPA 8270C
	EPA 8270D
2-Nitrophenol	EPA 8270C
	EPA 8270D
3-Methylphenol	EPA 8270C
	EPA 8270D
4-Chloro-3-methylphenol	EPA 8270C
	EPA 8270D
4-Methylphenol	EPA 8270C
	EPA 8270D
4-Nitrophenol	EPA 8270C
	EPA 8270D
Pentachlorophenol	EPA 8270C
	EPA 8270D
Phenol	EPA 8270C
	EPA 8270D
Semi-Volatile Organics	
1,1'-Biphenyl	EPA 8270C
	EPA 8270D
1,2-Dichlorobenzene, Semi-volatile	EPA 8270C
	EPA 8270D
1,3-Dichlorobenzene, Semi-volatile	EPA 8270C
	EPA 8270D

Semi-Volatile Organics	
1,4-Dichlorobenzene, Semi-volatile	EPA 8270C
	EPA 8270D
2-Methylnaphthalene	EPA 8270C
	EPA 8270D
2-Picoline	EPA 8270D
4-Amino biphenyl	EPA 8270C
	EPA 8270D
Acetophenone	EPA 8270C
	EPA 8270D
Aramite	EPA 8270C
	EPA 8270D
Benzaldehyde	EPA 8270C
	EPA 8270D
Benzoic Acid	EPA 8270C
	EPA 8270D
Benzyl alcohol	EPA 8270C
	EPA 8270D
Caprolactam	EPA 8270C
	EPA 8270D
Dibenzofuran	EPA 8270C
	EPA 8270D
Ethyl methanesulfonate	EPA 8270C
	EPA 8270D
Isosafrole	EPA 8270C
	EPA 8270D

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Semi-Volatile Organics	
Methyl methanesulfonate	EPA 8270C
	EPA 8270D
O,O,O-Triethyl phosphorothioate	EPA 8270C
	EPA 8270D
Phenacetin	EPA 8270C
	EPA 8270D
Safrole	EPA 8270C
	EPA 8270D
Volatile Aromatics	
1,2,4-Trichlorobenzene, Volatile	EPA 8260B
	EPA 8260C
1,2,4-Trimethylbenzene	EPA 8021B
	EPA 8260B
	EPA 8260C
1,2-Dichlorobenzene	EPA 8260B
	EPA 8260C
1,3,5-Trimethylbenzene	EPA 8021B
	EPA 8260B
	EPA 8260C
1,3-Dichlorobenzene	EPA 8260B
	EPA 8260C
1,4-Dichlorobenzene	EPA 8260B
	EPA 8260C
2-Chlorotoluene	EPA 8260B
	EPA 8260C
Volatile Aromatics	
4-Chlorotoluene	EPA 8260B
	EPA 8260C
Benzene	EPA 8021B
	EPA 8260B
	EPA 8260C
Bromobenzene	EPA 8260B
	EPA 8260C
Chlorobenzene	EPA 8021B
	EPA 8260B
	EPA 8260C
Ethyl benzene	EPA 8021B
	EPA 8260B
	EPA 8260C
Isopropylbenzene	EPA 8021B
	EPA 8260B
	EPA 8260C
Naphthalene, Volatile	EPA 8260B
	EPA 8260C
n-Butylbenzene	EPA 8021B
	EPA 8260B
	EPA 8260C
n-Propylbenzene	EPA 8021B
	EPA 8260B
	EPA 8260C
p-Isopropyltoluene (P-Cymene)	EPA 8021B

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Volatile Aromatics	
p-Isopropyltoluene (P-Cymene)	EPA 8260B
	EPA 8260C
sec-Butylbenzene	EPA 8021B
	EPA 8260B
	EPA 8260C
Styrene	EPA 8260B
	EPA 8260C
tert-Butylbenzene	EPA 8021B
	EPA 8260B
	EPA 8260C
Toluene	EPA 8021B
	EPA 8260B
	EPA 8260C
Total Xylenes	EPA 8021B
	EPA 8260B
	EPA 8260C
Volatile Chlorinated Organics	
Benzyl chloride	EPA 8260C
Volatile Halocarbons	
1,1,1,2-Tetrachloroethane	EPA 8260B
	EPA 8260C
1,1,1-Trichloroethane	EPA 8260B
	EPA 8260C
1,1,2,2-Tetrachloroethane	EPA 8260B
	EPA 8260C
Volatile Halocarbons	
1,1,2-Trichloro-1,2,2-Trifluoroethane	EPA 8260B
	EPA 8260C
1,1,2-Trichloroethane	EPA 8260B
	EPA 8260C
1,1-Dichloroethane	EPA 8260B
	EPA 8260C
1,1-Dichloroethene	EPA 8260B
	EPA 8260C
1,1-Dichloropropene	EPA 8260B
	EPA 8260C
1,2,3-Trichloropropane	EPA 8260B
	EPA 8260C
1,2-Dibromo-3-chloropropane	EPA 8260B
	EPA 8260C
1,2-Dibromoethane	EPA 8260B
	EPA 8260C
1,2-Dichloroethane	EPA 8260B
	EPA 8260C
1,2-Dichloropropane	EPA 8260B
	EPA 8260C
1,3-Dichloropropane	EPA 8260B
	EPA 8260C
2,2-Dichloropropane	EPA 8260B
	EPA 8260C
2-Chloro-1,3-butadiene (Chloroprene)	EPA 8260B

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Volatile Halocarbons	
2-Chloro-1,3-butadiene (Chloroprene)	EPA 8260C
2-Chloroethylvinyl ether	EPA 8260B
	EPA 8260C
3-Chloropropene (Allyl chloride)	EPA 8260B
	EPA 8260C
Bromochloromethane	EPA 8260B
	EPA 8260C
Bromodichloromethane	EPA 8260B
	EPA 8260C
Bromoform	EPA 8260B
	EPA 8260C
Bromomethane	EPA 8260B
	EPA 8260C
Carbon tetrachloride	EPA 8260B
	EPA 8260C
Chloroethane	EPA 8260B
	EPA 8260C
Chloroform	EPA 8260B
	EPA 8260C
Chloromethane	EPA 8260B
	EPA 8260C
cis-1,2-Dichloroethene	EPA 8260B
	EPA 8260C
cis-1,3-Dichloropropene	EPA 8260B
	EPA 8260C

Volatile Halocarbons	
Dibromochloromethane	EPA 8260B
	EPA 8260C
Dibromomethane	EPA 8260B
	EPA 8260C
Dichlorodifluoromethane	EPA 8260B
	EPA 8260C
Hexachlorobutadiene, Volatile	EPA 8260B
	EPA 8260C
Methyl iodide	EPA 8260C
Methylene chloride	EPA 8260B
	EPA 8260C
Tetrachloroethene	EPA 8260B
	EPA 8260C
trans-1,2-Dichloroethene	EPA 8260B
	EPA 8260C
trans-1,3-Dichloropropene	EPA 8260B
	EPA 8260C
trans-1,4-Dichloro-2-butene	EPA 8260B
	EPA 8260C
Trichloroethene	EPA 8260B
	EPA 8260C
Trichlorofluoromethane	EPA 8260B
	EPA 8260C
Vinyl chloride	EPA 8260B
	EPA 8260C

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Volatile Organics	
1,4-Dioxane	EPA 8260B
	EPA 8260C
2-Butanone (Methylethyl ketone)	EPA 8260B
	EPA 8260C
2-Hexanone	EPA 8260B
	EPA 8260C
2-Nitropropane	EPA 8260B
	EPA 8260C
4-Methyl-2-Pentanone	EPA 8260B
	EPA 8260C
Acetone	EPA 8260B
	EPA 8260C
Acetonitrile	EPA 8260B
	EPA 8260C
Carbon Disulfide	EPA 8260B
	EPA 8260C
Cyclohexane	EPA 8260B
	EPA 8260C
Di-ethyl ether	EPA 8260B
	EPA 8260C
Ethyl Acetate	EPA 8260B
	EPA 8260C
Ethylene Glycol	EPA 8015 B
	EPA 8015C
Isobutyl alcohol	EPA 8260B

Volatile Organics	
Isobutyl alcohol	EPA 8260C
Isopropanol	EPA 8260B
	EPA 8260C
Methyl acetate	EPA 8260B
	EPA 8260C
Methyl cyclohexane	EPA 8260B
	EPA 8260C
Methyl tert-butyl ether	EPA 8021B
	EPA 8260B
	EPA 8260C
n-Butanol	EPA 8260B
	EPA 8260C
o-Toluidine	EPA 8260B
	EPA 8260C
	EPA 8270C
	EPA 8270D
Propionitrile	EPA 8260B
	EPA 8260C
tert-butyl alcohol	EPA 8260B
	EPA 8260C
Vinyl acetate	EPA 8260B
	EPA 8260C
Sample Preparation Methods	
	EPA 3050B
	EPA 3060A

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All approved analytes are listed below:

Sample Preparation Methods

EPA 3541
EPA 3550C
EPA 3580A
EPA 5030B
EPA 5035A-H
EPA 5035A-L
EPA 9030B

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NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2013
Issued April 02, 2012
Revised June 21, 2012

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MR. MICHAEL PERRY
COLUMBIA ANALYTICAL SERVICES
1565 JEFFERSON ROAD BUILDING 300, SUITE 360
ROCHESTER, NY 14623

NY Lab Id No: 10145

is hereby APPROVED as an Environmental Laboratory for the category
ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved subcategories and/or analytes are listed below:

Miscellaneous

Lead in Dust Wipes	EPA 6010B
	EPA 6010C

Sample Preparation Methods

	EPA 3050B

Serial No.: 47162

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WADSWORTH CENTER

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CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

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ROCHESTER, NY 14623

NY Lab Id No: 10145

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2003) for the category ENVIRONMENTAL ANALYSES AIR AND EMISSIONS
All approved analytes are listed below:

Acrylates	
Acrylonitrile	EPA TO-15
Ethyl acrylate	EPA TO-15
Methyl methacrylate	EPA TO-15
Chlorinated Hydrocarbons	
1,2,4-Trichlorobenzene	EPA TO-15
Hexachlorobutadiene	EPA TO-15
Miscellaneous Air	
Sulfuric Acid	40 CFR 60 Method 8
Purgeable Aromatics	
1,2,4-Trimethylbenzene	EPA TO-15
1,2-Dichlorobenzene	EPA TO-15
1,3,5-Trimethylbenzene	EPA TO-15
1,3-Dichlorobenzene	EPA TO-15
1,4-Dichlorobenzene	EPA TO-15
Benzene	EPA TO-15
Chlorobenzene	EPA TO-15
Ethyl benzene	EPA TO-15
m/p-Xylenes	EPA TO-15
o-Xylene	EPA TO-15
Styrene	EPA TO-15
Toluene	EPA TO-15
Total Xylenes	EPA TO-15
Purgeable Halocarbons	
1,1,1-Trichloroethane	EPA TO-15

Purgeable Halocarbons	
1,1,2,2-Tetrachloroethane	EPA TO-15
1,1,2-Trichloro-1,2,2-Trifluoroethane	EPA TO-15
1,1,2-Trichloroethane	EPA TO-15
1,1-Dichloroethane	EPA TO-15
1,1-Dichloroethene	EPA TO-15
1,2-Dibromoethane	EPA TO-15
1,2-Dichloroethane	EPA TO-15
1,2-Dichloropropane	EPA TO-15
Bromodichloromethane	EPA TO-15
Bromoform	EPA TO-15
Bromomethane	EPA TO-15
Carbon tetrachloride	EPA TO-15
Chloroethane	EPA TO-15
Chloroform	EPA TO-15
Chloromethane	EPA TO-15
cis-1,2-Dichloroethene	EPA TO-15
cis-1,3-Dichloropropene	EPA TO-15
Dibromochloromethane	EPA TO-15
Dichlorodifluoromethane	EPA TO-15
Methylene chloride	EPA TO-15
Tetrachloroethene	EPA TO-15
trans-1,2-Dichloroethene	EPA TO-15
trans-1,3-Dichloropropene	EPA TO-15
Trichloroethene	EPA TO-15
Trichlorofluoromethane	EPA TO-15

Serial No.: 45980

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NELAP RECOGNIZED ACCREDITATION BODY

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NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

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All approved analytes are listed below:

Purgeable Halocarbons	
Vinyl chloride	EPA TO-15
Volatile Chlorinated Organics	
Benzyl chloride	EPA TO-15
Volatile Organics	
1,2-Dichlorotetrafluoroethane	EPA TO-15
1,3-Butadiene	EPA TO-15
2,2,4-Trimethylpentane	EPA TO-15
2-Butanone (Methylethyl ketone)	EPA TO-15
4-Methyl-2-Pentanone	EPA TO-15
Acetone	EPA TO-15
Carbon Disulfide	EPA TO-15
Cyclohexane	EPA TO-15
Hexane	EPA TO-15
Methyl iodide	EPA TO-15
Methyl tert-butyl ether	EPA TO-15
n-Heptane	EPA TO-15
Vinyl acetate	EPA TO-15

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Proprietary

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State of New Jersey
Department of Environmental Protection

Certifies That

Accutest Laboratories

Laboratory Certification ID # 12129

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 2009 TNI Standard approved by the

The NELAC Institute

Expiration Date June 30, 2013

NJDEP is a NELAP Recognized Accreditation Body

Joseph F. Aiello, Manager
Office of Quality Assurance

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.

LABORATORY ACCREDITATION BUREAU

Certificate # L2248

Scope of Accreditation
For
Accutest Laboratories – New Jersey

2235 Route 130
Dayton, NJ 08810
Phillip M. Worby
732-329-0200

In recognition of a successful assessment to ISO/IEC 17025:2005 and the requirements of the DoD Environmental Laboratory Accreditation Program (DoD ELAP) as detailed in the DoD Quality Systems Manual for Environmental Laboratories (DoD QSM v4.2) based on the National Environmental Laboratory Accreditation Conference Chapter 5 Quality Systems Standard (NELAC Voted Revision June 5, 2003), accreditation is granted to Accutest Laboratories to perform the following tests:

Accreditation granted through: **April 14, 2013**

Testing – Environmental

Non-Potable Water		
Technology	**Method**	**Analyte**
Membrane Filter (MF)	SM 9222 D	Fecal Coliform
Membrane Filter (MF)	SM 9222 B	Total Coliform
Pour Plate	SM 9215 B	Heterotrophic Plate Count
Electrometric Titration	SM 2320 B	Alkalinity as CaCO3
Automated Phenate	SM 4500-NH3 B+G (20^{th} ed.)	Ammonia
Dissolved Oxygen	SM 5210 B	Biochemical Oxygen Demand
Dissolved Oxygen	SM 5210 B	Carbonaceous Biochemical Oxygen Demand
Titrimetric	SM 5220 C (M)	Chemical Oxygen Demand
Distillation, Spectrophotometric	EPA 335.4	Cyanide
Distillation, Spectrophotometric	SM 4500-CN C,G	Cyanide – Amenable to Chlorination
Titrimetric, EDTA	SM 2340 B/C	Hardness – total as CaCO3
Digestion, Distillation, Semiautomated Digestor	EPA 351.2	Kjeldahl Nitrogen - Total
Spectrophotometric, Manual	SM 4500-NO2-B	Nitrite
Combustion	SM 5310 B	Total Organic Carbon (TOC)
Calculation	EPA 351.2 – SM 4500-NH3 B+G (20^{th} ed)	Organic Nitrogen
Spectrophotometric	SM 4500-P, E	Orthophosphate

LABORATORY ACCREDITATION BUREAU

Certificate # L2248

Non-Potable Water		
Technology	**Method**	**Analyte**
Distillation, Colorimetric Auto	EPA 420.1 + .4	Phenols
Persulfate Digestion + Manual	EPA 365.3	Phosphorus (total)
Gravimetric	SM 2540 C	Residue – filterable (TDS)
Gravimetric	SM 2540 D	Residue – nonfilterable (TSS)
Volumetric (Imhoff Cone)	SM 2540 F	Residue – settleable
Gravimetric	EPA 160.4	Residue – volatile
Gravimetric	SM 2540 G	Total, fixed, and volatile solids (SQAR)
Electrical Conductivity	SM 2520 B	Salinity
Filtration – Colorimetric	SM 4500-Si, D	Silica – dissolved
Wheatstone Bridge	SM 2510 B	Specific Conductance
Wheatstone Bridge	EPA 9050A	Specific Conductance
Titrimetric, Iodine	SM 4500-S, F	Sulfides
Colorimetric (Methylene Blue)	SM 5540 C	Surfactants
Nephelometric	EPA 180.1	Turbidity
Electrode	SM 4500-O, G	Oxygen (dissolved)
Electrometric	SM 4500-H, B	pH
Colorimetric	SM 3500-Cr, D	Chromium, VI
Digestion, Colorimetric	SM 3500-Fe, B	Iron, Ferrous
Manual Cold Vapor	EPA 245.1	Mercury
ICP-MS	EPA 6020/A/200.8	Aluminum
ICP-MS	EPA 6020/A/200.8	Antimony
ICP-MS	EPA 6020/A/200.8	Arsenic
ICP-MS	EPA 6020/A/200.8	Barium
ICP-MS	EPA 6020/A/200.8	Beryllium
ICP-MS	EPA 6020/A/200.8	Cadmium
ICP-MS	EPA 6020/A/200.8	Calcium
ICP-MS	EPA 6020/A/200.8	Chromium
ICP-MS	EPA 6020/A/200.8	Cobalt
ICP-MS	EPA 6020/A/200.8	Copper
ICP-MS	EPA 6020/A/200.8	Iron
ICP-MS	EPA 6020/A/200.8	Lead
ICP-MS	EPA 6020/A/200.8	Magnesium
ICP-MS	EPA 6020/A/200.8	Manganese
ICP-MS	EPA 6020/A/200.8	Molybdenum

LABORATORY ACCREDITATION BUREAU

Certificate # L2248

Non-Potable Water		
Technology	**Method**	**Analyte**
ICP-MS	EPA 6020/A/200.8	Nickel
ICP-MS	EPA 6020/A/200.8	Potassium
ICP-MS	EPA 6020/A/200.8	Selenium
ICP-MS	EPA 6020/A/200.8	Silver
ICP-MS	EPA 6020/A/200.8	Sodium
ICP-MS	EPA 6020/A/200.8	Thallium
ICP-MS	EPA 6020/A/200.8	Tin
ICP-MS	EPA 200.8	Titanium
ICP-MS	EPA 6020/A/200.8	Vanadium
ICP-MS	EPA 6020/A/200.8	Zinc
GC-ECD	EPA 8011	1,2-Dibromomethane (EDB)
GC-ECD	EPA 8011	1,2-Dibromo-3-chloropropane
GC-ECD	EPA 8011	1,2,3-Trichloropropane
GC-FID	EPA 8015B/C	Diesel range organics (DRO)
GC-FID	EPA 8015B/C	Gasoline range organics (GRO)
GC-FID	EPA 8015B/C	Ethanol
GC-FID	EPA 8015B/C	Isobutyl alcohol (2-Methyl-1-propanol)
GC-FID	EPA 8015B/C	Isopropyl alcohol (2-Propanol)
GC-FID	EPA 8015B/C	Methanol
GC-FID	EPA 8015B/C	Tert-butyl alcohol
GC-FID	TCEQ 1005	Diesel Range Organics
GC-FID	NJDEP-EPH	Extractable Petroleum Hydrocarbons
GC-PID	EPA 602	Benzene
GC-PID	EPA 602	Chlorobenzene
GC-PID	EPA 602	1,2-Dichlorobenzene
GC-PID	EPA 602	1,3-Dichlorobenzene
GC-PID	EPA 602	1,4-Dichlorobenzene
GC-PID	EPA 602	Ethylbenzene
GC-PID	EPA 602	Methyl tert-butyl ether
GC-PID	EPA 602	Tert-butyl alcohol
GC-PID	EPA 602	Toluene
GC-PID	EPA 602	Xylenes (total)
GC-FID	EPA 603	Acrolein
GC-FID	EPA 603	Acrylonitrile
GC	EPA 8021B	Benzene

LABORATORY ACCREDITATION BUREAU

Certificate # L2248

Non-Potable Water		
Technology	**Method**	**Analyte**
GC	EPA 8021B	Chlorobenzene
GC	EPA 8021B	1,2-Dichlorobenzene
GC	EPA 8021B	1,3-Dichlorobenzene
GC	EPA 8021B	1,4-Dichlorobenzene
GC	EPA 8021B	Ethylbenzene
GC	EPA 8021B	Styrene
GC	EPA 8021B	Toluene
GC	EPA 8021B	o-Xylene
GC	EPA 8021B	m-Xylene
GC	EPA 8021B	p-Xylene
GC	EPA 8021B	trans-1,3-Dichloropropene
GC	EPA 8021B	cis-1,2-Dichloroethene
GC	EPA 8021B	trans-1,2-Dichloroethene
GC	EPA 8021B	cis-1,3-Dichloropropene
GC	EPA 8021B	Tetrachloroethene
GC	EPA 8021B	Trichloroethene
GC	EPA 8021B	Methyl tert-butyl ether
GC-ECD	EPA 8081A/B/608	4 4`-DDD
GC-ECD	EPA 8081A/B/608	4 4`-DDE
GC-ECD	EPA 8081A/B/608	4 4`-DDT
GC-ECD	EPA 8081A/B/608	Aldrin
GC-ECD	EPA 8081A/B/608	Chlordane (tech.)
GC-ECD	EPA 8081A/B/608	Dieldrin
GC-ECD	EPA 8081A/B/608	Endosulfan I
GC-ECD	EPA 8081A/B/608	Endosulfan II
GC-ECD	EPA 8081A/B/608	Endosulfan sulfate
GC-ECD	EPA 8081A/B/608	Endrin
GC-ECD	EPA 8081A/B/608	Endrin aldehyde
GC-ECD	EPA 8081A/B/608	Endrin ketone
GC-ECD	EPA 8081A/B/608	Heptachlor
GC-ECD	EPA 8081A/B/608	Heptachlor epoxide
GC-ECD	EPA 8081A/B/608	Methoxychlor
GC-ECD	EPA 8081A/B/608	Toxaphene (Chlorinated camphene)
GC-ECD	EPA 8081A/B/608	alpha-BHC (alpha-Hexachlorocyclohexane)
GC-ECD	EPA 8081A/B/608	alpha-Chlordane

LABORATORY ACCREDITATION BUREAU

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Non-Potable Water		
Technology	**Method**	**Analyte**
GC-ECD	EPA 8081A/B/608	beta-BHC (beta-Hexachlorocyclohexane)
GC-ECD	EPA 8081A/B/608	delta-BHC
GC-ECD	EPA 8081A/B/608	gamma-BHC (Lindane gamma-Hexachlorocyclohexane)
GC-ECD	EPA 8081A/B/608	gamma-Chlordane
GC-ECD	EPA 8081A/B	Mirex
GC-ECD	EPA 8082/A/608	Aroclor-1016 (PCB-1016)
GC-ECD	EPA 8082/A/608	Aroclor-1221 (PCB-1221)
GC-ECD	EPA 8082/A/608	Aroclor-1232 (PCB-1232)
GC-ECD	EPA 8082/A/608	Aroclor-1242 (PCB-1242)
GC-ECD	EPA 8082/A/608	Aroclor-1248 (PCB-1248)
GC-ECD	EPA 8082/A/608	Aroclor-1254 (PCB-1254)
GC-ECD	EPA 8082/A/608	Aroclor-1260 (PCB-1260)
GC-ECD	EPA 8082A/608	Aroclor-1262 (PCB-1262)
GC-ECD	EPA 8082/A/608	Aroclor-1268 (PCB-1268)
GC-ECD	EPA 8151A	2 4 5-T
GC-ECD	EPA 8151A	2 4-D
GC-ECD	EPA 8151A	2 4-DB
GC-ECD	EPA 8151A	Dalapon
GC-ECD	EPA 8151A	Dicamba
GC-ECD	EPA 8151A	Dichloroprop (Dichlorprop)
GC-ECD	EPA 8151A	Dinoseb (2-sec-butyl-4 6-dinitrophenol DNBP)
GC-ECD	EPA 8151A	MCPA
GC-ECD	EPA 8151A	MCPP
GC-ECD	EPA 8151A	Pentachlorophenol
GC-ECD	EPA 8151A	Silvex (2 4 5-TP)
GC-ECD	EPA 8151A	Picloram
GC-FID	EPA RSK-175	Ethane
GC-FID	EPA RSK-175	Ethene
GC-FID	EPA RSK-175	Methane
GC-FID	EPA RSK-175	Propane
GC-MS	EPA 624	n-Heptane
GC-MS	EPA 624	n-Hexane
GC-MS	EPA 624	Isobutyraldehyde
GC-MS	EPA 624	Isopropanol
GC-MS	EPA 624	Isopropyl acetate

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Non-Potable Water		
Technology	**Method**	**Analyte**
GC-MS	EPA 624	Isopropyl ether
GC-MS	EPA 624	Methyl formate
GC-MS	EPA 624	o-Xylene
GC-MS	EPA 624	m- + p-Xylene
GC-MS	EPA 8260B	Ethylene glycol
GC-MS	EPA 8260B	Propylene glycol
GC-MS	EPA 8260B	1 1 1 2-Tetrachloroethane
GC-MS	EPA 8260B/624	1 1 1-Trichloroethane
GC-MS	EPA 8260B/624	1 1 2 2-Tetrachloroethane
GC-MS	EPA 8260B/624	1 1 2-Trichloroethane
GC-MS	EPA 8260B/624	1 1-Dichloroethane
GC-MS	EPA 8260B/624	1 1-Dichloroethylene
GC-MS	EPA 8260B	1 1-Dichloropropene
GC-MS	EPA 8260B	1 2 3-Trichlorobenzene
GC-MS	EPA 8260B	1 2 3-Trichloropropane
GC-MS	EPA 8260B	1 2 4-Trichlorobenzene
GC-MS	EPA 8260B/624	1 2 4-Trimethylbenzene
GC-MS	EPA 8260B	1 2-Dibromo-3-chloropropane (DBCP)
GC-MS	EPA 8260B/624	1 2-Dibromoethane (EDB Ethylene dibromide)
GC-MS	EPA 8260B/624	1 2-Dichlorobenzene
GC-MS	EPA 8260B/624	1 2-Dichloroethane
GC-MS	EPA 8260B/624	1 2-Dichloropropane
GC-MS	EPA 8260B/624	1 3 5-Trimethylbenzene
GC-MS	EPA 8260B/624	1 3-Dichlorobenzene
GC-MS	EPA 8260B	1 3-Dichloropropane
GC-MS	EPA 8260B/624	1 4-Dichlorobenzene
GC-MS	EPA 8260B	1-Chlorohexane
GC-MS	EPA 8260B	2 2-Dichloropropane
GC-MS	EPA 8260B/624	2-Butanone (Methyl ethyl ketone MEK)
GC-MS	EPA 8260B/624	2-Chloroethyl vinyl ether
GC-MS	EPA 8260B	2-Chlorotoluene
GC-MS	EPA 8260B/624	2-Hexanone
GC-MS	EPA 8260B	2-Nitropropane
GC-MS	EPA 8260B	4-Chlorotoluene
GC-MS	EPA 8260B/624	4-Methyl-2-pentanone (MIBK)

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Non-Potable Water		
Technology	**Method**	**Analyte**
GC-MS	EPA 8260B/624	Acetone
GC-MS	EPA 8260B	Acetonitrile
GC-MS	EPA 8260B/624	Acrolein (Propenal)
GC-MS	EPA 8260B/624	Acrylonitrile
GC-MS	EPA 8260B	Allyl chloride (3-Chloropropene)
GC-MS	EPA 8260B/624	Benzene
GC-MS	EPA 8260B	Bromobenzene
GC-MS	EPA 8260B	Bromochloromethane
GC-MS	EPA 8260B/624	Bromodichloromethane
GC-MS	EPA 8260B/624	Bromoform
GC-MS	EPA 8260B/624	Carbon disulfide
GC-MS	EPA 8260B/624	Carbon tetrachloride
GC-MS	EPA 8260B/624	Chlorobenzene
GC-MS	EPA 8260B/624	Chloroethane
GC-MS	EPA 8260B/624	Chloroform
GC-MS	EPA 8260B	Chloroprene
GC-MS	EPA 8260B/624	Di-isopropylether (DIPE)
GC-MS	EPA 8260B/624	Dibromochloromethane
GC-MS	EPA 8260B	Dibromomethane
GC-MS	EPA 8260B/624	Dichlorodifluoromethane
GC-MS	EPA 8260B/624	Diethyl ether
GC-MS	EPA 8260B	Ethanol
GC-MS	EPA 8260B/624	Ethyl acetate
GC-MS	EPA 8260B	Ethyl methacrylate
GC-MS	EPA 8260B/624	Ethyl-t-butylether (ETBE)
GC-MS	EPA 8260B/624	Ethylbenzene
GC-MS	EPA 8260B	Hexachlorobutadiene
GC-MS	EPA 8260B	Iodomethane (Methyl iodide)
GC-MS	EPA 8260B	Isobutyl alcohol (2-Methyl-1-propanol)
GC-MS	EPA 8260B/624	Isopropylbenzene
GC-MS	EPA 8260B	Methacrylonitrile
GC-MS	EPA 8260B/624	Methyl bromide (Bromomethane)
GC-MS	EPA 8260B/624	Methyl chloride (Chloromethane)
GC-MS	EPA 8260B	Methyl methacrylate
GC-MS	EPA 8260B/624	Methyl tert-butyl ether (MTBE)

LABORATORY ACCREDITATION BUREAU

Certificate # L2248

Non-Potable Water		
Technology	**Method**	**Analyte**
GC-MS	EPA 8260B/624	Methylene chloride
GC-MS	EPA 8260B/624	Naphthalene
GC-MS	EPA 8260B	Pentachloroethane
GC-MS	EPA 8260B	Propionitrile (Ethyl cyanide)
GC-MS	EPA 8260B/624	Styrene
GC-MS	EPA 8260B/624	T-amylmethylether (TAME)
GC-MS	EPA 8260B/624	Tetrachloroethylene (Perchloroethylene)
GC-MS	EPA 8260B/624	Toluene
GC-MS	EPA 8260B/624	Trichloroethene (Trichloroethylene)
GC-MS	EPA 8260B/624	Trichlorofluoromethane
GC-MS	EPA 8260B/624	Vinyl acetate
GC-MS	EPA 8260B/624	Vinyl chloride
GC-MS	EPA 8260B/624	Xylene (total)
GC-MS	EPA 8260B/624	cis-1 2-Dichloroethylene
GC-MS	EPA 8260B/624	cis-1 3-Dichloropropene
GC-MS	EPA 8260B	n-Butylbenzene
GC-MS	EPA 8260B	n-Propylbenzene
GC-MS	EPA 8260B/624	p-Dioxane
GC-MS	EPA 8260B	p-Isopropyltoluene
GC-MS	EPA 8260B	sec-Butylbenzene
GC-MS	EPA 8260B/624	tert-Butyl alcohol
GC-MS	EPA 8260B	tert-Butylbenzene
GC-MS	EPA 8260B/624	trans-1 2-Dichloroethylene
GC-MS	EPA 8260B/624	trans-1 3-Dichloropropylene
GC-MS	EPA 8260B	trans-1 4-Dichloro-2-butene
GC-MS	EPA 8260B	Cyclohexane
GC-MS	EPA 8260B	Cyclohexanone
GC-MS	EPA 8260B/624	1-Butanol
GC-MS	EPA 8260B/624	Tetrahydrofuran
GC-MS	EPA 8260B/624	1 1 2-Trichloro-1 2 2-trifluoroethane
GC-MS	EPA 8260B	Methyl acrylate
GC-MS	EPA 8260B	Methyl acetate
GC-MS	EPA 8260B	Hexachloroethane
GC-MS	EPA 8260B	Benzyl chloride
GC-MS	EPA 8260B	Methylcyclohexane

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Non-Potable Water		
Technology	**Method**	**Analyte**
GC-MS	EPA 8260B	2,2,4-Trimethylpentane
GC-MS	EPA 625	2,3-Dichloroaniline
GC-MS	EPA 625	1-Methylphenanthrene
GC-MS	EPA 8270C/D/625	1 2 4 5-Tetrachlorobenzene
GC-MS	EPA 8270C/D/625	1 2 4-Trichlorobenzene
GC-MS	EPA 8270C/D	1 2-Dichlorobenzene
GC-MS	EPA 8270C/D/625	1 2-Diphenylhydrazine
GC-MS	EPA 8270C/D	1 3 5-Trinitrobenzene (1 3 5-TNB)
GC-MS	EPA 8270C/D	1 3-Dichlorobenzene
GC-MS	EPA 8270C/D	1 3-Dinitrobenzene (1 3-DNB)
GC-MS	EPA 8270C/D	1 4-Dichlorobenzene
GC-MS	EPA 8270C/D	1 4-Naphthoquinone
GC-MS	EPA 8270C/D	1 4-Phenylenediamine
GC-MS	EPA 8270C/D	1-Naphthylamine
GC-MS	EPA 8270C/D/625	2 3 4 6-Tetrachlorophenol
GC-MS	EPA 8270C/D/625	2 4 5-Trichlorophenol
GC-MS	EPA 8270C/D/625	2 4 6-Trichlorophenol
GC-MS	EPA 8270C/D/625	2 4-Dichlorophenol
GC-MS	EPA 8270C/D/625	2 4-Dimethylphenol
GC-MS	EPA 8270C/D/625	2 4-Dinitrophenol
GC-MS	EPA 8270C/D/625	2 4-Dinitrotoluene (2 4-DNT)
GC-MS	EPA 8270C/D	2 6-Dichlorophenol
GC-MS	EPA 8270C/D/625	2 6-Dinitrotoluene (2 6-DNT)
GC-MS	EPA 8270C/D	2-Acetylaminofluorene
GC-MS	EPA 8270C/D/625	2-Chloronaphthalene
GC-MS	EPA 8270C/D/625	2-Chlorophenol
GC-MS	EPA 8270C/D/625	2-Methyl-4 6-dinitrophenol
GC-MS	EPA 8270C/D/625	2-Methylnaphthalene
GC-MS	EPA 8270C/D/625	2-Methylphenol (o-Cresol)
GC-MS	EPA 8270C/D	2-Naphthylamine
GC-MS	EPA 8270C/D/625	2-Nitroaniline
GC-MS	EPA 8270C/D/625	2-Nitrophenol
GC-MS	EPA 8270C/D	2-Picoline (2-Methylpyridine)
GC-MS	EPA 8270C/D/625	3 3`-Dichlorobenzidine
GC-MS	EPA 8270C/D	3 3`-Dimethylbenzidine

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Non-Potable Water		
Technology	**Method**	**Analyte**
GC-MS	EPA 8270C/D	3-Methylcholanthrene
GC-MS	EPA 8270C/D	3-Methylphenol (m-Cresol)
GC-MS	EPA 8270C/D/625	3-Nitroaniline
GC-MS	EPA 8270C/D	4-Aminobiphenyl
GC-MS	EPA 8270C/D/625	4-Bromophenyl phenyl ether
GC-MS	EPA 8270C/D/625	4-Chloro-3-methylphenol
GC-MS	EPA 8270C/D/625	4-Chloroaniline
GC-MS	EPA 8270C/D/625	4-Chlorophenyl phenylether
GC-MS	EPA 8270C/D	4-Dimethyl aminoazobenzene
GC-MS	EPA 8270C/D/625	4-Methylphenol (p-Cresol)
GC-MS	EPA 8270C/D/625	4-Nitroaniline
GC-MS	EPA 8270C/D/625	4-Nitrophenol
GC-MS	EPA 8270C/D	5-Nitro-o-toluidine
GC-MS	EPA 8270C/D/625	7 12-Dimethylbenz(a) anthracene
GC-MS	EPA 8270C/D/625	Acenaphthene
GC-MS	EPA 8270C/D/625	Acenaphthylene
GC-MS	EPA 8270C/D/625	Acetophenone
GC-MS	EPA 8270C/D/625	Aniline
GC-MS	EPA 8270C/D/625	Anthracene
GC-MS	EPA 8270C/D	Aramite
GC-MS	EPA 8270C/D/625	Benzidine
GC-MS	EPA 8270C/D/625	Benzo(a)anthracene
GC-MS	EPA 8270C/D/625	Benzo(a)pyrene
GC-MS	EPA 8270C/D/625	Benzo(b)fluoranthene
GC-MS	EPA 8270C/D/625	Benzo(g h i)perylene
GC-MS	EPA 8270C/D/625	Benzo(k)fluoranthene
GC-MS	EPA 8270C/D/625	Benzoic acid
GC-MS	EPA 8270C/D	Benzyl alcohol
GC-MS	EPA 8270C/D/625	Butyl benzyl phthalate
GC-MS	EPA 8270C/D/625	Carbazole
GC-MS	EPA 8270C/D/625	Chrysene
GC-MS	EPA 8270C/D/625	Di-n-butyl phthalate
GC-MS	EPA 8270C/D/625	Di-n-octyl phthalate
GC-MS	EPA 8270C/D/625	Dibenz(a h)anthracene
GC-MS	EPA 8270C/D/625	Dibenz(a h)acridine

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Non-Potable Water		
Technology	**Method**	**Analyte**
GC-MS	EPA 8270C/D/625	Dibenzofuran
GC-MS	EPA 8270C/D/625	Diethyl phthalate
GC-MS	EPA 8270C/D/625	Dimethyl phthalate
GC-MS	EPA 8270C/D	Ethyl methanesulfonate
GC-MS	EPA 8270C/D/625	Fluoranthene
GC-MS	EPA 8270C/D/625	Fluorene
GC-MS	EPA 8270C/D/625	Hexachlorobenzene
GC-MS	EPA 8270C/D/625	Hexachlorobutadiene
GC-MS	EPA 8270C/D/625	Hexachlorocyclopentadiene
GC-MS	EPA 8270C/D/625	Hexachloroethane
GC-MS	EPA 8270C/D	Hexachlorophene
GC-MS	EPA 8270C/D	Hexachloropropene
GC-MS	EPA 8270C/D/625	Indeno(1 2 3-cd)pyrene
GC-MS	EPA 8270C/D/625	Isophorone
GC-MS	EPA 8270C/D	Isosafrole
GC-MS	EPA 8270C/D	Methapyrilene
GC-MS	EPA 8270C/D	Methyl methanesulfonate
GC-MS	EPA 8270C/D/625	Naphthalene
GC-MS	EPA 8270C/D/625	Nitrobenzene
GC-MS	EPA 8270C/D	Nitroquinoline-1-oxide
GC-MS	EPA 8270C/D/625	Pentachlorobenzene
GC-MS	EPA 8270C/D	Pentachloronitrobenzene
GC-MS	EPA 8270C/D/625	Pentachlorophenol
GC-MS	EPA 8270C/D	Phenacetin
GC-MS	EPA 8270C/D/625	Phenanthrene
GC-MS	EPA 8270C/D/625	Phenol
GC-MS	EPA 8270C/D	Pronamide (Kerb)
GC-MS	EPA 8270C/D/625	Pyrene
GC-MS	EPA 8270C/D/625	Pyridine
GC-MS	EPA 8270C/D	Safrole
GC-MS	EPA 8270C/D	a-a-Dimethylphenethylamine
GC-MS	EPA 8270C/D/625	bis(2-Chloroethoxy)methane
GC-MS	EPA 8270C/D/625	bis(2-Chloroethyl) ether
GC-MS	EPA 8270C/D/625	bis(2-Chloroisopropyl) ether (2 2`-Oxybis(1-chloropropane))
GC-MS	EPA 8270C/D/625	bis(2-Ethylhexyl) phthalate (DEHP)

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Non-Potable Water		
Technology	**Method**	**Analyte**
GC-MS	EPA 8270C/D/625	n-Nitroso-di-n-butylamine
GC-MS	EPA 8270C/D/625	n-Nitrosodi-n-propylamine
GC-MS	EPA 8270C/D/625	n-Nitrosodiethylamine
GC-MS	EPA 8270C/D/625	n-Nitrosodimethylamine
GC-MS	EPA 8270C/D/625	n-Nitrosodiphenylamine
GC-MS	EPA 8270C/D	n-Nitrosomethylethylamine
GC-MS	EPA 8270C/D	n-Nitrosomorpholine
GC-MS	EPA 8270C/D	n-Nitrosopiperidine
GC-MS	EPA 8270C/D/625	n-Nitrosopyrrolidine
GC-MS	EPA 8270C/D	o-Toluidine
GC-MS	EPA 8270C/D	Chlorobenzilate
GC-MS	EPA 8270C/D	Diallate
GC-MS	EPA 8270C/D	Dimethoate
GC-MS	EPA 8270C/D	Disulfoton
GC-MS	EPA 8270C/D	Famphur
GC-MS	EPA 8270C/D	Isodrin
GC-MS	EPA 8270C/D	Kepone
GC-MS	EPA 8270C/D	Methyl parathion (Parathion methyl)
GC-MS	EPA 8270C/D	Phorate
GC-MS	EPA 8270C/D	Thionazin (Zinophos)
GC-MS	EPA 8270C/D	o o o-Triethyl phosphorothioate
GC-MS	EPA 8270C/D	Pentachloroethane
GC-MS	EPA 8270C/D/625	Alpha-terpineol
GC-MS	EPA 8270C/D	Dinoseb
GC-MS	EPA 8270C/D	Parathion
GC-MS	EPA 8270C/D	1,1'-Biphenyl
GC-MS	EPA 8270C/D	Diphenylamine
GC-MS	EPA 8270C/D	Benzaldehyde
GC-MS	EPA 8270C/D/625	n-Decane
GC-MS	EPA 8270C/D/625	n-Octadecane
GC-MS	EPA 8270C/D	Caprolactam
GC-MS	EPA 8270C/D	Atrazine
GC-MS	EPA 8270C/D	Hydroquinone
GC-MS-SIM	EPA 8270C/D	Benzo(a)anthracene
GC-MS-SIM	EPA 8270C/D	Benzo(a)pyrene

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Non-Potable Water		
Technology	**Method**	**Analyte**
GC-MS-SIM	EPA 8270C/D	Benzo(b)fluoranthene
GC-MS-SIM	EPA 8270C/D	Benzo(k)fluoranthene
GC-MS-SIM	EPA 8270C/D	Dibenzo(a,h)anthracene
GC-MS-SIM	EPA 8270C/D	Hexachlorobenzene
GC-MS-SIM	EPA 8270C/D	Indeno(1,2,3-cd)pyrene
GC-MS-SIM	EPA 8270C/D	Pentachlorophenol
HPLC-UV/VIS	EPA 8310	Acenaphthene
HPLC-UV/VIS	EPA 8310	Acenaphthylene
HPLC-UV/VIS	EPA 8310	Anthracene
HPLC-UV/VIS	EPA 8310	Benzo(a)anthracene
HPLC-UV/VIS	EPA 8310	Benzo(a)pyrene
HPLC-UV/VIS	EPA 8310	Benzo(b)fluoranthene
HPLC-UV/VIS	EPA 8310	Benzo(g h i)perylene
HPLC-UV/VIS	EPA 8310	Benzo(k)fluoranthene
HPLC-UV/VIS	EPA 8310	Chrysene
HPLC-UV/VIS	EPA 8310	Dibenz(a h)anthracene
HPLC-UV/VIS	EPA 8310	Fluoranthene
HPLC-UV/VIS	EPA 8310	Fluorene
HPLC-UV/VIS	EPA 8310	Indeno(1 2 3-cd)pyrene
HPLC-UV/VIS	EPA 8310	Naphthalene
HPLC-UV/VIS	EPA 8310	Phenanthrene
HPLC-UV/VIS	EPA 8310	Pyrene
ICP-AES	EPA 6010B/C/200.7	Aluminum
ICP-AES	EPA 6010B/C/200.7	Antimony
ICP-AES	EPA 6010B/C/200.7	Arsenic
ICP-AES	EPA 6010B/C/200.7	Barium
ICP-AES	EPA 6010B/C/200.7	Beryllium
ICP-AES	EPA 6010B/C/200.7	Boron
ICP-AES	EPA 6010B/C/200.7	Cadmium
ICP-AES	EPA 6010B/C/200.7	Calcium
ICP-AES	EPA 6010B/C/200.7	Chromium
ICP-AES	EPA 6010B/C/200.7	Cobalt
ICP-AES	EPA 6010B/C/200.7	Copper
ICP	EPA 200.7	Hardness – total as CaCO3
ICP-AES	EPA 6010B/C/200.7	Iron

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Non-Potable Water		
Technology	**Method**	**Analyte**
ICP-AES	EPA 6010B/C/200.7	Lead
ICP-AES	EPA 6010B/C/200.7	Magnesium
ICP-AES	EPA 6010B/C/200.7	Manganese
ICP-AES	EPA 6010B/C/200.7	Molybdenum
ICP-AES	EPA 6010B/C/200.7	Nickel
ICP-AES	EPA 6010B/C/200.7	Potassium
ICP-AES	EPA 6010B/C/200.7	Selenium
ICP	EPA 200.7	Silica - dissolved
ICP-AES	EPA 6010B/C/200.7	Silver
ICP-AES	EPA 6010B/C/200.7	Sodium
ICP-AES	EPA 6010B/C	Strontium
ICP-AES	EPA 6010B/C/200.7	Thallium
ICP-AES	EPA 6010B/C/200.7	Tin
ICP-AES	EPA 6010B/C/200.7	Titanium
ICP-AES	EPA 6010B/C/200.7	Vanadium
ICP-AES	EPA 6010B/C/200.7	Zinc
Atomic Fluorescence	EPA 245.7 / 1631E	Mercury
CVAA	EPA 7470A	Mercury
UV-VIS	EPA 7196A	Hexavalent Chromium
IC	EPA 7199	Hexavalent Chromium
IC	EPA 300.0/9056/A	Bromide
IC	EPA 300.0/9056/A	Chloride
IC	EPA 300.0/9056/A	Fluoride
IC	EPA 300.0/9056/A	Sulfate
Pensky-Martens Closed-Cup	EPA 1010A	Ignitability
Electrometric Measurement	EPA 9040C	pH
Gravimetric	EPA 1664A	Silica Gen Treated N-Hexane Extractable Material (Oil and Grease)
Gravimetric	SM 2540 B	Total Solids
Distillation / UV-Vis	EPA 9010B/9012B (M)	Total and Amenable Cyanide
Combustion / IR	EPA 9060A	Total Organic Carbon
Combustion / Titration	EPA 9020B	Total Organic Halides
Titration	EPA 9034	Acid-Soluble and Acid-Insoluble Sulfides
Electrode	EPA 9045C	pH
Colorimetric / Distillation	EPA 9066	Phenolics

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Non-Potable Water		
Technology	**Method**	**Analyte**
Preparation	**Method**	**Type**
TCLP Extraction	EPA 1311	Toxicity Characteristic Leaching Procedure
SPLP	EPA 1312	Synthetic Precipitation Leaching Procedure
Acid Digestion	EPA 3005A/3010A	Waters for Total Recoverable or Dissolved Metals
Purge and Trap	EPA 5030B	Aqueous samples
Liquid Extraction	EPA 3510C	Semivolatile Separatory Funnel Liquid

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
ICP-MS	EPA 6020/A	Aluminum
ICP-MS	EPA 6020/A	Antimony
ICP-MS	EPA 6020/A	Arsenic
ICP-MS	EPA 6020/A	Barium
ICP-MS	EPA 6020/A	Beryllium
ICP-MS	EPA 6020/A	Cadmium
ICP-MS	EPA 6020/A	Calcium
ICP-MS	EPA 6020/A	Chromium
ICP-MS	EPA 6020/A	Cobalt
ICP-MS	EPA 6020/A	Copper
ICP-MS	EPA 6020/A	Iron
ICP-MS	EPA 6020/A	Lead
ICP-MS	EPA 6020/A	Magnesium
ICP-MS	EPA 6020/A	Manganese
ICP-MS	EPA 6020/A	Molybdenum
ICP-MS	EPA 6020/A	Nickel
ICP-MS	EPA 6020/A	Potassium
ICP-MS	EPA 6020/A	Selenium
ICP-MS	EPA 6020/A	Silver
ICP-MS	EPA 6020/A	Sodium
ICP-MS	EPA 6020/A	Thallium
ICP-MS	EPA 6020/A	Tin
ICP-MS	EPA 6020/A	Vanadium

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Solid and Chemical Materials		
Technology	**Method**	**Analyte**
ICP-MS	EPA 6020/A	Zinc
GC-ECD	EPA 8011	1,2-Dibromomethane (EDB)
GC-ECD	EPA 8011	1,2-Dibromo-3-chloropropane
GC-ECD	EPA 8011	1,2,3-Trichloropropane
GC-FID	EPA 8015 B/C	Diesel range organics (DRO)
GC-FID	EPA 8015 B/C	Gasoline range organics (GRO)
GC-FID	EPA 8015 B/C	Ethanol
GC-FID	EPA 8015 B/C	Isobutyl alcohol (2-Methyl-1-propanol)
GC-FID	EPA 8015 B/C	Isopropyl alcohol (2-Propanol)
GC-FID	EPA 8015 B/C	Methanol
GC-FID	EPA 8015 B/C	Tert-butyl alcohol
GC-FID	TCEQ 1005	Diesel Range Organics
GC-FID	NJDEP-EPH	Extractable Petroleum Hydrocarbons
GC	EPA 8021B	Benzene
GC	EPA 8021B	Chlorobenzene
GC	EPA 8021B	1,2-Dichlorobenzene
GC	EPA 8021B	1,3-Dichlorobenzene
GC	EPA 8021B	1,4-Dichlorobenzene
GC	EPA 8021B	Ethylbenzene
GC	EPA 8021B	Styrene
GC	EPA 8021B	Toluene
GC	EPA 8021B	o-Xylene
GC	EPA 8021B	m-Xylene
GC	EPA 8021B	p-Xylene
GC	EPA 8021B	trans-1,3-Dichloropropene
GC	EPA 8021B	cis-1,2-Dichloroethene
GC	EPA 8021B	trans-1,2-Dichloroethene
GC	EPA 8021B	cis-1,3-Dichloropropene
GC	EPA 8021B	Tetrachloroethene
GC	EPA 8021B	Trichloroethene
GC	EPA 8021B	Methyl tert-butyl ether
GC-ECD	EPA 8081A/B	4 4`-DDD
GC-ECD	EPA 8081A/B	4 4`-DDE
GC-ECD	EPA 8081A/B	4 4`-DDT
GC-ECD	EPA 8081A/B	Aldrin

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Solid and Chemical Materials		
Technology	**Method**	**Analyte**
GC-ECD	EPA 8081A/B	Chlordane (tech.)
GC-ECD	EPA 8081A/B	Dieldrin
GC-ECD	EPA 8081A/B	Endosulfan I
GC-ECD	EPA 8081A/B	Endosulfan II
GC-ECD	EPA 8081A/B	Endosulfan sulfate
GC-ECD	EPA 8081A/B	Endrin
GC-ECD	EPA 8081A/B	Endrin aldehyde
GC-ECD	EPA 8081A/B	Endrin ketone
GC-ECD	EPA 8081A/B	Heptachlor
GC-ECD	EPA 8081A/B	Heptachlor epoxide
GC-ECD	EPA 8081A/B	Methoxychlor
GC-ECD	EPA 8081A/B	Toxaphene (Chlorinated camphene)
GC-ECD	EPA 8081A/B	alpha-BHC (alpha-Hexachlorocyclohexane)
GC-ECD	EPA 8081A/B	alpha-Chlordane
GC-ECD	EPA 8081A/B	beta-BHC (beta-Hexachlorocyclohexane)
GC-ECD	EPA 8081A/B	delta-BHC
GC-ECD	EPA 8081A/B	gamma-BHC (Lindane gamma-Hexachlorocyclohexane)
GC-ECD	EPA 8081A/B	gamma-Chlordane
GC-ECD	EPA 8081A/B	Mirex
GC-ECD	EPA 8082/A	Aroclor-1016 (PCB-1016)
GC-ECD	EPA 8082/A	Aroclor-1221 (PCB-1221)
GC-ECD	EPA 8082/A	Aroclor-1232 (PCB-1232)
GC-ECD	EPA 8082/A	Aroclor-1242 (PCB-1242)
GC-ECD	EPA 8082/A	Aroclor-1248 (PCB-1248)
GC-ECD	EPA 8082/A	Aroclor-1254 (PCB-1254)
GC-ECD	EPA 8082/A	Aroclor-1260 (PCB-1260)
GC-ECD	EPA 8082A	Aroclor-1262 (PCB-1262)
GC-ECD	EPA 8082/A	Aroclor-1268 (PCB-1268)
GC-ECD	EPA 8151A	2 4 5-T
GC-ECD	EPA 8151A	2 4-D
GC-ECD	EPA 8151A	2 4-DB
GC-ECD	EPA 8151A	Dalapon
GC-ECD	EPA 8151A	Dicamba
GC-ECD	EPA 8151A	Dichloroprop (Dichlorprop)
GC-ECD	EPA 8151A	Dinoseb (2-sec-butyl-4 6-dinitrophenol DNBP)

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Solid and Chemical Materials		
Technology	**Method**	**Analyte**
GC-ECD	EPA 8151A	MCPA
GC-ECD	EPA 8151A	MCPP
GC-ECD	EPA 8151A	Pentachlorophenol
GC-ECD	EPA 8151A	Silvex (2 4 5-TP)
GC-ECD	EPA 8151A	Picloram
GC-FID	EPA RSK-175	Ethane
GC-FID	EPA RSK-175	Ethene
GC-FID	EPA RSK-175	Methane
GC-FID	EPA RSK-175	Propane
GC-MS	EPA 8260	Ethylene glycol
GC-MS	EPA 8260	Propylene glycol
GC-MS	EPA 8260B	1 1 1 2-Tetrachloroethane
GC-MS	EPA 8260B	1 1 1-Trichloroethane
GC-MS	EPA 8260B	1 1 2 2-Tetrachloroethane
GC-MS	EPA 8260B	1 1 2-Trichloroethane
GC-MS	EPA 8260B	1 1-Dichloroethane
GC-MS	EPA 8260B	1 1-Dichloroethylene
GC-MS	EPA 8260B	1 1-Dichloropropene
GC-MS	EPA 8260B	1 2 3-Trichlorobenzene
GC-MS	EPA 8260B	1 2 3-Trichloropropane
GC-MS	EPA 8260B	1 2 4-Trichlorobenzene
GC-MS	EPA 8260B	1 2 4-Trimethylbenzene
GC-MS	EPA 8260B	1 2-Dibromo-3-chloropropane (DBCP)
GC-MS	EPA 8260B	1 2-Dibromoethane (EDB Ethylene dibromide)
GC-MS	EPA 8260B	1 2-Dichlorobenzene
GC-MS	EPA 8260B	1 2-Dichloroethane
GC-MS	EPA 8260B	1 2-Dichloropropane
GC-MS	EPA 8260B	1 3 5-Trimethylbenzene
GC-MS	EPA 8260B	1 3-Dichlorobenzene
GC-MS	EPA 8260B	1 3-Dichloropropane
GC-MS	EPA 8260B	1 4-Dichlorobenzene
GC-MS	EPA 8260B	1-Chlorohexane
GC-MS	EPA 8260B	2 2-Dichloropropane
GC-MS	EPA 8260B	2-Butanone (Methyl ethyl ketone MEK)
GC-MS	EPA 8260B	2-Chloroethyl vinyl ether

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Solid and Chemical Materials		
Technology	**Method**	**Analyte**
GC-MS	EPA 8260B	2-Chlorotoluene
GC-MS	EPA 8260B	2-Hexanone
GC-MS	EPA 8260B	2-Nitropropane
GC-MS	EPA 8260B	4-Chlorotoluene
GC-MS	EPA 8260B	4-Methyl-2-pentanone (MIBK)
GC-MS	EPA 8260B	Acetone
GC-MS	EPA 8260B	Acetonitrile
GC-MS	EPA 8260B	Acrolein (Propenal)
GC-MS	EPA 8260B	Acrylonitrile
GC-MS	EPA 8260B	Allyl chloride (3-Chloropropene)
GC-MS	EPA 8260B	Benzene
GC-MS	EPA 8260B	Bromobenzene
GC-MS	EPA 8260B	Bromochloromethane
GC-MS	EPA 8260B	Bromodichloromethane
GC-MS	EPA 8260B	Bromoform
GC-MS	EPA 8260B	Carbon disulfide
GC-MS	EPA 8260B	Carbon tetrachloride
GC-MS	EPA 8260B	Chlorobenzene
GC-MS	EPA 8260B	Chloroethane
GC-MS	EPA 8260B	Chloroform
GC-MS	EPA 8260B	Chloroprene
GC-MS	EPA 8260B	Di-isopropylether (DIPE)
GC-MS	EPA 8260B	Dibromochloromethane
GC-MS	EPA 8260B	Dibromomethane
GC-MS	EPA 8260B	Dichlorodifluoromethane
GC-MS	EPA 8260B	Diethyl ether
GC-MS	EPA 8260B	Ethanol
GC-MS	EPA 8260B	Ethyl acetate
GC-MS	EPA 8260B	Ethyl methacrylate
GC-MS	EPA 8260B	Ethyl-t-butylether (ETBE)
GC-MS	EPA 8260B	Ethylbenzene
GC-MS	EPA 8260B	Hexachlorobutadiene
GC-MS	EPA 8260B	Iodomethane (Methyl iodide)
GC-MS	EPA 8260B	Isobutyl alcohol (2-Methyl-1-propanol)
GC-MS	EPA 8260B	Isopropylbenzene

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Solid and Chemical Materials		
Technology	**Method**	**Analyte**
GC-MS	EPA 8260B	Methacrylonitrile
GC-MS	EPA 8260B	Methyl bromide (Bromomethane)
GC-MS	EPA 8260B	Methyl chloride (Chloromethane)
GC-MS	EPA 8260B	Methyl methacrylate
GC-MS	EPA 8260B	Methyl tert-butyl ether (MTBE)
GC-MS	EPA 8260B	Methylene chloride
GC-MS	EPA 8260B	Naphthalene
GC-MS	EPA 8260B	Pentachloroethane
GC-MS	EPA 8260B	Propionitrile (Ethyl cyanide)
GC-MS	EPA 8260B	Styrene
GC-MS	EPA 8260B	T-amylmethylether (TAME)
GC-MS	EPA 8260B	Tetrachloroethylene (Perchloroethylene)
GC-MS	EPA 8260B	Toluene
GC-MS	EPA 8260B	Trichloroethene (Trichloroethylene)
GC-MS	EPA 8260B	Trichlorofluoromethane
GC-MS	EPA 8260B	Vinyl acetate
GC-MS	EPA 8260B	Vinyl chloride
GC-MS	EPA 8260B	Xylene (total)
GC-MS	EPA 8260B	cis-1 2-Dichloroethylene
GC-MS	EPA 8260B	cis-1 3-Dichloropropene
GC-MS	EPA 8260B	n-Butylbenzene
GC-MS	EPA 8260B	n-Propylbenzene
GC-MS	EPA 8260B	p-Dioxane
GC-MS	EPA 8260B	p-Isopropyltoluene
GC-MS	EPA 8260B	sec-Butylbenzene
GC-MS	EPA 8260B	tert-Butyl alcohol
GC-MS	EPA 8260B	tert-Butylbenzene
GC-MS	EPA 8260B	trans-1 2-Dichloroethylene
GC-MS	EPA 8260B	trans-1 3-Dichloropropylene
GC-MS	EPA 8260B	trans-1 4-Dichloro-2-butene
GC-MS	EPA 8260B	Cyclohexane
GC-MS	EPA 8260B	Cyclohexanone
GC-MS	EPA 8260B	1-Butanol
GC-MS	EPA 8260B	Tetrahydrofuran
GC-MS	EPA 8260B	1 1 2-Trichloro-1 2 2-trifluoroethane

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Solid and Chemical Materials		
Technology	**Method**	**Analyte**
GC-MS	EPA 8260B	Methyl acrylate
GC-MS	EPA 8260B	Methyl acetate
GC-MS	EPA 8260B	Hexachloroethane
GC-MS	EPA 8260B	Methylcyclohexane
GC-MS	EPA 8260B	2,2,4-Trimethylpentane
GC-MS	EPA 8270C/D	1 2 4 5-Tetrachlorobenzene
GC-MS	EPA 8270C/D	1 2 4-Trichlorobenzene
GC-MS	EPA 8270C/D	1 2-Dichlorobenzene
GC-MS	EPA 8270C/D	1 2-Diphenylhydrazine
GC-MS	EPA 8270C/D	1 3 5-Trinitrobenzene (1 3 5-TNB)
GC-MS	EPA 8270C/D	1 3-Dichlorobenzene
GC-MS	EPA 8270C/D	1 3-Dinitrobenzene (1 3-DNB)
GC-MS	EPA 8270C/D	1 4-Dichlorobenzene
GC-MS	EPA 8270C/D	1 4-Naphthoquinone
GC-MS	EPA 8270C/D	1-Naphthylamine
GC-MS	EPA 8270C/D	2 3 4 6-Tetrachlorophenol
GC-MS	EPA 8270C/D	2 4 5-Trichlorophenol
GC-MS	EPA 8270C/D	2 4 6-Trichlorophenol
GC-MS	EPA 8270C/D	2 4-Dichlorophenol
GC-MS	EPA 8270C/D	2 4-Dimethylphenol
GC-MS	EPA 8270C/D	2 4-Dinitrophenol
GC-MS	EPA 8270C/D	2 4-Dinitrotoluene (2 4-DNT)
GC-MS	EPA 8270C/D	2 6-Dichlorophenol
GC-MS	EPA 8270C/D	2 6-Dinitrotoluene (2 6-DNT)
GC-MS	EPA 8270C/D	2-Acetylaminofluorene
GC-MS	EPA 8270C/D	2-Chloronaphthalene
GC-MS	EPA 8270C/D	2-Chlorophenol
GC-MS	EPA 8270C/D	2-Methyl-4 6-dinitrophenol
GC-MS	EPA 8270C/D	2-Methylnaphthalene
GC-MS	EPA 8270C/D	2-Methylphenol (o-Cresol)
GC-MS	EPA 8270C/D	2-Naphthylamine
GC-MS	EPA 8270C/D	2-Nitroaniline
GC-MS	EPA 8270C/D	2-Nitrophenol
GC-MS	EPA 8270C/D	2-Picoline (2-Methylpyridine)
GC-MS	EPA 8270C/D	3 3`-Dichlorobenzidine

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Solid and Chemical Materials		
Technology	**Method**	**Analyte**
GC-MS	EPA 8270C/D	3-Methylcholanthrene
GC-MS	EPA 8270C/D	3-Methylphenol (m-Cresol)
GC-MS	EPA 8270C/D	3-Nitroaniline
GC-MS	EPA 8270C/D	4-Aminobiphenyl
GC-MS	EPA 8270C/D	4-Bromophenyl phenyl ether
GC-MS	EPA 8270C/D	4-Chloro-3-methylphenol
GC-MS	EPA 8270C/D	4-Chloroaniline
GC-MS	EPA 8270C/D	4-Chlorophenyl phenylether
GC-MS	EPA 8270C/D	4-Dimethyl aminoazobenzene
GC-MS	EPA 8270C/D	4-Methylphenol (p-Cresol)
GC-MS	EPA 8270C/D	4-Nitroaniline
GC-MS	EPA 8270C/D	4-Nitrophenol
GC-MS	EPA 8270C/D	5-Nitro-o-toluidine
GC-MS	EPA 8270C/D	7 12-Dimethylbenz(a) anthracene
GC-MS	EPA 8270C/D	Acenaphthene
GC-MS	EPA 8270C/D	Acenaphthylene
GC-MS	EPA 8270C/D	Acetophenone
GC-MS	EPA 8270C/D	Aniline
GC-MS	EPA 8270C/D	Anthracene
GC-MS	EPA 8270C/D	Benzidine
GC-MS	EPA 8270C/D	Benzo(a)anthracene
GC-MS	EPA 8270C/D	Benzo(a)pyrene
GC-MS	EPA 8270C/D	Benzo(b)fluoranthene
GC-MS	EPA 8270C/D	Benzo(g h i)perylene
GC-MS	EPA 8270C/D	Benzo(k)fluoranthene
GC-MS	EPA 8270C/D	Benzoic acid
GC-MS	EPA 8270C/D	Benzyl alcohol
GC-MS	EPA 8270C/D	Butyl benzyl phthalate
GC-MS	EPA 8270C/D	Carbazole
GC-MS	EPA 8270C/D	Chrysene
GC-MS	EPA 8270C/D	Di-n-butyl phthalate
GC-MS	EPA 8270C/D	Di-n-octyl phthalate
GC-MS	EPA 8270C/D	Dibenz(a h)anthracene
GC-MS	EPA 8270C/D	Dibenz(a j)acridine
GC-MS	EPA 8270C/D	Dibenzofuran

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Solid and Chemical Materials		
Technology	**Method**	**Analyte**
GC-MS	EPA 8270C/D	Diethyl phthalate
GC-MS	EPA 8270C/D	Dimethyl phthalate
GC-MS	EPA 8270C/D	Ethyl methanesulfonate
GC-MS	EPA 8270C/D	Fluoranthene
GC-MS	EPA 8270C/D	Fluorene
GC-MS	EPA 8270C/D	Hexachlorobenzene
GC-MS	EPA 8270C/D	Hexachlorobutadiene
GC-MS	EPA 8270C/D	Hexachlorocyclopentadiene
GC-MS	EPA 8270C/D	Hexachloroethane
GC-MS	EPA 8270C/D	Hexachloropropene
GC-MS	EPA 8270C/D	Indeno(1 2 3-cd)pyrene
GC-MS	EPA 8270C/D	Isophorone
GC-MS	EPA 8270C/D	Isosafrole
GC-MS	EPA 8270C/D	Methyl methanesulfonate
GC-MS	EPA 8270C/D	Naphthalene
GC-MS	EPA 8270C/D	Nitrobenzene
GC-MS	EPA 8270C/D	Nitroquinoline-1-oxide
GC-MS	EPA 8270C/D	Pentachlorobenzene
GC-MS	EPA 8270C/D	Pentachloronitrobenzene
GC-MS	EPA 8270C/D	Pentachlorophenol
GC-MS	EPA 8270C/D	Phenacetin
GC-MS	EPA 8270C/D	Phenanthrene
GC-MS	EPA 8270C/D	Phenol
GC-MS	EPA 8270C/D	Pronamide (Kerb)
GC-MS	EPA 8270C/D	Pyrene
GC-MS	EPA 8270C/D	Pyridine
GC-MS	EPA 8270C/D	Safrole
GC-MS	EPA 8270C/D	a-a-Dimethylphenethylamine
GC-MS	EPA 8270C/D	bis(2-Chloroethoxy)methane
GC-MS	EPA 8270C/D	bis(2-Chloroethyl) ether
GC-MS	EPA 8270C/D	bis(2-Chloroisopropyl) ether (2 2`-Oxybis(1-chloropropane))
GC-MS	EPA 8270C/D	bis(2-Ethylhexyl) phthalate (DEHP)
GC-MS	EPA 8270C/D	n-Nitroso-di-n-butylamine
GC-MS	EPA 8270C/D	n-Nitrosodi-n-propylamine
GC-MS	EPA 8270C/D	n-Nitrosodiethylamine

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Solid and Chemical Materials		
Technology	**Method**	**Analyte**
GC-MS	EPA 8270C/D	n-Nitrosodimethylamine
GC-MS	EPA 8270C/D	n-Nitrosodiphenylamine
GC-MS	EPA 8270C/D	n-Nitrosomethylethylamine
GC-MS	EPA 8270C/D	n-Nitrosomorpholine
GC-MS	EPA 8270C/D	n-Nitrosopiperidine
GC-MS	EPA 8270C/D	n-Nitrosopyrrolidine
GC-MS	EPA 8270C/D	o-Toluidine
GC-MS	EPA 8270C/D	Chlorobenzilate
GC-MS	EPA 8270C/D	Diallate
GC-MS	EPA 8270C/D	Dimethoate
GC-MS	EPA 8270C/D	Disulfoton
GC-MS	EPA 8270C/D	Isodrin
GC-MS	EPA 8270C/D	Kepone
GC-MS	EPA 8270C/D	Methyl parathion (Parathion methyl)
GC-MS	EPA 8270C/D	Phorate
GC-MS	EPA 8270C/D	Thionazin (Zinophos)
GC-MS	EPA 8270C/D	o o o-Triethyl phosphorothioate
GC-MS	EPA 8270C/D	Pentachloroethane
GC-MS	EPA 8270C/D	Alpha-terpineol
GC-MS	EPA 8270C/D	Dinoseb
GC-MS	EPA 8270C/D	Parathion
GC-MS	EPA 8270C/D	1,1'-Biphenyl
GC-MS	EPA 8270C/D	Diphenylamine
GC-MS	EPA 8270C/D	Benzaldehyde
GC-MS	EPA 8270C/D	n-Decane
GC-MS	EPA 8270C/D	n-Octadecane
GC-MS	EPA 8270C/D	Caprolactam
GC-MS	EPA 8270C/D	Atrazine
GC-MS	EPA 8270C/D	Hydroquinone
GC-MS-SIM	EPA 8270C/D	Benzo(a)anthracene
GC-MS-SIM	EPA 8270C/D	Benzo(a)pyrene
GC-MS-SIM	EPA 8270C/D	Benzo(b)fluoranthene
GC-MS-SIM	EPA 8270C/D	Benzo(k)fluoranthene
GC-MS-SIM	EPA 8270C/D	Dibenzo(a,h)anthracene
GC-MS-SIM	EPA 8270C/D	Hexachlorobenzene

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Solid and Chemical Materials		
Technology	**Method**	**Analyte**
GC-MS-SIM	EPA 8270C/D	Indeno(1,2,3-cd)pyrene
GC-MS-SIM	EPA 8270C/D	Pentachlorophenol
HPLC-UV/VIS	EPA 8310	Acenaphthene
HPLC-UV/VIS	EPA 8310	Acenaphthylene
HPLC-UV/VIS	EPA 8310	Anthracene
HPLC-UV/VIS	EPA 8310	Benzo(a)anthracene
HPLC-UV/VIS	EPA 8310	Benzo(a)pyrene
HPLC-UV/VIS	EPA 8310	Benzo(b)fluoranthene
HPLC-UV/VIS	EPA 8310	Benzo(g h i)perylene
HPLC-UV/VIS	EPA 8310	Benzo(k)fluoranthene
HPLC-UV/VIS	EPA 8310	Chrysene
HPLC-UV/VIS	EPA 8310	Dibenz(a h)anthracene
HPLC-UV/VIS	EPA 8310	Fluoranthene
HPLC-UV/VIS	EPA 8310	Fluorene
HPLC-UV/VIS	EPA 8310	Indeno(1 2 3-cd)pyrene
HPLC-UV/VIS	EPA 8310	Naphthalene
HPLC-UV/VIS	EPA 8310	Phenanthrene
HPLC-UV/VIS	EPA 8310	Pyrene
ICP-AES	EPA 6010B/C	Aluminum
ICP-AES	EPA 6010B/C	Antimony
ICP-AES	EPA 6010B/C	Arsenic
ICP-AES	EPA 6010B/C	Barium
ICP-AES	EPA 6010B/C	Beryllium
ICP-AES	EPA 6010B/C	Boron
ICP-AES	EPA 6010B/C	Cadmium
ICP-AES	EPA 6010B/C	Calcium
ICP-AES	EPA 6010B/C	Chromium
ICP-AES	EPA 6010B/C	Cobalt
ICP-AES	EPA 6010B/C	Copper
ICP-AES	EPA 6010B/C	Iron
ICP-AES	EPA 6010B/C	Lead
ICP-AES	EPA 6010B/C	Magnesium
ICP-AES	EPA 6010B/C	Manganese
ICP-AES	EPA 6010B/C	Molybdenum
ICP-AES	EPA 6010B/C	Nickel

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Solid and Chemical Materials		
Technology	**Method**	**Analyte**
ICP-AES	EPA 6010B/C	Potassium
ICP-AES	EPA 6010B/C	Selenium
ICP-AES	EPA 6010B/C	Silver
ICP-AES	EPA 6010B/C	Sodium
ICP-AES	EPA 6010B/C	Strontium
ICP-AES	EPA 6010B/C	Thallium
ICP-AES	EPA 6010B/C	Tin
ICP-AES	EPA 6010B/C	Titanium
ICP-AES	EPA 6010B/C	Vanadium
ICP-AES	EPA 6010B/C	Zinc
CVAA	EPA 7471A	Mercury
CVAA	EPA 7470A	Mercury
UV-VIS	EPA 7196A	Hexavalent Chromium
IC	EPA 7199	Hexavalent Chromium
IC	EPA 9056/A	Bromide
IC	EPA 9056/A	Chloride
IC	EPA 9056/A	Fluoride
IC	EPA 9056/A	Sulfate
Ignitability	EPA 1010A	Pensky-Martens Closed-Cup
Mix with Water or Calcium Chloride	EPA 9045C	Hydrogen Ion, pH
RCRA	EPA 7.3.3.2	Hydrogen Cyanide Released from Wastes: SW 846 Chapter 7
RCRA	EPA 7.3.4.2	Hydrogen Sulfide Released from Wastes: SW 846 Chapter 7
Extraction / Gravimetric	EPA 1664A	Silica Gen Treated N-Hexane Extractable Material (Oil and Grease)
Gravimetric	EPA 9071B	Oil and Grease Extraction Method for sludge and sediment samples
Gravimetric	SM 2540 B Mod.	% Solids
Distillation / Colormetric	EPA 9010B/C/9012B(M)	Total and Amenable Cyanide
Combustion	Lloyd Kahn	Total Organic Carbon
Combustion / IR	EPA 9060A	Total Organic Carbon
Distillation / Colormetric	EPA 9065	Phenols
Titration	EPA 9034	Acid-Soluble and Acid-Insoluble Sulfides
Electrode	EPA 9040C	pH
Preparation	**Method**	**Type**
Acid Digestion	EPA 3050B	Sediments, Sludges, and Soils

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Solid and Chemical Materials		
Technology	**Method**	**Analyte**
Closed-System Purge-and-Trap and Extraction	EPA 5035B	Volatile Organics in Soil and Waste Samples
Soxhlet Extraction	EPA 3540C	Semivolatile Extraction
Pressurized Fluid Extraction (PFE)	EPA 3545/A	Semivolatile Extraction
Ultrasonic Extraction	EPA 3550B/C	Semivolatile Extraction
Alumina Cleanup	EPA 3610B	Semivolatile Extraction - Cleanup
Florisil Cleanup	EPA 3620B/C	Semivolatile Extraction - Cleanup
Silica gel cleanup	EPA 3630C	Semivolatile Extraction - Cleanup
Acid base partition cleanup	EPA 3650B	Semivolatile Extraction - Cleanup
Sulfur cleanup	EPA 3660B	Semivolatile Extraction - Cleanup
Sulfuric Acid / permanganate Cleanup	EPA 3665A	Semivolatile Extraction - Cleanup
Acid Digestion	EPA 3050B	Sediments, Sludges, and Soils
Alkaline Digestion	EPA 3060A	Hexavalent Chromium
TCLP Extraction	EPA 1311	Toxicity Characteristic Leaching Procedure
SPLP	EPA 1312	Synthetic Precipitation Leaching Procedure
Extraction / Combustion	EPA 9023	Extractable Organic Halides (EOX)

Air		
Technology	**Method**	**Analyte**
GC-MS	EPA TO-15	Acetaldehyde
GC-MS	EPA TO-15	Acetone
GC-MS	EPA TO-15	Acetophenone
GC-MS	EPA TO-15	Acrolein
GC-MS	EPA TO-15	Acrylamide
GC-MS	EPA TO-15	Acrylic acid
GC-MS	EPA TO-15	Allyl chloride
GC-MS	EPA TO-15	Benzene
GC-MS	EPA TO-15	Benzyl chloride
GC-MS	EPA TO-15	Propriolactone (beta-)
GC-MS	EPA TO-15	Bis (2-chloroethyl) ether
GC-MS	EPA TO-15	Bis (chloromethyl) ether
GC-MS	EPA TO-15	Bromodichloromethane
GC-MS	EPA TO-15	Bromoform

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Air		
Technology	**Method**	**Analyte**
GC-MS	EPA TO-15	Bromomethane
GC-MS	EPA TO-15	Butadiene (1,3-)
GC-MS	EPA TO-15	Carbon disulfide
GC-MS	EPA TO-15	Carbon tetrachloride
GC-MS	EPA TO-15	Carbon oxysulfide (Carbonyl sulfide)
GC-MS	EPA TO-15	Catechol
GC-MS	EPA TO-15	Butadiene (2-chloro-1,3-)
GC-MS	EPA TO-15	Chloroacetic acid
GC-MS	EPA TO-15	Chlorobenzene
GC-MS	EPA TO-15	Chloroethane
GC-MS	EPA TO-15	Chloroform
GC-MS	EPA TO-15	Chloromethane
GC-MS	EPA TO-15	Chloromethyl methyl ether
GC-MS	EPA TO-15	Chlorotoluene (2-)
GC-MS	EPA TO-15	Cresols/Cresylic acid
GC-MS	EPA TO-15	Cyclohexane
GC-MS	EPA TO-15	Diazomethane
GC-MS	EPA TO-15	Dibromochloromethane
GC-MS	EPA TO-15	Dibromo-3-chloropropane (1,2-)
GC-MS	EPA TO-15	Dibromoethane (1,2-) (EDB)
GC-MS	EPA TO-15	Dichlorobenzene (1,2-)
GC-MS	EPA TO-15	Dichlorobenzene (1,3-)
GC-MS	EPA TO-15	Dichlorobenzene (1,4-)
GC-MS	EPA TO-15	Dichlorodifluoromethane
GC-MS	EPA TO-15	Dichloroethane (1,1-)
GC-MS	EPA TO-15	Dichloroethane (1,2-)
GC-MS	EPA TO-15	Dichloroethene (1,1-)
GC-MS	EPA TO-15	Dichloroethene (cis-1,2-)
GC-MS	EPA TO-15	Dichloroethene (trans-1,2-)
GC-MS	EPA TO-15	Dichlorofluoromethane
GC-MS	EPA TO-15	Dichloropropane (1,2-)
GC-MS	EPA TO-15	Dichloropropene (cis-1,3-)
GC-MS	EPA TO-15	Dichloropropene (trans-1,3-)
GC-MS	EPA TO-15	Dichlorotetrafluoroethane (1,2-)
GC-MS	EPA TO-15	Diethyl sulfate
GC-MS	EPA TO-15	Dimethyl sulfate

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Air		
Technology	**Method**	**Analyte**
GC-MS	EPA TO-15	Dimethylcarbamoyl chloride
GC-MS	EPA TO-15	Dimethyl formamide (N,N-)
GC-MS	EPA TO-15	Dioxane (1,4-)
GC-MS	EPA TO-15	Epichlorohydrin
GC-MS	EPA TO-15	Epoxybutane (1,2-)
GC-MS	EPA TO-15	Ethanol
GC-MS	EPA TO-15	Ethyl acetate
GC-MS	EPA TO-15	Ethyl acrylate
GC-MS	EPA TO-15	Ethyl carbamate (Urethane)
GC-MS	EPA TO-15	Ethylbenzene
GC-MS	EPA TO-15	Ethylene Oxide
GC-MS	EPA TO-15	Ethyltoluene (4-)
GC-MS	EPA TO-15	Formaldehyde
GC-MS	EPA TO-15	Hexachlorobutadiene (1,3-)
GC-MS	EPA TO-15	Hexachloroethane
GC-MS	EPA TO-15	Hexanone (2-)
GC-MS	EPA TO-15	Heptane (n-)
GC-MS	EPA TO-15	Hexane (n-)
GC-MS	EPA TO-15	Isophorone
GC-MS	EPA TO-15	Isopropanol
GC-MS	EPA TO-15	Isopropylbenzene
GC-MS	EPA TO-15	Methyl alcohol (Methanol)
GC-MS	EPA TO-15	Methyl ethyl ketone
GC-MS	EPA TO-15	Methyl iodide
GC-MS	EPA TO-15	Methyl isobutyl ketone
GC-MS	EPA TO-15	Methyl isocyanate
GC-MS	EPA TO-15	Methyl methacrylate
GC-MS	EPA TO-15	Methyl tert-butyl ether
GC-MS	EPA TO-15	Methylene chloride (Dichloromethane)
GC-MS	EPA TO-15	Methylphenol (2-)
GC-MS	EPA TO-15	Naphthalene
GC-MS	EPA TO-15	Nitrobenzene
GC-MS	EPA TO-15	Nitropropane (2-)
GC-MS	EPA TO-15	N-Nitrosodimethylamine
GC-MS	EPA TO-15	N-Nitrosomorpholine
GC-MS	EPA TO-15	N-Nitroso-N-methylurea

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Air		
Technology	**Method**	**Analyte**
GC-MS	EPA TO-15	Phenol
GC-MS	EPA TO-15	Phosgene
GC-MS	EPA TO-15	Propionaldehyde
GC-MS	EPA TO-15	Propylene
GC-MS	EPA TO-15	Propylene oxide
GC-MS	EPA TO-15	Propane sultone (1,3-)
GC-MS	EPA TO-15	Styrene
GC-MS	EPA TO-15	Styrene oxide
GC-MS	EPA TO-15	Trichlorobenzene (1,2,4-)
GC-MS	EPA TO-15	Trimethylbenzene (1,3,5-)
GC-MS	EPA TO-15	Trimethylbenzene (1,2,4-)
GC-MS	EPA TO-15	Trimethylpentane (2,2,4-)
GC-MS	EPA TO-15	Tert-butyl alcohol
GC-MS	EPA TO-15	Tetrachloroethane (1,1,2,2-)
GC-MS	EPA TO-15	Tetrachloroethene
GC-MS	EPA TO-15	Tetrahydrofuran
GC-MS	EPA TO-15	Toluene
GC-MS	EPA TO-15	Trichloroethane (1,1,1-)
GC-MS	EPA TO-15	Trichloroethane (1,1,2-)
GC-MS	EPA TO-15	Trichloroethene
GC-MS	EPA TO-15	Trichlorofluoromethane
GC-MS	EPA TO-15	Trichloro (1,1,2) trifluoroethane (1,2,2-)
GC-MS	EPA TO-15	Trifluoromethane
GC-MS	EPA TO-15	Vinyl acetate
GC-MS	EPA TO-15	Vinyl bromide
GC-MS	EPA TO-15	Vinyl chloride
GC-MS	EPA TO-15	Xylene (m-)
GC-MS	EPA TO-15	Xylene (o-)
GC-MS	EPA TO-15	Xylene (p-)
GC-MS	EPA TO-15	Xylenes (total)
GC-PID-FID	EPA TO-3	n-Butane
GC-PID-FID	EPA TO-3	Ethane
GC-PID-FID	EPA TO-3	Methane
GC-PID-FID	EPA TO-3	n-Pentane
GC-PID-FID	EPA TO-3	Propane
GC-PID-FID	EPA TO-3	Benzene

LABORATORY ACCREDITATION BUREAU

Certificate # L2248

Air		
Technology	**Method**	**Analyte**
GC-PID-FID	EPA TO-3	Ethylbenzene
GC-PID-FID	EPA TO-3	Methyl Tertiary Butyl Ether
GC-PID-FID	EPA TO-3	n-Hexane
GC-PID-FID	EPA TO-3	Toluene
GC-PID-FID	EPA TO-3	Xylene (m,p-)
GC-PID-FID	EPA TO-3	Xylene (o-)
GC-PID-FID	EPA TO-3	Xylenes (total)
GC-PID-FID	EPA TO-3	Tertiary Butyl Alcohol
GC-PID-FID	EPA TO-3	Isopropyl Benzene (Cumene)
GC-PID-FID	EPA TO-3	Total Petroleum Hydrocarbons (C1-C4) as Methane
GC-PID-FID	EPA TO-3	Total Petroleum Hydrocarbons (C1-C4) as Propane
GC-PID-FID	EPA TO-3	Total Petroleum Hydrocarbons (C5-C10) as Pentane
GC-PID-FID	EPA TO-3	Total Petroleum Hydrocarbons (C5-C10) as Hexane
GC-PID-FID	EPA TO-3	Total Petroleum Hydrocarbons as Equivalent Pentane
GC-PID-FID	EPA TO-3	Total Petroleum Hydrocarbons as Equivalent Methane
GC-PID-FID	EPA TO-3	Total Petroleum Hydrocarbons as Equivalent Hexane

Potable Water		
Technology	**Method**	**Analyte**
ONPG-MUG (Colilert)	SM 9223 B	Total coliform/E.coli
Pour Plate	SM 9215 B	Heterotrophic bacteria
Nephelometric	EPA 180.1	Turbidity
Automated Cd Reduction	EPA 353.2	Nitrate
Spectrophotometric	SM 4500-NO2, B	Nitrite
Spectrophotometric, Distill, Semi Automated	EPA 335.4	Cyanide
Gravimetric	SM 2540 C	Total dissolved solids (TDS)
Titrimetric, EDTA	SM 2340 C	Total Hardness
Electrometric Titration	SM 2320 B	Alkalinity
Automated Phenate	SM 4500-NH3, G	Ammonia
Platinum-Cobalt	SM 2120 B	Color
Methylene Blue	SM 5540 C	Foaming agents
Conductance	SM 2510 B	Conductivity
Molybdosilicate	SM 4500-Si, D	Silica
Colorimetric	SM 4500-P, E	Orthophosphate

LABORATORY ACCREDITATION BUREAU

Certificate # L2248

Potable Water		
Technology	**Method**	**Analyte**
Combustion	SM 5310 B	Total organic carbon (TOC)
Pyrolysis, Titrimetric	SM 5320 B	Total organic halides (TOX)
Ion Chromatography	EPA 300.0	Chloride
Ion Chromatography	EPA 300.0	Fluoride
Ion Chromatography	EPA 300.0	Sulfate
Ion Chromatography	EPA 314.0	Perchlorate
Electrometric	SM 4500-H, B	pH
ICP	EPA 200.7	Aluminum
ICP	EPA 200.7	Barium
ICP	EPA 200.7	Beryllium
ICP	EPA 200.7	Cadmium
ICP	EPA 200.7	Calcium
ICP	EPA 200.7	Chromium
ICP	EPA 200.7	Copper
ICP	EPA 200.7	Iron
ICP	EPA 200.7	Magnesium
ICP	EPA 200.7	Manganese
ICP	EPA 200.7	Nickel
ICP	EPA 200.7	Silica
ICP	EPA 200.7	Silver
ICP	EPA 200.7	Sodium
ICP-Calculation	EPA 200.7	Total Hardness
ICP	EPA 200.7	Zinc
Manual Cold Vapor	EPA 245.1	Mercury
ICP-MS	EPA 200.8	Aluminum
ICP-MS	EPA 200.8	Antimony
ICP-MS	EPA 200.8	Arsenic
ICP-MS	EPA 200.8	Barium
ICP-MS	EPA 200.8	Beryllium
ICP-MS	EPA 200.8	Cadmium
ICP-MS	EPA 200.8	Chromium
ICP-MS	EPA 200.8	Copper
ICP-MS	EPA 200.8	Lead
ICP-MS	EPA 200.8	Manganese
ICP-MS	EPA 200.8	Nickel

LABORATORY ACCREDITATION BUREAU

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Potable Water		
Technology	**Method**	**Analyte**
ICP-MS	EPA 200.8	Selenium
ICP-MS	EPA 200.8	Silver
ICP-MS	EPA 200.8	Thallium
ICP-MS	EPA 200.8	Zinc
GC	EPA 504.1	1,2-Dibromoethane (EDB)
GC	EPA 504.1	1,2-Dibromo-3-chloropropane (EDCP)
GC	EPA 504.1	1,2,3-Trichloropropane
GC-MS	EPA 524.2	Bromoform
GC-MS	EPA 524.2	Chloroform
GC-MS	EPA 524.2	Dibromochloromethane
GC-MS	EPA 524.2	Bromodichloromethane
GC-MS	EPA 524.2	Benzene
GC-MS	EPA 524.2	Carbon tetrachloride
GC-MS	EPA 524.2	Chlorobenzene
GC-MS	EPA 524.2	1,2-Dichlorobenzene
GC-MS	EPA 524.2	1,3-Dichlorobenzene
GC-MS	EPA 524.2	1,4-Dichlorobenzene
GC-MS	EPA 524.2	1,1-Dichloroethane
GC-MS	EPA 524.2	1,2-Dichloroethane
GC-MS	EPA 524.2	cis-1,2-Dichloroethene
GC-MS	EPA 524.2	trans-1,2-Dichloroethene
GC-MS	EPA 524.2	Methylene chloride
GC-MS	EPA 524.2	1,2-Dichloropropane
GC-MS	EPA 524.2	Ethylbenzene
GC-MS	EPA 524.2	Methyl tert-butyl ether
GC-MS	EPA 524.2	Naphthalene
GC-MS	EPA 524.2	Styrene
GC-MS	EPA 524.2	1,1,2,2-Tetrachloroethene
GC-MS	EPA 524.2	Tetrachloroethene
GC-MS	EPA 524.2	1,1,1-Trichloroethane
GC-MS	EPA 524.2	Trichloroethene
GC-MS	EPA 524.2	Toluene
GC-MS	EPA 524.2	1,2,4-Trichlorobenzene
GC-MS	EPA 524.2	1,1-Dichloroethene
GC-MS	EPA 524.2	1,1,2-Trichloroethane

LABORATORY ACCREDITATION BUREAU

Certificate # L2248

Potable Water		
Technology	**Method**	**Analyte**
GC-MS	EPA 524.2	Vinyl chloride
GC-MS	EPA 524.2	Xylenes (total)
GC-MS	EPA 524.2	Bromobenzene
GC-MS	EPA 524.2	Bromochloromethane
GC-MS	EPA 524.2	Bromomethane
GC-MS	EPA 524.2	n-Butyl benzene
GC-MS	EPA 524.2	Sec-butylbenzene
GC-MS	EPA 524.2	Tert-butylbenzene
GC-MS	EPA 524.2	Chloroethane
GC-MS	EPA 524.2	Chloromethane
GC-MS	EPA 524.2	2-Chlorotoluene
GC-MS	EPA 524.2	4-Chlorotoluene
GC-MS	EPA 524.2	1,2-Dibromo-3-chloropropane
GC-MS	EPA 524.2	1,2-Dibromoethane (EDB)
GC-MS	EPA 524.2	Dibromomethane
GC-MS	EPA 524.2	Dichlorodifluoromethane
GC-MS	EPA 524.2	1,3-Dichloropropane
GC-MS	EPA 524.2	2,2-Dichloropropane
GC-MS	EPA 524.2	1,1-Dichloropropene
GC-MS	EPA 524.2	cis-1,3-Dichloropropene
GC-MS	EPA 524.2	trans-1,3-Dichloropropene
GC-MS	EPA 524.2	1,3-Hexachlorobutadiene
GC-MS	EPA 524.2	Isopropylbenzene
GC-MS	EPA 524.2	4-Isopropyltoluene
GC-MS	EPA 524.2	n-Propylbenzene
GC-MS	EPA 524.2	1,1,1,2-Tetrachloroethane
GC-MS	EPA 524.2	1,2,3-Trichlorobenzene
GC-MS	EPA 524.2	Trichlorofluoromethane
GC-MS	EPA 524.2	1,2,3-Trichloropropane
GC-MS	EPA 524.2	1,2,4-Trimethylbenzene
GC-MS	EPA 524.2	1,3,5-Trimethylbenzene
GC-MS	EPA 524.2	Nitrobenzene
GC-MS	EPA 524.2	Acetone
GC-MS	EPA 524.2	Acrylonitrile
GC-MS	EPA 524.2	Allyl chloride

LABORATORY ACCREDITATION BUREAU

Certificate # L2248

Potable Water		
Technology	**Method**	**Analyte**
GC-MS	EPA 524.2	2-Butanone
GC-MS	EPA 524.2	Carbon disulfide
GC-MS	EPA 524.2	Chloroacetonitrile
GC-MS	EPA 524.2	1-Chlorobutane
GC-MS	EPA 524.2	trans-1,4-Dichloro-2-butene
GC-MS	EPA 524.2	1,1-Dichloropropanone
GC-MS	EPA 524.2	Diethyl ether (Ethyl ether)
GC-MS	EPA 524.2	Ethyl methacrylate
GC-MS	EPA 524.2	n-Hexane
GC-MS	EPA 524.2	Hexachloroethane
GC-MS	EPA 524.2	2-Hexanone
GC-MS	EPA 524.2	Methacrylonitrile
GC-MS	EPA 524.2	Methyl acrylate
GC-MS	EPA 524.2	Methyl iodide
GC-MS	EPA 524.2	Methyl methacrylate
GC-MS	EPA 524.2	4-methyl-2-Pentanone (MIBK)
GC-MS	EPA 524.2	2-Nitropropane
GC-MS	EPA 524.2	Pentachloroethane
GC-MS	EPA 524.2	Propionitrile
GC-MS	EPA 524.2	Tert-butyl alcohol
GC-MS	EPA 524.2	Tetrahydrofuran

Notes:

1) This laboratory offers commercial testing service.
2) (M) = modified.

Approved by: _____

R. Douglas Leonard
Chief Technical Officer

Date: August 30, 2012

Issued: 4/14/2010 Revised: 6/25/10 Revised: 4/19/11 Revised: 8/30/12

New Jersey Department of Environmental Protection

National Environmental Laboratory Accreditation Program

ANNUAL CERTIFIED PARAMETER LIST AND CURRENT STATUS

Effective as of 08/22/2012 until 06/30/2013

Laboratory Name: ACCUTEST LABORATORIES Laboratory Number: 12129 Activity ID: NLC120003
2235 RT 130
BLDG B
Dayton, NJ 08810

Category: CAP03 -- Atmospheric Organic Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	CAP03.00180	AE	GC/MS, Canisters	[EPA TO-15]	Acetaldehyde
Certified	Yes	NJ	CAP03.00184	AE	GC/MS, Canisters	[EPA TO-15]	Acetone
Certified	Yes	NJ	CAP03.00190	AE	GC/MS, Canisters	[EPA TO-15]	Acetophenone
Certified	Yes	NJ	CAP03.00195	AE	GC/MS, Canisters	[EPA TO-15]	Acrolein
Certified	Yes	NJ	CAP03.00200	AE	GC/MS, Canisters	[EPA TO-15]	Acrylamide
Certified	Yes	NJ	CAP03.00205	AE	GC/MS, Canisters	[EPA TO-15]	Acrylic acid
Certified	Yes	NJ	CAP03.00215	AE	GC/MS, Canisters	[EPA TO-15]	Allyl chloride
Certified	Yes	NJ	CAP03.00225	AE	GC/MS, Canisters	[EPA TO-15]	Benzene
Certified	Yes	NJ	CAP03.00230	AE	GC/MS, Canisters	[EPA TO-15]	Benzyl chloride
Certified	Yes	NJ	CAP03.00235	AE	GC/MS, Canisters	[EPA TO-15]	Propiolactone (beta-)
Certified	Yes	NJ	CAP03.00240	AE	GC/MS, Canisters	[EPA TO-15]	Bis (2-chloroethyl) ether
Certified	Yes	NJ	CAP03.00245	AE	GC/MS, Canisters	[EPA TO-15]	Bis (chloromethyl) ether
Certified	Yes	NJ	CAP03.00250	AE	GC/MS, Canisters	[EPA TO-15]	Bromodichloromethane
Certified	Yes	NJ	CAP03.00255	AE	GC/MS, Canisters	[EPA TO-15]	Bromoform
Certified	Yes	NJ	CAP03.00260	AE	GC/MS, Canisters	[EPA TO-15]	Bromomethane
Certified	Yes	NJ	CAP03.00265	AE	GC/MS, Canisters	[EPA TO-15]	Butadiene (1,3-)
Certified	Yes	NJ	CAP03.00270	AE	GC/MS, Canisters	[EPA TO-15]	Carbon disulfide
Certified	Yes	NJ	CAP03.00275	AE	GC/MS, Canisters	[EPA TO-15]	Carbon tetrachloride
Certified	Yes	NJ	CAP03.00280	AE	GC/MS, Canisters	[EPA TO-15]	Carbon oxysulfide (Carbonyl sulfide)
Certified	Yes	NJ	CAP03.00285	AE	GC/MS, Canisters	[EPA TO-15]	Catechol
Certified	Yes	NJ	CAP03.00290	AE	GC/MS, Canisters	[EPA TO-15]	Butadiene (2-chloro-1,3-)
Certified	Yes	NJ	CAP03.00295	AE	GC/MS, Canisters	[EPA TO-15]	Chloroacetic acid
Certified	Yes	NJ	CAP03.00300	AE	GC/MS, Canisters	[EPA TO-15]	Chlorobenzene
Certified	Yes	NJ	CAP03.00305	AE	GC/MS, Canisters	[EPA TO-15]	Chloroethane
Certified	Yes	NJ	CAP03.00310	AE	GC/MS, Canisters	[EPA TO-15]	Chloroform
Certified	Yes	NJ	CAP03.00315	AE	GC/MS, Canisters	[EPA TO-15]	Chloromethane
Certified	Yes	NJ	CAP03.00320	AE	GC/MS, Canisters	[EPA TO-15]	Chloromethyl methyl ether
Certified	Yes	NJ	CAP03.00325	AE	GC/MS, Canisters	[EPA TO-15]	Chlorotoluene (2-)
Certified	Yes	NJ	CAP03.00330	AE	GC/MS, Canisters	[EPA TO-15]	Cresols/Cresylic acid
Certified	Yes	NJ	CAP03.00335	AE	GC/MS, Canisters	[EPA TO-15]	Cyclohexane
Certified	Yes	NJ	CAP03.00340	AE	GC/MS, Canisters	[EPA TO-15]	Diazomethane

KEY: AE = Air and Emissions, BT = Biological Tissues, DW = Drinking Water, NPW = Non-Potable Water, SCM = Solid and Chemical Materials

New Jersey Department of Environmental Protection

National Environmental Laboratory Accreditation Program

ANNUAL CERTIFIED PARAMETER LIST AND CURRENT STATUS

Effective as of 08/22/2012 until 06/30/2013

Laboratory Name: ACCUTEST LABORATORIES Laboratory Number: 12129 Activity ID: NLC120003
2235 RT 130
BLDG B
Dayton, NJ 08810

Category: CAP03 – Atmospheric Organic Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	CAP03.00342	AE	GC/MS, Canisters	[EPA TO-15]	Dibromochloromethane
Certified	Yes	NJ	CAP03.00345	AE	GC/MS, Canisters	[EPA TO-15]	Dibromo-3-chloropropane (1,2-)
Certified	Yes	NJ	CAP03.00350	AE	GC/MS, Canisters	[EPA TO-15]	Dibromoethane (1,2-) (EDB)
Certified	Yes	NJ	CAP03.00355	AE	GC/MS, Canisters	[EPA TO-15]	Dichlorobenzene (1,2-)
Certified	Yes	NJ	CAP03.00360	AE	GC/MS, Canisters	[EPA TO-15]	Dichlorobenzene (1,3-)
Certified	Yes	NJ	CAP03.00365	AE	GC/MS, Canisters	[EPA TO-15]	Dichlorobenzene (1,4-)
Certified	Yes	NJ	CAP03.00368	AE	GC/MS, Canisters	[EPA TO-15]	Dichlorodifluoromethane
Certified	Yes	NJ	CAP03.00370	AE	GC/MS, Canisters	[EPA TO-15]	Dichloroethane (1,1-)
Certified	Yes	NJ	CAP03.00375	AE	GC/MS, Canisters	[EPA TO-15]	Dichloroethane (1,2-)
Certified	Yes	NJ	CAP03.00380	AE	GC/MS, Canisters	[EPA TO-15]	Dichloroethene (1,1-)
Certified	Yes	NJ	CAP03.00384	AE	GC/MS, Canisters	[EPA TO-15]	Dichloroethene (cis-1,2-)
Certified	Yes	NJ	CAP03.00385	AE	GC/MS, Canisters	[EPA TO-15]	Dichloroethene (trans-1,2-)
Certified	Yes	NJ	CAP03.00390	AE	GC/MS, Canisters	[EPA TO-15]	Dichlorofluoromethane
Certified	Yes	NJ	CAP03.00395	AE	GC/MS, Canisters	[EPA TO-15]	Dichloropropane (1,2-)
Certified	Yes	NJ	CAP03.00400	AE	GC/MS, Canisters	[EPA TO-15]	Dichloropropene (cis-1,3-)
Certified	Yes	NJ	CAP03.00401	AE	GC/MS, Canisters	[EPA TO-15]	Dichloropropene (trans-1,3-)
Certified	Yes	NJ	CAP03.00405	AE	GC/MS, Canisters	[EPA TO-15]	Dichlorotetrafluoroethane (1,2-)
Certified	Yes	NJ	CAP03.00410	AE	GC/MS, Canisters	[EPA TO-15]	Diethyl sulfate
Certified	Yes	NJ	CAP03.00415	AE	GC/MS, Canisters	[EPA TO-15]	Dimethyl sulfate
Certified	Yes	NJ	CAP03.00425	AE	GC/MS, Canisters	[EPA TO-15]	Dimethylcarbamoyl chloride
Certified	Yes	NJ	CAP03.00430	AE	GC/MS, Canisters	[EPA TO-15]	Dimethyl formamide (N, N-)
Certified	Yes	NJ	CAP03.00440	AE	GC/MS, Canisters	[EPA TO-15]	Dioxane (1,4-)
Certified	Yes	NJ	CAP03.00445	AE	GC/MS, Canisters	[EPA TO-15]	Epichlorohydrin
Certified	Yes	NJ	CAP03.00450	AE	GC/MS, Canisters	[EPA TO-15]	Epoxybutane (1,2-)
Certified	Yes	NJ	CAP03.00451	AE	GC/MS, Canisters	[EPA TO-15]	Ethanol
Certified	Yes	NJ	CAP03.00452	AE	GC/MS, Canisters	[EPA TO-15]	Ethyl acetate
Certified	Yes	NJ	CAP03.00455	AE	GC/MS, Canisters	[EPA TO-15]	Ethyl acrylate
Certified	Yes	NJ	CAP03.00460	AE	GC/MS, Canisters	[EPA TO-15]	Ethyl carbamate (Urethane)
Certified	Yes	NJ	CAP03.00465	AE	GC/MS, Canisters	[EPA TO-15]	Ethylbenzene
Certified	Yes	NJ	CAP03.00470	AE	GC/MS, Canisters	[EPA TO-15]	Ethylene Oxide
Certified	Yes	NJ	CAP03.00480	AE	GC/MS, Canisters	[EPA TO-15]	Ethyltoluene (4-)
Certified	Yes	NJ	CAP03.00485	AE	GC/MS, Canisters	[EPA TO-15]	Formaldehyde

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New Jersey Department of Environmental Protection

National Environmental Laboratory Accreditation Program

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Effective as of 08/22/2012 until 06/30/2013

Laboratory Name: ACCUTEST LABORATORIES Laboratory Number: 12129 Activity ID: NLC120003
2235 RT 130
BLDG B
Dayton, NJ 08810

Category: CAP03 – Atmospheric Organic Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	CAP03.00490	AE	GC/MS, Canisters	[EPA TO-15]	Hexachlorobutadiene (1,3-)
Certified	Yes	NJ	CAP03.00495	AE	GC/MS, Canisters	[EPA TO-15]	Hexachloroethane
Certified	Yes	NJ	CAP03.00498	AE	GC/MS, Canisters	[EPA TO-15]	Hexanone (2-)
Certified	Yes	NJ	CAP03.00500	AE	GC/MS, Canisters	[EPA TO-15]	Heptane (n-)
Certified	Yes	NJ	CAP03.00505	AE	GC/MS, Canisters	[EPA TO-15]	Hexane (n-)
Certified	Yes	NJ	CAP03.00510	AE	GC/MS, Canisters	[EPA TO-15]	Isophorone
Certified	Yes	NJ	CAP03.00511	AE	GC/MS, Canisters	[EPA TO-15]	Isopropanol
Certified	Yes	NJ	CAP03.00515	AE	GC/MS, Canisters	[EPA TO-15]	Isopropylbenzene
Certified	Yes	NJ	CAP03.00520	AE	GC/MS, Canisters	[EPA TO-15]	Methyl alcohol (Methanol)
Certified	Yes	NJ	CAP03.00525	AE	GC/MS, Canisters	[EPA TO-15]	Methyl ethyl ketone
Certified	Yes	NJ	CAP03.00530	AE	GC/MS, Canisters	[EPA TO-15]	Methyl iodide
Certified	Yes	NJ	CAP03.00535	AE	GC/MS, Canisters	[EPA TO-15]	Methyl isobutyl ketone (MIBK)
Certified	Yes	NJ	CAP03.00540	AE	GC/MS, Canisters	[EPA TO-15]	Methyl isocyanate
Certified	Yes	NJ	CAP03.00545	AE	GC/MS, Canisters	[EPA TO-15]	Methyl methacrylate
Certified	Yes	NJ	CAP03.00550	AE	GC/MS, Canisters	[EPA TO-15]	Methyl tert-butyl ether
Certified	Yes	NJ	CAP03.00555	AE	GC/MS, Canisters	[EPA TO-15]	Methylene chloride (Dichloromethane)
Certified	Yes	NJ	CAP03.00565	AE	GC/MS, Canisters	[EPA TO-15]	Methylphenol (2-)
Certified	Yes	NJ	CAP03.00567	AE	GC/MS, Canisters	[EPA TO-15]	Naphthalene
Certified	Yes	NJ	CAP03.00570	AE	GC/MS, Canisters	[EPA TO-15]	Nitrobenzene
Certified	Yes	NJ	CAP03.00575	AE	GC/MS, Canisters	[EPA TO-15]	Nitropropane (2-)
Certified	Yes	NJ	CAP03.00580	AE	GC/MS, Canisters	[EPA TO-15]	N-Nitrosodimethylamine
Certified	Yes	NJ	CAP03.00585	AE	GC/MS, Canisters	[EPA TO-15]	N-Nitrosomorpholine
Certified	Yes	NJ	CAP03.00590	AE	GC/MS, Canisters	[EPA TO-15]	N-Nitroso-N-methylurea
Certified	Yes	NJ	CAP03.00595	AE	GC/MS, Canisters	[EPA TO-15]	Phenol
Certified	Yes	NJ	CAP03.00600	AE	GC/MS, Canisters	[EPA TO-15]	Phosgene
Certified	Yes	NJ	CAP03.00605	AE	GC/MS, Canisters	[EPA TO-15]	Propionaldehyde
Certified	Yes	NJ	CAP03.00612	AE	GC/MS, Canisters	[EPA TO-15]	Propylene
Certified	Yes	NJ	CAP03.00615	AE	GC/MS, Canisters	[EPA TO-15]	Propylene oxide
Certified	Yes	NJ	CAP03.00620	AE	GC/MS, Canisters	[EPA TO-15]	Propane sultone (1,3-)
Certified	Yes	NJ	CAP03.00625	AE	GC/MS, Canisters	[EPA TO-15]	Styrene
Certified	Yes	NJ	CAP03.00630	AE	GC/MS, Canisters	[EPA TO-15]	Styrene oxide
Certified	Yes	NJ	CAP03.00635	AE	GC/MS, Canisters	[EPA TO-15]	Trichlorobenzene (1,2,4-)

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New Jersey Department of Environmental Protection

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ANNUAL CERTIFIED PARAMETER LIST AND CURRENT STATUS

Effective as of 08/22/2012 until 06/30/2013

Laboratory Name: ACCUTEST LABORATORIES Laboratory Number: 12129 Activity ID: NLC120003
2235 RT 130
BLDG B
Dayton, NJ 08810

Category: CAP03 – Atmospheric Organic Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	CAP03.00640	AE	GC/MS, Canisters	[EPA TO-15]	Trimethylbenzene (1,3,5-)
Certified	Yes	NJ	CAP03.00645	AE	GC/MS, Canisters	[EPA TO-15]	Trimethylbenzene (1,2,4-)
Certified	Yes	NJ	CAP03.00650	AE	GC/MS, Canisters	[EPA TO-15]	Trimethylpentane (2,2,4-)
Certified	Yes	NJ	CAP03.00652	AE	GC/MS, Canisters	[EPA TO-15]	Tert-butyl alcohol
Certified	Yes	NJ	CAP03.00655	AE	GC/MS, Canisters	[EPA TO-15]	Tetrachloroethane (1,1,2,2-)
Certified	Yes	NJ	CAP03.00660	AE	GC/MS, Canisters	[EPA TO-15]	Tetrachloroethene
Certified	Yes	NJ	CAP03.00662	AE	GC/MS, Canisters	[EPA TO-15]	Tetrahydrofuran
Certified	Yes	NJ	CAP03.00665	AE	GC/MS, Canisters	[EPA TO-15]	Toluene
Certified	Yes	NJ	CAP03.00670	AE	GC/MS, Canisters	[EPA TO-15]	Trichloroethane (1,1,1-)
Certified	Yes	NJ	CAP03.00675	AE	GC/MS, Canisters	[EPA TO-15]	Trichloroethane (1,1,2-)
Certified	Yes	NJ	CAP03.00680	AE	GC/MS, Canisters	[EPA TO-15]	Trichloroethene
Certified	Yes	NJ	CAP03.00684	AE	GC/MS, Canisters	[EPA TO-15]	Trichlorofluoromethane
Certified	Yes	NJ	CAP03.00685	AE	GC/MS, Canisters	[EPA TO-15]	Trichloro (1,1,2-) trifluoroethane (1,2,2-)
Certified	Yes	NJ	CAP03.00695	AE	GC/MS, Canisters	[EPA TO-15]	Trifluoromethane
Certified	Yes	NJ	CAP03.00700	AE	GC/MS, Canisters	[EPA TO-15]	Vinyl acetate
Certified	Yes	NJ	CAP03.00705	AE	GC/MS, Canisters	[EPA TO-15]	Vinyl bromide
Certified	Yes	NJ	CAP03.00710	AE	GC/MS, Canisters	[EPA TO-15]	Vinyl chloride
Certified	Yes	NJ	CAP03.00715	AE	GC/MS, Canisters	[EPA TO-15]	Xylene (m-)
Certified	Yes	NJ	CAP03.00720	AE	GC/MS, Canisters	[EPA TO-15]	Xylene (o-)
Certified	Yes	NJ	CAP03.00725	AE	GC/MS, Canisters	[EPA TO-15]	Xylene (p-)
Certified	Yes	NJ	CAP03.00730	AE	GC/MS, Canisters	[EPA TO-15]	Xylenes (total)
Certified	Yes	NJ	CAP03.02450	AE	GC, FID and/or ECD, Cryogenic Preconcentration	[EPA TO-3]	Benzene
Certified	Yes	NJ	CAP03.02482	AE	GC, FID and/or ECD, Cryogenic Preconcentration	[EPA TO-3]	Ethylbenzene
Certified	Yes	NJ	CAP03.02483	AE	GC, FID and/or ECD, Cryogenic Preconcentration	[EPA TO-3]	Isopropylbenzene
Certified	Yes	NJ	CAP03.02485	AE	GC, FID and/or ECD, Cryogenic Preconcentration	[EPA TO-3]	Methane
Certified	Yes	NJ	CAP03.02486	AE	GC, FID and/or ECD, Cryogenic Preconcentration	[EPA TO-3]	Methyl tert-butyl ether
Certified	Yes	NJ	CAP03.02488	AE	GC, FID and/or ECD, Cryogenic Preconcentration	[EPA TO-3]	Tert-butyl alcohol

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New Jersey Department of Environmental Protection

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ANNUAL CERTIFIED PARAMETER LIST AND CURRENT STATUS

Effective as of 08/22/2012 until 06/30/2013

Laboratory Name: ACCUTEST LABORATORIES Laboratory Number: 12129 Activity ID: NLC120003
2235 RT 130
BLDG B
Dayton, NJ 08810

Category: CAP03 – Atmospheric Organic Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	CAP03.02489	AE	GC, FID and/or ECD, Cryogenic Preconcentration	[EPA TO-3]	Toluene
Certified	Yes	NJ	CAP03.02515	AE	GC, FID and/or ECD, Cryogenic Preconcentration	[EPA TO-3]	Xylenes (total)
Applied	No	NJ	CAP03.06850	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Acetone
Applied	No	NJ	CAP03.06852	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Allyl chloride
Applied	No	NJ	CAP03.06854	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Benzene
Applied	No	NJ	CAP03.06856	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Bromodichloromethane
Applied	No	NJ	CAP03.06858	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Bromoform
Applied	No	NJ	CAP03.06860	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Bromomethane
Applied	No	NJ	CAP03.06862	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Butadiene (1,3-)
Applied	No	NJ	CAP03.06864	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Carbon disulfide
Applied	No	NJ	CAP03.06866	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Carbon tetrachloride
Applied	No	NJ	CAP03.06868	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Chlorobenzene
Applied	No	NJ	CAP03.06870	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Chloroethane
Applied	No	NJ	CAP03.06872	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Chloroform
Applied	No	NJ	CAP03.06874	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Chloromethane
Applied	No	NJ	CAP03.06876	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Chlorotoluene (2-)
Applied	No	NJ	CAP03.06878	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Cyclohexane
Applied	No	NJ	CAP03.06880	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Dibromochloromethane
Applied	No	NJ	CAP03.06882	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Dibromoethane (1,2-) (EDB)
Applied	No	NJ	CAP03.06884	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Dichlorobenzene (1,2-)
Applied	No	NJ	CAP03.06886	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Dichlorobenzene (1,3-)
Applied	No	NJ	CAP03.06888	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Dichlorobenzene (1,4-)
Applied	No	NJ	CAP03.06890	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Dichlorodifluoromethane
Applied	No	NJ	CAP03.06892	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Dichloroethane (1,1-)
Applied	No	NJ	CAP03.06894	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Dichloroethane (1,2-)
Applied	No	NJ	CAP03.06896	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Dichloroethene (1,1-)
Applied	No	NJ	CAP03.06898	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Dichloroethene (cis-1,2-)
Applied	No	NJ	CAP03.06900	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Dichloroethene (trans-1,2-)
Applied	No	NJ	CAP03.06902	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Dichloropropane (1,2-)
Applied	No	NJ	CAP03.06904	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Dichloropropene (cis-1,3-)

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2235 RT 130
BLDG B
Dayton, NJ 08810

Category: CAP03 – Atmospheric Organic Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Applied	No	NJ	CAP03.06906	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Dichloropropene (trans-1,3-)
Applied	No	NJ	CAP03.06908	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Dichlorotetrafluoroethane (1,2-)
Applied	No	NJ	CAP03.06910	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Dioxane (1,4-)
Applied	No	NJ	CAP03.06912	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Ethanol
Applied	No	NJ	CAP03.06914	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Ethylbenzene
Applied	No	NJ	CAP03.06916	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Ethyltoluene (4-)
Applied	No	NJ	CAP03.06918	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Heptane (n-)
Applied	No	NJ	CAP03.06920	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Hexachlorobutadiene (1,3-)
Applied	No	NJ	CAP03.06922	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Hexane (n-)
Applied	No	NJ	CAP03.06924	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Isopropanol
Applied	No	NJ	CAP03.06926	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Methylene chloride (Dichloromethane)
Applied	No	NJ	CAP03.06928	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Methyl ethyl ketone
Applied	No	NJ	CAP03.06930	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Methyl isobutyl ketone (MIBK)
Applied	No	NJ	CAP03.06932	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Methyl methacrylate
Applied	No	NJ	CAP03.06934	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Methyl tert-butyl ether
Applied	No	NJ	CAP03.06936	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Styrene
Applied	No	NJ	CAP03.06938	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Tert-butyl alcohol
Applied	No	NJ	CAP03.06940	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Tetrachloroethane (1,1,2,2-)
Applied	No	NJ	CAP03.06942	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Tetrachloroethene
Applied	No	NJ	CAP03.06944	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Tetrahydrofuran
Applied	No	NJ	CAP03.06946	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Toluene
Applied	No	NJ	CAP03.06948	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Trichlorobenzene (1,2,4-)
Applied	No	NJ	CAP03.06950	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Trichloroethane (1,1,1-)
Applied	No	NJ	CAP03.06952	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Trichloroethane (1,1,2-)
Applied	No	NJ	CAP03.06954	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Trichloroethene
Applied	No	NJ	CAP03.06956	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Trichlorofluoromethane
Applied	No	NJ	CAP03.06958	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Trichloro (1,1,2-) trifluoroethane (1,2,2-)
Applied	No	NJ	CAP03.06960	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Trimethylbenzene (1,2,4-)
Applied	No	NJ	CAP03.06962	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Trimethylbenzene (1,3,5-)
Applied	No	NJ	CAP03.06964	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Trimethylpentane (2,2,4-)
Applied	No	NJ	CAP03.06966	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Vinyl bromide
Applied	No	NJ	CAP03.06968	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Vinyl chloride

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Laboratory Name: ACCUTEST LABORATORIES Laboratory Number: 12129 Activity ID: NLC120003
2235 RT 130
BLDG B
Dayton, NJ 08810

Category: CAP03 -- Atmospheric Organic Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Applied	No	NJ	CAP03.06970	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Xylene (m- + p-)
Applied	No	NJ	CAP03.06972	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Xylene (o-)

Category: SDW01 -- Microbiological Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SDW01.05000	DW	ONPG-MUG (Autoanalysis Colilert System) (P-A)	[SM 9223B]	Total coliform / E. coli
Certified	Yes	NJ	SDW01.14000	DW	Pour Plate	[SM 9215 B]	Heterotrophic bacteria

Category: SDW02 -- Inorganic Parameters Including Na + Ca

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SDW02.01000	DW	Nephelometric	[EPA 180.1]	Turbidity
Certified	Yes	NJ	SDW02.02000	DW	Automated Cadmium Reduction	[EPA 353.2]	Nitrate
Certified	Yes	NJ	SDW02.09000	DW	Spectrophotometric	[SM 4500-NO2 B]	Nitrite
Certified	Yes	NJ	SDW02.14000	DW	Ion Chromatography	[EPA 300.0]	Fluoride
Certified	Yes	NJ	SDW02.15200	DW	Spectrophotometric, Distill, Semi Automated	[EPA 335.4]	Cyanide
Certified	Yes	NJ	SDW02.19000	DW	Ion Chromatography	[EPA 300.0]	Sulfate
Certified	Yes	NJ	SDW02.20000	DW	ICP	[EPA 200.7]	Sodium
Certified	Yes	NJ	SDW02.24000	DW	Gravimetric At 180	[SM 2540 C]	Total dissolved solids (TDS)
Certified	Yes	NJ	SDW02.27000	DW	ICP	[EPA 200.7]	Calcium
Certified	Yes	NJ	SDW02.27200	DW	Ca as Carbonate	[EPA 200.7]	Calcium-hardness
Certified	Yes	NJ	SDW02.27300	DW	Hardness By Calculation	[EPA 200.7]	Total hardness
Certified	Yes	NJ	SDW02.27400	DW	Titrimetric, EDTA	[SM 2340 C]	Total hardness
Certified	Yes	NJ	SDW02.29000	DW	Electrometric Titration	[SM 2320 B]	Alkalinity
Certified	Yes	NJ	SDW02.29310	DW	Automated Phenate	[SM 4500-NH3 G]	Ammonia
Certified	Yes	NJ	SDW02.31000	DW	Ion Chromatography	[EPA 300.0]	Chloride
Certified	Yes	NJ	SDW02.31120	DW	Ion Chromatography	[EPA 314.0]	Perchlorate
Certified	Yes	NJ	SDW02.32000	DW	Platinum-Cobalt	[SM 2120 B]	Color

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2235 RT 130
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Dayton, NJ 08810

Category: SDW02 – Inorganic Parameters Including Na + Ca

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SDW02.33000	DW	Methylene Blue	[SM 5540 C]	Foaming agents
Certified	Yes	NJ	SDW02.34000	DW	Consistent Series	[SM 2150 B]	Odor
Certified	Yes	NJ	SDW02.35000	DW	Conductance	[SM 2510 B]	Conductivity
Certified	Yes	NJ	SDW02.36100	DW	Molybdosilicate	[SM 4500-Si D (18/19th ed)]	Silica
Certified	Yes	NJ	SDW02.36400	DW	ICP	[EPA 200.7]	Silica
Certified	Yes	NJ	SDW02.37000	DW	Colorimetric	[SM 4500-P E]	Orthophosphate
Certified	Yes	NJ	SDW02.39500	DW	High Temp. Combustion, Filtration	[SM 5310B]	Dissolved organic carbon (DOC)
Applied	No	NJ	SDW02.39510	DW	Persulfate-UV, Filtration	[SM 5310C]	Dissolved organic carbon (DOC)
Applied	No	NJ	SDW02.39520	DW	Wet-Oxidation, Filtration	[SM 5310D]	Dissolved organic carbon (DOC)
Certified	Yes	NJ	SDW02.39600	DW	High Temp. Combustion	[SM 5310 B]	Total organic carbon (TOC)
Certified	Yes	NJ	SDW02.40000	DW	Pyrolysis, Titrimetric	[SM 5320 B]	Total organic halides (TOX)

Category: SDW03 – Analyze-Immediately Inorganic Parameter

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SDW03.00002	DW	All Categories Sample Handling Procedures	[OTHER NJAC 7:18-6 & 9]	PWTA Sampling Parameters
Certified	Yes	NJ	SDW03.02000	DW	DPD, Ferrous Titrimetric	[SM 4500-Cl F]	Chlorine - residual
Certified	Yes	NJ	SDW03.08000	DW	Electrometric	[SM 4500-H B]	pH
Certified	Yes	NJ	SDW03.09000	DW	Thermometric	[SM 2550 B]	Temperature

Category: SDW04 – Inorganic Parameters, Metals

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SDW04.03000	DW	ICP	[EPA 200.7]	Aluminum
Certified	Yes	NJ	SDW04.03100	DW	ICP/MS	[EPA 200.8]	Aluminum
Certified	Yes	NJ	SDW04.07000	DW	ICP/MS	[EPA 200.8]	Antimony
Certified	Yes	NJ	SDW04.12000	DW	ICP/MS	[EPA 200.8]	Arsenic
Certified	Yes	NJ	SDW04.16000	DW	ICP	[EPA 200.7]	Barium
Certified	Yes	NJ	SDW04.17000	DW	ICP/MS	[EPA 200.8]	Barium

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Category: SDW04 – Inorganic Parameters, Metals

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SDW04.20000	DW	ICP	[EPA 200.7]	Beryllium
Certified	Yes	NJ	SDW04.21000	DW	ICP/MS	[EPA 200.8]	Beryllium
Certified	Yes	NJ	SDW04.24000	DW	ICP	[EPA 200.7]	Cadmium
Certified	Yes	NJ	SDW04.25000	DW	ICP/MS	[EPA 200.8]	Cadmium
Certified	Yes	NJ	SDW04.28000	DW	ICP	[EPA 200.7]	Chromium
Certified	Yes	NJ	SDW04.29000	DW	ICP/MS	[EPA 200.8]	Chromium
Certified	Yes	NJ	SDW04.33000	DW	ICP	[EPA 200.7]	Copper
Certified	Yes	NJ	SDW04.34000	DW	ICP/MS	[EPA 200.8]	Copper
Certified	Yes	NJ	SDW04.37000	DW	ICP	[EPA 200.7]	Iron
Certified	Yes	NJ	SDW04.40000	DW	ICP/MS	[EPA 200.8]	Lead
Certified	Yes	NJ	SDW04.41100	DW	ICP	[EPA 200.7]	Magnesium
Certified	Yes	NJ	SDW04.44000	DW	ICP	[EPA 200.7]	Manganese
Certified	Yes	NJ	SDW04.45000	DW	ICP/MS	[EPA 200.8]	Manganese
Certified	Yes	NJ	SDW04.46000	DW	Manual Cold Vapor	[EPA 245.1]	Mercury
Certified	Yes	NJ	SDW04.52000	DW	ICP	[EPA 200.7]	Nickel
Certified	Yes	NJ	SDW04.53000	DW	ICP/MS	[EPA 200.8]	Nickel
Certified	Yes	NJ	SDW04.57000	DW	ICP/MS	[EPA 200.8]	Selenium
Certified	Yes	NJ	SDW04.62000	DW	ICP	[EPA 200.7]	Silver
Certified	Yes	NJ	SDW04.63000	DW	ICP/MS	[EPA 200.8]	Silver
Certified	Yes	NJ	SDW04.65000	DW	ICP/MS	[EPA 200.8]	Thallium
Certified	Yes	NJ	SDW04.67000	DW	ICP	[EPA 200.7]	Zinc
Certified	Yes	NJ	SDW04.68000	DW	ICP/MS	[EPA 200.8]	Zinc

Category: SDW05 – Organic Parameters, Chromatography

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SDW05.12010	DW	Solvent Extract, GC	[EPA 504.1]	Dibromoethane (1,2-) (EDB)
Certified	Yes	NJ	SDW05.12020	DW	Solvent Extract, GC	[EPA 504.1]	Dibromo-3-chloropropane (1,2-)
Certified	Yes	NJ	SDW05.12030	DW	Solvent Extract, GC	[EPA 504.1]	Trichloropropane (1,2,3-)

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---- Annual Certified Parameters List ---- Effective as of 08/22/2012 until 06/30/2013

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Category: SDW06 -- Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SDW06.01010	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Bromoform
Certified	Yes	NJ	SDW06.01020	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Chloroform
Certified	Yes	NJ	SDW06.01030	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dibromochloromethane
Certified	Yes	NJ	SDW06.01040	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Bromodichloromethane
Certified	Yes	NJ	SDW06.02010	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Benzene
Certified	Yes	NJ	SDW06.02020	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Carbon tetrachloride
Certified	Yes	NJ	SDW06.02030	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Chlorobenzene
Certified	Yes	NJ	SDW06.02040	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichlorobenzene (1,2-)
Certified	Yes	NJ	SDW06.02050	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichlorobenzene (1,3-)
Certified	Yes	NJ	SDW06.02060	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichlorobenzene (1,4-)
Certified	Yes	NJ	SDW06.02070	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichloroethane (1,1-)
Certified	Yes	NJ	SDW06.02080	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichloroethane (1,2-)
Certified	Yes	NJ	SDW06.02090	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichloroethene (cis-1,2-)
Certified	Yes	NJ	SDW06.02100	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichloroethene (trans-1,2-)
Certified	Yes	NJ	SDW06.02110	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Methylene chloride (Dichloromethane)
Certified	Yes	NJ	SDW06.02120	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichloropropane (1,2-)
Certified	Yes	NJ	SDW06.02130	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Ethylbenzene
Certified	Yes	NJ	SDW06.02140	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Methyl tert-butyl ether
Certified	Yes	NJ	SDW06.02150	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Naphthalene
Certified	Yes	NJ	SDW06.02160	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Styrene
Certified	Yes	NJ	SDW06.02170	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Tetrachloroethane (1,1,2,2-)
Certified	Yes	NJ	SDW06.02180	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Tetrachloroethene
Certified	Yes	NJ	SDW06.02190	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Trichloroethane (1,1,1-)
Certified	Yes	NJ	SDW06.02200	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Trichloroethene
Certified	Yes	NJ	SDW06.02210	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Toluene
Certified	Yes	NJ	SDW06.02220	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Trichlorobenzene (1,2,4-)
Certified	Yes	NJ	SDW06.02230	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichloroethene (1,1-)
Certified	Yes	NJ	SDW06.02240	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Trichloroethane (1,1,2-)
Certified	Yes	NJ	SDW06.02250	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Vinyl chloride
Certified	Yes	NJ	SDW06.02260	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Xylenes (total)
Certified	Yes	NJ	SDW06.03010	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Bromobenzene
Certified	Yes	NJ	SDW06.03020	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Bromochloromethane

KEY: AE = Air and Emissions, BT = Biological Tissues, DW = Drinking Water, NPW = Non-Potable Water, SCM = Solid and Chemical Materials

New Jersey Department of Environmental Protection

National Environmental Laboratory Accreditation Program

ANNUAL CERTIFIED PARAMETER LIST AND CURRENT STATUS

Effective as of 08/22/2012 until 06/30/2013

Laboratory Name: ACCUTEST LABORATORIES Laboratory Number: 12129 Activity ID: NLC120003
2235 RT 130
BLDG B
Dayton, NJ 08810

Category: SDW06 -- Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SDW06.03030	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Bromomethane
Certified	Yes	NJ	SDW06.03040	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Butyl benzene (n-)
Certified	Yes	NJ	SDW06.03050	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Sec-butylbenzene
Certified	Yes	NJ	SDW06.03060	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Tert-butylbenzene
Certified	Yes	NJ	SDW06.03070	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Chloroethane
Certified	Yes	NJ	SDW06.03080	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Chloromethane
Certified	Yes	NJ	SDW06.03090	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Chlorotoluene (2-)
Certified	Yes	NJ	SDW06.03100	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Chlorotoluene (4-)
Certified	Yes	NJ	SDW06.03110	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dibromo-3-chloropropane (1,2-)
Certified	Yes	NJ	SDW06.03120	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dibromoethane (1,2-) (EDB)
Certified	Yes	NJ	SDW06.03130	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dibromomethane
Certified	Yes	NJ	SDW06.03140	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichlorodifluoromethane
Certified	Yes	NJ	SDW06.03150	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichloropropane (1,3-)
Certified	Yes	NJ	SDW06.03160	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichloropropane (2,2-)
Certified	Yes	NJ	SDW06.03170	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichloropropene (1,1-)
Certified	Yes	NJ	SDW06.03180	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichloropropene (cis-1,3-)
Certified	Yes	NJ	SDW06.03190	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichloropropene (trans-1,3-)
Certified	Yes	NJ	SDW06.03200	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Hexachlorobutadiene (1,3-)
Certified	Yes	NJ	SDW06.03210	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Isopropylbenzene
Certified	Yes	NJ	SDW06.03220	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Isopropyltoluene (4-)
Certified	Yes	NJ	SDW06.03230	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Propylbenzene (n-)
Certified	Yes	NJ	SDW06.03240	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Tetrachloroethane (1,1,1,2-)
Certified	Yes	NJ	SDW06.03250	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Trichlorobenzene (1,2,3-)
Certified	Yes	NJ	SDW06.03260	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Trichlorofluoromethane
Certified	Yes	NJ	SDW06.03270	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Trichloropropane (1,2,3-)
Certified	Yes	NJ	SDW06.03280	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Trimethylbenzene (1,2,4-)
Certified	Yes	NJ	SDW06.03300	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Trimethylbenzene (1,3,5-)
Certified	Yes	NJ	SDW06.03310	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Nitrobenzene
Certified	Yes	NJ	SDW06.03410	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Acetone
Certified	Yes	NJ	SDW06.03420	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Acrylonitrile
Certified	Yes	NJ	SDW06.03430	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Allyl chloride
Certified	Yes	NJ	SDW06.03440	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Butanone (2-)

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Laboratory Name: ACCUTEST LABORATORIES Laboratory Number: 12129 Activity ID: NLC120003
2235 RT 130
BLDG B
Dayton, NJ 08810

Category: SDW06 -- Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SDW06.03450	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Carbon disulfide
Certified	Yes	NJ	SDW06.03460	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Chloroacetonitrile
Certified	Yes	NJ	SDW06.03470	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Chlorobutane (1-)
Certified	Yes	NJ	SDW06.03480	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichloro-2-butene (trans-1,4-)
Certified	Yes	NJ	SDW06.03490	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichloropropanone (1,1-)
Certified	Yes	NJ	SDW06.03500	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Diethyl ether (Ethyl ether)
Certified	Yes	NJ	SDW06.03510	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Ethyl methacrylate
Applied	No	NJ	SDW06.03515	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Hexane (n-)
Certified	Yes	NJ	SDW06.03520	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Hexachloroethane
Certified	Yes	NJ	SDW06.03530	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Hexanone (2-)
Certified	Yes	NJ	SDW06.03540	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Methacrylonitrile
Certified	Yes	NJ	SDW06.03550	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Methyl acrylate
Certified	Yes	NJ	SDW06.03560	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Methyl iodide
Certified	Yes	NJ	SDW06.03570	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Methyl methacrylate
Certified	Yes	NJ	SDW06.03580	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Pentanone (4-methyl-2-) (MIBK)
Certified	Yes	NJ	SDW06.03590	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Nitropropane (2-)
Certified	Yes	NJ	SDW06.03600	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Pentachloroethane
Certified	Yes	NJ	SDW06.03610	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Propionitrile
Certified	Yes	NJ	SDW06.03615	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Tert-butyl alcohol
Certified	Yes	NJ	SDW06.03620	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Tetrahydrofuran

Category: SHW03 -- Analyze-Immediately Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW03.01000	NPW	Aqueous, Electrometric	[SW-846 9040C]	pH
Certified	Yes	NJ	SHW03.02000	NPW	Thermometric	[SM 2550 B]	Temperature

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Dayton, NJ 08810

Category: SHW04 – Inorganic Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW04.01000	NPW	Acid Digestion/Surface and Groundwater, ICP, FLAA	[SW-846 3005A]	Metals, Total Rec and Dissolved
Certified	Yes	NJ	SHW04.01500	NPW	Acid Digestion/Aqueous Samples, ICP, FLAA	[SW-846 3010A]	Metals, Total
Certified	Yes	NJ	SHW04.33000	NPW	AA, Manual Cold Vapor	[SW-846 7470A]	Mercury - liquid waste

Category: SHW05 – Organic Parameters, Prep. / Screening

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW05.01000	NPW	Separatory Funnel Extraction	[SW-846 3510C]	Semivolatile organics
Certified	Yes	NJ	SHW05.02000	NPW	Continuous Liquid-Liquid Extraction	[SW-846 3520C]	Semivolatile organics
Certified	Yes	NJ	SHW05.07000	NPW	Purge & Trap Aqueous	[SW-846 5030B]	Volatile organics

Category: SHW07 – Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW07.04016	NPW	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Benzyl chloride
Certified	Yes	NJ	SHW07.04680	NPW	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Aramite
Certified	Yes	NJ	SHW07.04775	NPW	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dimethyl benzidine (3,3-)
Certified	Yes	NJ	SHW07.04795	NPW	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Famphur
Certified	Yes	NJ	SHW07.04800	NPW	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Hexachlorophene
Certified	Yes	NJ	SHW07.04840	NPW	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Methapyrilene
Certified	Yes	NJ	SHW07.04915	NPW	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Phenylenediamine (1,4-)

Category: SHW09 – Miscellaneous Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW09.06000	NPW	Combustion, Titration	[SW-846 9020B]	Total organic halides (TOX)
Certified	Yes	NJ	SHW09.17000	NPW	Wheatstone Bridge	[SW-846 9050A]	Specific conductance

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BLDG B
Dayton, NJ 08810

Category: SHW09 – Miscellaneous Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW09.22000	NPW	Colorimetric, Auto, 4AAP Distillation	[SW-846 9066]	Phenols

Category: WPP01 – Microbiological Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	WPP01.02000	NPW	Membrane Filter (MF), Single Step	[SM 9222 D]	Fecal coliform
Certified	Yes	NJ	WPP01.04000	NPW	MF Single Step or Two Step	[SM 9222 B]	Total coliform
Certified	Yes	NJ	WPP01.10000	NPW	Pour Plate	[SM 9215 B]	Heterotrophic plate count

Category: WPP02 – Inorg. Parameters, Nutrients and Demands

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	WPP02.01000	NPW	Electrometric or Phenolphthalein	[SM 2310 B(4A)]	Acidity as CaCO3
Certified	Yes	NJ	WPP02.01500	NPW	Electrometric or Color Titration	[SM 2320 B]	Alkalinity as CaCO3
Certified	Yes	NJ	WPP02.04000	NPW	Automated Phenate	[SM 4500-NH3 B+G (20th ed.)]	Ammonia
Certified	Yes	NJ	WPP02.05000	NPW	Dissolved Oxygen Depletion	[SM 5210 B]	Biochemical oxygen demand
Certified	Yes	NJ	WPP02.06000	NPW	ICP	[EPA 200.7]	Boron
Certified	Yes	NJ	WPP02.07100	NPW	Ion Chromatography	[EPA 300.0]	Bromide
Certified	Yes	NJ	WPP02.08000	NPW	Digestion, ICP	[EPA 200.7]	Calcium
Certified	Yes	NJ	WPP02.08050	NPW	ICP/MS	[EPA 200.8]	Calcium
Certified	Yes	NJ	WPP02.09500	NPW	Dissolved Oxygen Depletion, Nitrification Inhibition	[SM 5210 B]	Carbonaceous BOD (CBOD)
Certified	Yes	NJ	WPP02.10000	NPW	Titrimetric	[SM 5220 C]	Chemical oxygen demand
Certified	Yes	NJ	WPP02.11500	NPW	Titrimetric, Mercuric Nitrate	[SM 4500-Cl C]	Chloride
Certified	Yes	NJ	WPP02.12600	NPW	Ion Chromatography	[EPA 300.0]	Chloride
Certified	Yes	NJ	WPP02.13500	NPW	Colorimetric (Platinum-Cobalt)	[SM 2120 B]	Color
Certified	Yes	NJ	WPP02.15500	NPW	Distillation, Spectrophotometric (Auto)	[EPA 335.4]	Cyanide
Certified	Yes	NJ	WPP02.16000	NPW	Manual Distillation, Titrimetr/Spectro	[SM 4500-CN C,G]	Cyanide - amenable to Cl2
Certified	Yes	NJ	WPP02.18100	NPW	Ion Chromatography	[EPA 300.0]	Fluoride
Certified	Yes	NJ	WPP02.19000	NPW	Titrimetric, EDTA	[SM 2340 C]	Hardness - total as CaCO3

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Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	WPP02.20100	NPW	Ca + Mg Carbonates, ICP	[EPA 200.7]	Hardness - total as CaCO3
Certified	Yes	NJ	WPP02.22500	NPW	Digestion, Distillation, Semiautomated Digestor	[EPA 351.2]	Kjeldahl nitrogen - total
Certified	Yes	NJ	WPP02.24000	NPW	Digestion, ICP	[EPA 200.7]	Magnesium
Certified	Yes	NJ	WPP02.24050	NPW	ICP/MS	[EPA 200.8]	Magnesium
Certified	Yes	NJ	WPP02.27000	NPW	Cadmium Reduction, Automated	[EPA 353.2]	Nitrate - nitrite
Certified	Yes	NJ	WPP02.28000	NPW	Spectrophotometric, Manual	[SM 4500-NO2 B]	Nitrite
Certified	Yes	NJ	WPP02.29100	NPW	Gravimetric, Hexane Extractable Material-LL	[EPA 1664A]	Oil & grease - hem-LL
Certified	Yes	NJ	WPP02.29200	NPW	Gravimetric, Silica Gel Treated-Hem	[EPA 1664A]	Oil & grease - sgt-non polar
Certified	Yes	NJ	WPP02.30000	NPW	Combustion or Oxidation	[SM 5310 B, C or D]	Total organic carbon (TOC)
Certified	Yes	NJ	WPP02.30050	NPW	Filtration and Oxidation or Combustion	[SM 5310B, C or D]	Dissolved organic carbon (DOC)
Certified	Yes	NJ	WPP02.30500	NPW	Total Kjeldahl-N Minus Ammonia-N	[USER DEFINED EPA 351.2 - SM4500 NH3 B+G (20TH ED)]	Organic nitrogen
Certified	Yes	NJ	WPP02.31500	NPW	Ascorbic Acid, Manual Single Reagent	[SM 4500-P, E]	Orthophosphate
Certified	Yes	NJ	WPP02.33000	NPW	Manual Distillation, Colorimetric Auto	[EPA 420.1 + .4]	Phenols
Certified	Yes	NJ	WPP02.34000	NPW	Persulfate Digestion + Manual	[EPA 365.3]	Phosphorus (total)
Certified	Yes	NJ	WPP02.36500	NPW	Digestion, ICP	[EPA 200.7]	Potassium
Certified	Yes	NJ	WPP02.36550	NPW	ICP/MS	[EPA 200.8]	Potassium
Certified	Yes	NJ	WPP02.38000	NPW	Gravimetric, 103-105 Degrees C	[SM 2540 B]	Residue - total
Certified	Yes	NJ	WPP02.38500	NPW	Gravimetric, 180 Degrees C	[SM 2540 C]	Residue - filterable (TDS)
Certified	Yes	NJ	WPP02.39000	NPW	Gravimetric, 103-105 Degrees C, Post Washing	[SM 2540 D]	Residue - nonfilterable (TSS)
Certified	Yes	NJ	WPP02.39500	NPW	Volumetric (Imhoff Cone) or Gravimetric	[SM 2540 F]	Residue - settleable
Certified	Yes	NJ	WPP02.40000	NPW	Gravimetric, 550 Degrees C	[EPA 160.4]	Residue - volatile
Certified	Yes	NJ	WPP02.40100	NPW	Gravimetric, 500 Degrees C	[SM 2540 G SM 18th Ed.]	Total, fixed, and volatile solids (SQAR)
Certified	Yes	NJ	WPP02.40500	NPW	Electrical Conductivity	[SM 2520 B]	Salinity
Certified	Yes	NJ	WPP02.41500	NPW	0.45u Filtration + Colorimetric (Manual)	[SM 4500-Si D (18/19th ed)]	Silica - dissolved
Certified	Yes	NJ	WPP02.42500	NPW	0.45u Filtration + ICP	[EPA 200.7]	Silica - dissolved
Certified	Yes	NJ	WPP02.44000	NPW	Digestion, ICP	[EPA 200.7]	Sodium
Certified	Yes	NJ	WPP02.44050	NPW	ICP/MS	[EPA 200.8]	Sodium
Certified	Yes	NJ	WPP02.45500	NPW	Wheatstone Bridge	[SM 2510 B]	Specific conductance
Certified	Yes	NJ	WPP02.47100	NPW	Ion Chromatography	[EPA 300.0]	Sulfate
Certified	Yes	NJ	WPP02.47500	NPW	Titrimetric, Iodine	[SM 4500-S F (19/20th ed)]	Sulfides
Certified	Yes	NJ	WPP02.48500	NPW	Colorimetric (Methylene Blue)	[SM 5540 C]	Surfactants

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2235 RT 130
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Dayton, NJ 08810

Category: WPP02 -- Inorg. Parameters, Nutrients and Demands

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	WPP02.48510	NPW	Colorimetric (CTAS)	[SM 5540 D]	Surfactants
Certified	Yes	NJ	WPP02.50000	NPW	Nephelometric	[EPA 180.1]	Turbidity

Category: WPP03 -- Analyze-Immediately Inorganic Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	WPP03.04000	NPW	DPD-FAS	[SM 4500-Cl F]	Chlorine
Certified	Yes	NJ	WPP03.07000	NPW	Winkler, Azide Modification	[SM 4500-O C]	Oxygen (dissolved)
Certified	Yes	NJ	WPP03.08000	NPW	Electrode	[SM 4500-O G]	Oxygen (dissolved)
Certified	Yes	NJ	WPP03.09000	NPW	Electrometric	[SM 4500-H B]	pH
Certified	Yes	NJ	WPP03.12000	NPW	Titrimetric, Iodine-Iodate	[SM 4500-SO3 B]	Sulfite - SO3
Certified	Yes	NJ	WPP03.14000	NPW	Thermometric	[SM 2550 B]	Temperature

Category: WPP04 -- Inorganic Parameters, Metals

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	WPP04.02000	NPW	Digestion, ICP	[EPA 200.7]	Aluminum
Certified	Yes	NJ	WPP04.02100	NPW	ICP/MS	[EPA 200.8]	Aluminum
Certified	Yes	NJ	WPP04.04500	NPW	Digestion, ICP	[EPA 200.7]	Antimony
Certified	Yes	NJ	WPP04.04600	NPW	ICP/MS	[EPA 200.8]	Antimony
Certified	Yes	NJ	WPP04.05600	NPW	Digestion, ICP	[EPA 200.7]	Arsenic
Certified	Yes	NJ	WPP04.05700	NPW	ICP/MS	[EPA 200.8]	Arsenic
Certified	Yes	NJ	WPP04.08000	NPW	Digestion, ICP	[EPA 200.7]	Barium
Certified	Yes	NJ	WPP04.08200	NPW	ICP/MS	[EPA 200.8]	Barium
Certified	Yes	NJ	WPP04.11000	NPW	Digestion, ICP	[EPA 200.7]	Beryllium
Certified	Yes	NJ	WPP04.11100	NPW	ICP/MS	[EPA 200.8]	Beryllium
Certified	Yes	NJ	WPP04.13500	NPW	Digestion, ICP	[EPA 200.7]	Cadmium
Certified	Yes	NJ	WPP04.13600	NPW	ICP/MS	[EPA 200.8]	Cadmium
Certified	Yes	NJ	WPP04.15000	NPW	0.45u Filter, Colorimetric DPC	[SM 3500-Cr D (18/19th ed)]	Chromium (VI)

KEY: AE = Air and Emissions, BT = Biological Tissues, DW = Drinking Water, NPW = Non-Potable Water, SCM = Solid and Chemical Materials

New Jersey Department of Environmental Protection

National Environmental Laboratory Accreditation Program

ANNUAL CERTIFIED PARAMETER LIST AND CURRENT STATUS

Effective as of 08/22/2012 until 06/30/2013

Laboratory Name: ACCUTEST LABORATORIES Laboratory Number: 12129 Activity ID: NLC120003
2235 RT 130
BLDG B
Dayton, NJ 08810

Category: WPP04 – Inorganic Parameters, Metals

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	WPP04.15100	NPW	0.45u Filter, Ion Chromatography	[EPA 218.6]	Chromium (VI)
Certified	Yes	NJ	WPP04.18000	NPW	Digestion, ICP	[EPA 200.7]	Chromium
Certified	Yes	NJ	WPP04.18100	NPW	ICP/MS	[EPA 200.8]	Chromium
Certified	Yes	NJ	WPP04.19500	NPW	Digestion, ICP	[EPA 200.7]	Cobalt
Certified	Yes	NJ	WPP04.19600	NPW	ICP/MS	[EPA 200.8]	Cobalt
Certified	Yes	NJ	WPP04.21500	NPW	Digestion, ICP	[EPA 200.7]	Copper
Certified	Yes	NJ	WPP04.21600	NPW	ICP/MS	[EPA 200.8]	Copper
Certified	Yes	NJ	WPP04.26500	NPW	Digestion, ICP	[EPA 200.7]	Iron
Certified	Yes	NJ	WPP04.26550	NPW	ICP/MS	[EPA 200.8]	Iron
Certified	Yes	NJ	WPP04.27001	NPW	Digestion, Colorimetric (Phenanthroline)	[SM 3500-Fe B (20th ed)]	Iron, Ferrous
Certified	Yes	NJ	WPP04.28000	NPW	Digestion, ICP	[EPA 200.7]	Lead
Certified	Yes	NJ	WPP04.28100	NPW	ICP/MS	[EPA 200.8]	Lead
Certified	Yes	NJ	WPP04.31000	NPW	Digestion, ICP	[EPA 200.7]	Manganese
Certified	Yes	NJ	WPP04.31100	NPW	ICP/MS	[EPA 200.8]	Manganese
Certified	Yes	NJ	WPP04.33000	NPW	Manual Cold Vapor	[EPA 245.1]	Mercury
Certified	Yes	NJ	WPP04.33100	NPW	Cold Vapor Atomic Fluorescence Spectrometry	[EPA 245.7]	Mercury
Certified	Yes	NJ	WPP04.33200	NPW	Purge & Trap Atomic Fluorescence	[EPA 1631E]	Mercury
Certified	Yes	NJ	WPP04.35000	NPW	Digestion, ICP	[EPA 200.7]	Molybdenum
Certified	Yes	NJ	WPP04.35200	NPW	ICP/MS	[EPA 200.8]	Molybdenum
Certified	Yes	NJ	WPP04.37500	NPW	Digestion, ICP	[EPA 200.7]	Nickel
Certified	Yes	NJ	WPP04.37600	NPW	ICP/MS	[EPA 200.8]	Nickel
Certified	Yes	NJ	WPP04.45500	NPW	Digestion, ICP	[EPA 200.7]	Selenium
Certified	Yes	NJ	WPP04.45600	NPW	ICP/MS	[EPA 200.8]	Selenium
Certified	Yes	NJ	WPP04.48000	NPW	Digestion, ICP	[EPA 200.7]	Silver
Certified	Yes	NJ	WPP04.48200	NPW	ICP/MS	[EPA 200.8]	Silver
Certified	Yes	NJ	WPP04.50000	NPW	Digestion, ICP	[EPA 200.7]	Thallium
Certified	Yes	NJ	WPP04.50100	NPW	ICP/MS	[EPA 200.8]	Thallium
Certified	Yes	NJ	WPP04.51100	NPW	Digestion, ICP	[EPA 200.7]	Tin
Certified	Yes	NJ	WPP04.51200	NPW	ICP/MS	[EPA 200.8]	Tin
Certified	Yes	NJ	WPP04.52050	NPW	Digestion, ICP	[EPA 200.7]	Titanium
Certified	Yes	NJ	WPP04.52070	NPW	ICP/MS	[EPA 200.8]	Titanium
Certified	Yes	NJ	WPP04.54000	NPW	Digestion, ICP	[EPA 200.7]	Vanadium

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--- Annual Certified Parameters List --- Effective as of 08/22/2012 until 06/30/2013

New Jersey Department of Environmental Protection

National Environmental Laboratory Accreditation Program

ANNUAL CERTIFIED PARAMETER LIST AND CURRENT STATUS

Effective as of 08/22/2012 until 06/30/2013

Laboratory Name: ACCUTEST LABORATORIES Laboratory Number: 12129 Activity ID: NLC120003
2235 RT 130
BLDG B
Dayton, NJ 08810

Category: WPP04 -- Inorganic Parameters, Metals

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	WPP04.54100	NPW	ICP/MS	[EPA 200.8]	Vanadium
Certified	Yes	NJ	WPP04.56500	NPW	Digestion, ICP	[EPA 200.7]	Zinc
Certified	Yes	NJ	WPP04.56600	NPW	ICP/MS	[EPA 200.8]	Zinc

Category: WPP05 -- Organic Parameters, Chromatography

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	WPP05.02010	NPW	Purge & Trap, GC (PID)	[EPA 602]	Benzene
Certified	Yes	NJ	WPP05.02020	NPW	Purge & Trap, GC (PID)	[EPA 602]	Chlorobenzene
Certified	Yes	NJ	WPP05.02030	NPW	Purge & Trap, GC (PID)	[EPA 602]	Dichlorobenzene (1,2-)
Certified	Yes	NJ	WPP05.02040	NPW	Purge & Trap, GC (PID)	[EPA 602]	Dichlorobenzene (1,3-)
Certified	Yes	NJ	WPP05.02050	NPW	Purge & Trap, GC (PID)	[EPA 602]	Dichlorobenzene (1,4-)
Certified	Yes	NJ	WPP05.02060	NPW	Purge & Trap, GC (PID)	[EPA 602]	Ethylbenzene
Certified	Yes	NJ	WPP05.02062	NPW	Purge & Trap, GC (PID)	[EPA 602]	Methyl tert-butyl ether
Certified	Yes	NJ	WPP05.02064	NPW	Purge & Trap, GC (PID)	[EPA 602]	Tert-butyl alcohol
Certified	Yes	NJ	WPP05.02070	NPW	Purge & Trap, GC (PID)	[EPA 602]	Toluene
Certified	Yes	NJ	WPP05.02080	NPW	Purge & Trap, GC (PID)	[EPA 602]	Xylenes (total)
Certified	Yes	NJ	WPP05.03000	NPW	Purge & Trap, GC (FID)	[EPA 603]	Acrolein
Certified	Yes	NJ	WPP05.03005	NPW	Purge & Trap, GC (FID)	[EPA 603]	Acrylonitrile
Certified	Yes	NJ	WPP05.09010	NPW	Extract/GC (ECD)	[EPA 608]	Aldrin
Certified	Yes	NJ	WPP05.09020	NPW	Extract/GC (ECD)	[EPA 608]	Alpha BHC
Certified	Yes	NJ	WPP05.09030	NPW	Extract/GC (ECD)	[EPA 608]	Beta BHC
Certified	Yes	NJ	WPP05.09040	NPW	Extract/GC (ECD)	[EPA 608]	Delta BHC
Certified	Yes	NJ	WPP05.09050	NPW	Extract/GC (ECD)	[EPA 608]	Lindane (gamma BHC)
Certified	Yes	NJ	WPP05.09060	NPW	Extract/GC (ECD)	[EPA 608]	Chlordane
Certified	Yes	NJ	WPP05.09062	NPW	Extract/GC (ECD)	[EPA 608]	Chlordane (alpha)
Certified	Yes	NJ	WPP05.09063	NPW	Extract/GC (ECD)	[EPA 608]	Chlordane (gamma)
Applied	No	NJ	WPP05.09065	NPW	Extract/GC (ECD)	[EPA 608]	Chlorobenzilate
Certified	Yes	NJ	WPP05.09070	NPW	Extract/GC (ECD)	[EPA 608]	DDD (4,4'-)
Certified	Yes	NJ	WPP05.09080	NPW	Extract/GC (ECD)	[EPA 608]	DDE (4,4'-)

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ANNUAL CERTIFIED PARAMETER LIST AND CURRENT STATUS

Effective as of 08/22/2012 until 06/30/2013

Laboratory Name: ACCUTEST LABORATORIES Laboratory Number: 12129 Activity ID: NLC120003
2235 RT 130
BLDG B
Dayton, NJ 08810

Category: WPP05 -- Organic Parameters, Chromatography

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	WPP05.09090	NPW	Extract/GC (ECD)	[EPA 608]	DDT (4,4'-)
Certified	Yes	NJ	WPP05.09100	NPW	Extract/GC (ECD)	[EPA 608]	Dieldrin
Certified	Yes	NJ	WPP05.09110	NPW	Extract/GC (ECD)	[EPA 608]	Endosulfan I
Certified	Yes	NJ	WPP05.09120	NPW	Extract/GC (ECD)	[EPA 608]	Endosulfan II
Certified	Yes	NJ	WPP05.09130	NPW	Extract/GC (ECD)	[EPA 608]	Endosulfan sulfate
Certified	Yes	NJ	WPP05.09140	NPW	Extract/GC (ECD)	[EPA 608]	Endrin
Certified	Yes	NJ	WPP05.09150	NPW	Extract/GC (ECD)	[EPA 608]	Endrin aldehyde
Certified	Yes	NJ	WPP05.09160	NPW	Extract/GC (ECD)	[EPA 608]	Endrin ketone
Certified	Yes	NJ	WPP05.09170	NPW	Extract/GC (ECD)	[EPA 608]	Heptachlor
Certified	Yes	NJ	WPP05.09180	NPW	Extract/GC (ECD)	[EPA 608]	Heptachlor epoxide
Certified	Yes	NJ	WPP05.09190	NPW	Extract/GC (ECD)	[EPA 608]	Methoxychlor
Applied	No	NJ	WPP05.09198	NPW	Extract/GC (ECD)	[EPA 608]	Simazine
Certified	Yes	NJ	WPP05.09200	NPW	Extract/GC (ECD)	[EPA 608]	Toxaphene
Certified	Yes	NJ	WPP05.11010	NPW	Extract/GC (ECD)	[EPA 608]	PCB 1016
Certified	Yes	NJ	WPP05.11020	NPW	Extract/GC (ECD)	[EPA 608]	PCB 1221
Certified	Yes	NJ	WPP05.11030	NPW	Extract/GC (ECD)	[EPA 608]	PCB 1232
Certified	Yes	NJ	WPP05.11040	NPW	Extract/GC (ECD)	[EPA 608]	PCB 1242
Certified	Yes	NJ	WPP05.11050	NPW	Extract/GC (ECD)	[EPA 608]	PCB 1248
Certified	Yes	NJ	WPP05.11060	NPW	Extract/GC (ECD)	[EPA 608]	PCB 1254
Certified	Yes	NJ	WPP05.11070	NPW	Extract/GC (ECD)	[EPA 608]	PCB 1260

Category: WPP06 -- Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Applied	No	NJ	WPP06.02001	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Amyl acetate (n-)
Applied	No	NJ	WPP06.02002	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Amyl alcohol (n-)
Certified	Yes	NJ	WPP06.02003	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Acetone
Certified	Yes	NJ	WPP06.02007	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Acrolein
Certified	Yes	NJ	WPP06.02009	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Acrylonitrile
Certified	Yes	NJ	WPP06.02010	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Benzene

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Laboratory Name: ACCUTEST LABORATORIES Laboratory Number: 12129 Activity ID: NLC120003
2235 RT 130
BLDG B
Dayton, NJ 08810

Category: WPP06 -- Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	WPP06.02020	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Bromodichloromethane
Certified	Yes	NJ	WPP06.02030	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Bromoform
Certified	Yes	NJ	WPP06.02040	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Bromomethane
Certified	Yes	NJ	WPP06.02041	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Butanone (2-)
Certified	Yes	NJ	WPP06.02042	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Butyl acetate (n-)
Certified	Yes	NJ	WPP06.02045	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Carbon disulfide
Certified	Yes	NJ	WPP06.02050	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Carbon tetrachloride
Certified	Yes	NJ	WPP06.02060	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Chlorobenzene
Certified	Yes	NJ	WPP06.02070	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Chloroethane
Certified	Yes	NJ	WPP06.02080	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Chloroethyl vinyl ether (2-)
Certified	Yes	NJ	WPP06.02090	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Chloroform
Certified	Yes	NJ	WPP06.02100	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Chloromethane
Certified	Yes	NJ	WPP06.02110	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dibromochloromethane
Certified	Yes	NJ	WPP06.02115	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dibromoethane (1,2-) (EDB)
Certified	Yes	NJ	WPP06.02120	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichlorobenzene (1,2-)
Certified	Yes	NJ	WPP06.02130	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichlorobenzene (1,3-)
Certified	Yes	NJ	WPP06.02140	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichlorobenzene (1,4-)
Certified	Yes	NJ	WPP06.02145	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichlorodifluoromethane
Certified	Yes	NJ	WPP06.02150	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichloroethane (1,1-)
Certified	Yes	NJ	WPP06.02160	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichloroethane (1,2-)
Certified	Yes	NJ	WPP06.02170	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichloroethene (1,1-)
Certified	Yes	NJ	WPP06.02175	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichloroethene (cis-1,2-)
Certified	Yes	NJ	WPP06.02180	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichloroethene (trans-1,2-)
Certified	Yes	NJ	WPP06.02190	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichloropropane (1,2-)
Certified	Yes	NJ	WPP06.02198	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Diethyl ether (Ethyl ether)
Certified	Yes	NJ	WPP06.02200	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichloropropene (cis-1,3-)
Certified	Yes	NJ	WPP06.02210	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichloropropene (trans-1,3-)
Certified	Yes	NJ	WPP06.02212	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Ethyl acetate
Certified	Yes	NJ	WPP06.02220	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Ethylbenzene
Certified	Yes	NJ	WPP06.02222	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Heptane (n-)
Certified	Yes	NJ	WPP06.02223	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Hexane (n-)
Applied	No	NJ	WPP06.02224	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Isobutyraldehyde

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ANNUAL CERTIFIED PARAMETER LIST AND CURRENT STATUS

Effective as of 08/22/2012 until 06/30/2013

Laboratory Name: ACCUTEST LABORATORIES Laboratory Number: 12129 Activity ID: NLC120003
2235 RT 130
BLDG B
Dayton, NJ 08810

Category: WPP06 – Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Applied	No	NJ	WPP06.02225	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Isopropanol
Applied	No	NJ	WPP06.02226	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Isopropyl acetate
Certified	Yes	NJ	WPP06.02227	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Isopropyl ether
Certified	Yes	NJ	WPP06.02230	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Methylene chloride (Dichloromethane)
Applied	No	NJ	WPP06.02231	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Methyl formate
Certified	Yes	NJ	WPP06.02232	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Methyl tert-butyl ether
Certified	Yes	NJ	WPP06.02233	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Methyl isobutyl ketone (MIBK)
Certified	Yes	NJ	WPP06.02234	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Tert-butyl alcohol
Certified	Yes	NJ	WPP06.02235	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Tetrahydrofuran
Certified	Yes	NJ	WPP06.02238	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Styrene
Certified	Yes	NJ	WPP06.02240	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Tetrachloroethane (1,1,2,2-)
Certified	Yes	NJ	WPP06.02250	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Tetrachloroethene
Certified	Yes	NJ	WPP06.02260	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Toluene
Certified	Yes	NJ	WPP06.02270	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Trichloroethane (1,1,1-)
Certified	Yes	NJ	WPP06.02280	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Trichloroethane (1,1,2-)
Certified	Yes	NJ	WPP06.02290	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Trichloroethene
Certified	Yes	NJ	WPP06.02300	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Trichlorofluoromethane
Certified	Yes	NJ	WPP06.02305	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Trichloro (1,1,2-) trifluoroethane (1,2,2-)
Certified	Yes	NJ	WPP06.02307	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Vinyl acetate
Certified	Yes	NJ	WPP06.02310	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Vinyl chloride
Certified	Yes	NJ	WPP06.02312	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Xylenes (total)
Certified	Yes	NJ	WPP06.02315	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Xylene (o-)
Certified	Yes	NJ	WPP06.02317	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Xylene (m- + p-)
Certified	Yes	NJ	WPP06.02325	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Hexanone (2-)
Certified	Yes	NJ	WPP06.02335	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Ethyl-tert-butyl Ether [ETBE]
Certified	Yes	NJ	WPP06.02400	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Diisopropyl Ether [DIPE]
Certified	Yes	NJ	WPP06.02410	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dioxane (1,4-)
Certified	Yes	NJ	WPP06.02460	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Isopropylbenzene
Certified	Yes	NJ	WPP06.02510	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Naphthalene
Certified	Yes	NJ	WPP06.02570	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	tert-Amylmethyl ether [TAME]
Certified	Yes	NJ	WPP06.02650	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Trimethylbenzene (1,2,4-)
Certified	Yes	NJ	WPP06.02660	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Trimethylbenzene (1,3,5-)

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2235 RT 130
BLDG B
Dayton, NJ 08810

Category: WPP06 – Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	WPP06.03010	NPW	Extract, GC/MS	[EPA 625]	Acenaphthene
Certified	Yes	NJ	WPP06.03020	NPW	Extract, GC/MS	[EPA 625]	Acenaphthylene
Certified	Yes	NJ	WPP06.03030	NPW	Extract, GC/MS	[EPA 625]	Anthracene
Certified	Yes	NJ	WPP06.03040	NPW	Extract, GC/MS	[EPA 625]	Benzo(a)anthracene
Certified	Yes	NJ	WPP06.03050	NPW	Extract, GC/MS	[EPA 625]	Benzo(b)fluoranthene
Certified	Yes	NJ	WPP06.03060	NPW	Extract, GC/MS	[EPA 625]	Benzo(k)fluoranthene
Certified	Yes	NJ	WPP06.03070	NPW	Extract, GC/MS	[EPA 625]	Benzo(a)pyrene
Certified	Yes	NJ	WPP06.03080	NPW	Extract, GC/MS	[EPA 625]	Benzo(ghi)perylene
Certified	Yes	NJ	WPP06.03090	NPW	Extract, GC/MS	[EPA 625]	Butyl benzyl phthalate
Certified	Yes	NJ	WPP06.03100	NPW	Extract, GC/MS	[EPA 625]	Bis (2-chloroethyl) ether
Certified	Yes	NJ	WPP06.03110	NPW	Extract, GC/MS	[EPA 625]	Bis (2-chloroethoxy) methane
Certified	Yes	NJ	WPP06.03120	NPW	Extract, GC/MS	[EPA 625]	Bis (2-ethylhexyl) phthalate
Certified	Yes	NJ	WPP06.03130	NPW	Extract, GC/MS	[EPA 625]	Bis (2-chloroisopropyl) ether
Certified	Yes	NJ	WPP06.03140	NPW	Extract, GC/MS	[EPA 625]	Bromophenyl-phenyl ether (4-)
Certified	Yes	NJ	WPP06.03150	NPW	Extract, GC/MS	[EPA 625]	Chloronaphthalene (2-)
Certified	Yes	NJ	WPP06.03160	NPW	Extract, GC/MS	[EPA 625]	Chlorophenyl-phenyl ether (4-)
Certified	Yes	NJ	WPP06.03170	NPW	Extract, GC/MS	[EPA 625]	Chrysene
Certified	Yes	NJ	WPP06.03178	NPW	Extract, GC/MS	[EPA 625]	Dibenz(a,h)acridine
Certified	Yes	NJ	WPP06.03180	NPW	Extract, GC/MS	[EPA 625]	Dibenzo(a,h)anthracene
Certified	Yes	NJ	WPP06.03186	NPW	Extract, GC/MS	[EPA 625]	Dibenzofuran
Certified	Yes	NJ	WPP06.03190	NPW	Extract, GC/MS	[EPA 625]	Di-n-butyl phthalate
Certified	Yes	NJ	WPP06.03230	NPW	Extract, GC/MS	[EPA 625]	Dichlorobenzidine (3,3'-)
Certified	Yes	NJ	WPP06.03240	NPW	Extract, GC/MS	[EPA 625]	Diethyl phthalate
Certified	Yes	NJ	WPP06.03244	NPW	Extract, GC/MS	[EPA 625]	Dimethylbenz(a)anthracene (7,12-)
Certified	Yes	NJ	WPP06.03250	NPW	Extract, GC/MS	[EPA 625]	Dimethyl phthalate
Certified	Yes	NJ	WPP06.03260	NPW	Extract, GC/MS	[EPA 625]	Dinitrotoluene (2,4-)
Certified	Yes	NJ	WPP06.03270	NPW	Extract, GC/MS	[EPA 625]	Dinitrotoluene (2,6-)
Certified	Yes	NJ	WPP06.03280	NPW	Extract, GC/MS	[EPA 625]	Di-n-octyl phthalate
Certified	Yes	NJ	WPP06.03290	NPW	Extract, GC/MS	[EPA 625]	Fluoranthene
Certified	Yes	NJ	WPP06.03300	NPW	Extract, GC/MS	[EPA 625]	Fluorene
Certified	Yes	NJ	WPP06.03310	NPW	Extract, GC/MS	[EPA 625]	Hexachlorobenzene
Certified	Yes	NJ	WPP06.03320	NPW	Extract, GC/MS	[EPA 625]	Hexachlorobutadiene (1,3-)

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New Jersey Department of Environmental Protection

National Environmental Laboratory Accreditation Program

ANNUAL CERTIFIED PARAMETER LIST AND CURRENT STATUS

Effective as of 08/22/2012 until 06/30/2013

Laboratory Name: ACCUTEST LABORATORIES Laboratory Number: 12129 Activity ID: NLC120003
2235 RT 130
BLDG B
Dayton, NJ 08810

Category: WPP06 – Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	WPP06.03330	NPW	Extract, GC/MS	[EPA 625]	Hexachloroethane
Certified	Yes	NJ	WPP06.03340	NPW	Extract, GC/MS	[EPA 625]	Indeno(1,2,3-cd)pyrene
Certified	Yes	NJ	WPP06.03350	NPW	Extract, GC/MS	[EPA 625]	Isophorone
Certified	Yes	NJ	WPP06.03358	NPW	Extract, GC/MS	[EPA 625]	Methylnaphthalene (2-)
Certified	Yes	NJ	WPP06.03360	NPW	Extract, GC/MS	[EPA 625]	Naphthalene
Certified	Yes	NJ	WPP06.03366	NPW	Extract, GC/MS	[EPA 625]	Chloroaniline (4-)
Certified	Yes	NJ	WPP06.03367	NPW	Extract, GC/MS	[EPA 625]	Nitroaniline (2-)
Certified	Yes	NJ	WPP06.03368	NPW	Extract, GC/MS	[EPA 625]	Nitroaniline (3-)
Certified	Yes	NJ	WPP06.03369	NPW	Extract, GC/MS	[EPA 625]	Nitroaniline (4-)
Certified	Yes	NJ	WPP06.03370	NPW	Extract, GC/MS	[EPA 625]	Nitrobenzene
Certified	Yes	NJ	WPP06.03380	NPW	Extract, GC/MS	[EPA 625]	N-Nitroso-di-n-propylamine
Certified	Yes	NJ	WPP06.03390	NPW	Extract, GC/MS	[EPA 625]	Phenanthrene
Certified	Yes	NJ	WPP06.03400	NPW	Extract, GC/MS	[EPA 625]	Pyrene
Certified	Yes	NJ	WPP06.03402	NPW	Extract, GC/MS	[EPA 625]	Pentachlorobenzene
Certified	Yes	NJ	WPP06.03405	NPW	Extract, GC/MS	[EPA 625]	Tetrachlorobenzene (1,2,4,5-)
Certified	Yes	NJ	WPP06.03410	NPW	Extract, GC/MS	[EPA 625]	Trichlorobenzene (1,2,4-)
Certified	Yes	NJ	WPP06.03420	NPW	Extract, GC/MS	[EPA 625]	Methyl phenol (4-chloro-3-)
Certified	Yes	NJ	WPP06.03430	NPW	Extract, GC/MS	[EPA 625]	Chlorophenol (2-)
Certified	Yes	NJ	WPP06.03440	NPW	Extract, GC/MS	[EPA 625]	Dichlorophenol (2,4-)
Certified	Yes	NJ	WPP06.03450	NPW	Extract, GC/MS	[EPA 625]	Dimethylphenol (2,4-)
Certified	Yes	NJ	WPP06.03460	NPW	Extract, GC/MS	[EPA 625]	Dinitrophenol (2,4-)
Certified	Yes	NJ	WPP06.03470	NPW	Extract, GC/MS	[EPA 625]	Dinitrophenol (2-methyl-4,6-)
Certified	Yes	NJ	WPP06.03480	NPW	Extract, GC/MS	[EPA 625]	Nitrophenol (2-)
Certified	Yes	NJ	WPP06.03490	NPW	Extract, GC/MS	[EPA 625]	Nitrophenol (4-)
Certified	Yes	NJ	WPP06.03500	NPW	Extract, GC/MS	[EPA 625]	Pentachlorophenol
Certified	Yes	NJ	WPP06.03510	NPW	Extract, GC/MS	[EPA 625]	Phenol
Certified	Yes	NJ	WPP06.03512	NPW	Extract, GC/MS	[EPA 625]	Tetrachlorophenol (2,3,4,6-)
Certified	Yes	NJ	WPP06.03518	NPW	Extract, GC/MS	[EPA 625]	Trichlorophenol (2,4,5-)
Certified	Yes	NJ	WPP06.03520	NPW	Extract, GC/MS	[EPA 625]	Trichlorophenol (2,4,6-)
Certified	Yes	NJ	WPP06.03530	NPW	Extract, GC/MS	[EPA 625]	Benzoic acid
Certified	Yes	NJ	WPP06.03540	NPW	Extract, GC/MS	[EPA 625]	Methylphenol (4-)
Certified	Yes	NJ	WPP06.03550	NPW	Extract, GC/MS	[EPA 625]	Acetophenone

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---- Annual Certified Parameters List ---- Effective as of 08/22/2012 until 06/30/2013

New Jersey Department of Environmental Protection

National Environmental Laboratory Accreditation Program

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Laboratory Name: ACCUTEST LABORATORIES Laboratory Number: 12129 Activity ID: NLC120003
2235 RT 130
BLDG B
Dayton, NJ 08810

Category: WPP06 -- Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	WPP06.03560	NPW	Extract, GC/MS	[EPA 625]	Alpha - terpineol
Certified	Yes	NJ	WPP06.03570	NPW	Extract, GC/MS	[EPA 625]	Aniline
Certified	Yes	NJ	WPP06.03580	NPW	Extract, GC/MS	[EPA 625]	Benzidine
Certified	Yes	NJ	WPP06.03590	NPW	Extract, GC/MS	[EPA 625]	Carbazole
Certified	Yes	NJ	WPP06.03600	NPW	Extract, GC/MS	[EPA 625]	Dichloroaniline (2,3-)
Certified	Yes	NJ	WPP06.03605	NPW	Extract, GC/MS	[EPA 625]	Diphenylhydrazine (1,2-)
Certified	Yes	NJ	WPP06.03610	NPW	Extract, GC/MS	[EPA 625]	Methylphenol (2-)
Certified	Yes	NJ	WPP06.03620	NPW	Extract, GC/MS	[EPA 625]	Decane (n-)
Certified	Yes	NJ	WPP06.03660	NPW	Extract, GC/MS	[EPA 625]	Hexachlorocyclopentadiene
Certified	Yes	NJ	WPP06.03675	NPW	Extract, GC/MS	[EPA 625]	N-Nitroso-di-n-butylamine
Certified	Yes	NJ	WPP06.03677	NPW	Extract, GC/MS	[EPA 625]	N-Nitrosodiethylamine
Certified	Yes	NJ	WPP06.03680	NPW	Extract, GC/MS	[EPA 625]	N-Nitrosodimethylamine
Certified	Yes	NJ	WPP06.03690	NPW	Extract, GC/MS	[EPA 625]	N-Nitrosodiphenylamine
Certified	Yes	NJ	WPP06.03695	NPW	Extract, GC/MS	[EPA 625]	N-Nitrosopyrrolidine
Certified	Yes	NJ	WPP06.03700	NPW	Extract, GC/MS	[EPA 625]	Octadecane (n-)
Certified	Yes	NJ	WPP06.03720	NPW	Extract, GC/MS	[EPA 625]	Pyridine
Certified	Yes	NJ	WPP06.03730	NPW	Extract, GC/MS	[EPA 625]	Methylphenanthrene (1-)

Category: WPP07 -- Organic Parameters, Individual Pesticide

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	WPP07.11000	NPW	GC	[USER DEFINED EPA 608]	Beta BHC
Certified	Yes	NJ	WPP07.13000	NPW	GC	[USER DEFINED EPA 608]	Delta BHC
Certified	Yes	NJ	WPP07.20000	NPW	GC	[USER DEFINED EPA 608]	Chlordane
Certified	Yes	NJ	WPP07.45000	NPW	GC	[USER DEFINED EPA 608]	Endosulfan sulfate
Certified	Yes	NJ	WPP07.47000	NPW	GC	[USER DEFINED EPA 608]	Endrin
Certified	Yes	NJ	WPP07.62000	NPW	GC	[USER DEFINED EPA 608]	Methoxychlor
Certified	Yes	NJ	WPP07.85000	NPW	GC	[USER DEFINED EPA 608]	Toxaphene

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2235 RT 130
BLDG B
Dayton, NJ 08810

Category: SHW02 -- Characteristics of Hazardous Waste

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW02.01000	NPW, SCM	Pensky Martens	[SW-846 1010A]	Ignitability
Certified	Yes	NJ	SHW02.03000	NPW, SCM	Aqueous Waste, Potentiometric	[SW-846 9040C]	Corrosivity - pH waste, >20% water
Certified	Yes	NJ	SHW02.06900	NPW, SCM	TCLP, Toxicity Procedure, ZHE	[SW-846 1311]	Volatile organics
Certified	Yes	NJ	SHW02.06950	NPW, SCM	TCLP, Toxicity Procedure, Shaker	[SW-846 1311]	Semivolatile organics
Certified	Yes	NJ	SHW02.07000	NPW, SCM	TCLP, Toxicity Procedure, Shaker	[SW-846 1311]	Metals
Certified	Yes	NJ	SHW02.08000	NPW, SCM	Synthetic PPT Leachate Procedure	[SW-846 1312]	Metals - organics
Certified	Yes	NJ	SHW02.09000	NPW, SCM	Multiple Extractions	[SW-846 1320]	Metals - organics

Category: SHW04 -- Inorganic Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW04.05000	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Aluminum
Certified	Yes	NJ	SHW04.05500	NPW, SCM	ICP/MS	[SW-846 6020A] [SW-846 6020]	Aluminum
Certified	Yes	NJ	SHW04.06500	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Antimony
Certified	Yes	NJ	SHW04.07000	NPW, SCM	ICP/MS	[SW-846 6020A] [SW-846 6020]	Antimony
Certified	Yes	NJ	SHW04.09000	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Arsenic
Certified	Yes	NJ	SHW04.09500	NPW, SCM	ICP/MS	[SW-846 6020A] [SW-846 6020]	Arsenic
Certified	Yes	NJ	SHW04.11500	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Barium
Certified	Yes	NJ	SHW04.12000	NPW, SCM	ICP/MS	[SW-846 6020A] [SW-846 6020]	Barium
Certified	Yes	NJ	SHW04.13500	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Beryllium
Certified	Yes	NJ	SHW04.14000	NPW, SCM	ICP/MS	[SW-846 6020A] [SW-846 6020]	Beryllium
Certified	Yes	NJ	SHW04.15100	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Boron
Certified	Yes	NJ	SHW04.15500	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Cadmium
Certified	Yes	NJ	SHW04.16000	NPW, SCM	ICP/MS	[SW-846 6020A] [SW-846 6020]	Cadmium
Certified	Yes	NJ	SHW04.17500	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Calcium
Certified	Yes	NJ	SHW04.17505	NPW, SCM	ICP/MS	[SW-846 6020A] [SW-846 6020]	Calcium
Certified	Yes	NJ	SHW04.18500	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Chromium
Certified	Yes	NJ	SHW04.19000	NPW, SCM	ICP/MS	[SW-846 6020A] [SW-846 6020]	Chromium
Certified	Yes	NJ	SHW04.21000	NPW, SCM	Colorimetric	[SW-846 7196A]	Chromium (VI)
Certified	Yes	NJ	SHW04.22100	NPW, SCM	Ion Chromatography	[SW-846 7199]	Chromium (VI)

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Laboratory Name: ACCUTEST LABORATORIES Laboratory Number: 12129 Activity ID: NLC120003
2235 RT 130
BLDG B
Dayton, NJ 08810

Category: SHW04 – Inorganic Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW04.22500	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Cobalt
Certified	Yes	NJ	SHW04.23000	NPW, SCM	ICP/MS	[SW-846 6020A] [SW-846 6020]	Cobalt
Certified	Yes	NJ	SHW04.24500	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Copper
Certified	Yes	NJ	SHW04.25000	NPW, SCM	ICP/MS	[SW-846 6020A] [SW-846 6020]	Copper
Certified	Yes	NJ	SHW04.26000	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Iron
Certified	Yes	NJ	SHW04.26005	NPW, SCM	ICP/MS	[SW-846 6020A] [SW-846 6020]	Iron
Certified	Yes	NJ	SHW04.27500	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Lead
Certified	Yes	NJ	SHW04.28000	NPW, SCM	ICP/MS	[SW-846 6020A] [SW-846 6020]	Lead
Certified	Yes	NJ	SHW04.30500	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Magnesium
Certified	Yes	NJ	SHW04.30505	NPW, SCM	ICP/MS	[SW-846 6020A] [SW-846 6020]	Magnesium
Certified	Yes	NJ	SHW04.31500	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Manganese
Certified	Yes	NJ	SHW04.31600	NPW, SCM	ICP/MS	[SW-846 6020A] [SW-846 6020]	Manganese
Certified	Yes	NJ	SHW04.34000	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Molybdenum
Certified	Yes	NJ	SHW04.34005	NPW, SCM	ICP/MS	[SW-846 6020A] [SW-846 6020]	Molybdenum
Certified	Yes	NJ	SHW04.35500	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Nickel
Certified	Yes	NJ	SHW04.36000	NPW, SCM	ICP/MS	[SW-846 6020A] [SW-846 6020]	Nickel
Certified	Yes	NJ	SHW04.38000	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Potassium
Certified	Yes	NJ	SHW04.38505	NPW, SCM	ICP/MS	[SW-846 6020A] [SW-846 6020]	Potassium
Certified	Yes	NJ	SHW04.39000	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Selenium
Certified	Yes	NJ	SHW04.40600	NPW, SCM	ICP/MS	[SW-846 6020A] [SW-846 6020]	Selenium
Certified	Yes	NJ	SHW04.41000	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Silver
Certified	Yes	NJ	SHW04.41500	NPW, SCM	ICP/MS	[SW-846 6020A] [SW-846 6020]	Silver
Certified	Yes	NJ	SHW04.43000	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Sodium
Certified	Yes	NJ	SHW04.43005	NPW, SCM	ICP/MS	[SW-846 6020A] [SW-846 6020]	Sodium
Certified	Yes	NJ	SHW04.44000	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Strontium
Applied	No	NJ	SHW04.44001	NPW, SCM	ICP/MS	[SW-846 6020A] [SW-846 6020]	Strontium
Certified	Yes	NJ	SHW04.45000	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Thallium
Certified	Yes	NJ	SHW04.45500	NPW, SCM	ICP/MS	[SW-846 6020A] [SW-846 6020]	Thallium
Certified	Yes	NJ	SHW04.47100	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Tin
Certified	Yes	NJ	SHW04.47105	NPW, SCM	ICP/MS	[SW-846 6020A] [SW-846 6020]	Tin
Certified	Yes	NJ	SHW04.47145	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Titanium
Applied	No	NJ	SHW04.47150	NPW, SCM	ICP/MS	[SW-846 6020A]	Titanium

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2235 RT 130
BLDG B
Dayton, NJ 08810

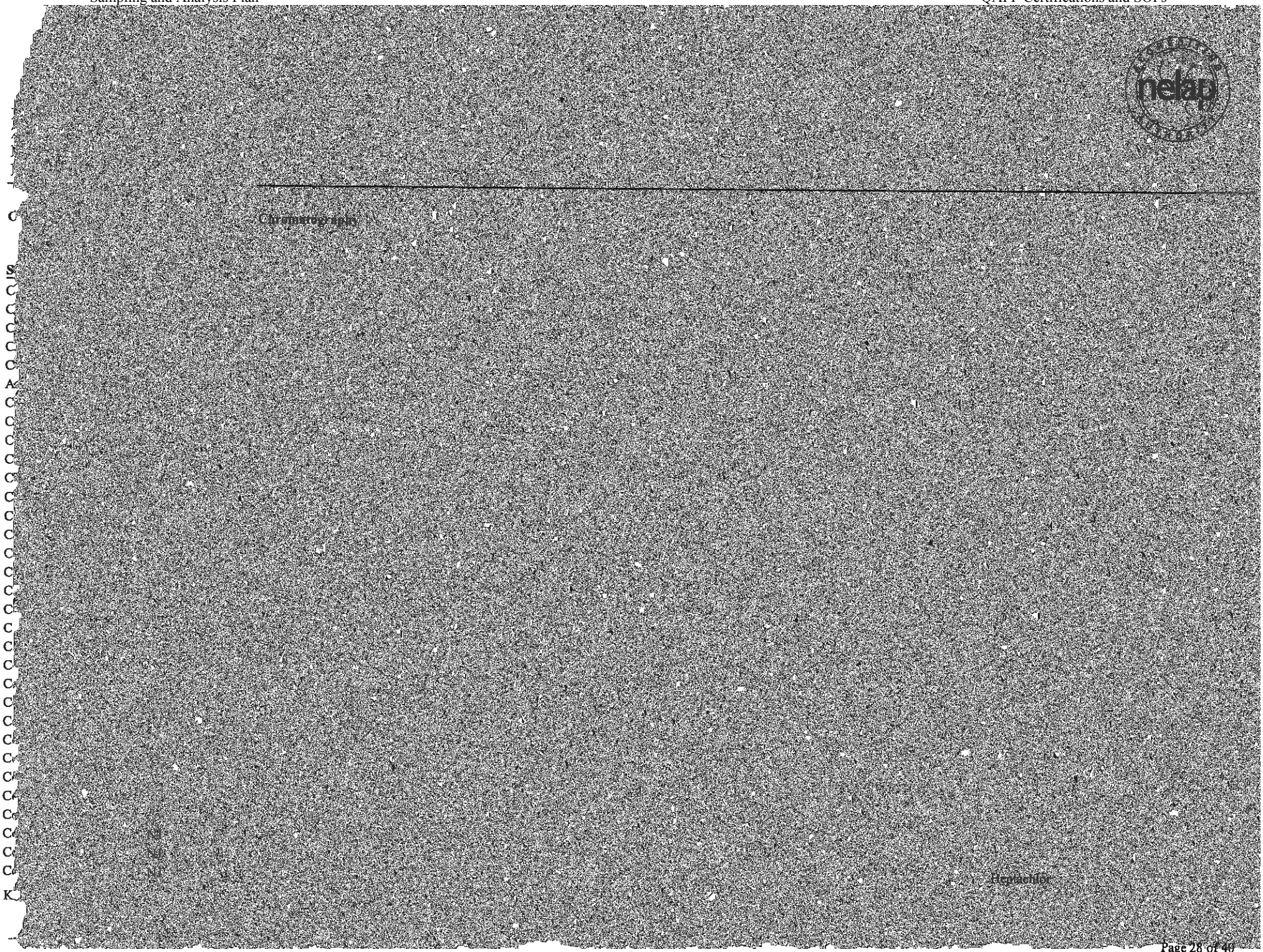
Category: SHW04 -- Inorganic Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW04.47500	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Vanadium
Certified	Yes	NJ	SHW04.47505	NPW, SCM	ICP/MS	[SW-846 6020A] [SW-846 6020]	Vanadium
Certified	Yes	NJ	SHW04.49000	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Zinc
Certified	Yes	NJ	SHW04.49500	NPW, SCM	ICP/MS	[SW-846 6020A] [SW-846 6020]	Zinc
Applied	No	NJ	SHW04.51045	NPW, SCM	ICP	[SW-846 6010B]	Zirconium

Category: SHW06 -- Organic Parameters, Chromatography

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW06.02010	NPW, SCM	Microextraction, GC, ECD	[SW-846 8011]	Dibromoethane (1,2-) (EDB)
Certified	Yes	NJ	SHW06.02020	NPW, SCM	Microextraction, GC, ECD	[SW-846 8011]	Dibromo-3-chloropropane (1,2-)
Certified	Yes	NJ	SHW06.02030	NPW, SCM	Microextraction, GC, ECD	[SW-846 8011]	Trichloropropane (1,2,3-)
Certified	Yes	NJ	SHW06.03048	NPW, SCM	GC, Direct Injection or P & T, FID	[SW-846 8015B] [SW-846 8015C]	Butanol (1-)
Certified	Yes	NJ	SHW06.03050	NPW, SCM	GC, Direct Injection or P & T, FID	[SW-846 8015B] [SW-846 8015C]	Tert-butyl alcohol
Certified	Yes	NJ	SHW06.03090	NPW, SCM	GC, Direct Injection or P & T, FID	[SW-846 8015B] [SW-846 8015C]	Iso-butyl alcohol
Certified	Yes	NJ	SHW06.03142	NPW, SCM	GC, Direct Injection or P & T, FID	[SW-846 8015B] [SW-846 8015C]	Propyl Alcohol (n-)
Certified	Yes	NJ	SHW06.03145	NPW, SCM	GC, Direct Injection or P & T, FID	[SW-846 8015B] [SW-846 8015C]	Isopropyl alcohol
Certified	Yes	NJ	SHW06.03180	NPW, SCM	GC, Direct Injection or P & T, FID	[SW-846 8015B] [SW-846 8015C]	Methyl alcohol (Methanol)
Certified	Yes	NJ	SHW06.03778	NPW, SCM	GC, Direct Injection or P & T, FID	[SW-846 8015B] [SW-846 8015C]	Ethyl alcohol
Certified	Yes	NJ	SHW06.04010	NPW, SCM	GC P&T, FID	[SW-846 8015B] [SW-846 8015C]	Gasoline range organic
Certified	Yes	NJ	SHW06.04500	NPW, SCM	Extraction, GC, FID	[SW-846 8015B] [SW-846 8015C]	Diesel range organic
Certified	Yes	NJ	SHW06.04505	NPW, SCM	Extraction, GC, FID	[USER DEFINED TCEQ 1005]	Diesel range organic
Certified	Yes	NJ	SHW06.04520	NPW, SCM	Extraction, GC, FID	[OTHER NJ-OQA-QAM-025, Rev. 7]	Petroleum Organics
Certified	Yes	NJ	SHW06.04540	NPW, SCM	Extraction, GC, FID	[OTHER NJDEP EPH 10/08, Rev. 3]	Extractable Petroleum Hydrocarbons
Certified	Yes	NJ	SHW06.05010	NPW, SCM	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Benzene
Certified	Yes	NJ	SHW06.05020	NPW, SCM	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Chlorobenzene
Certified	Yes	NJ	SHW06.05030	NPW, SCM	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Dichlorobenzene (1,2-)
Certified	Yes	NJ	SHW06.05040	NPW, SCM	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Dichlorobenzene (1,3-)
Certified	Yes	NJ	SHW06.05050	NPW, SCM	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Dichlorobenzene (1,4-)
Certified	Yes	NJ	SHW06.05060	NPW, SCM	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Ethylbenzene

KEY: AE = Air and Emissions, BT = Biological Tissues, DW = Drinking Water, NPW = Non-Potable Water, SCM = Solid and Chemical Materials


Chromatography
Heptachlor

New Jersey Department of Environmental Protection

National Environmental Laboratory Accreditation Program

ANNUAL CERTIFIED PARAMETER LIST AND CURRENT STATUS

Effective as of 08/22/2012 until 06/30/2013

Laboratory Name: ACCUTEST LABORATORIES Laboratory Number: 12129 Activity ID: NLC120003
2235 RT 130
BLDG B
Dayton, NJ 08810

Category: SHW06 -- Organic Parameters, Chromatography

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW06.12200	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A] [SW-846 8081B]	Heptachlor epoxide
Certified	Yes	NJ	SHW06.12210	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A] [SW-846 8081B]	Methoxychlor
Certified	Yes	NJ	SHW06.12212	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A] [SW-846 8081B]	Mirex
Certified	Yes	NJ	SHW06.12220	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A] [SW-846 8081B]	Toxaphene
Certified	Yes	NJ	SHW06.13110	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8082] [SW-846 8082A]	PCB 1016
Certified	Yes	NJ	SHW06.13120	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8082] [SW-846 8082A]	PCB 1221
Certified	Yes	NJ	SHW06.13130	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8082] [SW-846 8082A]	PCB 1232
Certified	Yes	NJ	SHW06.13140	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8082] [SW-846 8082A]	PCB 1242
Certified	Yes	NJ	SHW06.13150	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8082] [SW-846 8082A]	PCB 1248
Certified	Yes	NJ	SHW06.13160	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8082] [SW-846 8082A]	PCB 1254
Certified	Yes	NJ	SHW06.13170	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8082] [SW-846 8082A]	PCB 1260
Certified	Yes	NJ	SHW06.13175	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8082A]	PCB-1262
Certified	Yes	NJ	SHW06.13180	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8082A]	PCB-1268
Certified	Yes	NJ	SHW06.16010	NPW, SCM	GC, Extraction or Direct Inject, FID	[SW-846 8100]	Acenaphthene
Certified	Yes	NJ	SHW06.16020	NPW, SCM	GC, Extraction or Direct Inject, FID	[SW-846 8100]	Acenaphthylene
Certified	Yes	NJ	SHW06.16030	NPW, SCM	GC, Extraction or Direct Inject, FID	[SW-846 8100]	Anthracene
Certified	Yes	NJ	SHW06.16040	NPW, SCM	GC, Extraction or Direct Inject, FID	[SW-846 8100]	Benzo(a)anthracene
Certified	Yes	NJ	SHW06.16050	NPW, SCM	GC, Extraction or Direct Inject, FID	[SW-846 8100]	Benzo(a)pyrene
Certified	Yes	NJ	SHW06.16060	NPW, SCM	GC, Extraction or Direct Inject, FID	[SW-846 8100]	Benzo(b)fluoranthene
Certified	Yes	NJ	SHW06.16070	NPW, SCM	GC, Extraction or Direct Inject, FID	[SW-846 8100]	Benzo(k)fluoranthene
Certified	Yes	NJ	SHW06.16080	NPW, SCM	GC, Extraction or Direct Inject, FID	[SW-846 8100]	Benzo(ghi)perylene
Certified	Yes	NJ	SHW06.16090	NPW, SCM	GC, Extraction or Direct Inject, FID	[SW-846 8100]	Chrysene
Certified	Yes	NJ	SHW06.16100	NPW, SCM	GC, Extraction or Direct Inject, FID	[SW-846 8100]	Dibenzo(a,h)anthracene
Certified	Yes	NJ	SHW06.16110	NPW, SCM	GC, Extraction or Direct Inject, FID	[SW-846 8100]	Fluoranthene
Certified	Yes	NJ	SHW06.16120	NPW, SCM	GC, Extraction or Direct Inject, FID	[SW-846 8100]	Fluorene
Certified	Yes	NJ	SHW06.16130	NPW, SCM	GC, Extraction or Direct Inject, FID	[SW-846 8100]	Indeno(1,2,3-cd)pyrene
Certified	Yes	NJ	SHW06.16140	NPW, SCM	GC, Extraction or Direct Inject, FID	[SW-846 8100]	Naphthalene
Certified	Yes	NJ	SHW06.16150	NPW, SCM	GC, Extraction or Direct Inject, FID	[SW-846 8100]	Phenanthrene
Certified	Yes	NJ	SHW06.16160	NPW, SCM	GC, Extraction or Direct Inject, FID	[SW-846 8100]	Pyrene
Certified	Yes	NJ	SHW06.23010	NPW, SCM	GC, Extraction, ECD, Capillary	[SW-846 8151A]	Dalapon
Certified	Yes	NJ	SHW06.23020	NPW, SCM	GC, Extraction, ECD, Capillary	[SW-846 8151A]	Dicamba
Certified	Yes	NJ	SHW06.23021	NPW, SCM	GC, Extraction, ECD, Capillary	[SW-846 8151A]	Dichlorprop

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2235 RT 130
BLDG B
Dayton, NJ 08810

Category: SHW06 – Organic Parameters, Chromatography

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Certified	Yes	NJ	SHW06.23030	NPW, SCM	GC, Extraction, ECD, Capillary	[SW-846 8151A]	Dinoseb
Certified	Yes	NJ	SHW06.23040	NPW, SCM	GC, Extraction, ECD, Capillary	[SW-846 8151A]	D (2,4-)
Certified	Yes	NJ	SHW06.23041	NPW, SCM	GC, Extraction, ECD, Capillary	[SW-846 8151A]	DB (2,4-)
Certified	Yes	NJ	SHW06.23050	NPW, SCM	GC, Extraction, ECD, Capillary	[SW-846 8151A]	T (2,4,5-)
Certified	Yes	NJ	SHW06.23060	NPW, SCM	GC, Extraction, ECD, Capillary	[SW-846 8151A]	TP (2,4,5-) (Silvex)
Certified	Yes	NJ	SHW06.23063	NPW, SCM	GC, Extraction, ECD, Capillary	[SW-846 8151A]	MCPA
Certified	Yes	NJ	SHW06.23064	NPW, SCM	GC, Extraction, ECD, Capillary	[SW-846 8151A]	MCPP
Certified	Yes	NJ	SHW06.23066	NPW, SCM	GC, Extraction, ECD, Capillary	[SW-846 8151A]	Pentachlorophenol
Certified	Yes	NJ	SHW06.23070	NPW, SCM	GC, Extraction, ECD, Capillary	[SW-846 8151A]	Picloram
Certified	Yes	NJ	SHW06.23100	NPW, SCM	GC, Headspace, FID	[OTHER J. Chrom. Sci. RSK-175]	Ethane
Certified	Yes	NJ	SHW06.23105	NPW, SCM	GC, Headspace, FID	[OTHER J. Chrom. Sci. RSK-175]	Ethene
Certified	Yes	NJ	SHW06.23110	NPW, SCM	GC, Headspace, FID	[OTHER J. Chrom. Sci. RSK-175]	Methane
Certified	Yes	NJ	SHW06.23115	NPW, SCM	GC, Headspace, FID	[OTHER J. Chrom. Sci. RSK-175]	Propane
Certified	Yes	NJ	SHW06.24110	NPW, SCM	Extraction, HPLC	[SW-846 8310]	Acenaphthene
Certified	Yes	NJ	SHW06.24120	NPW, SCM	Extraction, HPLC	[SW-846 8310]	Acenaphthylene
Certified	Yes	NJ	SHW06.24130	NPW, SCM	Extraction, HPLC	[SW-846 8310]	Anthracene
Certified	Yes	NJ	SHW06.24140	NPW, SCM	Extraction, HPLC	[SW-846 8310]	Benzo(a)anthracene
Certified	Yes	NJ	SHW06.24150	NPW, SCM	Extraction, HPLC	[SW-846 8310]	Benzo(a)pyrene
Certified	Yes	NJ	SHW06.24160	NPW, SCM	Extraction, HPLC	[SW-846 8310]	Benzo(b)fluoranthene
Certified	Yes	NJ	SHW06.24170	NPW, SCM	Extraction, HPLC	[SW-846 8310]	Benzo(ghi)perylene
Certified	Yes	NJ	SHW06.24180	NPW, SCM	Extraction, HPLC	[SW-846 8310]	Benzo(k)fluoranthene
Certified	Yes	NJ	SHW06.24190	NPW, SCM	Extraction, HPLC	[SW-846 8310]	Chrysene
Certified	Yes	NJ	SHW06.24200	NPW, SCM	Extraction, HPLC	[SW-846 8310]	Dibenzo(a,h)anthracene
Certified	Yes	NJ	SHW06.24210	NPW, SCM	Extraction, HPLC	[SW-846 8310]	Fluoranthene
Certified	Yes	NJ	SHW06.24220	NPW, SCM	Extraction, HPLC	[SW-846 8310]	Fluorene
Certified	Yes	NJ	SHW06.24230	NPW, SCM	Extraction, HPLC	[SW-846 8310]	Indeno(1,2,3-cd)pyrene
Certified	Yes	NJ	SHW06.24240	NPW, SCM	Extraction, HPLC	[SW-846 8310]	Naphthalene
Certified	Yes	NJ	SHW06.24250	NPW, SCM	Extraction, HPLC	[SW-846 8310]	Phenanthrene
Certified	Yes	NJ	SHW06.24260	NPW, SCM	Extraction, HPLC	[SW-846 8310]	Pyrene

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Laboratory Name: ACCUTEST LABORATORIES Laboratory Number: 12129 Activity ID: NLC120003
2235 RT 130
BLDG B
Dayton, NJ 08810

Category: SHW07 – Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW07.04004	NPW, SCM	GC/MS/SIM, Direct Aqueous Injection	[USER DEFINED SW-846 8260B]	Ethylene glycol
Certified	Yes	NJ	SHW07.04006	NPW, SCM	GC/MS/SIM, Direct Aqueous Injection	[USER DEFINED SW-846 8260B]	Propylene glycol
Certified	Yes	NJ	SHW07.04010	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Benzene
Certified	Yes	NJ	SHW07.04011	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Bromobenzene
Certified	Yes	NJ	SHW07.04012	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Butyl benzene (n-)
Certified	Yes	NJ	SHW07.04013	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Sec-butylbenzene
Certified	Yes	NJ	SHW07.04014	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Tert-butylbenzene
Certified	Yes	NJ	SHW07.04020	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Chlorobenzene
Certified	Yes	NJ	SHW07.04022	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Chlorotoluene (2-)
Certified	Yes	NJ	SHW07.04023	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Chlorotoluene (4-)
Certified	Yes	NJ	SHW07.04030	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Dichlorobenzene (1,2-)
Certified	Yes	NJ	SHW07.04040	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Dichlorobenzene (1,3-)
Certified	Yes	NJ	SHW07.04050	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Dichlorobenzene (1,4-)
Certified	Yes	NJ	SHW07.04060	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Ethylbenzene
Certified	Yes	NJ	SHW07.04065	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Isopropylbenzene
Certified	Yes	NJ	SHW07.04067	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Propylbenzene (n-)
Certified	Yes	NJ	SHW07.04070	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Toluene
Certified	Yes	NJ	SHW07.04071	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Isopropyltoluene (4-)
Certified	Yes	NJ	SHW07.04072	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Trichlorobenzene (1,2,3-)
Certified	Yes	NJ	SHW07.04073	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Trimethylbenzene (1,2,4-)
Certified	Yes	NJ	SHW07.04074	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Trimethylbenzene (1,3,5-)
Certified	Yes	NJ	SHW07.04080	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Xylenes (total)
Certified	Yes	NJ	SHW07.04081	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Xylene (m-)
Certified	Yes	NJ	SHW07.04082	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Xylene (o-)
Certified	Yes	NJ	SHW07.04083	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Xylene (p-)
Certified	Yes	NJ	SHW07.04087	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	tert-Amylmethyl ether [TAME]
Certified	Yes	NJ	SHW07.04088	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Allyl chloride
Certified	Yes	NJ	SHW07.04089	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Bromochloromethane
Certified	Yes	NJ	SHW07.04090	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Bromodichloromethane
Certified	Yes	NJ	SHW07.04100	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Bromoform
Certified	Yes	NJ	SHW07.04110	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Bromomethane
Certified	Yes	NJ	SHW07.04111	NPW, SCM	GC/MS, P&T, or Direct Injection, Capillary	[SW-846 8260B]	Cyclohexane

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2235 RT 130
BLDG B
Dayton, NJ 08810

Category: SHW07 – Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW07.04112	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Cyclohexanone
Certified	Yes	NJ	SHW07.04115	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Butadiene (2-chloro-1,3-)
Certified	Yes	NJ	SHW07.04120	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Carbon tetrachloride
Certified	Yes	NJ	SHW07.04130	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Chloroethane
Certified	Yes	NJ	SHW07.04140	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Chloroethyl vinyl ether (2-)
Certified	Yes	NJ	SHW07.04150	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Chloroform
Certified	Yes	NJ	SHW07.04160	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Chloromethane
Certified	Yes	NJ	SHW07.04165	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Diethyl ether (Ethyl ether)
Certified	Yes	NJ	SHW07.04170	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Dichloropropene (trans-1,3-)
Certified	Yes	NJ	SHW07.04180	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Dibromochloromethane
Certified	Yes	NJ	SHW07.04185	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Dibromoethane (1,2-) (EDB)
Certified	Yes	NJ	SHW07.04186	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Dibromomethane
Certified	Yes	NJ	SHW07.04187	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Dibromo-3-chloropropane (1,2-)
Certified	Yes	NJ	SHW07.04190	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Dichlorodifluoromethane
Certified	Yes	NJ	SHW07.04200	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Dichloroethane (1,1-)
Certified	Yes	NJ	SHW07.04210	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Dichloroethane (1,2-)
Certified	Yes	NJ	SHW07.04220	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Dichloroethene (1,1-)
Certified	Yes	NJ	SHW07.04230	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Dichloroethene (trans-1,2-)
Certified	Yes	NJ	SHW07.04235	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Dichloroethene (cis-1,2-)
Certified	Yes	NJ	SHW07.04240	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Dichloropropane (1,2-)
Certified	Yes	NJ	SHW07.04241	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Dichloropropane (1,3-)
Certified	Yes	NJ	SHW07.04242	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Dichloropropane (2,2-)
Certified	Yes	NJ	SHW07.04249	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Dichloropropene (1,1-)
Certified	Yes	NJ	SHW07.04250	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Dichloropropene (cis-1,3-)
Certified	Yes	NJ	SHW07.04255	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Dichloro-2-butene (trans-1,4-)
Certified	Yes	NJ	SHW07.04257	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Diisopropyl Ether [DIPE]
Certified	Yes	NJ	SHW07.04258	NPW, SCM	GC/MS, P&T, or Direct Injection, Capillary	[SW-846 8260B]	Butanol (1-)
Certified	Yes	NJ	SHW07.04259	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Ethanol
Certified	Yes	NJ	SHW07.04260	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Methylene chloride (Dichloromethane)
Certified	Yes	NJ	SHW07.04265	NPW, SCM	GC/MS, P&T, or Direct Injection, Capillary	[SW-846 8260B]	Nitropropane (2-)
Certified	Yes	NJ	SHW07.04270	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Tetrachloroethane (1,1,2,2-)
Certified	Yes	NJ	SHW07.04280	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Tetrachloroethene

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Certified	Yes	NJ	SHW07.04282	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Tetrahydrofuran
Certified	Yes	NJ	SHW07.04290	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Trichloroethane (1,1,1-)
Certified	Yes	NJ	SHW07.04300	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Trichloroethane (1,1,2-)
Certified	Yes	NJ	SHW07.04310	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Trichloroethene
Certified	Yes	NJ	SHW07.04320	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Trichlorofluoromethane
Certified	Yes	NJ	SHW07.04322	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Trichloro (1,1,2-) trifluoroethane (1,2,2-)
Certified	Yes	NJ	SHW07.04325	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Trichloropropane (1,2,3-)
Certified	Yes	NJ	SHW07.04327	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Vinyl acetate
Certified	Yes	NJ	SHW07.04330	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Vinyl chloride
Certified	Yes	NJ	SHW07.04340	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Acetone
Certified	Yes	NJ	SHW07.04350	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Carbon disulfide
Certified	Yes	NJ	SHW07.04360	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Butanone (2-)
Certified	Yes	NJ	SHW07.04364	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Ethyl-tert-butyl Ether [ETBE]
Certified	Yes	NJ	SHW07.04365	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Ethyl acetate
Certified	Yes	NJ	SHW07.04367	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Ethyl methacrylate
Certified	Yes	NJ	SHW07.04370	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Hexanone (2-)
Certified	Yes	NJ	SHW07.04371	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Methacrylonitrile
Certified	Yes	NJ	SHW07.04372	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Methyl acrylate
Certified	Yes	NJ	SHW07.04373	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Methyl methacrylate
Certified	Yes	NJ	SHW07.04374	NPW, SCM	GC/MS, P&T, or Direct Injection, Capillary	[SW-846 8260B]	Methyl acetate
Certified	Yes	NJ	SHW07.04375	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Methyl iodide
Certified	Yes	NJ	SHW07.04376	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Iso-butyl alcohol
Certified	Yes	NJ	SHW07.04379	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Pentachloroethane
Certified	Yes	NJ	SHW07.04380	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Pentanone (4-methyl-2-) (MIBK)
Certified	Yes	NJ	SHW07.04385	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Propionitrile
Certified	Yes	NJ	SHW07.04390	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Methyl tert-butyl ether
Certified	Yes	NJ	SHW07.04395	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Tert-butyl alcohol
Certified	Yes	NJ	SHW07.04398	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Acetonitrile
Certified	Yes	NJ	SHW07.04400	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Acrolein
Certified	Yes	NJ	SHW07.04410	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Acrylonitrile
Certified	Yes	NJ	SHW07.04420	NPW, SCM	GC/MS, P&T, or Direct Injection, Capillary	[SW-846 8260B]	Heptane (n-)
Certified	Yes	NJ	SHW07.04425	NPW, SCM	GC/MS, P&T, or Direct Injection, Capillary	[SW-846 8260B]	Hexane (n-)

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Effective as of 08/22/2012 until 06/30/2013

Laboratory Name: ACCUTEST LABORATORIES Laboratory Number: 12129 Activity ID: NLC120003
2235 RT 130
BLDG B
Dayton, NJ 08810

Category: SHW07 -- Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW07.04500	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Hexachlorobutadiene (1,3-)
Certified	Yes	NJ	SHW07.04530	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Hexachloroethane
Certified	Yes	NJ	SHW07.04535	NPW, SCM	GC/MS, P&T, or Direct Injection, Capillary	[SW-846 8260B]	Methylcyclohexane
Certified	Yes	NJ	SHW07.04540	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260C, Rev. 2, 12/96]	Naphthalene
Certified	Yes	NJ	SHW07.04550	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Styrene
Certified	Yes	NJ	SHW07.04560	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Tetrachloroethane (1,1,1,2-)
Certified	Yes	NJ	SHW07.04570	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Trichlorobenzene (1,2,4-)
Certified	Yes	NJ	SHW07.04572	NPW, SCM	GC/MS, Extract, or Direct Injection, Capillary	[SW-846 8260B]	Trimethylpentane (2,2,4-)
Certified	Yes	NJ	SHW07.04590	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Dioxane (1,4-)
Certified	Yes	NJ	SHW07.04660	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Alpha - terpineol
Certified	Yes	NJ	SHW07.04665	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Acetophenone
Certified	Yes	NJ	SHW07.04670	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Acetylaminofluorene (2-)
Certified	Yes	NJ	SHW07.04675	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Aminobiphenyl (4-)
Certified	Yes	NJ	SHW07.04702	NPW, SCM	GC/MS, Extract, or Direct Injection, Capillary	[SW-846 8270C] [SW-846 8270D]	Biphenyl (1,1'-)
Certified	Yes	NJ	SHW07.04705	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Chlorobenzilate
Certified	Yes	NJ	SHW07.04715	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Diallate (cis)
Certified	Yes	NJ	SHW07.04720	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Diallate (trans)
Certified	Yes	NJ	SHW07.04730	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dibenz(a,h)acridine
Certified	Yes	NJ	SHW07.04755	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dichlorophenol (2,6-)
Certified	Yes	NJ	SHW07.04760	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dimethoate
Certified	Yes	NJ	SHW07.04767	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dimethylaminoazobenzene
Certified	Yes	NJ	SHW07.04770	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dimethylbenz(a)anthracene (7,12-)
Certified	Yes	NJ	SHW07.04780	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dinitrobenzene (1,3-)
Certified	Yes	NJ	SHW07.04785	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dinoseb
Certified	Yes	NJ	SHW07.04790	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Disulfoton
Certified	Yes	NJ	SHW07.04810	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Isodrin
Certified	Yes	NJ	SHW07.04815	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Isosafrole (cis-)
Certified	Yes	NJ	SHW07.04820	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Isosafrole (trans-)
Certified	Yes	NJ	SHW07.04825	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Kepone
Certified	Yes	NJ	SHW07.04830	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Methanesulfonate (Ethyl-)
Certified	Yes	NJ	SHW07.04835	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Methanesulfonate (Methyl-)
Certified	Yes	NJ	SHW07.04845	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Methylcholanthrene (3-)

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2235 RT 130
BLDG B
Dayton, NJ 08810

Category: SHW07 -- Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW07.04850	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Napthoquinone (1,4-)
Certified	Yes	NJ	SHW07.04855	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Napththylamine (1-)
Certified	Yes	NJ	SHW07.04860	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Napththylamine (2-)
Certified	Yes	NJ	SHW07.04870	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	N-Nitroso-di-n-butylamine
Certified	Yes	NJ	SHW07.04875	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	N-Nitrosomorpholine
Certified	Yes	NJ	SHW07.04880	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	N-Nitrosopiperidine
Certified	Yes	NJ	SHW07.04885	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Parathion
Certified	Yes	NJ	SHW07.04890	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Parathion methyl
Certified	Yes	NJ	SHW07.04895	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Pentachlorobenzene
Certified	Yes	NJ	SHW07.04900	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Pentachloroethane
Certified	Yes	NJ	SHW07.04905	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Pentachloronitrobenzene
Certified	Yes	NJ	SHW07.04910	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Phenacetin
Certified	Yes	NJ	SHW07.04920	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Phenylethylamine (alpha, alpha-Dimethyl)
Certified	Yes	NJ	SHW07.04925	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Phorate
Certified	Yes	NJ	SHW07.04930	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Phosphorothioate (O,O,O-triethyl)
Certified	Yes	NJ	SHW07.04935	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Phosphorothioate (O,O-diethyl-O-2-pyrazinyl) [Thionazin]
Certified	Yes	NJ	SHW07.04940	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Picoline (2-)
Certified	Yes	NJ	SHW07.04945	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Pronamide
Certified	Yes	NJ	SHW07.04950	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Quinoline -1-Oxide (4-Nitro)
Certified	Yes	NJ	SHW07.04955	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Safrole
Certified	Yes	NJ	SHW07.04975	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Tetrachlorobenzene (1,2,4,5-)
Certified	Yes	NJ	SHW07.04980	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Tetrachlorophenol (2,3,4,6-)
Certified	Yes	NJ	SHW07.04985	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Toluidine (2-) (2-Methylaniline)
Certified	Yes	NJ	SHW07.04990	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Toluidine (5-nitro-2-)
Certified	Yes	NJ	SHW07.04995	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Trinitrobenzene (1,3,5-)
Certified	Yes	NJ	SHW07.05004	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	N-Nitrosodiethylamine
Certified	Yes	NJ	SHW07.05005	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	N-Nitrosodimethylamine
Certified	Yes	NJ	SHW07.05006	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	N-Nitroso-di-n-propylamine
Certified	Yes	NJ	SHW07.05010	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	N-Nitrosodiphenylamine
Certified	Yes	NJ	SHW07.05011	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	N-Nitrosomethylethylamine
Certified	Yes	NJ	SHW07.05012	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	N-Nitrosopyrrolidine

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2235 RT 130
BLDG B
Dayton, NJ 08810

Category: SHW07 -- Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW07.05020	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Diphenylamine
Certified	Yes	NJ	SHW07.05030	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Carbazole
Certified	Yes	NJ	SHW07.05038	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Benzidine
Certified	Yes	NJ	SHW07.05040	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dichlorobenzidine (3,3'-)
Certified	Yes	NJ	SHW07.05045	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Diphenylhydrazine (1,2-)
Certified	Yes	NJ	SHW07.05048	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Aniline
Certified	Yes	NJ	SHW07.05050	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Chloroaniline (4-)
Certified	Yes	NJ	SHW07.05060	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Nitroaniline (2-)
Certified	Yes	NJ	SHW07.05062	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Nitroaniline (3-)
Certified	Yes	NJ	SHW07.05063	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Nitroaniline (4-)
Certified	Yes	NJ	SHW07.05070	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Chloronaphthalene (2-)
Certified	Yes	NJ	SHW07.05080	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Hexachlorobenzene
Certified	Yes	NJ	SHW07.05090	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Hexachlorobutadiene (1,3-)
Certified	Yes	NJ	SHW07.05100	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Hexachlorocyclopentadiene
Certified	Yes	NJ	SHW07.05110	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Hexachloroethane
Certified	Yes	NJ	SHW07.05115	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Hexachloropropene
Certified	Yes	NJ	SHW07.05120	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Trichlorobenzene (1,2,4-)
Certified	Yes	NJ	SHW07.05130	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Bis (2-chloroethoxy) methane
Certified	Yes	NJ	SHW07.05132	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Bis (2-chloroethyl) ether
Certified	Yes	NJ	SHW07.05140	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Bis (2-chloroisopropyl) ether
Certified	Yes	NJ	SHW07.05150	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Chlorophenyl-phenyl ether (4-)
Certified	Yes	NJ	SHW07.05160	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Bromophenyl-phenyl ether (4-)
Certified	Yes	NJ	SHW07.05165	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[USER DEFINED SW-846 8270]	Dioxane (1,4-)
Certified	Yes	NJ	SHW07.05170	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dinitrotoluene (2,4-)
Certified	Yes	NJ	SHW07.05180	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dinitrotoluene (2,6-)
Certified	Yes	NJ	SHW07.05190	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Isophorone
Certified	Yes	NJ	SHW07.05200	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Nitrobenzene
Certified	Yes	NJ	SHW07.05210	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Butyl benzyl phthalate
Certified	Yes	NJ	SHW07.05220	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Bis (2-ethylhexyl) phthalate
Certified	Yes	NJ	SHW07.05230	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Diethyl phthalate
Certified	Yes	NJ	SHW07.05240	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dimethyl phthalate
Certified	Yes	NJ	SHW07.05250	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Di-n-butyl phthalate

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Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW07.05260	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Di-n-octyl phthalate
Certified	Yes	NJ	SHW07.05270	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Acenaphthene
Certified	Yes	NJ	SHW07.05280	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Anthracene
Certified	Yes	NJ	SHW07.05290	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Acenaphthylene
Certified	Yes	NJ	SHW07.05300	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Benzo(a)anthracene
Certified	Yes	NJ	SHW07.05310	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Benzo(a)pyrene
Certified	Yes	NJ	SHW07.05320	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Benzo(b)fluoranthene
Certified	Yes	NJ	SHW07.05330	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Benzo(ghi)perylene
Certified	Yes	NJ	SHW07.05340	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Benzo(k)fluoranthene
Certified	Yes	NJ	SHW07.05350	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Chrysene
Certified	Yes	NJ	SHW07.05360	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dibenzo(a,h)anthracene
Certified	Yes	NJ	SHW07.05370	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Fluoranthene
Certified	Yes	NJ	SHW07.05380	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Fluorene
Certified	Yes	NJ	SHW07.05390	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Indeno(1,2,3-cd)pyrene
Certified	Yes	NJ	SHW07.05395	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Methylnaphthalene (1-)
Certified	Yes	NJ	SHW07.05400	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Methylnaphthalene (2-)
Certified	Yes	NJ	SHW07.05410	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Naphthalene
Certified	Yes	NJ	SHW07.05420	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Phenanthrene
Certified	Yes	NJ	SHW07.05430	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Pyrene
Certified	Yes	NJ	SHW07.05440	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Methyl phenol (4-chloro-3-)
Certified	Yes	NJ	SHW07.05450	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Chlorophenol (2-)
Certified	Yes	NJ	SHW07.05460	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dichlorophenol (2,4-)
Certified	Yes	NJ	SHW07.05470	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dimethylphenol (2,4-)
Certified	Yes	NJ	SHW07.05480	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dinitrophenol (2,4-)
Certified	Yes	NJ	SHW07.05490	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dinitrophenol (2-methyl-4,6-)
Certified	Yes	NJ	SHW07.05500	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Methylphenol (2-)
Certified	Yes	NJ	SHW07.05510	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Methylphenol (4-)
Certified	Yes	NJ	SHW07.05520	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Nitrophenol (2-)
Certified	Yes	NJ	SHW07.05530	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Nitrophenol (4-)
Certified	Yes	NJ	SHW07.05540	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Pentachlorophenol
Certified	Yes	NJ	SHW07.05550	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Phenol
Certified	Yes	NJ	SHW07.05560	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Trichlorophenol (2,4,5-)

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New Jersey Department of Environmental Protection

National Environmental Laboratory Accreditation Program

ANNUAL CERTIFIED PARAMETER LIST AND CURRENT STATUS

Effective as of 08/22/2012 until 06/30/2013

Laboratory Name: ACCUTEST LABORATORIES Laboratory Number: 12129 Activity ID: NLC120003
2235 RT 130
BLDG B
Dayton, NJ 08810

Category: SHW07 -- Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW07.05570	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Trichlorophenol (2,4,6-)
Certified	Yes	NJ	SHW07.05590	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Methylphenol (3-)
Certified	Yes	NJ	SHW07.05600	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dibenzofuran
Certified	Yes	NJ	SHW07.05691	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dichlorobenzene (1,2-)
Certified	Yes	NJ	SHW07.05692	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dichlorobenzene (1,3-)
Certified	Yes	NJ	SHW07.05700	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dichlorobenzene (1,4-)
Certified	Yes	NJ	SHW07.05705	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Benzaldehyde
Certified	Yes	NJ	SHW07.05710	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Benzoic acid
Certified	Yes	NJ	SHW07.05720	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Benzyl alcohol
Certified	Yes	NJ	SHW07.05725	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Decane (n-)
Certified	Yes	NJ	SHW07.05730	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Octadecane (n-)
Certified	Yes	NJ	SHW07.05750	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Pyridine
Certified	Yes	NJ	SHW07.05765	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Caprolactam
Certified	Yes	NJ	SHW07.05990	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Atrazine
Certified	Yes	NJ	SHW07.05995	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Hydroquinone
Certified	Yes	NJ	SHW07.07584	NPW, SCM	GC/MS/SIM, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Benzo(a)anthracene
Certified	Yes	NJ	SHW07.07586	NPW, SCM	GC/MS/SIM, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Benzo(a)pyrene
Certified	Yes	NJ	SHW07.07588	NPW, SCM	GC/MS/SIM, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Benzo(b)fluoranthene
Certified	Yes	NJ	SHW07.07590	NPW, SCM	GC/MS/SIM, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Benzo(k)fluoranthene
Certified	Yes	NJ	SHW07.07594	NPW, SCM	GC/MS/SIM, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dibenzo(a,h)anthracene
Certified	Yes	NJ	SHW07.07596	NPW, SCM	GC/MS/SIM, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Hexachlorobenzene
Certified	Yes	NJ	SHW07.07598	NPW, SCM	GC/MS/SIM, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Indeno(1,2,3-cd)pyrene
Certified	Yes	NJ	SHW07.07616	NPW, SCM	GC/MS/SIM, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Pentachlorophenol

Category: SHW09 -- Miscellaneous Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW09.02000	NPW, SCM	Distillation	[SW-846 9010C]	Cyanide
Certified	Yes	NJ	SHW09.03000	NPW, SCM	Distillation	[SW-846 9010C]	Cyanide - amenable to Cl2
Certified	Yes	NJ	SHW09.05000	NPW, SCM	Colorimetric, Automated	[SW-846 9012B]	Cyanide

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---- Annual Certified Parameters List ---- Effective as of 08/22/2012 until 06/30/2013

New Jersey Department of Environmental Protection

National Environmental Laboratory Accreditation Program

ANNUAL CERTIFIED PARAMETER LIST AND CURRENT STATUS

Effective as of 08/22/2012 until 06/30/2013

Laboratory Name: ACCUTEST LABORATORIES Laboratory Number: 12129 Activity ID: NLC120003
2235 RT 130
BLDG B
Dayton, NJ 08810

Category: SHW09 -- Miscellaneous Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW09.10100	NPW, SCM	Titration	[SW-846 9034]	Sulfides, acid sol. & insol.
Certified	Yes	NJ	SHW09.13050	NPW, SCM	Ion Chromatography	[SW-846 9056] [SW-846 9056A]	Sulfate
Certified	Yes	NJ	SHW09.14000	NPW, SCM	Electrometric	[SW-846 9040C]	pH - waste, >20% water
Certified	Yes	NJ	SHW09.19000	NPW, SCM	Infrared Spectrometry or FID	[SW-846 9060A]	Total organic carbon (TOC)
Certified	Yes	NJ	SHW09.21000	NPW, SCM	Colorimetric, Man, 4AAP Distillation	[SW-846 9065]	Phenols
Certified	Yes	NJ	SHW09.24100	NPW, SCM	Extraction & Gravimetric - LL or SPE	[SW-846 1664A]	Oil & grease - hem
Certified	Yes	NJ	SHW09.30250	NPW, SCM	Ion Chromatography	[SW-846 9056] [SW-846 9056A]	Bromide
Certified	Yes	NJ	SHW09.33100	NPW, SCM	Ion Chromatography	[SW-846 9056] [SW-846 9056A]	Chloride
Certified	Yes	NJ	SHW09.34150	NPW, SCM	Ion Chromatography	[SW-846 9056] [SW-846 9056A]	Fluoride
Certified	No	NJ	SHW09.34160	NPW, SCM	Ion Chromatography	[USER DEFINED EPA 314 (Modified for solid matrices)]	Perchlorate

Category: SHW04 -- Inorganic Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW04.03000	SCM	Acid Digestion, Soil Sediment & Sludge	[SW-846 3050B]	Metals
Certified	Yes	NJ	SHW04.03700	SCM	Chromium VI Digestion	[SW-846 3060A]	Metals
Certified	Yes	NJ	SHW04.33500	SCM	AA, Manual Cold Vapor	[SW-846 7471A] [SW-846 7471B]	Mercury - solid waste

Category: SHW05 -- Organic Parameters, Prep. / Screening

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW05.03000	SCM	Soxhlet Extraction	[SW-846 3540C]	Semivolatile organics
Certified	Yes	NJ	SHW05.04200	SCM	Pressurized Fluid Extraction	[SW-846 3545] [SW-846 3545A]	Semivolatile organics
Certified	Yes	NJ	SHW05.05000	SCM	Ultrasonic Extraction	[SW-846 3550B] [SW-846 3550C]	Semivolatile organics
Certified	Yes	NJ	SHW05.05110	SCM	Microwave Extraction	[SW-846 3546]	Semivolatile organics
Certified	Yes	NJ	SHW05.06000	SCM	Waste Dilution	[SW-846 3580A]	Organics
Certified	Yes	NJ	SHW05.07300	SCM	Closed System Purge & Trap	[SW-846 5035L] [SW-846 5035A]	Volatile organics - low conc.
Certified	Yes	NJ	SHW05.07310	SCM	Methanol Extract, Closed System P & T	[SW-846 5035H] [SW-846 5035A]	Volatile organics - high conc.
Certified	Yes	NJ	SHW05.10000	SCM	Cleanup-Alumina	[SW-846 3610B]	Semivolatile organics

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New Jersey Department of Environmental Protection

National Environmental Laboratory Accreditation Program

ANNUAL CERTIFIED PARAMETER LIST AND CURRENT STATUS

Effective as of 08/22/2012 until 06/30/2013

Laboratory Name: ACCUTEST LABORATORIES Laboratory Number: 12129 Activity ID: NLC120003
2235 RT 130
BLDG B
Dayton, NJ 08810

Category: SHW05 -- Organic Parameters, Prep. / Screening

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW05.11000	SCM	Petroleum Waste, Cleanup Alumina	[SW-846 3611B]	Semivolatile organics
Certified	Yes	NJ	SHW05.12000	SCM	Cleanup-Florisil	[SW-846 3620B] [SW-846 3620C]	Semivolatile organics
Certified	Yes	NJ	SHW05.13000	SCM	Cleanup-Silica Gel	[SW-846 3630C]	Semivolatile organics
Certified	Yes	NJ	SHW05.14000	SCM	Cleanup-Gel Permeation	[SW-846 3640A]	Semivolatile organics
Certified	Yes	NJ	SHW05.15000	SCM	Cleanup-Acid/Base Partition	[SW-846 3650B]	Semivolatile organics
Certified	Yes	NJ	SHW05.16000	SCM	Cleanup-Sulfur Removal	[SW-846 3660B]	Semivolatile organics
Certified	Yes	NJ	SHW05.17000	SCM	Cleanup-Sulfuric Acid/KMnO4	[SW-846 3665A]	Semivolatile organics
Certified	Yes	NJ	SHW05.18000	SCM	Headspace, GC or GC/MS Screen	[SW-846 3810]	Volatile organics

Category: SHW09 -- Miscellaneous Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW09.08100	SCM	Extraction	[SW-846 9023]	Extractable organic halides (EOX)
Certified	Yes	NJ	SHW09.16000	SCM	Mix with Water or Calcium Chloride	[SW-846 9045C]	pH - soil and waste
Certified	Yes	NJ	SHW09.19100	SCM	Pyrolytic	[USER DEFINED Lloyd Kahn modified]	Total organic carbon (TOC)
Certified	Yes	NJ	SHW09.25000	SCM	Extraction & Gravimetric	[SW-846 9071 B]	Oil & grease - sludge-hem
Certified	Yes	NJ	SHW09.26100	SCM	Combustion, Bomb Oxidation	[SW-846 5050]	Chlorine - total, solid waste
Certified	Yes	NJ	SHW09.28350	SCM	Bomb Calorimeter	[ASTM D-240]	Heat of combustion (BTU)
Certified	Yes	NJ	SHW09.29000	SCM	Flow-Through Paint Filter, Observation	[SW-846 9095]	Free liquid
Certified	Yes	NJ	SHW09.40000	SCM	Soils, Sodium Acetate	[SW-846 9081]	Cation-exchange capacity

Joseph F. Aiello, Manager

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---- Annual Certified Parameters List ---- Effective as of 08/22/2012 until 06/30/2013

LABORATORY ACCREDITATION BUREAU

Certificate # L2248

Scope of Accreditation For Accutest Laboratories – New Jersey

2235 Route 130
Dayton, NJ 08810
Phillip M. Worby
732-329-0200

In recognition of a successful assessment to ISO/IEC 17025:2005 and the requirements of the DoD Environmental Laboratory Accreditation Program (DoD ELAP) as detailed in the DoD Quality Systems Manual for Environmental Laboratories (DoD QSM v4.2) based on the National Environmental Laboratory Accreditation Conference Chapter 5 Quality Systems Standard (NELAC Voted Revision June 5, 2003), accreditation is granted to Accutest Laboratories to perform the following tests:

Accreditation granted through: **April 14, 2013**

Testing – Environmental

Non-Potable Water		
Technology	**Method**	**Analyte**
Membrane Filter (MF)	SM 9222 D	Fecal Coliform
Membrane Filter (MF)	SM 9222 B	Total Coliform
Pour Plate	SM 9215 B	Heterotrophic Plate Count
Electrometric Titration	SM 2320 B	Alkalinity as CaCO3
Automated Phenate	SM 4500-NH3 B+G (20^{th} ed.)	Ammonia
Dissolved Oxygen	SM 5210 B	Biochemical Oxygen Demand
Dissolved Oxygen	SM 5210 B	Carbonaceous Biochemical Oxygen Demand
Titrimetric	SM 5220 C (M)	Chemical Oxygen Demand
Distillation, Spectrophotometric	EPA 335.4	Cyanide
Distillation, Spectrophotometric	SM 4500-CN C,G	Cyanide – Amenable to Chlorination
Titrimetric, EDTA	SM 2340 B/C	Hardness – total as CaCO3
Digestion, Distillation, Semiautomated Digestor	EPA 351.2	Kjeldahl Nitrogen - Total
Spectrophotometric, Manual	SM 4500-NO2-B	Nitrite
Combustion	SM 5310 B	Total Organic Carbon (TOC)
Calculation	EPA 351.2 – SM 4500-NH3 B+G (20^{th} ed)	Organic Nitrogen
Spectrophotometric	SM 4500-P, E	Orthophosphate

LABORATORY ACCREDITATION BUREAU

Certificate # L2248

Non-Potable Water		
Technology	**Method**	**Analyte**
Distillation, Colorimetric Auto	EPA 420.1 + .4	Phenols
Persulfate Digestion + Manual	EPA 365.3	Phosphorus (total)
Gravimetric	SM 2540 C	Residue – filterable (TDS)
Gravimetric	SM 2540 D	Residue – nonfilterable (TSS)
Volumetric (Imhoff Cone)	SM 2540 F	Residue – settleable
Gravimetric	EPA 160.4	Residue – volatile
Gravimetric	SM 2540 G	Total, fixed, and volatile solids (SQAR)
Electrical Conductivity	SM 2520 B	Salinity
Filtration – Colorimetric	SM 4500-Si, D	Silica – dissolved
Wheatstone Bridge	SM 2510 B	Specific Conductance
Wheatstone Bridge	EPA 9050A	Specific Conductance
Titrimetric, Iodine	SM 4500-S, F	Sulfides
Colorimetric (Methylene Blue)	SM 5540 C	Surfactants
Nephelometric	EPA 180.1	Turbidity
Electrode	SM 4500-O, G	Oxygen (dissolved)
Electrometric	SM 4500-H, B	pH
Colorimetric	SM 3500-Cr, D	Chromium, VI
Digestion, Colorimetric	SM 3500-Fe, B	Iron, Ferrous
Manual Cold Vapor	EPA 245.1	Mercury
ICP-MS	EPA 6020/A/200.8	Aluminum
ICP-MS	EPA 6020/A/200.8	Antimony
ICP-MS	EPA 6020/A/200.8	Arsenic
ICP-MS	EPA 6020/A/200.8	Barium
ICP-MS	EPA 6020/A/200.8	Beryllium
ICP-MS	EPA 6020/A/200.8	Cadmium
ICP-MS	EPA 6020/A/200.8	Calcium
ICP-MS	EPA 6020/A/200.8	Chromium
ICP-MS	EPA 6020/A/200.8	Cobalt
ICP-MS	EPA 6020/A/200.8	Copper
ICP-MS	EPA 6020/A/200.8	Iron
ICP-MS	EPA 6020/A/200.8	Lead
ICP-MS	EPA 6020/A/200.8	Magnesium
ICP-MS	EPA 6020/A/200.8	Manganese
ICP-MS	EPA 6020/A/200.8	Molybdenum

LABORATORY ACCREDITATION BUREAU

Certificate # L2248

Non-Potable Water		
Technology	**Method**	**Analyte**
ICP-MS	EPA 6020/A/200.8	Nickel
ICP-MS	EPA 6020/A/200.8	Potassium
ICP-MS	EPA 6020/A/200.8	Selenium
ICP-MS	EPA 6020/A/200.8	Silver
ICP-MS	EPA 6020/A/200.8	Sodium
ICP-MS	EPA 6020/A/200.8	Thallium
ICP-MS	EPA 6020/A/200.8	Tin
ICP-MS	EPA 200.8	Titanium
ICP-MS	EPA 6020/A/200.8	Vanadium
ICP-MS	EPA 6020/A/200.8	Zinc
GC-ECD	EPA 8011	1,2-Dibromomethane (EDB)
GC-ECD	EPA 8011	1,2-Dibromo-3-chloropropane
GC-ECD	EPA 8011	1,2,3-Trichloropropane
GC-FID	EPA 8015B/C	Diesel range organics (DRO)
GC-FID	EPA 8015B/C	Gasoline range organics (GRO)
GC-FID	EPA 8015B/C	Ethanol
GC-FID	EPA 8015B/C	Isobutyl alcohol (2-Methyl-1-propanol)
GC-FID	EPA 8015B/C	Isopropyl alcohol (2-Propanol)
GC-FID	EPA 8015B/C	Methanol
GC-FID	EPA 8015B/C	Tert-butyl alcohol
GC-FID	TCEQ 1005	Diesel Range Organics
GC-FID	NJDEP-EPH	Extractable Petroleum Hydrocarbons
GC-PID	EPA 602	Benzene
GC-PID	EPA 602	Chlorobenzene
GC-PID	EPA 602	1,2-Dichlorobenzene
GC-PID	EPA 602	1,3-Dichlorobenzene
GC-PID	EPA 602	1,4-Dichlorobenzene
GC-PID	EPA 602	Ethylbenzene
GC-PID	EPA 602	Methyl tert-butyl ether
GC-PID	EPA 602	Tert-butyl alcohol
GC-PID	EPA 602	Toluene
GC-PID	EPA 602	Xylenes (total)
GC-FID	EPA 603	Acrolein
GC-FID	EPA 603	Acrylonitrile
GC	EPA 8021B	Benzene

LABORATORY ACCREDITATION BUREAU

Certificate # L2248

Non-Potable Water		
Technology	**Method**	**Analyte**
GC	EPA 8021B	Chlorobenzene
GC	EPA 8021B	1,2-Dichlorobenzene
GC	EPA 8021B	1,3-Dichlorobenzene
GC	EPA 8021B	1,4-Dichlorobenzene
GC	EPA 8021B	Ethylbenzene
GC	EPA 8021B	Styrene
GC	EPA 8021B	Toluene
GC	EPA 8021B	o-Xylene
GC	EPA 8021B	m-Xylene
GC	EPA 8021B	p-Xylene
GC	EPA 8021B	trans-1,3-Dichloropropene
GC	EPA 8021B	cis-1,2-Dichloroethene
GC	EPA 8021B	trans-1,2-Dichloroethene
GC	EPA 8021B	cis-1,3-Dichloropropene
GC	EPA 8021B	Tetrachloroethene
GC	EPA 8021B	Trichloroethene
GC	EPA 8021B	Methyl tert-butyl ether
GC-ECD	EPA 8081A/B/608	4 4`-DDD
GC-ECD	EPA 8081A/B/608	4 4`-DDE
GC-ECD	EPA 8081A/B/608	4 4`-DDT
GC-ECD	EPA 8081A/B/608	Aldrin
GC-ECD	EPA 8081A/B/608	Chlordane (tech.)
GC-ECD	EPA 8081A/B/608	Dieldrin
GC-ECD	EPA 8081A/B/608	Endosulfan I
GC-ECD	EPA 8081A/B/608	Endosulfan II
GC-ECD	EPA 8081A/B/608	Endosulfan sulfate
GC-ECD	EPA 8081A/B/608	Endrin
GC-ECD	EPA 8081A/B/608	Endrin aldehyde
GC-ECD	EPA 8081A/B/608	Endrin ketone
GC-ECD	EPA 8081A/B/608	Heptachlor
GC-ECD	EPA 8081A/B/608	Heptachlor epoxide
GC-ECD	EPA 8081A/B/608	Methoxychlor
GC-ECD	EPA 8081A/B/608	Toxaphene (Chlorinated camphene)
GC-ECD	EPA 8081A/B/608	alpha-BHC (alpha-Hexachlorocyclohexane)
GC-ECD	EPA 8081A/B/608	alpha-Chlordane

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Non-Potable Water		
Technology	**Method**	**Analyte**
GC-ECD	EPA 8081A/B/608	beta-BHC (beta-Hexachlorocyclohexane)
GC-ECD	EPA 8081A/B/608	delta-BHC
GC-ECD	EPA 8081A/B/608	gamma-BHC (Lindane gamma-Hexachlorocyclohexane)
GC-ECD	EPA 8081A/B/608	gamma-Chlordane
GC-ECD	EPA 8081A/B	Mirex
GC-ECD	EPA 8082/A/608	Aroclor-1016 (PCB-1016)
GC-ECD	EPA 8082/A/608	Aroclor-1221 (PCB-1221)
GC-ECD	EPA 8082/A/608	Aroclor-1232 (PCB-1232)
GC-ECD	EPA 8082/A/608	Aroclor-1242 (PCB-1242)
GC-ECD	EPA 8082/A/608	Aroclor-1248 (PCB-1248)
GC-ECD	EPA 8082/A/608	Aroclor-1254 (PCB-1254)
GC-ECD	EPA 8082/A/608	Aroclor-1260 (PCB-1260)
GC-ECD	EPA 8082A/608	Aroclor-1262 (PCB-1262)
GC-ECD	EPA 8082/A/608	Aroclor-1268 (PCB-1268)
GC-ECD	EPA 8151A	2 4 5-T
GC-ECD	EPA 8151A	2 4-D
GC-ECD	EPA 8151A	2 4-DB
GC-ECD	EPA 8151A	Dalapon
GC-ECD	EPA 8151A	Dicamba
GC-ECD	EPA 8151A	Dichloroprop (Dichlorprop)
GC-ECD	EPA 8151A	Dinoseb (2-sec-butyl-4 6-dinitrophenol DNBP)
GC-ECD	EPA 8151A	MCPA
GC-ECD	EPA 8151A	MCPP
GC-ECD	EPA 8151A	Pentachlorophenol
GC-ECD	EPA 8151A	Silvex (2 4 5-TP)
GC-ECD	EPA 8151A	Picloram
GC-FID	EPA RSK-175	Ethane
GC-FID	EPA RSK-175	Ethene
GC-FID	EPA RSK-175	Methane
GC-FID	EPA RSK-175	Propane
GC-MS	EPA 624	n-Heptane
GC-MS	EPA 624	n-Hexane
GC-MS	EPA 624	Isobutyraldehyde
GC-MS	EPA 624	Isopropanol
GC-MS	EPA 624	Isopropyl acetate

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Non-Potable Water		
Technology	**Method**	**Analyte**
GC-MS	EPA 624	Isopropyl ether
GC-MS	EPA 624	Methyl formate
GC-MS	EPA 624	o-Xylene
GC-MS	EPA 624	m- + p-Xylene
GC-MS	EPA 8260B	Ethylene glycol
GC-MS	EPA 8260B	Propylene glycol
GC-MS	EPA 8260B	1 1 1 2-Tetrachloroethane
GC-MS	EPA 8260B/624	1 1 1-Trichloroethane
GC-MS	EPA 8260B/624	1 1 2 2-Tetrachloroethane
GC-MS	EPA 8260B/624	1 1 2-Trichloroethane
GC-MS	EPA 8260B/624	1 1-Dichloroethane
GC-MS	EPA 8260B/624	1 1-Dichloroethylene
GC-MS	EPA 8260B	1 1-Dichloropropene
GC-MS	EPA 8260B	1 2 3-Trichlorobenzene
GC-MS	EPA 8260B	1 2 3-Trichloropropane
GC-MS	EPA 8260B	1 2 4-Trichlorobenzene
GC-MS	EPA 8260B/624	1 2 4-Trimethylbenzene
GC-MS	EPA 8260B	1 2-Dibromo-3-chloropropane (DBCP)
GC-MS	EPA 8260B/624	1 2-Dibromoethane (EDB Ethylene dibromide)
GC-MS	EPA 8260B/624	1 2-Dichlorobenzene
GC-MS	EPA 8260B/624	1 2-Dichloroethane
GC-MS	EPA 8260B/624	1 2-Dichloropropane
GC-MS	EPA 8260B/624	1 3 5-Trimethylbenzene
GC-MS	EPA 8260B/624	1 3-Dichlorobenzene
GC-MS	EPA 8260B	1 3-Dichloropropane
GC-MS	EPA 8260B/624	1 4-Dichlorobenzene
GC-MS	EPA 8260B	1-Chlorohexane
GC-MS	EPA 8260B	2 2-Dichloropropane
GC-MS	EPA 8260B/624	2-Butanone (Methyl ethyl ketone MEK)
GC-MS	EPA 8260B/624	2-Chloroethyl vinyl ether
GC-MS	EPA 8260B	2-Chlorotoluene
GC-MS	EPA 8260B/624	2-Hexanone
GC-MS	EPA 8260B	2-Nitropropane
GC-MS	EPA 8260B	4-Chlorotoluene
GC-MS	EPA 8260B/624	4-Methyl-2-pentanone (MIBK)

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Non-Potable Water		
Technology	**Method**	**Analyte**
GC-MS	EPA 8260B/624	Acetone
GC-MS	EPA 8260B	Acetonitrile
GC-MS	EPA 8260B/624	Acrolein (Propenal)
GC-MS	EPA 8260B/624	Acrylonitrile
GC-MS	EPA 8260B	Allyl chloride (3-Chloropropene)
GC-MS	EPA 8260B/624	Benzene
GC-MS	EPA 8260B	Bromobenzene
GC-MS	EPA 8260B	Bromochloromethane
GC-MS	EPA 8260B/624	Bromodichloromethane
GC-MS	EPA 8260B/624	Bromoform
GC-MS	EPA 8260B/624	Carbon disulfide
GC-MS	EPA 8260B/624	Carbon tetrachloride
GC-MS	EPA 8260B/624	Chlorobenzene
GC-MS	EPA 8260B/624	Chloroethane
GC-MS	EPA 8260B/624	Chloroform
GC-MS	EPA 8260B	Chloroprene
GC-MS	EPA 8260B/624	Di-isopropylether (DIPE)
GC-MS	EPA 8260B/624	Dibromochloromethane
GC-MS	EPA 8260B	Dibromomethane
GC-MS	EPA 8260B/624	Dichlorodifluoromethane
GC-MS	EPA 8260B/624	Diethyl ether
GC-MS	EPA 8260B	Ethanol
GC-MS	EPA 8260B/624	Ethyl acetate
GC-MS	EPA 8260B	Ethyl methacrylate
GC-MS	EPA 8260B/624	Ethyl-t-butylether (ETBE)
GC-MS	EPA 8260B/624	Ethylbenzene
GC-MS	EPA 8260B	Hexachlorobutadiene
GC-MS	EPA 8260B	Iodomethane (Methyl iodide)
GC-MS	EPA 8260B	Isobutyl alcohol (2-Methyl-1-propanol)
GC-MS	EPA 8260B/624	Isopropylbenzene
GC-MS	EPA 8260B	Methacrylonitrile
GC-MS	EPA 8260B/624	Methyl bromide (Bromomethane)
GC-MS	EPA 8260B/624	Methyl chloride (Chloromethane)
GC-MS	EPA 8260B	Methyl methacrylate
GC-MS	EPA 8260B/624	Methyl tert-butyl ether (MTBE)

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Non-Potable Water		
Technology	**Method**	**Analyte**
GC-MS	EPA 8260B/624	Methylene chloride
GC-MS	EPA 8260B/624	Naphthalene
GC-MS	EPA 8260B	Pentachloroethane
GC-MS	EPA 8260B	Propionitrile (Ethyl cyanide)
GC-MS	EPA 8260B/624	Styrene
GC-MS	EPA 8260B/624	T-amylmethylether (TAME)
GC-MS	EPA 8260B/624	Tetrachloroethylene (Perchloroethylene)
GC-MS	EPA 8260B/624	Toluene
GC-MS	EPA 8260B/624	Trichloroethene (Trichloroethylene)
GC-MS	EPA 8260B/624	Trichlorofluoromethane
GC-MS	EPA 8260B/624	Vinyl acetate
GC-MS	EPA 8260B/624	Vinyl chloride
GC-MS	EPA 8260B/624	Xylene (total)
GC-MS	EPA 8260B/624	cis-1 2-Dichloroethylene
GC-MS	EPA 8260B/624	cis-1 3-Dichloropropene
GC-MS	EPA 8260B	n-Butylbenzene
GC-MS	EPA 8260B	n-Propylbenzene
GC-MS	EPA 8260B/624	p-Dioxane
GC-MS	EPA 8260B	p-Isopropyltoluene
GC-MS	EPA 8260B	sec-Butylbenzene
GC-MS	EPA 8260B/624	tert-Butyl alcohol
GC-MS	EPA 8260B	tert-Butylbenzene
GC-MS	EPA 8260B/624	trans-1 2-Dichloroethylene
GC-MS	EPA 8260B/624	trans-1 3-Dichloropropylene
GC-MS	EPA 8260B	trans-1 4-Dichloro-2-butene
GC-MS	EPA 8260B	Cyclohexane
GC-MS	EPA 8260B	Cyclohexanone
GC-MS	EPA 8260B/624	1-Butanol
GC-MS	EPA 8260B/624	Tetrahydrofuran
GC-MS	EPA 8260B/624	1 1 2-Trichloro-1 2 2-trifluoroethane
GC-MS	EPA 8260B	Methyl acrylate
GC-MS	EPA 8260B	Methyl acetate
GC-MS	EPA 8260B	Hexachloroethane
GC-MS	EPA 8260B	Benzyl chloride
GC-MS	EPA 8260B	Methylcyclohexane

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Non-Potable Water		
Technology	**Method**	**Analyte**
GC-MS	EPA 8260B	2,2,4-Trimethylpentane
GC-MS	EPA 625	2,3-Dichloroaniline
GC-MS	EPA 625	1-Methylphenanthrene
GC-MS	EPA 8270C/D/625	1 2 4 5-Tetrachlorobenzene
GC-MS	EPA 8270C/D/625	1 2 4-Trichlorobenzene
GC-MS	EPA 8270C/D	1 2-Dichlorobenzene
GC-MS	EPA 8270C/D/625	1 2-Diphenylhydrazine
GC-MS	EPA 8270C/D	1 3 5-Trinitrobenzene (1 3 5-TNB)
GC-MS	EPA 8270C/D	1 3-Dichlorobenzene
GC-MS	EPA 8270C/D	1 3-Dinitrobenzene (1 3-DNB)
GC-MS	EPA 8270C/D	1 4-Dichlorobenzene
GC-MS	EPA 8270C/D	1 4-Naphthoquinone
GC-MS	EPA 8270C/D	1 4-Phenylenediamine
GC-MS	EPA 8270C/D	1-Naphthylamine
GC-MS	EPA 8270C/D/625	2 3 4 6-Tetrachlorophenol
GC-MS	EPA 8270C/D/625	2 4 5-Trichlorophenol
GC-MS	EPA 8270C/D/625	2 4 6-Trichlorophenol
GC-MS	EPA 8270C/D/625	2 4-Dichlorophenol
GC-MS	EPA 8270C/D/625	2 4-Dimethylphenol
GC-MS	EPA 8270C/D/625	2 4-Dinitrophenol
GC-MS	EPA 8270C/D/625	2 4-Dinitrotoluene (2 4-DNT)
GC-MS	EPA 8270C/D	2 6-Dichlorophenol
GC-MS	EPA 8270C/D/625	2 6-Dinitrotoluene (2 6-DNT)
GC-MS	EPA 8270C/D	2-Acetylaminofluorene
GC-MS	EPA 8270C/D/625	2-Chloronaphthalene
GC-MS	EPA 8270C/D/625	2-Chlorophenol
GC-MS	EPA 8270C/D/625	2-Methyl-4 6-dinitrophenol
GC-MS	EPA 8270C/D/625	2-Methylnaphthalene
GC-MS	EPA 8270C/D/625	2-Methylphenol (o-Cresol)
GC-MS	EPA 8270C/D	2-Naphthylamine
GC-MS	EPA 8270C/D/625	2-Nitroaniline
GC-MS	EPA 8270C/D/625	2-Nitrophenol
GC-MS	EPA 8270C/D	2-Picoline (2-Methylpyridine)
GC-MS	EPA 8270C/D/625	3 3`-Dichlorobenzidine
GC-MS	EPA 8270C/D	3 3`-Dimethylbenzidine

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Non-Potable Water		
Technology	**Method**	**Analyte**
GC-MS	EPA 8270C/D	3-Methylcholanthrene
GC-MS	EPA 8270C/D	3-Methylphenol (m-Cresol)
GC-MS	EPA 8270C/D/625	3-Nitroaniline
GC-MS	EPA 8270C/D	4-Aminobiphenyl
GC-MS	EPA 8270C/D/625	4-Bromophenyl phenyl ether
GC-MS	EPA 8270C/D/625	4-Chloro-3-methylphenol
GC-MS	EPA 8270C/D/625	4-Chloroaniline
GC-MS	EPA 8270C/D/625	4-Chlorophenyl phenylether
GC-MS	EPA 8270C/D	4-Dimethyl aminoazobenzene
GC-MS	EPA 8270C/D/625	4-Methylphenol (p-Cresol)
GC-MS	EPA 8270C/D/625	4-Nitroaniline
GC-MS	EPA 8270C/D/625	4-Nitrophenol
GC-MS	EPA 8270C/D	5-Nitro-o-toluidine
GC-MS	EPA 8270C/D/625	7 12-Dimethylbenz(a) anthracene
GC-MS	EPA 8270C/D/625	Acenaphthene
GC-MS	EPA 8270C/D/625	Acenaphthylene
GC-MS	EPA 8270C/D/625	Acetophenone
GC-MS	EPA 8270C/D/625	Aniline
GC-MS	EPA 8270C/D/625	Anthracene
GC-MS	EPA 8270C/D	Aramite
GC-MS	EPA 8270C/D/625	Benzidine
GC-MS	EPA 8270C/D/625	Benzo(a)anthracene
GC-MS	EPA 8270C/D/625	Benzo(a)pyrene
GC-MS	EPA 8270C/D/625	Benzo(b)fluoranthene
GC-MS	EPA 8270C/D/625	Benzo(g h i)perylene
GC-MS	EPA 8270C/D/625	Benzo(k)fluoranthene
GC-MS	EPA 8270C/D/625	Benzoic acid
GC-MS	EPA 8270C/D	Benzyl alcohol
GC-MS	EPA 8270C/D/625	Butyl benzyl phthalate
GC-MS	EPA 8270C/D/625	Carbazole
GC-MS	EPA 8270C/D/625	Chrysene
GC-MS	EPA 8270C/D/625	Di-n-butyl phthalate
GC-MS	EPA 8270C/D/625	Di-n-octyl phthalate
GC-MS	EPA 8270C/D/625	Dibenz(a h)anthracene
GC-MS	EPA 8270C/D/625	Dibenz(a h)acridine

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Non-Potable Water		
Technology	**Method**	**Analyte**
GC-MS	EPA 8270C/D/625	Dibenzofuran
GC-MS	EPA 8270C/D/625	Diethyl phthalate
GC-MS	EPA 8270C/D/625	Dimethyl phthalate
GC-MS	EPA 8270C/D	Ethyl methanesulfonate
GC-MS	EPA 8270C/D/625	Fluoranthene
GC-MS	EPA 8270C/D/625	Fluorene
GC-MS	EPA 8270C/D/625	Hexachlorobenzene
GC-MS	EPA 8270C/D/625	Hexachlorobutadiene
GC-MS	EPA 8270C/D/625	Hexachlorocyclopentadiene
GC-MS	EPA 8270C/D/625	Hexachloroethane
GC-MS	EPA 8270C/D	Hexachlorophene
GC-MS	EPA 8270C/D	Hexachloropropene
GC-MS	EPA 8270C/D/625	Indeno(1 2 3-cd)pyrene
GC-MS	EPA 8270C/D/625	Isophorone
GC-MS	EPA 8270C/D	Isosafrole
GC-MS	EPA 8270C/D	Methapyrilene
GC-MS	EPA 8270C/D	Methyl methanesulfonate
GC-MS	EPA 8270C/D/625	Naphthalene
GC-MS	EPA 8270C/D/625	Nitrobenzene
GC-MS	EPA 8270C/D	Nitroquinoline-1-oxide
GC-MS	EPA 8270C/D/625	Pentachlorobenzene
GC-MS	EPA 8270C/D	Pentachloronitrobenzene
GC-MS	EPA 8270C/D/625	Pentachlorophenol
GC-MS	EPA 8270C/D	Phenacetin
GC-MS	EPA 8270C/D/625	Phenanthrene
GC-MS	EPA 8270C/D/625	Phenol
GC-MS	EPA 8270C/D	Pronamide (Kerb)
GC-MS	EPA 8270C/D/625	Pyrene
GC-MS	EPA 8270C/D/625	Pyridine
GC-MS	EPA 8270C/D	Safrole
GC-MS	EPA 8270C/D	a-a-Dimethylphenethylamine
GC-MS	EPA 8270C/D/625	bis(2-Chloroethoxy)methane
GC-MS	EPA 8270C/D/625	bis(2-Chloroethyl) ether
GC-MS	EPA 8270C/D/625	bis(2-Chloroisopropyl) ether (2 2`-Oxybis(1-chloropropane))
GC-MS	EPA 8270C/D/625	bis(2-Ethylhexyl) phthalate (DEHP)

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Non-Potable Water		
Technology	**Method**	**Analyte**
GC-MS	EPA 8270C/D/625	n-Nitroso-di-n-butylamine
GC-MS	EPA 8270C/D/625	n-Nitrosodi-n-propylamine
GC-MS	EPA 8270C/D/625	n-Nitrosodiethylamine
GC-MS	EPA 8270C/D/625	n-Nitrosodimethylamine
GC-MS	EPA 8270C/D/625	n-Nitrosodiphenylamine
GC-MS	EPA 8270C/D	n-Nitrosomethylethylamine
GC-MS	EPA 8270C/D	n-Nitrosomorpholine
GC-MS	EPA 8270C/D	n-Nitrosopiperidine
GC-MS	EPA 8270C/D/625	n-Nitrosopyrrolidine
GC-MS	EPA 8270C/D	o-Toluidine
GC-MS	EPA 8270C/D	Chlorobenzilate
GC-MS	EPA 8270C/D	Diallate
GC-MS	EPA 8270C/D	Dimethoate
GC-MS	EPA 8270C/D	Disulfoton
GC-MS	EPA 8270C/D	Famphur
GC-MS	EPA 8270C/D	Isodrin
GC-MS	EPA 8270C/D	Kepone
GC-MS	EPA 8270C/D	Methyl parathion (Parathion methyl)
GC-MS	EPA 8270C/D	Phorate
GC-MS	EPA 8270C/D	Thionazin (Zinophos)
GC-MS	EPA 8270C/D	o o o-Triethyl phosphorothioate
GC-MS	EPA 8270C/D	Pentachloroethane
GC-MS	EPA 8270C/D/625	Alpha-terpineol
GC-MS	EPA 8270C/D	Dinoseb
GC-MS	EPA 8270C/D	Parathion
GC-MS	EPA 8270C/D	1,1'-Biphenyl
GC-MS	EPA 8270C/D	Diphenylamine
GC-MS	EPA 8270C/D	Benzaldehyde
GC-MS	EPA 8270C/D/625	n-Decane
GC-MS	EPA 8270C/D/625	n-Octadecane
GC-MS	EPA 8270C/D	Caprolactam
GC-MS	EPA 8270C/D	Atrazine
GC-MS	EPA 8270C/D	Hydroquinone
GC-MS-SIM	EPA 8270C/D	Benzo(a)anthracene
GC-MS-SIM	EPA 8270C/D	Benzo(a)pyrene

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Non-Potable Water		
Technology	**Method**	**Analyte**
GC-MS-SIM	EPA 8270C/D	Benzo(b)fluoranthene
GC-MS-SIM	EPA 8270C/D	Benzo(k)fluoranthene
GC-MS-SIM	EPA 8270C/D	Dibenzo(a,h)anthracene
GC-MS-SIM	EPA 8270C/D	Hexachlorobenzene
GC-MS-SIM	EPA 8270C/D	Indeno(1,2,3-cd)pyrene
GC-MS-SIM	EPA 8270C/D	Pentachlorophenol
HPLC-UV/VIS	EPA 8310	Acenaphthene
HPLC-UV/VIS	EPA 8310	Acenaphthylene
HPLC-UV/VIS	EPA 8310	Anthracene
HPLC-UV/VIS	EPA 8310	Benzo(a)anthracene
HPLC-UV/VIS	EPA 8310	Benzo(a)pyrene
HPLC-UV/VIS	EPA 8310	Benzo(b)fluoranthene
HPLC-UV/VIS	EPA 8310	Benzo(g h i)perylene
HPLC-UV/VIS	EPA 8310	Benzo(k)fluoranthene
HPLC-UV/VIS	EPA 8310	Chrysene
HPLC-UV/VIS	EPA 8310	Dibenz(a h)anthracene
HPLC-UV/VIS	EPA 8310	Fluoranthene
HPLC-UV/VIS	EPA 8310	Fluorene
HPLC-UV/VIS	EPA 8310	Indeno(1 2 3-cd)pyrene
HPLC-UV/VIS	EPA 8310	Naphthalene
HPLC-UV/VIS	EPA 8310	Phenanthrene
HPLC-UV/VIS	EPA 8310	Pyrene
ICP-AES	EPA 6010B/C/200.7	Aluminum
ICP-AES	EPA 6010B/C/200.7	Antimony
ICP-AES	EPA 6010B/C/200.7	Arsenic
ICP-AES	EPA 6010B/C/200.7	Barium
ICP-AES	EPA 6010B/C/200.7	Beryllium
ICP-AES	EPA 6010B/C/200.7	Boron
ICP-AES	EPA 6010B/C/200.7	Cadmium
ICP-AES	EPA 6010B/C/200.7	Calcium
ICP-AES	EPA 6010B/C/200.7	Chromium
ICP-AES	EPA 6010B/C/200.7	Cobalt
ICP-AES	EPA 6010B/C/200.7	Copper
ICP	EPA 200.7	Hardness – total as CaCO3
ICP-AES	EPA 6010B/C/200.7	Iron

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Non-Potable Water		
Technology	**Method**	**Analyte**
ICP-AES	EPA 6010B/C/200.7	Lead
ICP-AES	EPA 6010B/C/200.7	Magnesium
ICP-AES	EPA 6010B/C/200.7	Manganese
ICP-AES	EPA 6010B/C/200.7	Molybdenum
ICP-AES	EPA 6010B/C/200.7	Nickel
ICP-AES	EPA 6010B/C/200.7	Potassium
ICP-AES	EPA 6010B/C/200.7	Selenium
ICP	EPA 200.7	Silica - dissolved
ICP-AES	EPA 6010B/C/200.7	Silver
ICP-AES	EPA 6010B/C/200.7	Sodium
ICP-AES	EPA 6010B/C	Strontium
ICP-AES	EPA 6010B/C/200.7	Thallium
ICP-AES	EPA 6010B/C/200.7	Tin
ICP-AES	EPA 6010B/C/200.7	Titanium
ICP-AES	EPA 6010B/C/200.7	Vanadium
ICP-AES	EPA 6010B/C/200.7	Zinc
Atomic Fluorescence	EPA 245.7 / 1631E	Mercury
CVAA	EPA 7470A	Mercury
UV-VIS	EPA 7196A	Hexavalent Chromium
IC	EPA 7199	Hexavalent Chromium
IC	EPA 300.0/9056/A	Bromide
IC	EPA 300.0/9056/A	Chloride
IC	EPA 300.0/9056/A	Fluoride
IC	EPA 300.0/9056/A	Sulfate
Pensky-Martens Closed-Cup	EPA 1010A	Ignitability
Electrometric Measurement	EPA 9040C	pH
Gravimetric	EPA 1664A	Silica Gen Treated N-Hexane Extractable Material (Oil and Grease)
Gravimetric	SM 2540 B	Total Solids
Distillation / UV-Vis	EPA 9010B/9012B (M)	Total and Amenable Cyanide
Combustion / IR	EPA 9060A	Total Organic Carbon
Combustion / Titration	EPA 9020B	Total Organic Halides
Titration	EPA 9034	Acid-Soluble and Acid-Insoluble Sulfides
Electrode	EPA 9045C	pH
Colorimetric / Distillation	EPA 9066	Phenolics

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Non-Potable Water		
Technology	**Method**	**Analyte**
Preparation	**Method**	**Type**
TCLP Extraction	EPA 1311	Toxicity Characteristic Leaching Procedure
SPLP	EPA 1312	Synthetic Precipitation Leaching Procedure
Acid Digestion	EPA 3005A/3010A	Waters for Total Recoverable or Dissolved Metals
Purge and Trap	EPA 5030B	Aqueous samples
Liquid Extraction	EPA 3510C	Semivolatile Separatory Funnel Liquid

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
ICP-MS	EPA 6020/A	Aluminum
ICP-MS	EPA 6020/A	Antimony
ICP-MS	EPA 6020/A	Arsenic
ICP-MS	EPA 6020/A	Barium
ICP-MS	EPA 6020/A	Beryllium
ICP-MS	EPA 6020/A	Cadmium
ICP-MS	EPA 6020/A	Calcium
ICP-MS	EPA 6020/A	Chromium
ICP-MS	EPA 6020/A	Cobalt
ICP-MS	EPA 6020/A	Copper
ICP-MS	EPA 6020/A	Iron
ICP-MS	EPA 6020/A	Lead
ICP-MS	EPA 6020/A	Magnesium
ICP-MS	EPA 6020/A	Manganese
ICP-MS	EPA 6020/A	Molybdenum
ICP-MS	EPA 6020/A	Nickel
ICP-MS	EPA 6020/A	Potassium
ICP-MS	EPA 6020/A	Selenium
ICP-MS	EPA 6020/A	Silver
ICP-MS	EPA 6020/A	Sodium
ICP-MS	EPA 6020/A	Thallium
ICP-MS	EPA 6020/A	Tin
ICP-MS	EPA 6020/A	Vanadium

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Solid and Chemical Materials		
Technology	**Method**	**Analyte**
ICP-MS	EPA 6020/A	Zinc
GC-ECD	EPA 8011	1,2-Dibromomethane (EDB)
GC-ECD	EPA 8011	1,2-Dibromo-3-chloropropane
GC-ECD	EPA 8011	1,2,3-Trichloropropane
GC-FID	EPA 8015 B/C	Diesel range organics (DRO)
GC-FID	EPA 8015 B/C	Gasoline range organics (GRO)
GC-FID	EPA 8015 B/C	Ethanol
GC-FID	EPA 8015 B/C	Isobutyl alcohol (2-Methyl-1-propanol)
GC-FID	EPA 8015 B/C	Isopropyl alcohol (2-Propanol)
GC-FID	EPA 8015 B/C	Methanol
GC-FID	EPA 8015 B/C	Tert-butyl alcohol
GC-FID	TCEQ 1005	Diesel Range Organics
GC-FID	NJDEP-EPH	Extractable Petroleum Hydrocarbons
GC	EPA 8021B	Benzene
GC	EPA 8021B	Chlorobenzene
GC	EPA 8021B	1,2-Dichlorobenzene
GC	EPA 8021B	1,3-Dichlorobenzene
GC	EPA 8021B	1,4-Dichlorobenzene
GC	EPA 8021B	Ethylbenzene
GC	EPA 8021B	Styrene
GC	EPA 8021B	Toluene
GC	EPA 8021B	o-Xylene
GC	EPA 8021B	m-Xylene
GC	EPA 8021B	p-Xylene
GC	EPA 8021B	trans-1,3-Dichloropropene
GC	EPA 8021B	cis-1,2-Dichloroethene
GC	EPA 8021B	trans-1,2-Dichloroethene
GC	EPA 8021B	cis-1,3-Dichloropropene
GC	EPA 8021B	Tetrachloroethene
GC	EPA 8021B	Trichloroethene
GC	EPA 8021B	Methyl tert-butyl ether
GC-ECD	EPA 8081A/B	4 4`-DDD
GC-ECD	EPA 8081A/B	4 4`-DDE
GC-ECD	EPA 8081A/B	4 4`-DDT
GC-ECD	EPA 8081A/B	Aldrin

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Solid and Chemical Materials		
Technology	**Method**	**Analyte**
GC-ECD	EPA 8081A/B	Chlordane (tech.)
GC-ECD	EPA 8081A/B	Dieldrin
GC-ECD	EPA 8081A/B	Endosulfan I
GC-ECD	EPA 8081A/B	Endosulfan II
GC-ECD	EPA 8081A/B	Endosulfan sulfate
GC-ECD	EPA 8081A/B	Endrin
GC-ECD	EPA 8081A/B	Endrin aldehyde
GC-ECD	EPA 8081A/B	Endrin ketone
GC-ECD	EPA 8081A/B	Heptachlor
GC-ECD	EPA 8081A/B	Heptachlor epoxide
GC-ECD	EPA 8081A/B	Methoxychlor
GC-ECD	EPA 8081A/B	Toxaphene (Chlorinated camphene)
GC-ECD	EPA 8081A/B	alpha-BHC (alpha-Hexachlorocyclohexane)
GC-ECD	EPA 8081A/B	alpha-Chlordane
GC-ECD	EPA 8081A/B	beta-BHC (beta-Hexachlorocyclohexane)
GC-ECD	EPA 8081A/B	delta-BHC
GC-ECD	EPA 8081A/B	gamma-BHC (Lindane gamma-Hexachlorocyclohexane)
GC-ECD	EPA 8081A/B	gamma-Chlordane
GC-ECD	EPA 8081A/B	Mirex
GC-ECD	EPA 8082/A	Aroclor-1016 (PCB-1016)
GC-ECD	EPA 8082/A	Aroclor-1221 (PCB-1221)
GC-ECD	EPA 8082/A	Aroclor-1232 (PCB-1232)
GC-ECD	EPA 8082/A	Aroclor-1242 (PCB-1242)
GC-ECD	EPA 8082/A	Aroclor-1248 (PCB-1248)
GC-ECD	EPA 8082/A	Aroclor-1254 (PCB-1254)
GC-ECD	EPA 8082/A	Aroclor-1260 (PCB-1260)
GC-ECD	EPA 8082A	Aroclor-1262 (PCB-1262)
GC-ECD	EPA 8082/A	Aroclor-1268 (PCB-1268)
GC-ECD	EPA 8151A	2 4 5-T
GC-ECD	EPA 8151A	2 4-D
GC-ECD	EPA 8151A	2 4-DB
GC-ECD	EPA 8151A	Dalapon
GC-ECD	EPA 8151A	Dicamba
GC-ECD	EPA 8151A	Dichloroprop (Dichlorprop)
GC-ECD	EPA 8151A	Dinoseb (2-sec-butyl-4 6-dinitrophenol DNBP)

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Solid and Chemical Materials		
Technology	**Method**	**Analyte**
GC-ECD	EPA 8151A	MCPA
GC-ECD	EPA 8151A	MCPP
GC-ECD	EPA 8151A	Pentachlorophenol
GC-ECD	EPA 8151A	Silvex (2 4 5-TP)
GC-ECD	EPA 8151A	Picloram
GC-FID	EPA RSK-175	Ethane
GC-FID	EPA RSK-175	Ethene
GC-FID	EPA RSK-175	Methane
GC-FID	EPA RSK-175	Propane
GC-MS	EPA 8260	Ethylene glycol
GC-MS	EPA 8260	Propylene glycol
GC-MS	EPA 8260B	1 1 1 2-Tetrachloroethane
GC-MS	EPA 8260B	1 1 1-Trichloroethane
GC-MS	EPA 8260B	1 1 2 2-Tetrachloroethane
GC-MS	EPA 8260B	1 1 2-Trichloroethane
GC-MS	EPA 8260B	1 1-Dichloroethane
GC-MS	EPA 8260B	1 1-Dichloroethylene
GC-MS	EPA 8260B	1 1-Dichloropropene
GC-MS	EPA 8260B	1 2 3-Trichlorobenzene
GC-MS	EPA 8260B	1 2 3-Trichloropropane
GC-MS	EPA 8260B	1 2 4-Trichlorobenzene
GC-MS	EPA 8260B	1 2 4-Trimethylbenzene
GC-MS	EPA 8260B	1 2-Dibromo-3-chloropropane (DBCP)
GC-MS	EPA 8260B	1 2-Dibromoethane (EDB Ethylene dibromide)
GC-MS	EPA 8260B	1 2-Dichlorobenzene
GC-MS	EPA 8260B	1 2-Dichloroethane
GC-MS	EPA 8260B	1 2-Dichloropropane
GC-MS	EPA 8260B	1 3 5-Trimethylbenzene
GC-MS	EPA 8260B	1 3-Dichlorobenzene
GC-MS	EPA 8260B	1 3-Dichloropropane
GC-MS	EPA 8260B	1 4-Dichlorobenzene
GC-MS	EPA 8260B	1-Chlorohexane
GC-MS	EPA 8260B	2 2-Dichloropropane
GC-MS	EPA 8260B	2-Butanone (Methyl ethyl ketone MEK)
GC-MS	EPA 8260B	2-Chloroethyl vinyl ether

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Solid and Chemical Materials		
Technology	**Method**	**Analyte**
GC-MS	EPA 8260B	2-Chlorotoluene
GC-MS	EPA 8260B	2-Hexanone
GC-MS	EPA 8260B	2-Nitropropane
GC-MS	EPA 8260B	4-Chlorotoluene
GC-MS	EPA 8260B	4-Methyl-2-pentanone (MIBK)
GC-MS	EPA 8260B	Acetone
GC-MS	EPA 8260B	Acetonitrile
GC-MS	EPA 8260B	Acrolein (Propenal)
GC-MS	EPA 8260B	Acrylonitrile
GC-MS	EPA 8260B	Allyl chloride (3-Chloropropene)
GC-MS	EPA 8260B	Benzene
GC-MS	EPA 8260B	Bromobenzene
GC-MS	EPA 8260B	Bromochloromethane
GC-MS	EPA 8260B	Bromodichloromethane
GC-MS	EPA 8260B	Bromoform
GC-MS	EPA 8260B	Carbon disulfide
GC-MS	EPA 8260B	Carbon tetrachloride
GC-MS	EPA 8260B	Chlorobenzene
GC-MS	EPA 8260B	Chloroethane
GC-MS	EPA 8260B	Chloroform
GC-MS	EPA 8260B	Chloroprene
GC-MS	EPA 8260B	Di-isopropylether (DIPE)
GC-MS	EPA 8260B	Dibromochloromethane
GC-MS	EPA 8260B	Dibromomethane
GC-MS	EPA 8260B	Dichlorodifluoromethane
GC-MS	EPA 8260B	Diethyl ether
GC-MS	EPA 8260B	Ethanol
GC-MS	EPA 8260B	Ethyl acetate
GC-MS	EPA 8260B	Ethyl methacrylate
GC-MS	EPA 8260B	Ethyl-t-butylether (ETBE)
GC-MS	EPA 8260B	Ethylbenzene
GC-MS	EPA 8260B	Hexachlorobutadiene
GC-MS	EPA 8260B	Iodomethane (Methyl iodide)
GC-MS	EPA 8260B	Isobutyl alcohol (2-Methyl-1-propanol)
GC-MS	EPA 8260B	Isopropylbenzene

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Solid and Chemical Materials		
Technology	**Method**	**Analyte**
GC-MS	EPA 8260B	Methacrylonitrile
GC-MS	EPA 8260B	Methyl bromide (Bromomethane)
GC-MS	EPA 8260B	Methyl chloride (Chloromethane)
GC-MS	EPA 8260B	Methyl methacrylate
GC-MS	EPA 8260B	Methyl tert-butyl ether (MTBE)
GC-MS	EPA 8260B	Methylene chloride
GC-MS	EPA 8260B	Naphthalene
GC-MS	EPA 8260B	Pentachloroethane
GC-MS	EPA 8260B	Propionitrile (Ethyl cyanide)
GC-MS	EPA 8260B	Styrene
GC-MS	EPA 8260B	T-amylmethylether (TAME)
GC-MS	EPA 8260B	Tetrachloroethylene (Perchloroethylene)
GC-MS	EPA 8260B	Toluene
GC-MS	EPA 8260B	Trichloroethene (Trichloroethylene)
GC-MS	EPA 8260B	Trichlorofluoromethane
GC-MS	EPA 8260B	Vinyl acetate
GC-MS	EPA 8260B	Vinyl chloride
GC-MS	EPA 8260B	Xylene (total)
GC-MS	EPA 8260B	cis-1 2-Dichloroethylene
GC-MS	EPA 8260B	cis-1 3-Dichloropropene
GC-MS	EPA 8260B	n-Butylbenzene
GC-MS	EPA 8260B	n-Propylbenzene
GC-MS	EPA 8260B	p-Dioxane
GC-MS	EPA 8260B	p-Isopropyltoluene
GC-MS	EPA 8260B	sec-Butylbenzene
GC-MS	EPA 8260B	tert-Butyl alcohol
GC-MS	EPA 8260B	tert-Butylbenzene
GC-MS	EPA 8260B	trans-1 2-Dichloroethylene
GC-MS	EPA 8260B	trans-1 3-Dichloropropylene
GC-MS	EPA 8260B	trans-1 4-Dichloro-2-butene
GC-MS	EPA 8260B	Cyclohexane
GC-MS	EPA 8260B	Cyclohexanone
GC-MS	EPA 8260B	1-Butanol
GC-MS	EPA 8260B	Tetrahydrofuran
GC-MS	EPA 8260B	1 1 2-Trichloro-1 2 2-trifluoroethane

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Solid and Chemical Materials		
Technology	**Method**	**Analyte**
GC-MS	EPA 8260B	Methyl acrylate
GC-MS	EPA 8260B	Methyl acetate
GC-MS	EPA 8260B	Hexachloroethane
GC-MS	EPA 8260B	Methylcyclohexane
GC-MS	EPA 8260B	2,2,4-Trimethylpentane
GC-MS	EPA 8270C/D	1 2 4 5-Tetrachlorobenzene
GC-MS	EPA 8270C/D	1 2 4-Trichlorobenzene
GC-MS	EPA 8270C/D	1 2-Dichlorobenzene
GC-MS	EPA 8270C/D	1 2-Diphenylhydrazine
GC-MS	EPA 8270C/D	1 3 5-Trinitrobenzene (1 3 5-TNB)
GC-MS	EPA 8270C/D	1 3-Dichlorobenzene
GC-MS	EPA 8270C/D	1 3-Dinitrobenzene (1 3-DNB)
GC-MS	EPA 8270C/D	1 4-Dichlorobenzene
GC-MS	EPA 8270C/D	1 4-Naphthoquinone
GC-MS	EPA 8270C/D	1-Naphthylamine
GC-MS	EPA 8270C/D	2 3 4 6-Tetrachlorophenol
GC-MS	EPA 8270C/D	2 4 5-Trichlorophenol
GC-MS	EPA 8270C/D	2 4 6-Trichlorophenol
GC-MS	EPA 8270C/D	2 4-Dichlorophenol
GC-MS	EPA 8270C/D	2 4-Dimethylphenol
GC-MS	EPA 8270C/D	2 4-Dinitrophenol
GC-MS	EPA 8270C/D	2 4-Dinitrotoluene (2 4-DNT)
GC-MS	EPA 8270C/D	2 6-Dichlorophenol
GC-MS	EPA 8270C/D	2 6-Dinitrotoluene (2 6-DNT)
GC-MS	EPA 8270C/D	2-Acetylaminofluorene
GC-MS	EPA 8270C/D	2-Chloronaphthalene
GC-MS	EPA 8270C/D	2-Chlorophenol
GC-MS	EPA 8270C/D	2-Methyl-4 6-dinitrophenol
GC-MS	EPA 8270C/D	2-Methylnaphthalene
GC-MS	EPA 8270C/D	2-Methylphenol (o-Cresol)
GC-MS	EPA 8270C/D	2-Naphthylamine
GC-MS	EPA 8270C/D	2-Nitroaniline
GC-MS	EPA 8270C/D	2-Nitrophenol
GC-MS	EPA 8270C/D	2-Picoline (2-Methylpyridine)
GC-MS	EPA 8270C/D	3 3`-Dichlorobenzidine

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Solid and Chemical Materials		
Technology	**Method**	**Analyte**
GC-MS	EPA 8270C/D	3-Methylcholanthrene
GC-MS	EPA 8270C/D	3-Methylphenol (m-Cresol)
GC-MS	EPA 8270C/D	3-Nitroaniline
GC-MS	EPA 8270C/D	4-Aminobiphenyl
GC-MS	EPA 8270C/D	4-Bromophenyl phenyl ether
GC-MS	EPA 8270C/D	4-Chloro-3-methylphenol
GC-MS	EPA 8270C/D	4-Chloroaniline
GC-MS	EPA 8270C/D	4-Chlorophenyl phenylether
GC-MS	EPA 8270C/D	4-Dimethyl aminoazobenzene
GC-MS	EPA 8270C/D	4-Methylphenol (p-Cresol)
GC-MS	EPA 8270C/D	4-Nitroaniline
GC-MS	EPA 8270C/D	4-Nitrophenol
GC-MS	EPA 8270C/D	5-Nitro-o-toluidine
GC-MS	EPA 8270C/D	7 12-Dimethylbenz(a) anthracene
GC-MS	EPA 8270C/D	Acenaphthene
GC-MS	EPA 8270C/D	Acenaphthylene
GC-MS	EPA 8270C/D	Acetophenone
GC-MS	EPA 8270C/D	Aniline
GC-MS	EPA 8270C/D	Anthracene
GC-MS	EPA 8270C/D	Benzidine
GC-MS	EPA 8270C/D	Benzo(a)anthracene
GC-MS	EPA 8270C/D	Benzo(a)pyrene
GC-MS	EPA 8270C/D	Benzo(b)fluoranthene
GC-MS	EPA 8270C/D	Benzo(g h i)perylene
GC-MS	EPA 8270C/D	Benzo(k)fluoranthene
GC-MS	EPA 8270C/D	Benzoic acid
GC-MS	EPA 8270C/D	Benzyl alcohol
GC-MS	EPA 8270C/D	Butyl benzyl phthalate
GC-MS	EPA 8270C/D	Carbazole
GC-MS	EPA 8270C/D	Chrysene
GC-MS	EPA 8270C/D	Di-n-butyl phthalate
GC-MS	EPA 8270C/D	Di-n-octyl phthalate
GC-MS	EPA 8270C/D	Dibenz(a h)anthracene
GC-MS	EPA 8270C/D	Dibenz(a j)acridine
GC-MS	EPA 8270C/D	Dibenzofuran

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Solid and Chemical Materials		
Technology	**Method**	**Analyte**
GC-MS	EPA 8270C/D	Diethyl phthalate
GC-MS	EPA 8270C/D	Dimethyl phthalate
GC-MS	EPA 8270C/D	Ethyl methanesulfonate
GC-MS	EPA 8270C/D	Fluoranthene
GC-MS	EPA 8270C/D	Fluorene
GC-MS	EPA 8270C/D	Hexachlorobenzene
GC-MS	EPA 8270C/D	Hexachlorobutadiene
GC-MS	EPA 8270C/D	Hexachlorocyclopentadiene
GC-MS	EPA 8270C/D	Hexachloroethane
GC-MS	EPA 8270C/D	Hexachloropropene
GC-MS	EPA 8270C/D	Indeno(1 2 3-cd)pyrene
GC-MS	EPA 8270C/D	Isophorone
GC-MS	EPA 8270C/D	Isosafrole
GC-MS	EPA 8270C/D	Methyl methanesulfonate
GC-MS	EPA 8270C/D	Naphthalene
GC-MS	EPA 8270C/D	Nitrobenzene
GC-MS	EPA 8270C/D	Nitroquinoline-1-oxide
GC-MS	EPA 8270C/D	Pentachlorobenzene
GC-MS	EPA 8270C/D	Pentachloronitrobenzene
GC-MS	EPA 8270C/D	Pentachlorophenol
GC-MS	EPA 8270C/D	Phenacetin
GC-MS	EPA 8270C/D	Phenanthrene
GC-MS	EPA 8270C/D	Phenol
GC-MS	EPA 8270C/D	Pronamide (Kerb)
GC-MS	EPA 8270C/D	Pyrene
GC-MS	EPA 8270C/D	Pyridine
GC-MS	EPA 8270C/D	Safrole
GC-MS	EPA 8270C/D	a-a-Dimethylphenethylamine
GC-MS	EPA 8270C/D	bis(2-Chloroethoxy)methane
GC-MS	EPA 8270C/D	bis(2-Chloroethyl) ether
GC-MS	EPA 8270C/D	bis(2-Chloroisopropyl) ether (2 2`-Oxybis(1-chloropropane))
GC-MS	EPA 8270C/D	bis(2-Ethylhexyl) phthalate (DEHP)
GC-MS	EPA 8270C/D	n-Nitroso-di-n-butylamine
GC-MS	EPA 8270C/D	n-Nitrosodi-n-propylamine
GC-MS	EPA 8270C/D	n-Nitrosodiethylamine

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Solid and Chemical Materials		
Technology	**Method**	**Analyte**
GC-MS	EPA 8270C/D	n-Nitrosodimethylamine
GC-MS	EPA 8270C/D	n-Nitrosodiphenylamine
GC-MS	EPA 8270C/D	n-Nitrosomethylethylamine
GC-MS	EPA 8270C/D	n-Nitrosomorpholine
GC-MS	EPA 8270C/D	n-Nitrosopiperidine
GC-MS	EPA 8270C/D	n-Nitrosopyrrolidine
GC-MS	EPA 8270C/D	o-Toluidine
GC-MS	EPA 8270C/D	Chlorobenzilate
GC-MS	EPA 8270C/D	Diallate
GC-MS	EPA 8270C/D	Dimethoate
GC-MS	EPA 8270C/D	Disulfoton
GC-MS	EPA 8270C/D	Isodrin
GC-MS	EPA 8270C/D	Kepone
GC-MS	EPA 8270C/D	Methyl parathion (Parathion methyl)
GC-MS	EPA 8270C/D	Phorate
GC-MS	EPA 8270C/D	Thionazin (Zinophos)
GC-MS	EPA 8270C/D	o o o-Triethyl phosphorothioate
GC-MS	EPA 8270C/D	Pentachloroethane
GC-MS	EPA 8270C/D	Alpha-terpineol
GC-MS	EPA 8270C/D	Dinoseb
GC-MS	EPA 8270C/D	Parathion
GC-MS	EPA 8270C/D	1,1'-Biphenyl
GC-MS	EPA 8270C/D	Diphenylamine
GC-MS	EPA 8270C/D	Benzaldehyde
GC-MS	EPA 8270C/D	n-Decane
GC-MS	EPA 8270C/D	n-Octadecane
GC-MS	EPA 8270C/D	Caprolactam
GC-MS	EPA 8270C/D	Atrazine
GC-MS	EPA 8270C/D	Hydroquinone
GC-MS-SIM	EPA 8270C/D	Benzo(a)anthracene
GC-MS-SIM	EPA 8270C/D	Benzo(a)pyrene
GC-MS-SIM	EPA 8270C/D	Benzo(b)fluoranthene
GC-MS-SIM	EPA 8270C/D	Benzo(k)fluoranthene
GC-MS-SIM	EPA 8270C/D	Dibenzo(a,h)anthracene
GC-MS-SIM	EPA 8270C/D	Hexachlorobenzene

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Solid and Chemical Materials		
Technology	**Method**	**Analyte**
GC-MS-SIM	EPA 8270C/D	Indeno(1,2,3-cd)pyrene
GC-MS-SIM	EPA 8270C/D	Pentachlorophenol
HPLC-UV/VIS	EPA 8310	Acenaphthene
HPLC-UV/VIS	EPA 8310	Acenaphthylene
HPLC-UV/VIS	EPA 8310	Anthracene
HPLC-UV/VIS	EPA 8310	Benzo(a)anthracene
HPLC-UV/VIS	EPA 8310	Benzo(a)pyrene
HPLC-UV/VIS	EPA 8310	Benzo(b)fluoranthene
HPLC-UV/VIS	EPA 8310	Benzo(g h i)perylene
HPLC-UV/VIS	EPA 8310	Benzo(k)fluoranthene
HPLC-UV/VIS	EPA 8310	Chrysene
HPLC-UV/VIS	EPA 8310	Dibenz(a h)anthracene
HPLC-UV/VIS	EPA 8310	Fluoranthene
HPLC-UV/VIS	EPA 8310	Fluorene
HPLC-UV/VIS	EPA 8310	Indeno(1 2 3-cd)pyrene
HPLC-UV/VIS	EPA 8310	Naphthalene
HPLC-UV/VIS	EPA 8310	Phenanthrene
HPLC-UV/VIS	EPA 8310	Pyrene
ICP-AES	EPA 6010B/C	Aluminum
ICP-AES	EPA 6010B/C	Antimony
ICP-AES	EPA 6010B/C	Arsenic
ICP-AES	EPA 6010B/C	Barium
ICP-AES	EPA 6010B/C	Beryllium
ICP-AES	EPA 6010B/C	Boron
ICP-AES	EPA 6010B/C	Cadmium
ICP-AES	EPA 6010B/C	Calcium
ICP-AES	EPA 6010B/C	Chromium
ICP-AES	EPA 6010B/C	Cobalt
ICP-AES	EPA 6010B/C	Copper
ICP-AES	EPA 6010B/C	Iron
ICP-AES	EPA 6010B/C	Lead
ICP-AES	EPA 6010B/C	Magnesium
ICP-AES	EPA 6010B/C	Manganese
ICP-AES	EPA 6010B/C	Molybdenum
ICP-AES	EPA 6010B/C	Nickel

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Solid and Chemical Materials		
Technology	**Method**	**Analyte**
ICP-AES	EPA 6010B/C	Potassium
ICP-AES	EPA 6010B/C	Selenium
ICP-AES	EPA 6010B/C	Silver
ICP-AES	EPA 6010B/C	Sodium
ICP-AES	EPA 6010B/C	Strontium
ICP-AES	EPA 6010B/C	Thallium
ICP-AES	EPA 6010B/C	Tin
ICP-AES	EPA 6010B/C	Titanium
ICP-AES	EPA 6010B/C	Vanadium
ICP-AES	EPA 6010B/C	Zinc
CVAA	EPA 7471A	Mercury
CVAA	EPA 7470A	Mercury
UV-VIS	EPA 7196A	Hexavalent Chromium
IC	EPA 7199	Hexavalent Chromium
IC	EPA 9056/A	Bromide
IC	EPA 9056/A	Chloride
IC	EPA 9056/A	Fluoride
IC	EPA 9056/A	Sulfate
Ignitability	EPA 1010A	Pensky-Martens Closed-Cup
Mix with Water or Calcium Chloride	EPA 9045C	Hydrogen Ion, pH
RCRA	EPA 7.3.3.2	Hydrogen Cyanide Released from Wastes: SW 846 Chapter 7
RCRA	EPA 7.3.4.2	Hydrogen Sulfide Released from Wastes: SW 846 Chapter 7
Extraction / Gravimetric	EPA 1664A	Silica Gen Treated N-Hexane Extractable Material (Oil and Grease)
Gravimetric	EPA 9071B	Oil and Grease Extraction Method for sludge and sediment samples
Gravimetric	SM 2540 B Mod.	% Solids
Distillation / Colormetric	EPA 9010B/C/9012B(M)	Total and Amenable Cyanide
Combustion	Lloyd Kahn	Total Organic Carbon
Combustion / IR	EPA 9060A	Total Organic Carbon
Distillation / Colormetric	EPA 9065	Phenols
Titration	EPA 9034	Acid-Soluble and Acid-Insoluble Sulfides
Electrode	EPA 9040C	pH
Preparation	**Method**	**Type**
Acid Digestion	EPA 3050B	Sediments, Sludges, and Soils

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Solid and Chemical Materials		
Technology	**Method**	**Analyte**
Closed-System Purge-and-Trap and Extraction	EPA 5035B	Volatile Organics in Soil and Waste Samples
Soxhlet Extraction	EPA 3540C	Semivolatile Extraction
Pressurized Fluid Extraction (PFE)	EPA 3545/A	Semivolatile Extraction
Ultrasonic Extraction	EPA 3550B/C	Semivolatile Extraction
Alumina Cleanup	EPA 3610B	Semivolatile Extraction - Cleanup
Florisil Cleanup	EPA 3620B/C	Semivolatile Extraction - Cleanup
Silica gel cleanup	EPA 3630C	Semivolatile Extraction - Cleanup
Acid base partition cleanup	EPA 3650B	Semivolatile Extraction - Cleanup
Sulfur cleanup	EPA 3660B	Semivolatile Extraction - Cleanup
Sulfuric Acid / permanganate Cleanup	EPA 3665A	Semivolatile Extraction - Cleanup
Acid Digestion	EPA 3050B	Sediments, Sludges, and Soils
Alkaline Digestion	EPA 3060A	Hexavalent Chromium
TCLP Extraction	EPA 1311	Toxicity Characteristic Leaching Procedure
SPLP	EPA 1312	Synthetic Precipitation Leaching Procedure
Extraction / Combustion	EPA 9023	Extractable Organic Halides (EOX)

Air		
Technology	**Method**	**Analyte**
GC-MS	EPA TO-15	Acetaldehyde
GC-MS	EPA TO-15	Acetone
GC-MS	EPA TO-15	Acetophenone
GC-MS	EPA TO-15	Acrolein
GC-MS	EPA TO-15	Acrylamide
GC-MS	EPA TO-15	Acrylic acid
GC-MS	EPA TO-15	Allyl chloride
GC-MS	EPA TO-15	Benzene
GC-MS	EPA TO-15	Benzyl chloride
GC-MS	EPA TO-15	Propriolactone (beta-)
GC-MS	EPA TO-15	Bis (2-chloroethyl) ether
GC-MS	EPA TO-15	Bis (chloromethyl) ether
GC-MS	EPA TO-15	Bromodichloromethane
GC-MS	EPA TO-15	Bromoform

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Air		
Technology	**Method**	**Analyte**
GC-MS	EPA TO-15	Bromomethane
GC-MS	EPA TO-15	Butadiene (1,3-)
GC-MS	EPA TO-15	Carbon disulfide
GC-MS	EPA TO-15	Carbon tetrachloride
GC-MS	EPA TO-15	Carbon oxysulfide (Carbonyl sulfide)
GC-MS	EPA TO-15	Catechol
GC-MS	EPA TO-15	Butadiene (2-chloro-1,3-)
GC-MS	EPA TO-15	Chloroacetic acid
GC-MS	EPA TO-15	Chlorobenzene
GC-MS	EPA TO-15	Chloroethane
GC-MS	EPA TO-15	Chloroform
GC-MS	EPA TO-15	Chloromethane
GC-MS	EPA TO-15	Chloromethyl methyl ether
GC-MS	EPA TO-15	Chlorotoluene (2-)
GC-MS	EPA TO-15	Cresols/Cresylic acid
GC-MS	EPA TO-15	Cyclohexane
GC-MS	EPA TO-15	Diazomethane
GC-MS	EPA TO-15	Dibromochloromethane
GC-MS	EPA TO-15	Dibromo-3-chloropropane (1,2-)
GC-MS	EPA TO-15	Dibromoethane (1,2-) (EDB)
GC-MS	EPA TO-15	Dichlorobenzene (1,2-)
GC-MS	EPA TO-15	Dichlorobenzene (1,3-)
GC-MS	EPA TO-15	Dichlorobenzene (1,4-)
GC-MS	EPA TO-15	Dichlorodifluoromethane
GC-MS	EPA TO-15	Dichloroethane (1,1-)
GC-MS	EPA TO-15	Dichloroethane (1,2-)
GC-MS	EPA TO-15	Dichloroethene (1,1-)
GC-MS	EPA TO-15	Dichloroethene (cis-1,2-)
GC-MS	EPA TO-15	Dichloroethene (trans-1,2-)
GC-MS	EPA TO-15	Dichlorofluoromethane
GC-MS	EPA TO-15	Dichloropropane (1,2-)
GC-MS	EPA TO-15	Dichloropropene (cis-1,3-)
GC-MS	EPA TO-15	Dichloropropene (trans-1,3-)
GC-MS	EPA TO-15	Dichlorotetrafluoroethane (1,2-)
GC-MS	EPA TO-15	Diethyl sulfate
GC-MS	EPA TO-15	Dimethyl sulfate

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Air		
Technology	**Method**	**Analyte**
GC-MS	EPA TO-15	Dimethylcarbamoyl chloride
GC-MS	EPA TO-15	Dimethyl formamide (N,N-)
GC-MS	EPA TO-15	Dioxane (1,4-)
GC-MS	EPA TO-15	Epichlorohydrin
GC-MS	EPA TO-15	Epoxybutane (1,2-)
GC-MS	EPA TO-15	Ethanol
GC-MS	EPA TO-15	Ethyl acetate
GC-MS	EPA TO-15	Ethyl acrylate
GC-MS	EPA TO-15	Ethyl carbamate (Urethane)
GC-MS	EPA TO-15	Ethylbenzene
GC-MS	EPA TO-15	Ethylene Oxide
GC-MS	EPA TO-15	Ethyltoluene (4-)
GC-MS	EPA TO-15	Formaldehyde
GC-MS	EPA TO-15	Hexachlorobutadiene (1,3-)
GC-MS	EPA TO-15	Hexachloroethane
GC-MS	EPA TO-15	Hexanone (2-)
GC-MS	EPA TO-15	Heptane (n-)
GC-MS	EPA TO-15	Hexane (n-)
GC-MS	EPA TO-15	Isophorone
GC-MS	EPA TO-15	Isopropanol
GC-MS	EPA TO-15	Isopropylbenzene
GC-MS	EPA TO-15	Methyl alcohol (Methanol)
GC-MS	EPA TO-15	Methyl ethyl ketone
GC-MS	EPA TO-15	Methyl iodide
GC-MS	EPA TO-15	Methyl isobutyl ketone
GC-MS	EPA TO-15	Methyl isocyanate
GC-MS	EPA TO-15	Methyl methacrylate
GC-MS	EPA TO-15	Methyl tert-butyl ether
GC-MS	EPA TO-15	Methylene chloride (Dichloromethane)
GC-MS	EPA TO-15	Methylphenol (2-)
GC-MS	EPA TO-15	Naphthalene
GC-MS	EPA TO-15	Nitrobenzene
GC-MS	EPA TO-15	Nitropropane (2-)
GC-MS	EPA TO-15	N-Nitrosodimethylamine
GC-MS	EPA TO-15	N-Nitrosomorpholine
GC-MS	EPA TO-15	N-Nitroso-N-methylurea

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Air		
Technology	**Method**	**Analyte**
GC-MS	EPA TO-15	Phenol
GC-MS	EPA TO-15	Phosgene
GC-MS	EPA TO-15	Propionaldehyde
GC-MS	EPA TO-15	Propylene
GC-MS	EPA TO-15	Propylene oxide
GC-MS	EPA TO-15	Propane sultone (1,3-)
GC-MS	EPA TO-15	Styrene
GC-MS	EPA TO-15	Styrene oxide
GC-MS	EPA TO-15	Trichlorobenzene (1,2,4-)
GC-MS	EPA TO-15	Trimethylbenzene (1,3,5-)
GC-MS	EPA TO-15	Trimethylbenzene (1,2,4-)
GC-MS	EPA TO-15	Trimethylpentane (2,2,4-)
GC-MS	EPA TO-15	Tert-butyl alcohol
GC-MS	EPA TO-15	Tetrachloroethane (1,1,2,2-)
GC-MS	EPA TO-15	Tetrachloroethene
GC-MS	EPA TO-15	Tetrahydrofuran
GC-MS	EPA TO-15	Toluene
GC-MS	EPA TO-15	Trichloroethane (1,1,1-)
GC-MS	EPA TO-15	Trichloroethane (1,1,2-)
GC-MS	EPA TO-15	Trichloroethene
GC-MS	EPA TO-15	Trichlorofluoromethane
GC-MS	EPA TO-15	Trichloro (1,1,2) trifluoroethane (1,2,2-)
GC-MS	EPA TO-15	Trifluoromethane
GC-MS	EPA TO-15	Vinyl acetate
GC-MS	EPA TO-15	Vinyl bromide
GC-MS	EPA TO-15	Vinyl chloride
GC-MS	EPA TO-15	Xylene (m-)
GC-MS	EPA TO-15	Xylene (o-)
GC-MS	EPA TO-15	Xylene (p-)
GC-MS	EPA TO-15	Xylenes (total)
GC-PID-FID	EPA TO-3	n-Butane
GC-PID-FID	EPA TO-3	Ethane
GC-PID-FID	EPA TO-3	Methane
GC-PID-FID	EPA TO-3	n-Pentane
GC-PID-FID	EPA TO-3	Propane
GC-PID-FID	EPA TO-3	Benzene

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Air		
Technology	**Method**	**Analyte**
GC-PID-FID	EPA TO-3	Ethylbenzene
GC-PID-FID	EPA TO-3	Methyl Tertiary Butyl Ether
GC-PID-FID	EPA TO-3	n-Hexane
GC-PID-FID	EPA TO-3	Toluene
GC-PID-FID	EPA TO-3	Xylene (m,p-)
GC-PID-FID	EPA TO-3	Xylene (o-)
GC-PID-FID	EPA TO-3	Xylenes (total)
GC-PID-FID	EPA TO-3	Tertiary Butyl Alcohol
GC-PID-FID	EPA TO-3	Isopropyl Benzene (Cumene)
GC-PID-FID	EPA TO-3	Total Petroleum Hydrocarbons (C1-C4) as Methane
GC-PID-FID	EPA TO-3	Total Petroleum Hydrocarbons (C1-C4) as Propane
GC-PID-FID	EPA TO-3	Total Petroleum Hydrocarbons (C5-C10) as Pentane
GC-PID-FID	EPA TO-3	Total Petroleum Hydrocarbons (C5-C10) as Hexane
GC-PID-FID	EPA TO-3	Total Petroleum Hydrocarbons as Equivalent Pentane
GC-PID-FID	EPA TO-3	Total Petroleum Hydrocarbons as Equivalent Methane
GC-PID-FID	EPA TO-3	Total Petroleum Hydrocarbons as Equivalent Hexane

Potable Water		
Technology	**Method**	**Analyte**
ONPG-MUG (Colilert)	SM 9223 B	Total coliform/E.coli
Pour Plate	SM 9215 B	Heterotrophic bacteria
Nephelometric	EPA 180.1	Turbidity
Automated Cd Reduction	EPA 353.2	Nitrate
Spectrophotometric	SM 4500-NO2, B	Nitrite
Spectrophotometric, Distill, Semi Automated	EPA 335.4	Cyanide
Gravimetric	SM 2540 C	Total dissolved solids (TDS)
Titrimetric, EDTA	SM 2340 C	Total Hardness
Electrometric Titration	SM 2320 B	Alkalinity
Automated Phenate	SM 4500-NH3, G	Ammonia
Platinum-Cobalt	SM 2120 B	Color
Methylene Blue	SM 5540 C	Foaming agents
Conductance	SM 2510 B	Conductivity
Molybdosilicate	SM 4500-Si, D	Silica
Colorimetric	SM 4500-P, E	Orthophosphate

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Potable Water		
Technology	**Method**	**Analyte**
Combustion	SM 5310 B	Total organic carbon (TOC)
Pyrolysis, Titrimetric	SM 5320 B	Total organic halides (TOX)
Ion Chromatography	EPA 300.0	Chloride
Ion Chromatography	EPA 300.0	Fluoride
Ion Chromatography	EPA 300.0	Sulfate
Ion Chromatography	EPA 314.0	Perchlorate
Electrometric	SM 4500-H, B	pH
ICP	EPA 200.7	Aluminum
ICP	EPA 200.7	Barium
ICP	EPA 200.7	Beryllium
ICP	EPA 200.7	Cadmium
ICP	EPA 200.7	Calcium
ICP	EPA 200.7	Chromium
ICP	EPA 200.7	Copper
ICP	EPA 200.7	Iron
ICP	EPA 200.7	Magnesium
ICP	EPA 200.7	Manganese
ICP	EPA 200.7	Nickel
ICP	EPA 200.7	Silica
ICP	EPA 200.7	Silver
ICP	EPA 200.7	Sodium
ICP-Calculation	EPA 200.7	Total Hardness
ICP	EPA 200.7	Zinc
Manual Cold Vapor	EPA 245.1	Mercury
ICP-MS	EPA 200.8	Aluminum
ICP-MS	EPA 200.8	Antimony
ICP-MS	EPA 200.8	Arsenic
ICP-MS	EPA 200.8	Barium
ICP-MS	EPA 200.8	Beryllium
ICP-MS	EPA 200.8	Cadmium
ICP-MS	EPA 200.8	Chromium
ICP-MS	EPA 200.8	Copper
ICP-MS	EPA 200.8	Lead
ICP-MS	EPA 200.8	Manganese
ICP-MS	EPA 200.8	Nickel

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Potable Water		
Technology	**Method**	**Analyte**
ICP-MS	EPA 200.8	Selenium
ICP-MS	EPA 200.8	Silver
ICP-MS	EPA 200.8	Thallium
ICP-MS	EPA 200.8	Zinc
GC	EPA 504.1	1,2-Dibromoethane (EDB)
GC	EPA 504.1	1,2-Dibromo-3-chloropropane (EDCP)
GC	EPA 504.1	1,2,3-Trichloropropane
GC-MS	EPA 524.2	Bromoform
GC-MS	EPA 524.2	Chloroform
GC-MS	EPA 524.2	Dibromochloromethane
GC-MS	EPA 524.2	Bromodichloromethane
GC-MS	EPA 524.2	Benzene
GC-MS	EPA 524.2	Carbon tetrachloride
GC-MS	EPA 524.2	Chlorobenzene
GC-MS	EPA 524.2	1,2-Dichlorobenzene
GC-MS	EPA 524.2	1,3-Dichlorobenzene
GC-MS	EPA 524.2	1,4-Dichlorobenzene
GC-MS	EPA 524.2	1,1-Dichloroethane
GC-MS	EPA 524.2	1,2-Dichloroethane
GC-MS	EPA 524.2	cis-1,2-Dichloroethene
GC-MS	EPA 524.2	trans-1,2-Dichloroethene
GC-MS	EPA 524.2	Methylene chloride
GC-MS	EPA 524.2	1,2-Dichloropropane
GC-MS	EPA 524.2	Ethylbenzene
GC-MS	EPA 524.2	Methyl tert-butyl ether
GC-MS	EPA 524.2	Naphthalene
GC-MS	EPA 524.2	Styrene
GC-MS	EPA 524.2	1,1,2,2-Tetrachloroethene
GC-MS	EPA 524.2	Tetrachloroethene
GC-MS	EPA 524.2	1,1,1-Trichloroethane
GC-MS	EPA 524.2	Trichloroethene
GC-MS	EPA 524.2	Toluene
GC-MS	EPA 524.2	1,2,4-Trichlorobenzene
GC-MS	EPA 524.2	1,1-Dichloroethene
GC-MS	EPA 524.2	1,1,2-Trichloroethane

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Potable Water		
Technology	**Method**	**Analyte**
GC-MS	EPA 524.2	Vinyl chloride
GC-MS	EPA 524.2	Xylenes (total)
GC-MS	EPA 524.2	Bromobenzene
GC-MS	EPA 524.2	Bromochloromethane
GC-MS	EPA 524.2	Bromomethane
GC-MS	EPA 524.2	n-Butyl benzene
GC-MS	EPA 524.2	Sec-butylbenzene
GC-MS	EPA 524.2	Tert-butylbenzene
GC-MS	EPA 524.2	Chloroethane
GC-MS	EPA 524.2	Chloromethane
GC-MS	EPA 524.2	2-Chlorotoluene
GC-MS	EPA 524.2	4-Chlorotoluene
GC-MS	EPA 524.2	1,2-Dibromo-3-chloropropane
GC-MS	EPA 524.2	1,2-Dibromoethane (EDB)
GC-MS	EPA 524.2	Dibromomethane
GC-MS	EPA 524.2	Dichlorodifluoromethane
GC-MS	EPA 524.2	1,3-Dichloropropane
GC-MS	EPA 524.2	2,2-Dichloropropane
GC-MS	EPA 524.2	1,1-Dichloropropene
GC-MS	EPA 524.2	cis-1,3-Dichloropropene
GC-MS	EPA 524.2	trans-1,3-Dichloropropene
GC-MS	EPA 524.2	1,3-Hexachlorobutadiene
GC-MS	EPA 524.2	Isopropylbenzene
GC-MS	EPA 524.2	4-Isopropyltoluene
GC-MS	EPA 524.2	n-Propylbenzene
GC-MS	EPA 524.2	1,1,1,2-Tetrachloroethane
GC-MS	EPA 524.2	1,2,3-Trichlorobenzene
GC-MS	EPA 524.2	Trichlorofluoromethane
GC-MS	EPA 524.2	1,2,3-Trichloropropane
GC-MS	EPA 524.2	1,2,4-Trimethylbenzene
GC-MS	EPA 524.2	1,3,5-Trimethylbenzene
GC-MS	EPA 524.2	Nitrobenzene
GC-MS	EPA 524.2	Acetone
GC-MS	EPA 524.2	Acrylonitrile
GC-MS	EPA 524.2	Allyl chloride

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Potable Water		
Technology	**Method**	**Analyte**
GC-MS	EPA 524.2	2-Butanone
GC-MS	EPA 524.2	Carbon disulfide
GC-MS	EPA 524.2	Chloroacetonitrile
GC-MS	EPA 524.2	1-Chlorobutane
GC-MS	EPA 524.2	trans-1,4-Dichloro-2-butene
GC-MS	EPA 524.2	1,1-Dichloropropanone
GC-MS	EPA 524.2	Diethyl ether (Ethyl ether)
GC-MS	EPA 524.2	Ethyl methacrylate
GC-MS	EPA 524.2	n-Hexane
GC-MS	EPA 524.2	Hexachloroethane
GC-MS	EPA 524.2	2-Hexanone
GC-MS	EPA 524.2	Methacrylonitrile
GC-MS	EPA 524.2	Methyl acrylate
GC-MS	EPA 524.2	Methyl iodide
GC-MS	EPA 524.2	Methyl methacrylate
GC-MS	EPA 524.2	4-methyl-2-Pentanone (MIBK)
GC-MS	EPA 524.2	2-Nitropropane
GC-MS	EPA 524.2	Pentachloroethane
GC-MS	EPA 524.2	Propionitrile
GC-MS	EPA 524.2	Tert-butyl alcohol
GC-MS	EPA 524.2	Tetrahydrofuran

Notes:

1) This laboratory offers commercial testing service.
2) (M) = modified.

Approved by: _____

R. Douglas Leonard
Chief Technical Officer

Date: August 30, 2012

Issued: 4/14/2010 Revised: 6/25/10 Revised: 4/19/11 Revised: 8/30/12

State of New Jersey
Department of Environmental Protection

Certifies That

Accutest Laboratories

Laboratory Certification ID # 12129

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 2009 TNI Standard approved by the

The NELAC Institute

Expiration Date June 30, 2013

NJDEP is a NELAP Recognized Accreditation Body

Joseph F. Aiello, Manager
Office of Quality Assurance

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.

New Jersey Department of Environmental Protection

National Environmental Laboratory Accreditation Program

ANNUAL CERTIFIED PARAMETER LIST AND CURRENT STATUS

Effective as of 08/22/2012 until 06/30/2013

Laboratory Name: ACCUTEST LABORATORIES Laboratory Number: 12129 Activity ID: NLC120003
2235 RT 130
BLDG B
Dayton, NJ 08810

Category: CAP03 -- Atmospheric Organic Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	CAP03.00180	AE	GC/MS, Canisters	[EPA TO-15]	Acetaldehyde
Certified	Yes	NJ	CAP03.00184	AE	GC/MS, Canisters	[EPA TO-15]	Acetone
Certified	Yes	NJ	CAP03.00190	AE	GC/MS, Canisters	[EPA TO-15]	Acetophenone
Certified	Yes	NJ	CAP03.00195	AE	GC/MS, Canisters	[EPA TO-15]	Acrolein
Certified	Yes	NJ	CAP03.00200	AE	GC/MS, Canisters	[EPA TO-15]	Acrylamide
Certified	Yes	NJ	CAP03.00205	AE	GC/MS, Canisters	[EPA TO-15]	Acrylic acid
Certified	Yes	NJ	CAP03.00215	AE	GC/MS, Canisters	[EPA TO-15]	Allyl chloride
Certified	Yes	NJ	CAP03.00225	AE	GC/MS, Canisters	[EPA TO-15]	Benzene
Certified	Yes	NJ	CAP03.00230	AE	GC/MS, Canisters	[EPA TO-15]	Benzyl chloride
Certified	Yes	NJ	CAP03.00235	AE	GC/MS, Canisters	[EPA TO-15]	Propiolactone (beta-)
Certified	Yes	NJ	CAP03.00240	AE	GC/MS, Canisters	[EPA TO-15]	Bis (2-chloroethyl) ether
Certified	Yes	NJ	CAP03.00245	AE	GC/MS, Canisters	[EPA TO-15]	Bis (chloromethyl) ether
Certified	Yes	NJ	CAP03.00250	AE	GC/MS, Canisters	[EPA TO-15]	Bromodichloromethane
Certified	Yes	NJ	CAP03.00255	AE	GC/MS, Canisters	[EPA TO-15]	Bromoform
Certified	Yes	NJ	CAP03.00260	AE	GC/MS, Canisters	[EPA TO-15]	Bromomethane
Certified	Yes	NJ	CAP03.00265	AE	GC/MS, Canisters	[EPA TO-15]	Butadiene (1,3-)
Certified	Yes	NJ	CAP03.00270	AE	GC/MS, Canisters	[EPA TO-15]	Carbon disulfide
Certified	Yes	NJ	CAP03.00275	AE	GC/MS, Canisters	[EPA TO-15]	Carbon tetrachloride
Certified	Yes	NJ	CAP03.00280	AE	GC/MS, Canisters	[EPA TO-15]	Carbon oxysulfide (Carbonyl sulfide)
Certified	Yes	NJ	CAP03.00285	AE	GC/MS, Canisters	[EPA TO-15]	Catechol
Certified	Yes	NJ	CAP03.00290	AE	GC/MS, Canisters	[EPA TO-15]	Butadiene (2-chloro-1,3-)
Certified	Yes	NJ	CAP03.00295	AE	GC/MS, Canisters	[EPA TO-15]	Chloroacetic acid
Certified	Yes	NJ	CAP03.00300	AE	GC/MS, Canisters	[EPA TO-15]	Chlorobenzene
Certified	Yes	NJ	CAP03.00305	AE	GC/MS, Canisters	[EPA TO-15]	Chloroethane
Certified	Yes	NJ	CAP03.00310	AE	GC/MS, Canisters	[EPA TO-15]	Chloroform
Certified	Yes	NJ	CAP03.00315	AE	GC/MS, Canisters	[EPA TO-15]	Chloromethane
Certified	Yes	NJ	CAP03.00320	AE	GC/MS, Canisters	[EPA TO-15]	Chloromethyl methyl ether
Certified	Yes	NJ	CAP03.00325	AE	GC/MS, Canisters	[EPA TO-15]	Chlorotoluene (2-)
Certified	Yes	NJ	CAP03.00330	AE	GC/MS, Canisters	[EPA TO-15]	Cresols/Cresylic acid
Certified	Yes	NJ	CAP03.00335	AE	GC/MS, Canisters	[EPA TO-15]	Cyclohexane
Certified	Yes	NJ	CAP03.00340	AE	GC/MS, Canisters	[EPA TO-15]	Diazomethane

KEY: AE = Air and Emissions, BT = Biological Tissues, DW = Drinking Water, NPW = Non-Potable Water, SCM = Solid and Chemical Materials

New Jersey Department of Environmental Protection

National Environmental Laboratory Accreditation Program

ANNUAL CERTIFIED PARAMETER LIST AND CURRENT STATUS

Effective as of 08/22/2012 until 06/30/2013

Laboratory Name: ACCUTEST LABORATORIES Laboratory Number: 12129 Activity ID: NLC120003
2235 RT 130
BLDG B
Dayton, NJ 08810

Category: CAP03 – Atmospheric Organic Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	CAP03.00342	AE	GC/MS, Canisters	[EPA TO-15]	Dibromochloromethane
Certified	Yes	NJ	CAP03.00345	AE	GC/MS, Canisters	[EPA TO-15]	Dibromo-3-chloropropane (1,2-)
Certified	Yes	NJ	CAP03.00350	AE	GC/MS, Canisters	[EPA TO-15]	Dibromoethane (1,2-) (EDB)
Certified	Yes	NJ	CAP03.00355	AE	GC/MS, Canisters	[EPA TO-15]	Dichlorobenzene (1,2-)
Certified	Yes	NJ	CAP03.00360	AE	GC/MS, Canisters	[EPA TO-15]	Dichlorobenzene (1,3-)
Certified	Yes	NJ	CAP03.00365	AE	GC/MS, Canisters	[EPA TO-15]	Dichlorobenzene (1,4-)
Certified	Yes	NJ	CAP03.00368	AE	GC/MS, Canisters	[EPA TO-15]	Dichlorodifluoromethane
Certified	Yes	NJ	CAP03.00370	AE	GC/MS, Canisters	[EPA TO-15]	Dichloroethane (1,1-)
Certified	Yes	NJ	CAP03.00375	AE	GC/MS, Canisters	[EPA TO-15]	Dichloroethane (1,2-)
Certified	Yes	NJ	CAP03.00380	AE	GC/MS, Canisters	[EPA TO-15]	Dichloroethene (1,1-)
Certified	Yes	NJ	CAP03.00384	AE	GC/MS, Canisters	[EPA TO-15]	Dichloroethene (cis-1,2-)
Certified	Yes	NJ	CAP03.00385	AE	GC/MS, Canisters	[EPA TO-15]	Dichloroethene (trans-1,2-)
Certified	Yes	NJ	CAP03.00390	AE	GC/MS, Canisters	[EPA TO-15]	Dichlorofluoromethane
Certified	Yes	NJ	CAP03.00395	AE	GC/MS, Canisters	[EPA TO-15]	Dichloropropane (1,2-)
Certified	Yes	NJ	CAP03.00400	AE	GC/MS, Canisters	[EPA TO-15]	Dichloropropene (cis-1,3-)
Certified	Yes	NJ	CAP03.00401	AE	GC/MS, Canisters	[EPA TO-15]	Dichloropropene (trans-1,3-)
Certified	Yes	NJ	CAP03.00405	AE	GC/MS, Canisters	[EPA TO-15]	Dichlorotetrafluoroethane (1,2-)
Certified	Yes	NJ	CAP03.00410	AE	GC/MS, Canisters	[EPA TO-15]	Diethyl sulfate
Certified	Yes	NJ	CAP03.00415	AE	GC/MS, Canisters	[EPA TO-15]	Dimethyl sulfate
Certified	Yes	NJ	CAP03.00425	AE	GC/MS, Canisters	[EPA TO-15]	Dimethylcarbamoyl chloride
Certified	Yes	NJ	CAP03.00430	AE	GC/MS, Canisters	[EPA TO-15]	Dimethyl formamide (N, N-)
Certified	Yes	NJ	CAP03.00440	AE	GC/MS, Canisters	[EPA TO-15]	Dioxane (1,4-)
Certified	Yes	NJ	CAP03.00445	AE	GC/MS, Canisters	[EPA TO-15]	Epichlorohydrin
Certified	Yes	NJ	CAP03.00450	AE	GC/MS, Canisters	[EPA TO-15]	Epoxybutane (1,2-)
Certified	Yes	NJ	CAP03.00451	AE	GC/MS, Canisters	[EPA TO-15]	Ethanol
Certified	Yes	NJ	CAP03.00452	AE	GC/MS, Canisters	[EPA TO-15]	Ethyl acetate
Certified	Yes	NJ	CAP03.00455	AE	GC/MS, Canisters	[EPA TO-15]	Ethyl acrylate
Certified	Yes	NJ	CAP03.00460	AE	GC/MS, Canisters	[EPA TO-15]	Ethyl carbamate (Urethane)
Certified	Yes	NJ	CAP03.00465	AE	GC/MS, Canisters	[EPA TO-15]	Ethylbenzene
Certified	Yes	NJ	CAP03.00470	AE	GC/MS, Canisters	[EPA TO-15]	Ethylene Oxide
Certified	Yes	NJ	CAP03.00480	AE	GC/MS, Canisters	[EPA TO-15]	Ethyltoluene (4-)
Certified	Yes	NJ	CAP03.00485	AE	GC/MS, Canisters	[EPA TO-15]	Formaldehyde

KEY: AE = Air and Emissions, BT = Biological Tissues, DW = Drinking Water, NPW = Non-Potable Water, SCM = Solid and Chemical Materials

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2235 RT 130
BLDG B
Dayton, NJ 08810

Category: CAP03 – Atmospheric Organic Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	CAP03.00490	AE	GC/MS, Canisters	[EPA TO-15]	Hexachlorobutadiene (1,3-)
Certified	Yes	NJ	CAP03.00495	AE	GC/MS, Canisters	[EPA TO-15]	Hexachloroethane
Certified	Yes	NJ	CAP03.00498	AE	GC/MS, Canisters	[EPA TO-15]	Hexanone (2-)
Certified	Yes	NJ	CAP03.00500	AE	GC/MS, Canisters	[EPA TO-15]	Heptane (n-)
Certified	Yes	NJ	CAP03.00505	AE	GC/MS, Canisters	[EPA TO-15]	Hexane (n-)
Certified	Yes	NJ	CAP03.00510	AE	GC/MS, Canisters	[EPA TO-15]	Isophorone
Certified	Yes	NJ	CAP03.00511	AE	GC/MS, Canisters	[EPA TO-15]	Isopropanol
Certified	Yes	NJ	CAP03.00515	AE	GC/MS, Canisters	[EPA TO-15]	Isopropylbenzene
Certified	Yes	NJ	CAP03.00520	AE	GC/MS, Canisters	[EPA TO-15]	Methyl alcohol (Methanol)
Certified	Yes	NJ	CAP03.00525	AE	GC/MS, Canisters	[EPA TO-15]	Methyl ethyl ketone
Certified	Yes	NJ	CAP03.00530	AE	GC/MS, Canisters	[EPA TO-15]	Methyl iodide
Certified	Yes	NJ	CAP03.00535	AE	GC/MS, Canisters	[EPA TO-15]	Methyl isobutyl ketone (MIBK)
Certified	Yes	NJ	CAP03.00540	AE	GC/MS, Canisters	[EPA TO-15]	Methyl isocyanate
Certified	Yes	NJ	CAP03.00545	AE	GC/MS, Canisters	[EPA TO-15]	Methyl methacrylate
Certified	Yes	NJ	CAP03.00550	AE	GC/MS, Canisters	[EPA TO-15]	Methyl tert-butyl ether
Certified	Yes	NJ	CAP03.00555	AE	GC/MS, Canisters	[EPA TO-15]	Methylene chloride (Dichloromethane)
Certified	Yes	NJ	CAP03.00565	AE	GC/MS, Canisters	[EPA TO-15]	Methylphenol (2-)
Certified	Yes	NJ	CAP03.00567	AE	GC/MS, Canisters	[EPA TO-15]	Naphthalene
Certified	Yes	NJ	CAP03.00570	AE	GC/MS, Canisters	[EPA TO-15]	Nitrobenzene
Certified	Yes	NJ	CAP03.00575	AE	GC/MS, Canisters	[EPA TO-15]	Nitropropane (2-)
Certified	Yes	NJ	CAP03.00580	AE	GC/MS, Canisters	[EPA TO-15]	N-Nitrosodimethylamine
Certified	Yes	NJ	CAP03.00585	AE	GC/MS, Canisters	[EPA TO-15]	N-Nitrosomorpholine
Certified	Yes	NJ	CAP03.00590	AE	GC/MS, Canisters	[EPA TO-15]	N-Nitroso-N-methylurea
Certified	Yes	NJ	CAP03.00595	AE	GC/MS, Canisters	[EPA TO-15]	Phenol
Certified	Yes	NJ	CAP03.00600	AE	GC/MS, Canisters	[EPA TO-15]	Phosgene
Certified	Yes	NJ	CAP03.00605	AE	GC/MS, Canisters	[EPA TO-15]	Propionaldehyde
Certified	Yes	NJ	CAP03.00612	AE	GC/MS, Canisters	[EPA TO-15]	Propylene
Certified	Yes	NJ	CAP03.00615	AE	GC/MS, Canisters	[EPA TO-15]	Propylene oxide
Certified	Yes	NJ	CAP03.00620	AE	GC/MS, Canisters	[EPA TO-15]	Propane sultone (1,3-)
Certified	Yes	NJ	CAP03.00625	AE	GC/MS, Canisters	[EPA TO-15]	Styrene
Certified	Yes	NJ	CAP03.00630	AE	GC/MS, Canisters	[EPA TO-15]	Styrene oxide
Certified	Yes	NJ	CAP03.00635	AE	GC/MS, Canisters	[EPA TO-15]	Trichlorobenzene (1,2,4-)

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Certified	Yes	NJ	CAP03.00640	AE	GC/MS, Canisters	[EPA TO-15]	Trimethylbenzene (1,3,5-)
Certified	Yes	NJ	CAP03.00645	AE	GC/MS, Canisters	[EPA TO-15]	Trimethylbenzene (1,2,4-)
Certified	Yes	NJ	CAP03.00650	AE	GC/MS, Canisters	[EPA TO-15]	Trimethylpentane (2,2,4-)
Certified	Yes	NJ	CAP03.00652	AE	GC/MS, Canisters	[EPA TO-15]	Tert-butyl alcohol
Certified	Yes	NJ	CAP03.00655	AE	GC/MS, Canisters	[EPA TO-15]	Tetrachloroethane (1,1,2,2-)
Certified	Yes	NJ	CAP03.00660	AE	GC/MS, Canisters	[EPA TO-15]	Tetrachloroethene
Certified	Yes	NJ	CAP03.00662	AE	GC/MS, Canisters	[EPA TO-15]	Tetrahydrofuran
Certified	Yes	NJ	CAP03.00665	AE	GC/MS, Canisters	[EPA TO-15]	Toluene
Certified	Yes	NJ	CAP03.00670	AE	GC/MS, Canisters	[EPA TO-15]	Trichloroethane (1,1,1-)
Certified	Yes	NJ	CAP03.00675	AE	GC/MS, Canisters	[EPA TO-15]	Trichloroethane (1,1,2-)
Certified	Yes	NJ	CAP03.00680	AE	GC/MS, Canisters	[EPA TO-15]	Trichloroethene
Certified	Yes	NJ	CAP03.00684	AE	GC/MS, Canisters	[EPA TO-15]	Trichlorofluoromethane
Certified	Yes	NJ	CAP03.00685	AE	GC/MS, Canisters	[EPA TO-15]	Trichloro (1,1,2-) trifluoroethane (1,2,2-)
Certified	Yes	NJ	CAP03.00695	AE	GC/MS, Canisters	[EPA TO-15]	Trifluoromethane
Certified	Yes	NJ	CAP03.00700	AE	GC/MS, Canisters	[EPA TO-15]	Vinyl acetate
Certified	Yes	NJ	CAP03.00705	AE	GC/MS, Canisters	[EPA TO-15]	Vinyl bromide
Certified	Yes	NJ	CAP03.00710	AE	GC/MS, Canisters	[EPA TO-15]	Vinyl chloride
Certified	Yes	NJ	CAP03.00715	AE	GC/MS, Canisters	[EPA TO-15]	Xylene (m-)
Certified	Yes	NJ	CAP03.00720	AE	GC/MS, Canisters	[EPA TO-15]	Xylene (o-)
Certified	Yes	NJ	CAP03.00725	AE	GC/MS, Canisters	[EPA TO-15]	Xylene (p-)
Certified	Yes	NJ	CAP03.00730	AE	GC/MS, Canisters	[EPA TO-15]	Xylenes (total)
Certified	Yes	NJ	CAP03.02450	AE	GC, FID and/or ECD, Cryogenic Preconcentration	[EPA TO-3]	Benzene
Certified	Yes	NJ	CAP03.02482	AE	GC, FID and/or ECD, Cryogenic Preconcentration	[EPA TO-3]	Ethylbenzene
Certified	Yes	NJ	CAP03.02483	AE	GC, FID and/or ECD, Cryogenic Preconcentration	[EPA TO-3]	Isopropylbenzene
Certified	Yes	NJ	CAP03.02485	AE	GC, FID and/or ECD, Cryogenic Preconcentration	[EPA TO-3]	Methane
Certified	Yes	NJ	CAP03.02486	AE	GC, FID and/or ECD, Cryogenic Preconcentration	[EPA TO-3]	Methyl tert-butyl ether
Certified	Yes	NJ	CAP03.02488	AE	GC, FID and/or ECD, Cryogenic Preconcentration	[EPA TO-3]	Tert-butyl alcohol

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Certified	Yes	NJ	CAP03.02489	AE	GC, FID and/or ECD, Cryogenic Preconcentration	[EPA TO-3]	Toluene
Certified	Yes	NJ	CAP03.02515	AE	GC, FID and/or ECD, Cryogenic Preconcentration	[EPA TO-3]	Xylenes (total)
Applied	No	NJ	CAP03.06850	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Acetone
Applied	No	NJ	CAP03.06852	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Allyl chloride
Applied	No	NJ	CAP03.06854	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Benzene
Applied	No	NJ	CAP03.06856	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Bromodichloromethane
Applied	No	NJ	CAP03.06858	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Bromoform
Applied	No	NJ	CAP03.06860	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Bromomethane
Applied	No	NJ	CAP03.06862	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Butadiene (1,3-)
Applied	No	NJ	CAP03.06864	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Carbon disulfide
Applied	No	NJ	CAP03.06866	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Carbon tetrachloride
Applied	No	NJ	CAP03.06868	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Chlorobenzene
Applied	No	NJ	CAP03.06870	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Chloroethane
Applied	No	NJ	CAP03.06872	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Chloroform
Applied	No	NJ	CAP03.06874	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Chloromethane
Applied	No	NJ	CAP03.06876	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Chlorotoluene (2-)
Applied	No	NJ	CAP03.06878	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Cyclohexane
Applied	No	NJ	CAP03.06880	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Dibromochloromethane
Applied	No	NJ	CAP03.06882	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Dibromoethane (1,2-) (EDB)
Applied	No	NJ	CAP03.06884	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Dichlorobenzene (1,2-)
Applied	No	NJ	CAP03.06886	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Dichlorobenzene (1,3-)
Applied	No	NJ	CAP03.06888	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Dichlorobenzene (1,4-)
Applied	No	NJ	CAP03.06890	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Dichlorodifluoromethane
Applied	No	NJ	CAP03.06892	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Dichloroethane (1,1-)
Applied	No	NJ	CAP03.06894	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Dichloroethane (1,2-)
Applied	No	NJ	CAP03.06896	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Dichloroethene (1,1-)
Applied	No	NJ	CAP03.06898	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Dichloroethene (cis-1,2-)
Applied	No	NJ	CAP03.06900	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Dichloroethene (trans-1,2-)
Applied	No	NJ	CAP03.06902	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Dichloropropane (1,2-)
Applied	No	NJ	CAP03.06904	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Dichloropropene (cis-1,3-)

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Applied	No	NJ	CAP03.06906	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Dichloropropene (trans-1,3-)
Applied	No	NJ	CAP03.06908	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Dichlorotetrafluoroethane (1,2-)
Applied	No	NJ	CAP03.06910	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Dioxane (1,4-)
Applied	No	NJ	CAP03.06912	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Ethanol
Applied	No	NJ	CAP03.06914	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Ethylbenzene
Applied	No	NJ	CAP03.06916	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Ethyltoluene (4-)
Applied	No	NJ	CAP03.06918	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Heptane (n-)
Applied	No	NJ	CAP03.06920	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Hexachlorobutadiene (1,3-)
Applied	No	NJ	CAP03.06922	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Hexane (n-)
Applied	No	NJ	CAP03.06924	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Isopropanol
Applied	No	NJ	CAP03.06926	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Methylene chloride (Dichloromethane)
Applied	No	NJ	CAP03.06928	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Methyl ethyl ketone
Applied	No	NJ	CAP03.06930	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Methyl isobutyl ketone (MIBK)
Applied	No	NJ	CAP03.06932	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Methyl methacrylate
Applied	No	NJ	CAP03.06934	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Methyl tert-butyl ether
Applied	No	NJ	CAP03.06936	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Styrene
Applied	No	NJ	CAP03.06938	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Tert-butyl alcohol
Applied	No	NJ	CAP03.06940	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Tetrachloroethane (1,1,2,2-)
Applied	No	NJ	CAP03.06942	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Tetrachloroethene
Applied	No	NJ	CAP03.06944	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Tetrahydrofuran
Applied	No	NJ	CAP03.06946	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Toluene
Applied	No	NJ	CAP03.06948	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Trichlorobenzene (1,2,4-)
Applied	No	NJ	CAP03.06950	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Trichloroethane (1,1,1-)
Applied	No	NJ	CAP03.06952	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Trichloroethane (1,1,2-)
Applied	No	NJ	CAP03.06954	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Trichloroethene
Applied	No	NJ	CAP03.06956	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Trichlorofluoromethane
Applied	No	NJ	CAP03.06958	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Trichloro (1,1,2-) trifluoroethane (1,2,2-)
Applied	No	NJ	CAP03.06960	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Trimethylbenzene (1,2,4-)
Applied	No	NJ	CAP03.06962	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Trimethylbenzene (1,3,5-)
Applied	No	NJ	CAP03.06964	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Trimethylpentane (2,2,4-)
Applied	No	NJ	CAP03.06966	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Vinyl bromide
Applied	No	NJ	CAP03.06968	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Vinyl chloride

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Applied	No	NJ	CAP03.06970	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Xylene (m- + p-)
Applied	No	NJ	CAP03.06972	AE	GC/MS, Canisters	[OTHER NJDEP-LLTO-15-3/2007]	Xylene (o-)

Category: SDW01 -- Microbiological Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SDW01.05000	DW	ONPG-MUG (Autoanalysis Colilert System) (P-A)	[SM 9223B]	Total coliform / E. coli
Certified	Yes	NJ	SDW01.14000	DW	Pour Plate	[SM 9215 B]	Heterotrophic bacteria

Category: SDW02 -- Inorganic Parameters Including Na + Ca

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SDW02.01000	DW	Nephelometric	[EPA 180.1]	Turbidity
Certified	Yes	NJ	SDW02.02000	DW	Automated Cadmium Reduction	[EPA 353.2]	Nitrate
Certified	Yes	NJ	SDW02.09000	DW	Spectrophotometric	[SM 4500-NO2 B]	Nitrite
Certified	Yes	NJ	SDW02.14000	DW	Ion Chromatography	[EPA 300.0]	Fluoride
Certified	Yes	NJ	SDW02.15200	DW	Spectrophotometric, Distill, Semi Automated	[EPA 335.4]	Cyanide
Certified	Yes	NJ	SDW02.19000	DW	Ion Chromatography	[EPA 300.0]	Sulfate
Certified	Yes	NJ	SDW02.20000	DW	ICP	[EPA 200.7]	Sodium
Certified	Yes	NJ	SDW02.24000	DW	Gravimetric At 180	[SM 2540 C]	Total dissolved solids (TDS)
Certified	Yes	NJ	SDW02.27000	DW	ICP	[EPA 200.7]	Calcium
Certified	Yes	NJ	SDW02.27200	DW	Ca as Carbonate	[EPA 200.7]	Calcium-hardness
Certified	Yes	NJ	SDW02.27300	DW	Hardness By Calculation	[EPA 200.7]	Total hardness
Certified	Yes	NJ	SDW02.27400	DW	Titrimetric, EDTA	[SM 2340 C]	Total hardness
Certified	Yes	NJ	SDW02.29000	DW	Electrometric Titration	[SM 2320 B]	Alkalinity
Certified	Yes	NJ	SDW02.29310	DW	Automated Phenate	[SM 4500-NH3 G]	Ammonia
Certified	Yes	NJ	SDW02.31000	DW	Ion Chromatography	[EPA 300.0]	Chloride
Certified	Yes	NJ	SDW02.31120	DW	Ion Chromatography	[EPA 314.0]	Perchlorate
Certified	Yes	NJ	SDW02.32000	DW	Platinum-Cobalt	[SM 2120 B]	Color

KEY: AE = Air and Emissions, BT = Biological Tissues, DW = Drinking Water, NPW = Non-Potable Water, SCM = Solid and Chemical Materials

New Jersey Department of Environmental Protection

National Environmental Laboratory Accreditation Program

ANNUAL CERTIFIED PARAMETER LIST AND CURRENT STATUS

Effective as of 08/22/2012 until 06/30/2013

Laboratory Name: ACCUTEST LABORATORIES Laboratory Number: 12129 Activity ID: NLC120003
2235 RT 130
BLDG B
Dayton, NJ 08810

Category: SDW02 – Inorganic Parameters Including Na + Ca

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SDW02.33000	DW	Methylene Blue	[SM 5540 C]	Foaming agents
Certified	Yes	NJ	SDW02.34000	DW	Consistent Series	[SM 2150 B]	Odor
Certified	Yes	NJ	SDW02.35000	DW	Conductance	[SM 2510 B]	Conductivity
Certified	Yes	NJ	SDW02.36100	DW	Molybdosilicate	[SM 4500-Si D (18/19th ed)]	Silica
Certified	Yes	NJ	SDW02.36400	DW	ICP	[EPA 200.7]	Silica
Certified	Yes	NJ	SDW02.37000	DW	Colorimetric	[SM 4500-P E]	Orthophosphate
Certified	Yes	NJ	SDW02.39500	DW	High Temp. Combustion, Filtration	[SM 5310B]	Dissolved organic carbon (DOC)
Applied	No	NJ	SDW02.39510	DW	Persulfate-UV, Filtration	[SM 5310C]	Dissolved organic carbon (DOC)
Applied	No	NJ	SDW02.39520	DW	Wet-Oxidation, Filtration	[SM 5310D]	Dissolved organic carbon (DOC)
Certified	Yes	NJ	SDW02.39600	DW	High Temp. Combustion	[SM 5310 B]	Total organic carbon (TOC)
Certified	Yes	NJ	SDW02.40000	DW	Pyrolysis, Titrimetric	[SM 5320 B]	Total organic halides (TOX)

Category: SDW03 – Analyze-Immediately Inorganic Parameter

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SDW03.00002	DW	All Categories Sample Handling Procedures	[OTHER NJAC 7:18-6 & 9]	PWTA Sampling Parameters
Certified	Yes	NJ	SDW03.02000	DW	DPD, Ferrous Titrimetric	[SM 4500-Cl F]	Chlorine - residual
Certified	Yes	NJ	SDW03.08000	DW	Electrometric	[SM 4500-H B]	pH
Certified	Yes	NJ	SDW03.09000	DW	Thermometric	[SM 2550 B]	Temperature

Category: SDW04 – Inorganic Parameters, Metals

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SDW04.03000	DW	ICP	[EPA 200.7]	Aluminum
Certified	Yes	NJ	SDW04.03100	DW	ICP/MS	[EPA 200.8]	Aluminum
Certified	Yes	NJ	SDW04.07000	DW	ICP/MS	[EPA 200.8]	Antimony
Certified	Yes	NJ	SDW04.12000	DW	ICP/MS	[EPA 200.8]	Arsenic
Certified	Yes	NJ	SDW04.16000	DW	ICP	[EPA 200.7]	Barium
Certified	Yes	NJ	SDW04.17000	DW	ICP/MS	[EPA 200.8]	Barium

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National Environmental Laboratory Accreditation Program

ANNUAL CERTIFIED PARAMETER LIST AND CURRENT STATUS

Effective as of 08/22/2012 until 06/30/2013

Laboratory Name: ACCUTEST LABORATORIES Laboratory Number: 12129 Activity ID: NLC120003
2235 RT 130
BLDG B
Dayton, NJ 08810

Category: SDW04 – Inorganic Parameters, Metals

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SDW04.20000	DW	ICP	[EPA 200.7]	Beryllium
Certified	Yes	NJ	SDW04.21000	DW	ICP/MS	[EPA 200.8]	Beryllium
Certified	Yes	NJ	SDW04.24000	DW	ICP	[EPA 200.7]	Cadmium
Certified	Yes	NJ	SDW04.25000	DW	ICP/MS	[EPA 200.8]	Cadmium
Certified	Yes	NJ	SDW04.28000	DW	ICP	[EPA 200.7]	Chromium
Certified	Yes	NJ	SDW04.29000	DW	ICP/MS	[EPA 200.8]	Chromium
Certified	Yes	NJ	SDW04.33000	DW	ICP	[EPA 200.7]	Copper
Certified	Yes	NJ	SDW04.34000	DW	ICP/MS	[EPA 200.8]	Copper
Certified	Yes	NJ	SDW04.37000	DW	ICP	[EPA 200.7]	Iron
Certified	Yes	NJ	SDW04.40000	DW	ICP/MS	[EPA 200.8]	Lead
Certified	Yes	NJ	SDW04.41100	DW	ICP	[EPA 200.7]	Magnesium
Certified	Yes	NJ	SDW04.44000	DW	ICP	[EPA 200.7]	Manganese
Certified	Yes	NJ	SDW04.45000	DW	ICP/MS	[EPA 200.8]	Manganese
Certified	Yes	NJ	SDW04.46000	DW	Manual Cold Vapor	[EPA 245.1]	Mercury
Certified	Yes	NJ	SDW04.52000	DW	ICP	[EPA 200.7]	Nickel
Certified	Yes	NJ	SDW04.53000	DW	ICP/MS	[EPA 200.8]	Nickel
Certified	Yes	NJ	SDW04.57000	DW	ICP/MS	[EPA 200.8]	Selenium
Certified	Yes	NJ	SDW04.62000	DW	ICP	[EPA 200.7]	Silver
Certified	Yes	NJ	SDW04.63000	DW	ICP/MS	[EPA 200.8]	Silver
Certified	Yes	NJ	SDW04.65000	DW	ICP/MS	[EPA 200.8]	Thallium
Certified	Yes	NJ	SDW04.67000	DW	ICP	[EPA 200.7]	Zinc
Certified	Yes	NJ	SDW04.68000	DW	ICP/MS	[EPA 200.8]	Zinc

Category: SDW05 – Organic Parameters, Chromatography

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SDW05.12010	DW	Solvent Extract, GC	[EPA 504.1]	Dibromoethane (1,2-) (EDB)
Certified	Yes	NJ	SDW05.12020	DW	Solvent Extract, GC	[EPA 504.1]	Dibromo-3-chloropropane (1,2-)
Certified	Yes	NJ	SDW05.12030	DW	Solvent Extract, GC	[EPA 504.1]	Trichloropropane (1,2,3-)

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---- Annual Certified Parameters List ---- Effective as of 08/22/2012 until 06/30/2013

New Jersey Department of Environmental Protection

National Environmental Laboratory Accreditation Program

ANNUAL CERTIFIED PARAMETER LIST AND CURRENT STATUS

Effective as of 08/22/2012 until 06/30/2013

Laboratory Name: ACCUTEST LABORATORIES Laboratory Number: 12129 Activity ID: NLC120003
2235 RT 130
BLDG B
Dayton, NJ 08810

Category: SDW06 -- Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SDW06.01010	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Bromoform
Certified	Yes	NJ	SDW06.01020	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Chloroform
Certified	Yes	NJ	SDW06.01030	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dibromochloromethane
Certified	Yes	NJ	SDW06.01040	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Bromodichloromethane
Certified	Yes	NJ	SDW06.02010	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Benzene
Certified	Yes	NJ	SDW06.02020	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Carbon tetrachloride
Certified	Yes	NJ	SDW06.02030	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Chlorobenzene
Certified	Yes	NJ	SDW06.02040	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichlorobenzene (1,2-)
Certified	Yes	NJ	SDW06.02050	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichlorobenzene (1,3-)
Certified	Yes	NJ	SDW06.02060	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichlorobenzene (1,4-)
Certified	Yes	NJ	SDW06.02070	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichloroethane (1,1-)
Certified	Yes	NJ	SDW06.02080	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichloroethane (1,2-)
Certified	Yes	NJ	SDW06.02090	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichloroethene (cis-1,2-)
Certified	Yes	NJ	SDW06.02100	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichloroethene (trans-1,2-)
Certified	Yes	NJ	SDW06.02110	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Methylene chloride (Dichloromethane)
Certified	Yes	NJ	SDW06.02120	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichloropropane (1,2-)
Certified	Yes	NJ	SDW06.02130	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Ethylbenzene
Certified	Yes	NJ	SDW06.02140	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Methyl tert-butyl ether
Certified	Yes	NJ	SDW06.02150	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Naphthalene
Certified	Yes	NJ	SDW06.02160	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Styrene
Certified	Yes	NJ	SDW06.02170	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Tetrachloroethane (1,1,2,2-)
Certified	Yes	NJ	SDW06.02180	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Tetrachloroethene
Certified	Yes	NJ	SDW06.02190	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Trichloroethane (1,1,1-)
Certified	Yes	NJ	SDW06.02200	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Trichloroethene
Certified	Yes	NJ	SDW06.02210	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Toluene
Certified	Yes	NJ	SDW06.02220	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Trichlorobenzene (1,2,4-)
Certified	Yes	NJ	SDW06.02230	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichloroethene (1,1-)
Certified	Yes	NJ	SDW06.02240	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Trichloroethane (1,1,2-)
Certified	Yes	NJ	SDW06.02250	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Vinyl chloride
Certified	Yes	NJ	SDW06.02260	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Xylenes (total)
Certified	Yes	NJ	SDW06.03010	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Bromobenzene
Certified	Yes	NJ	SDW06.03020	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Bromochloromethane

KEY: AE = Air and Emissions, BT = Biological Tissues, DW = Drinking Water, NPW = Non-Potable Water, SCM = Solid and Chemical Materials

New Jersey Department of Environmental Protection

National Environmental Laboratory Accreditation Program

ANNUAL CERTIFIED PARAMETER LIST AND CURRENT STATUS

Effective as of 08/22/2012 until 06/30/2013

Laboratory Name: ACCUTEST LABORATORIES Laboratory Number: 12129 Activity ID: NLC120003
2235 RT 130
BLDG B
Dayton, NJ 08810

Category: SDW06 -- Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SDW06.03030	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Bromomethane
Certified	Yes	NJ	SDW06.03040	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Butyl benzene (n-)
Certified	Yes	NJ	SDW06.03050	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Sec-butylbenzene
Certified	Yes	NJ	SDW06.03060	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Tert-butylbenzene
Certified	Yes	NJ	SDW06.03070	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Chloroethane
Certified	Yes	NJ	SDW06.03080	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Chloromethane
Certified	Yes	NJ	SDW06.03090	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Chlorotoluene (2-)
Certified	Yes	NJ	SDW06.03100	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Chlorotoluene (4-)
Certified	Yes	NJ	SDW06.03110	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dibromo-3-chloropropane (1,2-)
Certified	Yes	NJ	SDW06.03120	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dibromoethane (1,2-) (EDB)
Certified	Yes	NJ	SDW06.03130	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dibromomethane
Certified	Yes	NJ	SDW06.03140	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichlorodifluoromethane
Certified	Yes	NJ	SDW06.03150	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichloropropane (1,3-)
Certified	Yes	NJ	SDW06.03160	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichloropropane (2,2-)
Certified	Yes	NJ	SDW06.03170	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichloropropene (1,1-)
Certified	Yes	NJ	SDW06.03180	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichloropropene (cis-1,3-)
Certified	Yes	NJ	SDW06.03190	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichloropropene (trans-1,3-)
Certified	Yes	NJ	SDW06.03200	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Hexachlorobutadiene (1,3-)
Certified	Yes	NJ	SDW06.03210	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Isopropylbenzene
Certified	Yes	NJ	SDW06.03220	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Isopropyltoluene (4-)
Certified	Yes	NJ	SDW06.03230	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Propylbenzene (n-)
Certified	Yes	NJ	SDW06.03240	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Tetrachloroethane (1,1,1,2-)
Certified	Yes	NJ	SDW06.03250	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Trichlorobenzene (1,2,3-)
Certified	Yes	NJ	SDW06.03260	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Trichlorofluoromethane
Certified	Yes	NJ	SDW06.03270	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Trichloropropane (1,2,3-)
Certified	Yes	NJ	SDW06.03280	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Trimethylbenzene (1,2,4-)
Certified	Yes	NJ	SDW06.03300	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Trimethylbenzene (1,3,5-)
Certified	Yes	NJ	SDW06.03310	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Nitrobenzene
Certified	Yes	NJ	SDW06.03410	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Acetone
Certified	Yes	NJ	SDW06.03420	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Acrylonitrile
Certified	Yes	NJ	SDW06.03430	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Allyl chloride
Certified	Yes	NJ	SDW06.03440	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Butanone (2-)

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Laboratory Name: ACCUTEST LABORATORIES Laboratory Number: 12129 Activity ID: NLC120003
2235 RT 130
BLDG B
Dayton, NJ 08810

Category: SDW06 -- Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SDW06.03450	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Carbon disulfide
Certified	Yes	NJ	SDW06.03460	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Chloroacetonitrile
Certified	Yes	NJ	SDW06.03470	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Chlorobutane (1-)
Certified	Yes	NJ	SDW06.03480	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichloro-2-butene (trans-1,4-)
Certified	Yes	NJ	SDW06.03490	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichloropropanone (1,1-)
Certified	Yes	NJ	SDW06.03500	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Diethyl ether (Ethyl ether)
Certified	Yes	NJ	SDW06.03510	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Ethyl methacrylate
Applied	No	NJ	SDW06.03515	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Hexane (n-)
Certified	Yes	NJ	SDW06.03520	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Hexachloroethane
Certified	Yes	NJ	SDW06.03530	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Hexanone (2-)
Certified	Yes	NJ	SDW06.03540	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Methacrylonitrile
Certified	Yes	NJ	SDW06.03550	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Methyl acrylate
Certified	Yes	NJ	SDW06.03560	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Methyl iodide
Certified	Yes	NJ	SDW06.03570	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Methyl methacrylate
Certified	Yes	NJ	SDW06.03580	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Pentanone (4-methyl-2-) (MIBK)
Certified	Yes	NJ	SDW06.03590	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Nitropropane (2-)
Certified	Yes	NJ	SDW06.03600	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Pentachloroethane
Certified	Yes	NJ	SDW06.03610	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Propionitrile
Certified	Yes	NJ	SDW06.03615	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Tert-butyl alcohol
Certified	Yes	NJ	SDW06.03620	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Tetrahydrofuran

Category: SHW03 -- Analyze-Immediately Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW03.01000	NPW	Aqueous, Electrometric	[SW-846 9040C]	pH
Certified	Yes	NJ	SHW03.02000	NPW	Thermometric	[SM 2550 B]	Temperature

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2235 RT 130
BLDG B
Dayton, NJ 08810

Category: SHW04 – Inorganic Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW04.01000	NPW	Acid Digestion/Surface and Groundwater, ICP, FLAA	[SW-846 3005A]	Metals, Total Rec and Dissolved
Certified	Yes	NJ	SHW04.01500	NPW	Acid Digestion/Aqueous Samples, ICP, FLAA	[SW-846 3010A]	Metals, Total
Certified	Yes	NJ	SHW04.33000	NPW	AA, Manual Cold Vapor	[SW-846 7470A]	Mercury - liquid waste

Category: SHW05 – Organic Parameters, Prep. / Screening

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW05.01000	NPW	Separatory Funnel Extraction	[SW-846 3510C]	Semivolatile organics
Certified	Yes	NJ	SHW05.02000	NPW	Continuous Liquid-Liquid Extraction	[SW-846 3520C]	Semivolatile organics
Certified	Yes	NJ	SHW05.07000	NPW	Purge & Trap Aqueous	[SW-846 5030B]	Volatile organics

Category: SHW07 – Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW07.04016	NPW	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Benzyl chloride
Certified	Yes	NJ	SHW07.04680	NPW	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Aramite
Certified	Yes	NJ	SHW07.04775	NPW	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dimethyl benzidine (3,3-)
Certified	Yes	NJ	SHW07.04795	NPW	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Famphur
Certified	Yes	NJ	SHW07.04800	NPW	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Hexachlorophene
Certified	Yes	NJ	SHW07.04840	NPW	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Methapyrilene
Certified	Yes	NJ	SHW07.04915	NPW	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Phenylenediamine (1,4-)

Category: SHW09 – Miscellaneous Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW09.06000	NPW	Combustion, Titration	[SW-846 9020B]	Total organic halides (TOX)
Certified	Yes	NJ	SHW09.17000	NPW	Wheatstone Bridge	[SW-846 9050A]	Specific conductance

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New Jersey Department of Environmental Protection

National Environmental Laboratory Accreditation Program

ANNUAL CERTIFIED PARAMETER LIST AND CURRENT STATUS

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Laboratory Name: ACCUTEST LABORATORIES Laboratory Number: 12129 Activity ID: NLC120003
2235 RT 130
BLDG B
Dayton, NJ 08810

Category: SHW09 – Miscellaneous Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW09.22000	NPW	Colorimetric, Auto, 4AAP Distillation	[SW-846 9066]	Phenols

Category: WPP01 – Microbiological Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	WPP01.02000	NPW	Membrane Filter (MF), Single Step	[SM 9222 D]	Fecal coliform
Certified	Yes	NJ	WPP01.04000	NPW	MF Single Step or Two Step	[SM 9222 B]	Total coliform
Certified	Yes	NJ	WPP01.10000	NPW	Pour Plate	[SM 9215 B]	Heterotrophic plate count

Category: WPP02 – Inorg. Parameters, Nutrients and Demands

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	WPP02.01000	NPW	Electrometric or Phenolphthalein	[SM 2310 B(4A)]	Acidity as CaCO3
Certified	Yes	NJ	WPP02.01500	NPW	Electrometric or Color Titration	[SM 2320 B]	Alkalinity as CaCO3
Certified	Yes	NJ	WPP02.04000	NPW	Automated Phenate	[SM 4500-NH3 B+G (20th ed.)]	Ammonia
Certified	Yes	NJ	WPP02.05000	NPW	Dissolved Oxygen Depletion	[SM 5210 B]	Biochemical oxygen demand
Certified	Yes	NJ	WPP02.06000	NPW	ICP	[EPA 200.7]	Boron
Certified	Yes	NJ	WPP02.07100	NPW	Ion Chromatography	[EPA 300.0]	Bromide
Certified	Yes	NJ	WPP02.08000	NPW	Digestion, ICP	[EPA 200.7]	Calcium
Certified	Yes	NJ	WPP02.08050	NPW	ICP/MS	[EPA 200.8]	Calcium
Certified	Yes	NJ	WPP02.09500	NPW	Dissolved Oxygen Depletion, Nitrification Inhibition	[SM 5210 B]	Carbonaceous BOD (CBOD)
Certified	Yes	NJ	WPP02.10000	NPW	Titrimetric	[SM 5220 C]	Chemical oxygen demand
Certified	Yes	NJ	WPP02.11500	NPW	Titrimetric, Mercuric Nitrate	[SM 4500-Cl C]	Chloride
Certified	Yes	NJ	WPP02.12600	NPW	Ion Chromatography	[EPA 300.0]	Chloride
Certified	Yes	NJ	WPP02.13500	NPW	Colorimetric (Platinum-Cobalt)	[SM 2120 B]	Color
Certified	Yes	NJ	WPP02.15500	NPW	Distillation, Spectrophotometric (Auto)	[EPA 335.4]	Cyanide
Certified	Yes	NJ	WPP02.16000	NPW	Manual Distillation, Titrimetr/Spectro	[SM 4500-CN C,G]	Cyanide - amenable to Cl2
Certified	Yes	NJ	WPP02.18100	NPW	Ion Chromatography	[EPA 300.0]	Fluoride
Certified	Yes	NJ	WPP02.19000	NPW	Titrimetric, EDTA	[SM 2340 C]	Hardness - total as CaCO3

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2235 RT 130
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Dayton, NJ 08810

Category: WPP02 -- Inorg. Parameters, Nutrients and Demands

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	WPP02.20100	NPW	Ca + Mg Carbonates, ICP	[EPA 200.7]	Hardness - total as CaCO3
Certified	Yes	NJ	WPP02.22500	NPW	Digestion, Distillation, Semiautomated Digestor	[EPA 351.2]	Kjeldahl nitrogen - total
Certified	Yes	NJ	WPP02.24000	NPW	Digestion, ICP	[EPA 200.7]	Magnesium
Certified	Yes	NJ	WPP02.24050	NPW	ICP/MS	[EPA 200.8]	Magnesium
Certified	Yes	NJ	WPP02.27000	NPW	Cadmium Reduction, Automated	[EPA 353.2]	Nitrate - nitrite
Certified	Yes	NJ	WPP02.28000	NPW	Spectrophotometric, Manual	[SM 4500-NO2 B]	Nitrite
Certified	Yes	NJ	WPP02.29100	NPW	Gravimetric, Hexane Extractable Material-LL	[EPA 1664A]	Oil & grease - hem-LL
Certified	Yes	NJ	WPP02.29200	NPW	Gravimetric, Silica Gel Treated-Hem	[EPA 1664A]	Oil & grease - sgt-non polar
Certified	Yes	NJ	WPP02.30000	NPW	Combustion or Oxidation	[SM 5310 B, C or D]	Total organic carbon (TOC)
Certified	Yes	NJ	WPP02.30050	NPW	Filtration and Oxidation or Combustion	[SM 5310B, C or D]	Dissolved organic carbon (DOC)
Certified	Yes	NJ	WPP02.30500	NPW	Total Kjeldahl-N Minus Ammonia-N	[USER DEFINED EPA 351.2 - SM4500 NH3 B+G (20TH ED)]	Organic nitrogen
Certified	Yes	NJ	WPP02.31500	NPW	Ascorbic Acid, Manual Single Reagent	[SM 4500-P, E]	Orthophosphate
Certified	Yes	NJ	WPP02.33000	NPW	Manual Distillation, Colorimetric Auto	[EPA 420.1 + .4]	Phenols
Certified	Yes	NJ	WPP02.34000	NPW	Persulfate Digestion + Manual	[EPA 365.3]	Phosphorus (total)
Certified	Yes	NJ	WPP02.36500	NPW	Digestion, ICP	[EPA 200.7]	Potassium
Certified	Yes	NJ	WPP02.36550	NPW	ICP/MS	[EPA 200.8]	Potassium
Certified	Yes	NJ	WPP02.38000	NPW	Gravimetric, 103-105 Degrees C	[SM 2540 B]	Residue - total
Certified	Yes	NJ	WPP02.38500	NPW	Gravimetric, 180 Degrees C	[SM 2540 C]	Residue - filterable (TDS)
Certified	Yes	NJ	WPP02.39000	NPW	Gravimetric, 103-105 Degrees C, Post Washing	[SM 2540 D]	Residue - nonfilterable (TSS)
Certified	Yes	NJ	WPP02.39500	NPW	Volumetric (Imhoff Cone) or Gravimetric	[SM 2540 F]	Residue - settleable
Certified	Yes	NJ	WPP02.40000	NPW	Gravimetric, 550 Degrees C	[EPA 160.4]	Residue - volatile
Certified	Yes	NJ	WPP02.40100	NPW	Gravimetric, 500 Degrees C	[SM 2540 G SM 18th Ed.]	Total, fixed, and volatile solids (SQAR)
Certified	Yes	NJ	WPP02.40500	NPW	Electrical Conductivity	[SM 2520 B]	Salinity
Certified	Yes	NJ	WPP02.41500	NPW	0.45u Filtration + Colorimetric (Manual)	[SM 4500-Si D (18/19th ed)]	Silica - dissolved
Certified	Yes	NJ	WPP02.42500	NPW	0.45u Filtration + ICP	[EPA 200.7]	Silica - dissolved
Certified	Yes	NJ	WPP02.44000	NPW	Digestion, ICP	[EPA 200.7]	Sodium
Certified	Yes	NJ	WPP02.44050	NPW	ICP/MS	[EPA 200.8]	Sodium
Certified	Yes	NJ	WPP02.45500	NPW	Wheatstone Bridge	[SM 2510 B]	Specific conductance
Certified	Yes	NJ	WPP02.47100	NPW	Ion Chromatography	[EPA 300.0]	Sulfate
Certified	Yes	NJ	WPP02.47500	NPW	Titrimetric, Iodine	[SM 4500-S F (19/20th ed)]	Sulfides
Certified	Yes	NJ	WPP02.48500	NPW	Colorimetric (Methylene Blue)	[SM 5540 C]	Surfactants

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2235 RT 130
BLDG B
Dayton, NJ 08810

Category: WPP02 -- Inorg. Parameters, Nutrients and Demands

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	WPP02.48510	NPW	Colorimetric (CTAS)	[SM 5540 D]	Surfactants
Certified	Yes	NJ	WPP02.50000	NPW	Nephelometric	[EPA 180.1]	Turbidity

Category: WPP03 -- Analyze-Immediately Inorganic Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	WPP03.04000	NPW	DPD-FAS	[SM 4500-Cl F]	Chlorine
Certified	Yes	NJ	WPP03.07000	NPW	Winkler, Azide Modification	[SM 4500-O C]	Oxygen (dissolved)
Certified	Yes	NJ	WPP03.08000	NPW	Electrode	[SM 4500-O G]	Oxygen (dissolved)
Certified	Yes	NJ	WPP03.09000	NPW	Electrometric	[SM 4500-H B]	pH
Certified	Yes	NJ	WPP03.12000	NPW	Titrimetric, Iodine-Iodate	[SM 4500-SO3 B]	Sulfite - SO3
Certified	Yes	NJ	WPP03.14000	NPW	Thermometric	[SM 2550 B]	Temperature

Category: WPP04 -- Inorganic Parameters, Metals

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	WPP04.02000	NPW	Digestion, ICP	[EPA 200.7]	Aluminum
Certified	Yes	NJ	WPP04.02100	NPW	ICP/MS	[EPA 200.8]	Aluminum
Certified	Yes	NJ	WPP04.04500	NPW	Digestion, ICP	[EPA 200.7]	Antimony
Certified	Yes	NJ	WPP04.04600	NPW	ICP/MS	[EPA 200.8]	Antimony
Certified	Yes	NJ	WPP04.05600	NPW	Digestion, ICP	[EPA 200.7]	Arsenic
Certified	Yes	NJ	WPP04.05700	NPW	ICP/MS	[EPA 200.8]	Arsenic
Certified	Yes	NJ	WPP04.08000	NPW	Digestion, ICP	[EPA 200.7]	Barium
Certified	Yes	NJ	WPP04.08200	NPW	ICP/MS	[EPA 200.8]	Barium
Certified	Yes	NJ	WPP04.11000	NPW	Digestion, ICP	[EPA 200.7]	Beryllium
Certified	Yes	NJ	WPP04.11100	NPW	ICP/MS	[EPA 200.8]	Beryllium
Certified	Yes	NJ	WPP04.13500	NPW	Digestion, ICP	[EPA 200.7]	Cadmium
Certified	Yes	NJ	WPP04.13600	NPW	ICP/MS	[EPA 200.8]	Cadmium
Certified	Yes	NJ	WPP04.15000	NPW	0.45u Filter, Colorimetric DPC	[SM 3500-Cr D (18/19th ed)]	Chromium (VI)

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2235 RT 130
BLDG B
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Category: WPP04 – Inorganic Parameters, Metals

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	WPP04.15100	NPW	0.45u Filter, Ion Chromatography	[EPA 218.6]	Chromium (VI)
Certified	Yes	NJ	WPP04.18000	NPW	Digestion, ICP	[EPA 200.7]	Chromium
Certified	Yes	NJ	WPP04.18100	NPW	ICP/MS	[EPA 200.8]	Chromium
Certified	Yes	NJ	WPP04.19500	NPW	Digestion, ICP	[EPA 200.7]	Cobalt
Certified	Yes	NJ	WPP04.19600	NPW	ICP/MS	[EPA 200.8]	Cobalt
Certified	Yes	NJ	WPP04.21500	NPW	Digestion, ICP	[EPA 200.7]	Copper
Certified	Yes	NJ	WPP04.21600	NPW	ICP/MS	[EPA 200.8]	Copper
Certified	Yes	NJ	WPP04.26500	NPW	Digestion, ICP	[EPA 200.7]	Iron
Certified	Yes	NJ	WPP04.26550	NPW	ICP/MS	[EPA 200.8]	Iron
Certified	Yes	NJ	WPP04.27001	NPW	Digestion, Colorimetric (Phenanthroline)	[SM 3500-Fe B (20th ed)]	Iron, Ferrous
Certified	Yes	NJ	WPP04.28000	NPW	Digestion, ICP	[EPA 200.7]	Lead
Certified	Yes	NJ	WPP04.28100	NPW	ICP/MS	[EPA 200.8]	Lead
Certified	Yes	NJ	WPP04.31000	NPW	Digestion, ICP	[EPA 200.7]	Manganese
Certified	Yes	NJ	WPP04.31100	NPW	ICP/MS	[EPA 200.8]	Manganese
Certified	Yes	NJ	WPP04.33000	NPW	Manual Cold Vapor	[EPA 245.1]	Mercury
Certified	Yes	NJ	WPP04.33100	NPW	Cold Vapor Atomic Fluorescence Spectrometry	[EPA 245.7]	Mercury
Certified	Yes	NJ	WPP04.33200	NPW	Purge & Trap Atomic Fluorescence	[EPA 1631E]	Mercury
Certified	Yes	NJ	WPP04.35000	NPW	Digestion, ICP	[EPA 200.7]	Molybdenum
Certified	Yes	NJ	WPP04.35200	NPW	ICP/MS	[EPA 200.8]	Molybdenum
Certified	Yes	NJ	WPP04.37500	NPW	Digestion, ICP	[EPA 200.7]	Nickel
Certified	Yes	NJ	WPP04.37600	NPW	ICP/MS	[EPA 200.8]	Nickel
Certified	Yes	NJ	WPP04.45500	NPW	Digestion, ICP	[EPA 200.7]	Selenium
Certified	Yes	NJ	WPP04.45600	NPW	ICP/MS	[EPA 200.8]	Selenium
Certified	Yes	NJ	WPP04.48000	NPW	Digestion, ICP	[EPA 200.7]	Silver
Certified	Yes	NJ	WPP04.48200	NPW	ICP/MS	[EPA 200.8]	Silver
Certified	Yes	NJ	WPP04.50000	NPW	Digestion, ICP	[EPA 200.7]	Thallium
Certified	Yes	NJ	WPP04.50100	NPW	ICP/MS	[EPA 200.8]	Thallium
Certified	Yes	NJ	WPP04.51100	NPW	Digestion, ICP	[EPA 200.7]	Tin
Certified	Yes	NJ	WPP04.51200	NPW	ICP/MS	[EPA 200.8]	Tin
Certified	Yes	NJ	WPP04.52050	NPW	Digestion, ICP	[EPA 200.7]	Titanium
Certified	Yes	NJ	WPP04.52070	NPW	ICP/MS	[EPA 200.8]	Titanium
Certified	Yes	NJ	WPP04.54000	NPW	Digestion, ICP	[EPA 200.7]	Vanadium

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Laboratory Name: ACCUTEST LABORATORIES Laboratory Number: 12129 Activity ID: NLC120003
2235 RT 130
BLDG B
Dayton, NJ 08810

Category: WPP04 -- Inorganic Parameters, Metals

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	WPP04.54100	NPW	ICP/MS	[EPA 200.8]	Vanadium
Certified	Yes	NJ	WPP04.56500	NPW	Digestion, ICP	[EPA 200.7]	Zinc
Certified	Yes	NJ	WPP04.56600	NPW	ICP/MS	[EPA 200.8]	Zinc

Category: WPP05 -- Organic Parameters, Chromatography

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	WPP05.02010	NPW	Purge & Trap, GC (PID)	[EPA 602]	Benzene
Certified	Yes	NJ	WPP05.02020	NPW	Purge & Trap, GC (PID)	[EPA 602]	Chlorobenzene
Certified	Yes	NJ	WPP05.02030	NPW	Purge & Trap, GC (PID)	[EPA 602]	Dichlorobenzene (1,2-)
Certified	Yes	NJ	WPP05.02040	NPW	Purge & Trap, GC (PID)	[EPA 602]	Dichlorobenzene (1,3-)
Certified	Yes	NJ	WPP05.02050	NPW	Purge & Trap, GC (PID)	[EPA 602]	Dichlorobenzene (1,4-)
Certified	Yes	NJ	WPP05.02060	NPW	Purge & Trap, GC (PID)	[EPA 602]	Ethylbenzene
Certified	Yes	NJ	WPP05.02062	NPW	Purge & Trap, GC (PID)	[EPA 602]	Methyl tert-butyl ether
Certified	Yes	NJ	WPP05.02064	NPW	Purge & Trap, GC (PID)	[EPA 602]	Tert-butyl alcohol
Certified	Yes	NJ	WPP05.02070	NPW	Purge & Trap, GC (PID)	[EPA 602]	Toluene
Certified	Yes	NJ	WPP05.02080	NPW	Purge & Trap, GC (PID)	[EPA 602]	Xylenes (total)
Certified	Yes	NJ	WPP05.03000	NPW	Purge & Trap, GC (FID)	[EPA 603]	Acrolein
Certified	Yes	NJ	WPP05.03005	NPW	Purge & Trap, GC (FID)	[EPA 603]	Acrylonitrile
Certified	Yes	NJ	WPP05.09010	NPW	Extract/GC (ECD)	[EPA 608]	Aldrin
Certified	Yes	NJ	WPP05.09020	NPW	Extract/GC (ECD)	[EPA 608]	Alpha BHC
Certified	Yes	NJ	WPP05.09030	NPW	Extract/GC (ECD)	[EPA 608]	Beta BHC
Certified	Yes	NJ	WPP05.09040	NPW	Extract/GC (ECD)	[EPA 608]	Delta BHC
Certified	Yes	NJ	WPP05.09050	NPW	Extract/GC (ECD)	[EPA 608]	Lindane (gamma BHC)
Certified	Yes	NJ	WPP05.09060	NPW	Extract/GC (ECD)	[EPA 608]	Chlordane
Certified	Yes	NJ	WPP05.09062	NPW	Extract/GC (ECD)	[EPA 608]	Chlordane (alpha)
Certified	Yes	NJ	WPP05.09063	NPW	Extract/GC (ECD)	[EPA 608]	Chlordane (gamma)
Applied	No	NJ	WPP05.09065	NPW	Extract/GC (ECD)	[EPA 608]	Chlorobenzilate
Certified	Yes	NJ	WPP05.09070	NPW	Extract/GC (ECD)	[EPA 608]	DDD (4,4'-)
Certified	Yes	NJ	WPP05.09080	NPW	Extract/GC (ECD)	[EPA 608]	DDE (4,4'-)

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Category: WPP05 -- Organic Parameters, Chromatography

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	WPP05.09090	NPW	Extract/GC (ECD)	[EPA 608]	DDT (4,4'-)
Certified	Yes	NJ	WPP05.09100	NPW	Extract/GC (ECD)	[EPA 608]	Dieldrin
Certified	Yes	NJ	WPP05.09110	NPW	Extract/GC (ECD)	[EPA 608]	Endosulfan I
Certified	Yes	NJ	WPP05.09120	NPW	Extract/GC (ECD)	[EPA 608]	Endosulfan II
Certified	Yes	NJ	WPP05.09130	NPW	Extract/GC (ECD)	[EPA 608]	Endosulfan sulfate
Certified	Yes	NJ	WPP05.09140	NPW	Extract/GC (ECD)	[EPA 608]	Endrin
Certified	Yes	NJ	WPP05.09150	NPW	Extract/GC (ECD)	[EPA 608]	Endrin aldehyde
Certified	Yes	NJ	WPP05.09160	NPW	Extract/GC (ECD)	[EPA 608]	Endrin ketone
Certified	Yes	NJ	WPP05.09170	NPW	Extract/GC (ECD)	[EPA 608]	Heptachlor
Certified	Yes	NJ	WPP05.09180	NPW	Extract/GC (ECD)	[EPA 608]	Heptachlor epoxide
Certified	Yes	NJ	WPP05.09190	NPW	Extract/GC (ECD)	[EPA 608]	Methoxychlor
Applied	No	NJ	WPP05.09198	NPW	Extract/GC (ECD)	[EPA 608]	Simazine
Certified	Yes	NJ	WPP05.09200	NPW	Extract/GC (ECD)	[EPA 608]	Toxaphene
Certified	Yes	NJ	WPP05.11010	NPW	Extract/GC (ECD)	[EPA 608]	PCB 1016
Certified	Yes	NJ	WPP05.11020	NPW	Extract/GC (ECD)	[EPA 608]	PCB 1221
Certified	Yes	NJ	WPP05.11030	NPW	Extract/GC (ECD)	[EPA 608]	PCB 1232
Certified	Yes	NJ	WPP05.11040	NPW	Extract/GC (ECD)	[EPA 608]	PCB 1242
Certified	Yes	NJ	WPP05.11050	NPW	Extract/GC (ECD)	[EPA 608]	PCB 1248
Certified	Yes	NJ	WPP05.11060	NPW	Extract/GC (ECD)	[EPA 608]	PCB 1254
Certified	Yes	NJ	WPP05.11070	NPW	Extract/GC (ECD)	[EPA 608]	PCB 1260

Category: WPP06 -- Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Applied	No	NJ	WPP06.02001	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Amyl acetate (n-)
Applied	No	NJ	WPP06.02002	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Amyl alcohol (n-)
Certified	Yes	NJ	WPP06.02003	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Acetone
Certified	Yes	NJ	WPP06.02007	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Acrolein
Certified	Yes	NJ	WPP06.02009	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Acrylonitrile
Certified	Yes	NJ	WPP06.02010	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Benzene

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BLDG B
Dayton, NJ 08810

Category: WPP06 -- Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	WPP06.02020	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Bromodichloromethane
Certified	Yes	NJ	WPP06.02030	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Bromoform
Certified	Yes	NJ	WPP06.02040	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Bromomethane
Certified	Yes	NJ	WPP06.02041	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Butanone (2-)
Certified	Yes	NJ	WPP06.02042	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Butyl acetate (n-)
Certified	Yes	NJ	WPP06.02045	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Carbon disulfide
Certified	Yes	NJ	WPP06.02050	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Carbon tetrachloride
Certified	Yes	NJ	WPP06.02060	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Chlorobenzene
Certified	Yes	NJ	WPP06.02070	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Chloroethane
Certified	Yes	NJ	WPP06.02080	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Chloroethyl vinyl ether (2-)
Certified	Yes	NJ	WPP06.02090	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Chloroform
Certified	Yes	NJ	WPP06.02100	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Chloromethane
Certified	Yes	NJ	WPP06.02110	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dibromochloromethane
Certified	Yes	NJ	WPP06.02115	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dibromoethane (1,2-) (EDB)
Certified	Yes	NJ	WPP06.02120	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichlorobenzene (1,2-)
Certified	Yes	NJ	WPP06.02130	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichlorobenzene (1,3-)
Certified	Yes	NJ	WPP06.02140	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichlorobenzene (1,4-)
Certified	Yes	NJ	WPP06.02145	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichlorodifluoromethane
Certified	Yes	NJ	WPP06.02150	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichloroethane (1,1-)
Certified	Yes	NJ	WPP06.02160	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichloroethane (1,2-)
Certified	Yes	NJ	WPP06.02170	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichloroethene (1,1-)
Certified	Yes	NJ	WPP06.02175	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichloroethene (cis-1,2-)
Certified	Yes	NJ	WPP06.02180	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichloroethene (trans-1,2-)
Certified	Yes	NJ	WPP06.02190	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichloropropane (1,2-)
Certified	Yes	NJ	WPP06.02198	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Diethyl ether (Ethyl ether)
Certified	Yes	NJ	WPP06.02200	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichloropropene (cis-1,3-)
Certified	Yes	NJ	WPP06.02210	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichloropropene (trans-1,3-)
Certified	Yes	NJ	WPP06.02212	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Ethyl acetate
Certified	Yes	NJ	WPP06.02220	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Ethylbenzene
Certified	Yes	NJ	WPP06.02222	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Heptane (n-)
Certified	Yes	NJ	WPP06.02223	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Hexane (n-)
Applied	No	NJ	WPP06.02224	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Isobutyraldehyde

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2235 RT 130
BLDG B
Dayton, NJ 08810

Category: WPP06 – Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Applied	No	NJ	WPP06.02225	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Isopropanol
Applied	No	NJ	WPP06.02226	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Isopropyl acetate
Certified	Yes	NJ	WPP06.02227	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Isopropyl ether
Certified	Yes	NJ	WPP06.02230	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Methylene chloride (Dichloromethane)
Applied	No	NJ	WPP06.02231	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Methyl formate
Certified	Yes	NJ	WPP06.02232	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Methyl tert-butyl ether
Certified	Yes	NJ	WPP06.02233	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Methyl isobutyl ketone (MIBK)
Certified	Yes	NJ	WPP06.02234	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Tert-butyl alcohol
Certified	Yes	NJ	WPP06.02235	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Tetrahydrofuran
Certified	Yes	NJ	WPP06.02238	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Styrene
Certified	Yes	NJ	WPP06.02240	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Tetrachloroethane (1,1,2,2-)
Certified	Yes	NJ	WPP06.02250	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Tetrachloroethene
Certified	Yes	NJ	WPP06.02260	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Toluene
Certified	Yes	NJ	WPP06.02270	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Trichloroethane (1,1,1-)
Certified	Yes	NJ	WPP06.02280	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Trichloroethane (1,1,2-)
Certified	Yes	NJ	WPP06.02290	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Trichloroethene
Certified	Yes	NJ	WPP06.02300	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Trichlorofluoromethane
Certified	Yes	NJ	WPP06.02305	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Trichloro (1,1,2-) trifluoroethane (1,2,2-)
Certified	Yes	NJ	WPP06.02307	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Vinyl acetate
Certified	Yes	NJ	WPP06.02310	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Vinyl chloride
Certified	Yes	NJ	WPP06.02312	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Xylenes (total)
Certified	Yes	NJ	WPP06.02315	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Xylene (o-)
Certified	Yes	NJ	WPP06.02317	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Xylene (m- + p-)
Certified	Yes	NJ	WPP06.02325	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Hexanone (2-)
Certified	Yes	NJ	WPP06.02335	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Ethyl-tert-butyl Ether [ETBE]
Certified	Yes	NJ	WPP06.02400	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Diisopropyl Ether [DIPE]
Certified	Yes	NJ	WPP06.02410	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dioxane (1,4-)
Certified	Yes	NJ	WPP06.02460	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Isopropylbenzene
Certified	Yes	NJ	WPP06.02510	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Naphthalene
Certified	Yes	NJ	WPP06.02570	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	tert-Amylmethyl ether [TAME]
Certified	Yes	NJ	WPP06.02650	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Trimethylbenzene (1,2,4-)
Certified	Yes	NJ	WPP06.02660	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Trimethylbenzene (1,3,5-)

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2235 RT 130
BLDG B
Dayton, NJ 08810

Category: WPP06 – Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	WPP06.03010	NPW	Extract, GC/MS	[EPA 625]	Acenaphthene
Certified	Yes	NJ	WPP06.03020	NPW	Extract, GC/MS	[EPA 625]	Acenaphthylene
Certified	Yes	NJ	WPP06.03030	NPW	Extract, GC/MS	[EPA 625]	Anthracene
Certified	Yes	NJ	WPP06.03040	NPW	Extract, GC/MS	[EPA 625]	Benzo(a)anthracene
Certified	Yes	NJ	WPP06.03050	NPW	Extract, GC/MS	[EPA 625]	Benzo(b)fluoranthene
Certified	Yes	NJ	WPP06.03060	NPW	Extract, GC/MS	[EPA 625]	Benzo(k)fluoranthene
Certified	Yes	NJ	WPP06.03070	NPW	Extract, GC/MS	[EPA 625]	Benzo(a)pyrene
Certified	Yes	NJ	WPP06.03080	NPW	Extract, GC/MS	[EPA 625]	Benzo(ghi)perylene
Certified	Yes	NJ	WPP06.03090	NPW	Extract, GC/MS	[EPA 625]	Butyl benzyl phthalate
Certified	Yes	NJ	WPP06.03100	NPW	Extract, GC/MS	[EPA 625]	Bis (2-chloroethyl) ether
Certified	Yes	NJ	WPP06.03110	NPW	Extract, GC/MS	[EPA 625]	Bis (2-chloroethoxy) methane
Certified	Yes	NJ	WPP06.03120	NPW	Extract, GC/MS	[EPA 625]	Bis (2-ethylhexyl) phthalate
Certified	Yes	NJ	WPP06.03130	NPW	Extract, GC/MS	[EPA 625]	Bis (2-chloroisopropyl) ether
Certified	Yes	NJ	WPP06.03140	NPW	Extract, GC/MS	[EPA 625]	Bromophenyl-phenyl ether (4-)
Certified	Yes	NJ	WPP06.03150	NPW	Extract, GC/MS	[EPA 625]	Chloronaphthalene (2-)
Certified	Yes	NJ	WPP06.03160	NPW	Extract, GC/MS	[EPA 625]	Chlorophenyl-phenyl ether (4-)
Certified	Yes	NJ	WPP06.03170	NPW	Extract, GC/MS	[EPA 625]	Chrysene
Certified	Yes	NJ	WPP06.03178	NPW	Extract, GC/MS	[EPA 625]	Dibenz(a,h)acridine
Certified	Yes	NJ	WPP06.03180	NPW	Extract, GC/MS	[EPA 625]	Dibenzo(a,h)anthracene
Certified	Yes	NJ	WPP06.03186	NPW	Extract, GC/MS	[EPA 625]	Dibenzofuran
Certified	Yes	NJ	WPP06.03190	NPW	Extract, GC/MS	[EPA 625]	Di-n-butyl phthalate
Certified	Yes	NJ	WPP06.03230	NPW	Extract, GC/MS	[EPA 625]	Dichlorobenzidine (3,3'-)
Certified	Yes	NJ	WPP06.03240	NPW	Extract, GC/MS	[EPA 625]	Diethyl phthalate
Certified	Yes	NJ	WPP06.03244	NPW	Extract, GC/MS	[EPA 625]	Dimethylbenz(a)anthracene (7,12-)
Certified	Yes	NJ	WPP06.03250	NPW	Extract, GC/MS	[EPA 625]	Dimethyl phthalate
Certified	Yes	NJ	WPP06.03260	NPW	Extract, GC/MS	[EPA 625]	Dinitrotoluene (2,4-)
Certified	Yes	NJ	WPP06.03270	NPW	Extract, GC/MS	[EPA 625]	Dinitrotoluene (2,6-)
Certified	Yes	NJ	WPP06.03280	NPW	Extract, GC/MS	[EPA 625]	Di-n-octyl phthalate
Certified	Yes	NJ	WPP06.03290	NPW	Extract, GC/MS	[EPA 625]	Fluoranthene
Certified	Yes	NJ	WPP06.03300	NPW	Extract, GC/MS	[EPA 625]	Fluorene
Certified	Yes	NJ	WPP06.03310	NPW	Extract, GC/MS	[EPA 625]	Hexachlorobenzene
Certified	Yes	NJ	WPP06.03320	NPW	Extract, GC/MS	[EPA 625]	Hexachlorobutadiene (1,3-)

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2235 RT 130
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Certified	Yes	NJ	WPP06.03330	NPW	Extract, GC/MS	[EPA 625]	Hexachloroethane
Certified	Yes	NJ	WPP06.03340	NPW	Extract, GC/MS	[EPA 625]	Indeno(1,2,3-cd)pyrene
Certified	Yes	NJ	WPP06.03350	NPW	Extract, GC/MS	[EPA 625]	Isophorone
Certified	Yes	NJ	WPP06.03358	NPW	Extract, GC/MS	[EPA 625]	Methylnaphthalene (2-)
Certified	Yes	NJ	WPP06.03360	NPW	Extract, GC/MS	[EPA 625]	Naphthalene
Certified	Yes	NJ	WPP06.03366	NPW	Extract, GC/MS	[EPA 625]	Chloroaniline (4-)
Certified	Yes	NJ	WPP06.03367	NPW	Extract, GC/MS	[EPA 625]	Nitroaniline (2-)
Certified	Yes	NJ	WPP06.03368	NPW	Extract, GC/MS	[EPA 625]	Nitroaniline (3-)
Certified	Yes	NJ	WPP06.03369	NPW	Extract, GC/MS	[EPA 625]	Nitroaniline (4-)
Certified	Yes	NJ	WPP06.03370	NPW	Extract, GC/MS	[EPA 625]	Nitrobenzene
Certified	Yes	NJ	WPP06.03380	NPW	Extract, GC/MS	[EPA 625]	N-Nitroso-di-n-propylamine
Certified	Yes	NJ	WPP06.03390	NPW	Extract, GC/MS	[EPA 625]	Phenanthrene
Certified	Yes	NJ	WPP06.03400	NPW	Extract, GC/MS	[EPA 625]	Pyrene
Certified	Yes	NJ	WPP06.03402	NPW	Extract, GC/MS	[EPA 625]	Pentachlorobenzene
Certified	Yes	NJ	WPP06.03405	NPW	Extract, GC/MS	[EPA 625]	Tetrachlorobenzene (1,2,4,5-)
Certified	Yes	NJ	WPP06.03410	NPW	Extract, GC/MS	[EPA 625]	Trichlorobenzene (1,2,4-)
Certified	Yes	NJ	WPP06.03420	NPW	Extract, GC/MS	[EPA 625]	Methyl phenol (4-chloro-3-)
Certified	Yes	NJ	WPP06.03430	NPW	Extract, GC/MS	[EPA 625]	Chlorophenol (2-)
Certified	Yes	NJ	WPP06.03440	NPW	Extract, GC/MS	[EPA 625]	Dichlorophenol (2,4-)
Certified	Yes	NJ	WPP06.03450	NPW	Extract, GC/MS	[EPA 625]	Dimethylphenol (2,4-)
Certified	Yes	NJ	WPP06.03460	NPW	Extract, GC/MS	[EPA 625]	Dinitrophenol (2,4-)
Certified	Yes	NJ	WPP06.03470	NPW	Extract, GC/MS	[EPA 625]	Dinitrophenol (2-methyl-4,6-)
Certified	Yes	NJ	WPP06.03480	NPW	Extract, GC/MS	[EPA 625]	Nitrophenol (2-)
Certified	Yes	NJ	WPP06.03490	NPW	Extract, GC/MS	[EPA 625]	Nitrophenol (4-)
Certified	Yes	NJ	WPP06.03500	NPW	Extract, GC/MS	[EPA 625]	Pentachlorophenol
Certified	Yes	NJ	WPP06.03510	NPW	Extract, GC/MS	[EPA 625]	Phenol
Certified	Yes	NJ	WPP06.03512	NPW	Extract, GC/MS	[EPA 625]	Tetrachlorophenol (2,3,4,6-)
Certified	Yes	NJ	WPP06.03518	NPW	Extract, GC/MS	[EPA 625]	Trichlorophenol (2,4,5-)
Certified	Yes	NJ	WPP06.03520	NPW	Extract, GC/MS	[EPA 625]	Trichlorophenol (2,4,6-)
Certified	Yes	NJ	WPP06.03530	NPW	Extract, GC/MS	[EPA 625]	Benzoic acid
Certified	Yes	NJ	WPP06.03540	NPW	Extract, GC/MS	[EPA 625]	Methylphenol (4-)
Certified	Yes	NJ	WPP06.03550	NPW	Extract, GC/MS	[EPA 625]	Acetophenone

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Certified	Yes	NJ	WPP06.03560	NPW	Extract, GC/MS	[EPA 625]	Alpha - terpineol
Certified	Yes	NJ	WPP06.03570	NPW	Extract, GC/MS	[EPA 625]	Aniline
Certified	Yes	NJ	WPP06.03580	NPW	Extract, GC/MS	[EPA 625]	Benzidine
Certified	Yes	NJ	WPP06.03590	NPW	Extract, GC/MS	[EPA 625]	Carbazole
Certified	Yes	NJ	WPP06.03600	NPW	Extract, GC/MS	[EPA 625]	Dichloroaniline (2,3-)
Certified	Yes	NJ	WPP06.03605	NPW	Extract, GC/MS	[EPA 625]	Diphenylhydrazine (1,2-)
Certified	Yes	NJ	WPP06.03610	NPW	Extract, GC/MS	[EPA 625]	Methylphenol (2-)
Certified	Yes	NJ	WPP06.03620	NPW	Extract, GC/MS	[EPA 625]	Decane (n-)
Certified	Yes	NJ	WPP06.03660	NPW	Extract, GC/MS	[EPA 625]	Hexachlorocyclopentadiene
Certified	Yes	NJ	WPP06.03675	NPW	Extract, GC/MS	[EPA 625]	N-Nitroso-di-n-butylamine
Certified	Yes	NJ	WPP06.03677	NPW	Extract, GC/MS	[EPA 625]	N-Nitrosodiethylamine
Certified	Yes	NJ	WPP06.03680	NPW	Extract, GC/MS	[EPA 625]	N-Nitrosodimethylamine
Certified	Yes	NJ	WPP06.03690	NPW	Extract, GC/MS	[EPA 625]	N-Nitrosodiphenylamine
Certified	Yes	NJ	WPP06.03695	NPW	Extract, GC/MS	[EPA 625]	N-Nitrosopyrrolidine
Certified	Yes	NJ	WPP06.03700	NPW	Extract, GC/MS	[EPA 625]	Octadecane (n-)
Certified	Yes	NJ	WPP06.03720	NPW	Extract, GC/MS	[EPA 625]	Pyridine
Certified	Yes	NJ	WPP06.03730	NPW	Extract, GC/MS	[EPA 625]	Methylphenanthrene (1-)

Category: WPP07 -- Organic Parameters, Individual Pesticide

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	WPP07.11000	NPW	GC	[USER DEFINED EPA 608]	Beta BHC
Certified	Yes	NJ	WPP07.13000	NPW	GC	[USER DEFINED EPA 608]	Delta BHC
Certified	Yes	NJ	WPP07.20000	NPW	GC	[USER DEFINED EPA 608]	Chlordane
Certified	Yes	NJ	WPP07.45000	NPW	GC	[USER DEFINED EPA 608]	Endosulfan sulfate
Certified	Yes	NJ	WPP07.47000	NPW	GC	[USER DEFINED EPA 608]	Endrin
Certified	Yes	NJ	WPP07.62000	NPW	GC	[USER DEFINED EPA 608]	Methoxychlor
Certified	Yes	NJ	WPP07.85000	NPW	GC	[USER DEFINED EPA 608]	Toxaphene

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Category: SHW02 -- Characteristics of Hazardous Waste

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW02.01000	NPW, SCM	Pensky Martens	[SW-846 1010A]	Ignitability
Certified	Yes	NJ	SHW02.03000	NPW, SCM	Aqueous Waste, Potentiometric	[SW-846 9040C]	Corrosivity - pH waste, >20% water
Certified	Yes	NJ	SHW02.06900	NPW, SCM	TCLP, Toxicity Procedure, ZHE	[SW-846 1311]	Volatile organics
Certified	Yes	NJ	SHW02.06950	NPW, SCM	TCLP, Toxicity Procedure, Shaker	[SW-846 1311]	Semivolatile organics
Certified	Yes	NJ	SHW02.07000	NPW, SCM	TCLP, Toxicity Procedure, Shaker	[SW-846 1311]	Metals
Certified	Yes	NJ	SHW02.08000	NPW, SCM	Synthetic PPT Leachate Procedure	[SW-846 1312]	Metals - organics
Certified	Yes	NJ	SHW02.09000	NPW, SCM	Multiple Extractions	[SW-846 1320]	Metals - organics

Category: SHW04 -- Inorganic Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW04.05000	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Aluminum
Certified	Yes	NJ	SHW04.05500	NPW, SCM	ICP/MS	[SW-846 6020A] [SW-846 6020]	Aluminum
Certified	Yes	NJ	SHW04.06500	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Antimony
Certified	Yes	NJ	SHW04.07000	NPW, SCM	ICP/MS	[SW-846 6020A] [SW-846 6020]	Antimony
Certified	Yes	NJ	SHW04.09000	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Arsenic
Certified	Yes	NJ	SHW04.09500	NPW, SCM	ICP/MS	[SW-846 6020A] [SW-846 6020]	Arsenic
Certified	Yes	NJ	SHW04.11500	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Barium
Certified	Yes	NJ	SHW04.12000	NPW, SCM	ICP/MS	[SW-846 6020A] [SW-846 6020]	Barium
Certified	Yes	NJ	SHW04.13500	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Beryllium
Certified	Yes	NJ	SHW04.14000	NPW, SCM	ICP/MS	[SW-846 6020A] [SW-846 6020]	Beryllium
Certified	Yes	NJ	SHW04.15100	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Boron
Certified	Yes	NJ	SHW04.15500	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Cadmium
Certified	Yes	NJ	SHW04.16000	NPW, SCM	ICP/MS	[SW-846 6020A] [SW-846 6020]	Cadmium
Certified	Yes	NJ	SHW04.17500	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Calcium
Certified	Yes	NJ	SHW04.17505	NPW, SCM	ICP/MS	[SW-846 6020A] [SW-846 6020]	Calcium
Certified	Yes	NJ	SHW04.18500	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Chromium
Certified	Yes	NJ	SHW04.19000	NPW, SCM	ICP/MS	[SW-846 6020A] [SW-846 6020]	Chromium
Certified	Yes	NJ	SHW04.21000	NPW, SCM	Colorimetric	[SW-846 7196A]	Chromium (VI)
Certified	Yes	NJ	SHW04.22100	NPW, SCM	Ion Chromatography	[SW-846 7199]	Chromium (VI)

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New Jersey Department of Environmental Protection

National Environmental Laboratory Accreditation Program

ANNUAL CERTIFIED PARAMETER LIST AND CURRENT STATUS

Effective as of 08/22/2012 until 06/30/2013

Laboratory Name: ACCUTEST LABORATORIES Laboratory Number: 12129 Activity ID: NLC120003
2235 RT 130
BLDG B
Dayton, NJ 08810

Category: SHW04 – Inorganic Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW04.22500	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Cobalt
Certified	Yes	NJ	SHW04.23000	NPW, SCM	ICP/MS	[SW-846 6020A] [SW-846 6020]	Cobalt
Certified	Yes	NJ	SHW04.24500	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Copper
Certified	Yes	NJ	SHW04.25000	NPW, SCM	ICP/MS	[SW-846 6020A] [SW-846 6020]	Copper
Certified	Yes	NJ	SHW04.26000	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Iron
Certified	Yes	NJ	SHW04.26005	NPW, SCM	ICP/MS	[SW-846 6020A] [SW-846 6020]	Iron
Certified	Yes	NJ	SHW04.27500	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Lead
Certified	Yes	NJ	SHW04.28000	NPW, SCM	ICP/MS	[SW-846 6020A] [SW-846 6020]	Lead
Certified	Yes	NJ	SHW04.30500	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Magnesium
Certified	Yes	NJ	SHW04.30505	NPW, SCM	ICP/MS	[SW-846 6020A] [SW-846 6020]	Magnesium
Certified	Yes	NJ	SHW04.31500	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Manganese
Certified	Yes	NJ	SHW04.31600	NPW, SCM	ICP/MS	[SW-846 6020A] [SW-846 6020]	Manganese
Certified	Yes	NJ	SHW04.34000	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Molybdenum
Certified	Yes	NJ	SHW04.34005	NPW, SCM	ICP/MS	[SW-846 6020A] [SW-846 6020]	Molybdenum
Certified	Yes	NJ	SHW04.35500	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Nickel
Certified	Yes	NJ	SHW04.36000	NPW, SCM	ICP/MS	[SW-846 6020A] [SW-846 6020]	Nickel
Certified	Yes	NJ	SHW04.38000	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Potassium
Certified	Yes	NJ	SHW04.38505	NPW, SCM	ICP/MS	[SW-846 6020A] [SW-846 6020]	Potassium
Certified	Yes	NJ	SHW04.39000	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Selenium
Certified	Yes	NJ	SHW04.40600	NPW, SCM	ICP/MS	[SW-846 6020A] [SW-846 6020]	Selenium
Certified	Yes	NJ	SHW04.41000	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Silver
Certified	Yes	NJ	SHW04.41500	NPW, SCM	ICP/MS	[SW-846 6020A] [SW-846 6020]	Silver
Certified	Yes	NJ	SHW04.43000	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Sodium
Certified	Yes	NJ	SHW04.43005	NPW, SCM	ICP/MS	[SW-846 6020A] [SW-846 6020]	Sodium
Certified	Yes	NJ	SHW04.44000	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Strontium
Applied	No	NJ	SHW04.44001	NPW, SCM	ICP/MS	[SW-846 6020A] [SW-846 6020]	Strontium
Certified	Yes	NJ	SHW04.45000	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Thallium
Certified	Yes	NJ	SHW04.45500	NPW, SCM	ICP/MS	[SW-846 6020A] [SW-846 6020]	Thallium
Certified	Yes	NJ	SHW04.47100	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Tin
Certified	Yes	NJ	SHW04.47105	NPW, SCM	ICP/MS	[SW-846 6020A] [SW-846 6020]	Tin
Certified	Yes	NJ	SHW04.47145	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Titanium
Applied	No	NJ	SHW04.47150	NPW, SCM	ICP/MS	[SW-846 6020A]	Titanium

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Laboratory Name: ACCUTEST LABORATORIES Laboratory Number: 12129 Activity ID: NLC120003
2235 RT 130
BLDG B
Dayton, NJ 08810

Category: SHW04 -- Inorganic Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW04.47500	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Vanadium
Certified	Yes	NJ	SHW04.47505	NPW, SCM	ICP/MS	[SW-846 6020A] [SW-846 6020]	Vanadium
Certified	Yes	NJ	SHW04.49000	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Zinc
Certified	Yes	NJ	SHW04.49500	NPW, SCM	ICP/MS	[SW-846 6020A] [SW-846 6020]	Zinc
Applied	No	NJ	SHW04.51045	NPW, SCM	ICP	[SW-846 6010B]	Zirconium

Category: SHW06 -- Organic Parameters, Chromatography

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW06.02010	NPW, SCM	Microextraction, GC, ECD	[SW-846 8011]	Dibromoethane (1,2-) (EDB)
Certified	Yes	NJ	SHW06.02020	NPW, SCM	Microextraction, GC, ECD	[SW-846 8011]	Dibromo-3-chloropropane (1,2-)
Certified	Yes	NJ	SHW06.02030	NPW, SCM	Microextraction, GC, ECD	[SW-846 8011]	Trichloropropane (1,2,3-)
Certified	Yes	NJ	SHW06.03048	NPW, SCM	GC, Direct Injection or P & T, FID	[SW-846 8015B] [SW-846 8015C]	Butanol (1-)
Certified	Yes	NJ	SHW06.03050	NPW, SCM	GC, Direct Injection or P & T, FID	[SW-846 8015B] [SW-846 8015C]	Tert-butyl alcohol
Certified	Yes	NJ	SHW06.03090	NPW, SCM	GC, Direct Injection or P & T, FID	[SW-846 8015B] [SW-846 8015C]	Iso-butyl alcohol
Certified	Yes	NJ	SHW06.03142	NPW, SCM	GC, Direct Injection or P & T, FID	[SW-846 8015B] [SW-846 8015C]	Propyl Alcohol (n-)
Certified	Yes	NJ	SHW06.03145	NPW, SCM	GC, Direct Injection or P & T, FID	[SW-846 8015B] [SW-846 8015C]	Isopropyl alcohol
Certified	Yes	NJ	SHW06.03180	NPW, SCM	GC, Direct Injection or P & T, FID	[SW-846 8015B] [SW-846 8015C]	Methyl alcohol (Methanol)
Certified	Yes	NJ	SHW06.03778	NPW, SCM	GC, Direct Injection or P & T, FID	[SW-846 8015B] [SW-846 8015C]	Ethyl alcohol
Certified	Yes	NJ	SHW06.04010	NPW, SCM	GC P&T, FID	[SW-846 8015B] [SW-846 8015C]	Gasoline range organic
Certified	Yes	NJ	SHW06.04500	NPW, SCM	Extraction, GC, FID	[SW-846 8015B] [SW-846 8015C]	Diesel range organic
Certified	Yes	NJ	SHW06.04505	NPW, SCM	Extraction, GC, FID	[USER DEFINED TCEQ 1005]	Diesel range organic
Certified	Yes	NJ	SHW06.04520	NPW, SCM	Extraction, GC, FID	[OTHER NJ-OQA-QAM-025, Rev. 7]	Petroleum Organics
Certified	Yes	NJ	SHW06.04540	NPW, SCM	Extraction, GC, FID	[OTHER NJDEP EPH 10/08, Rev. 3]	Extractable Petroleum Hydrocarbons
Certified	Yes	NJ	SHW06.05010	NPW, SCM	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Benzene
Certified	Yes	NJ	SHW06.05020	NPW, SCM	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Chlorobenzene
Certified	Yes	NJ	SHW06.05030	NPW, SCM	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Dichlorobenzene (1,2-)
Certified	Yes	NJ	SHW06.05040	NPW, SCM	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Dichlorobenzene (1,3-)
Certified	Yes	NJ	SHW06.05050	NPW, SCM	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Dichlorobenzene (1,4-)
Certified	Yes	NJ	SHW06.05060	NPW, SCM	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Ethylbenzene

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Laboratory Name: ACCUTEST LABORATORIES Laboratory Number: 12129 Activity ID: NLC120003
2235 RT 130
BLDG B
Dayton, NJ 08810

Category: SHW06 -- Organic Parameters, Chromatography

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW06.05068	NPW, SCM	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Styrene
Certified	Yes	NJ	SHW06.05070	NPW, SCM	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Toluene
Certified	Yes	NJ	SHW06.05080	NPW, SCM	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Xylene (o-)
Certified	Yes	NJ	SHW06.05090	NPW, SCM	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Xylene (m-)
Certified	Yes	NJ	SHW06.05100	NPW, SCM	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Xylene (p-)
Applied	No	NJ	SHW06.05105	NPW, SCM	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Xylenes (total)
Certified	Yes	NJ	SHW06.05180	NPW, SCM	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Dichloropropene (trans-1,3-)
Certified	Yes	NJ	SHW06.05240	NPW, SCM	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Dichloroethene (cis-1,2-)
Certified	Yes	NJ	SHW06.05250	NPW, SCM	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Dichloroethene (trans-1,2-)
Certified	Yes	NJ	SHW06.05270	NPW, SCM	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Dichloropropene (cis-1,3-)
Certified	Yes	NJ	SHW06.05300	NPW, SCM	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Tetrachloroethene
Certified	Yes	NJ	SHW06.05330	NPW, SCM	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Trichloroethene
Certified	Yes	NJ	SHW06.05360	NPW, SCM	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B]	Methyl tert-butyl ether
Certified	Yes	NJ	SHW06.12010	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A] [SW-846 8081B]	Aldrin
Certified	Yes	NJ	SHW06.12020	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A] [SW-846 8081B]	Alpha BHC
Certified	Yes	NJ	SHW06.12030	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A] [SW-846 8081B]	Beta BHC
Certified	Yes	NJ	SHW06.12040	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A] [SW-846 8081B]	Delta BHC
Certified	Yes	NJ	SHW06.12050	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A] [SW-846 8081B]	Lindane (gamma BHC)
Certified	Yes	NJ	SHW06.12060	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A] [SW-846 8081B]	Chlordane (technical)
Certified	Yes	NJ	SHW06.12070	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A] [SW-846 8081B]	Chlordane (alpha)
Certified	Yes	NJ	SHW06.12080	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A] [SW-846 8081B]	Chlordane (gamma)
Certified	Yes	NJ	SHW06.12090	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A] [SW-846 8081B]	DDD (4,4'-)
Certified	Yes	NJ	SHW06.12100	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A] [SW-846 8081B]	DDE (4,4'-)
Certified	Yes	NJ	SHW06.12110	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A] [SW-846 8081B]	DDT (4,4'-)
Certified	Yes	NJ	SHW06.12120	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A] [SW-846 8081B]	Dieldrin
Certified	Yes	NJ	SHW06.12130	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A] [SW-846 8081B]	Endosulfan I
Certified	Yes	NJ	SHW06.12140	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A] [SW-846 8081B]	Endosulfan II
Certified	Yes	NJ	SHW06.12150	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A] [SW-846 8081B]	Endosulfan sulfate
Certified	Yes	NJ	SHW06.12160	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A] [SW-846 8081B]	Endrin
Certified	Yes	NJ	SHW06.12170	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A] [SW-846 8081B]	Endrin aldehyde
Certified	Yes	NJ	SHW06.12180	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A] [SW-846 8081B]	Endrin ketone
Certified	Yes	NJ	SHW06.12190	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A] [SW-846 8081B]	Heptachlor

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Laboratory Name: ACCUTEST LABORATORIES Laboratory Number: 12129 Activity ID: NLC120003
2235 RT 130
BLDG B
Dayton, NJ 08810

Category: SHW06 -- Organic Parameters, Chromatography

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW06.12200	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A] [SW-846 8081B]	Heptachlor epoxide
Certified	Yes	NJ	SHW06.12210	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A] [SW-846 8081B]	Methoxychlor
Certified	Yes	NJ	SHW06.12212	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A] [SW-846 8081B]	Mirex
Certified	Yes	NJ	SHW06.12220	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A] [SW-846 8081B]	Toxaphene
Certified	Yes	NJ	SHW06.13110	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8082] [SW-846 8082A]	PCB 1016
Certified	Yes	NJ	SHW06.13120	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8082] [SW-846 8082A]	PCB 1221
Certified	Yes	NJ	SHW06.13130	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8082] [SW-846 8082A]	PCB 1232
Certified	Yes	NJ	SHW06.13140	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8082] [SW-846 8082A]	PCB 1242
Certified	Yes	NJ	SHW06.13150	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8082] [SW-846 8082A]	PCB 1248
Certified	Yes	NJ	SHW06.13160	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8082] [SW-846 8082A]	PCB 1254
Certified	Yes	NJ	SHW06.13170	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8082] [SW-846 8082A]	PCB 1260
Certified	Yes	NJ	SHW06.13175	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8082A]	PCB-1262
Certified	Yes	NJ	SHW06.13180	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8082A]	PCB-1268
Certified	Yes	NJ	SHW06.16010	NPW, SCM	GC, Extraction or Direct Inject, FID	[SW-846 8100]	Acenaphthene
Certified	Yes	NJ	SHW06.16020	NPW, SCM	GC, Extraction or Direct Inject, FID	[SW-846 8100]	Acenaphthylene
Certified	Yes	NJ	SHW06.16030	NPW, SCM	GC, Extraction or Direct Inject, FID	[SW-846 8100]	Anthracene
Certified	Yes	NJ	SHW06.16040	NPW, SCM	GC, Extraction or Direct Inject, FID	[SW-846 8100]	Benzo(a)anthracene
Certified	Yes	NJ	SHW06.16050	NPW, SCM	GC, Extraction or Direct Inject, FID	[SW-846 8100]	Benzo(a)pyrene
Certified	Yes	NJ	SHW06.16060	NPW, SCM	GC, Extraction or Direct Inject, FID	[SW-846 8100]	Benzo(b)fluoranthene
Certified	Yes	NJ	SHW06.16070	NPW, SCM	GC, Extraction or Direct Inject, FID	[SW-846 8100]	Benzo(k)fluoranthene
Certified	Yes	NJ	SHW06.16080	NPW, SCM	GC, Extraction or Direct Inject, FID	[SW-846 8100]	Benzo(ghi)perylene
Certified	Yes	NJ	SHW06.16090	NPW, SCM	GC, Extraction or Direct Inject, FID	[SW-846 8100]	Chrysene
Certified	Yes	NJ	SHW06.16100	NPW, SCM	GC, Extraction or Direct Inject, FID	[SW-846 8100]	Dibenzo(a,h)anthracene
Certified	Yes	NJ	SHW06.16110	NPW, SCM	GC, Extraction or Direct Inject, FID	[SW-846 8100]	Fluoranthene
Certified	Yes	NJ	SHW06.16120	NPW, SCM	GC, Extraction or Direct Inject, FID	[SW-846 8100]	Fluorene
Certified	Yes	NJ	SHW06.16130	NPW, SCM	GC, Extraction or Direct Inject, FID	[SW-846 8100]	Indeno(1,2,3-cd)pyrene
Certified	Yes	NJ	SHW06.16140	NPW, SCM	GC, Extraction or Direct Inject, FID	[SW-846 8100]	Naphthalene
Certified	Yes	NJ	SHW06.16150	NPW, SCM	GC, Extraction or Direct Inject, FID	[SW-846 8100]	Phenanthrene
Certified	Yes	NJ	SHW06.16160	NPW, SCM	GC, Extraction or Direct Inject, FID	[SW-846 8100]	Pyrene
Certified	Yes	NJ	SHW06.23010	NPW, SCM	GC, Extraction, ECD, Capillary	[SW-846 8151A]	Dalapon
Certified	Yes	NJ	SHW06.23020	NPW, SCM	GC, Extraction, ECD, Capillary	[SW-846 8151A]	Dicamba
Certified	Yes	NJ	SHW06.23021	NPW, SCM	GC, Extraction, ECD, Capillary	[SW-846 8151A]	Dichlorprop

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2235 RT 130
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Certified	Yes	NJ	SHW06.23030	NPW, SCM	GC, Extraction, ECD, Capillary	[SW-846 8151A]	Dinoseb
Certified	Yes	NJ	SHW06.23040	NPW, SCM	GC, Extraction, ECD, Capillary	[SW-846 8151A]	D (2,4-)
Certified	Yes	NJ	SHW06.23041	NPW, SCM	GC, Extraction, ECD, Capillary	[SW-846 8151A]	DB (2,4-)
Certified	Yes	NJ	SHW06.23050	NPW, SCM	GC, Extraction, ECD, Capillary	[SW-846 8151A]	T (2,4,5-)
Certified	Yes	NJ	SHW06.23060	NPW, SCM	GC, Extraction, ECD, Capillary	[SW-846 8151A]	TP (2,4,5-) (Silvex)
Certified	Yes	NJ	SHW06.23063	NPW, SCM	GC, Extraction, ECD, Capillary	[SW-846 8151A]	MCPA
Certified	Yes	NJ	SHW06.23064	NPW, SCM	GC, Extraction, ECD, Capillary	[SW-846 8151A]	MCPP
Certified	Yes	NJ	SHW06.23066	NPW, SCM	GC, Extraction, ECD, Capillary	[SW-846 8151A]	Pentachlorophenol
Certified	Yes	NJ	SHW06.23070	NPW, SCM	GC, Extraction, ECD, Capillary	[SW-846 8151A]	Picloram
Certified	Yes	NJ	SHW06.23100	NPW, SCM	GC, Headspace, FID	[OTHER J. Chrom. Sci. RSK-175]	Ethane
Certified	Yes	NJ	SHW06.23105	NPW, SCM	GC, Headspace, FID	[OTHER J. Chrom. Sci. RSK-175]	Ethene
Certified	Yes	NJ	SHW06.23110	NPW, SCM	GC, Headspace, FID	[OTHER J. Chrom. Sci. RSK-175]	Methane
Certified	Yes	NJ	SHW06.23115	NPW, SCM	GC, Headspace, FID	[OTHER J. Chrom. Sci. RSK-175]	Propane
Certified	Yes	NJ	SHW06.24110	NPW, SCM	Extraction, HPLC	[SW-846 8310]	Acenaphthene
Certified	Yes	NJ	SHW06.24120	NPW, SCM	Extraction, HPLC	[SW-846 8310]	Acenaphthylene
Certified	Yes	NJ	SHW06.24130	NPW, SCM	Extraction, HPLC	[SW-846 8310]	Anthracene
Certified	Yes	NJ	SHW06.24140	NPW, SCM	Extraction, HPLC	[SW-846 8310]	Benzo(a)anthracene
Certified	Yes	NJ	SHW06.24150	NPW, SCM	Extraction, HPLC	[SW-846 8310]	Benzo(a)pyrene
Certified	Yes	NJ	SHW06.24160	NPW, SCM	Extraction, HPLC	[SW-846 8310]	Benzo(b)fluoranthene
Certified	Yes	NJ	SHW06.24170	NPW, SCM	Extraction, HPLC	[SW-846 8310]	Benzo(ghi)perylene
Certified	Yes	NJ	SHW06.24180	NPW, SCM	Extraction, HPLC	[SW-846 8310]	Benzo(k)fluoranthene
Certified	Yes	NJ	SHW06.24190	NPW, SCM	Extraction, HPLC	[SW-846 8310]	Chrysene
Certified	Yes	NJ	SHW06.24200	NPW, SCM	Extraction, HPLC	[SW-846 8310]	Dibenzo(a,h)anthracene
Certified	Yes	NJ	SHW06.24210	NPW, SCM	Extraction, HPLC	[SW-846 8310]	Fluoranthene
Certified	Yes	NJ	SHW06.24220	NPW, SCM	Extraction, HPLC	[SW-846 8310]	Fluorene
Certified	Yes	NJ	SHW06.24230	NPW, SCM	Extraction, HPLC	[SW-846 8310]	Indeno(1,2,3-cd)pyrene
Certified	Yes	NJ	SHW06.24240	NPW, SCM	Extraction, HPLC	[SW-846 8310]	Naphthalene
Certified	Yes	NJ	SHW06.24250	NPW, SCM	Extraction, HPLC	[SW-846 8310]	Phenanthrene
Certified	Yes	NJ	SHW06.24260	NPW, SCM	Extraction, HPLC	[SW-846 8310]	Pyrene

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New Jersey Department of Environmental Protection

National Environmental Laboratory Accreditation Program

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Effective as of 08/22/2012 until 06/30/2013

Laboratory Name: ACCUTEST LABORATORIES Laboratory Number: 12129 Activity ID: NLC120003
2235 RT 130
BLDG B
Dayton, NJ 08810

Category: SHW07 – Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW07.04004	NPW, SCM	GC/MS/SIM, Direct Aqueous Injection	[USER DEFINED SW-846 8260B]	Ethylene glycol
Certified	Yes	NJ	SHW07.04006	NPW, SCM	GC/MS/SIM, Direct Aqueous Injection	[USER DEFINED SW-846 8260B]	Propylene glycol
Certified	Yes	NJ	SHW07.04010	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Benzene
Certified	Yes	NJ	SHW07.04011	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Bromobenzene
Certified	Yes	NJ	SHW07.04012	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Butyl benzene (n-)
Certified	Yes	NJ	SHW07.04013	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Sec-butylbenzene
Certified	Yes	NJ	SHW07.04014	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Tert-butylbenzene
Certified	Yes	NJ	SHW07.04020	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Chlorobenzene
Certified	Yes	NJ	SHW07.04022	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Chlorotoluene (2-)
Certified	Yes	NJ	SHW07.04023	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Chlorotoluene (4-)
Certified	Yes	NJ	SHW07.04030	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Dichlorobenzene (1,2-)
Certified	Yes	NJ	SHW07.04040	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Dichlorobenzene (1,3-)
Certified	Yes	NJ	SHW07.04050	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Dichlorobenzene (1,4-)
Certified	Yes	NJ	SHW07.04060	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Ethylbenzene
Certified	Yes	NJ	SHW07.04065	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Isopropylbenzene
Certified	Yes	NJ	SHW07.04067	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Propylbenzene (n-)
Certified	Yes	NJ	SHW07.04070	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Toluene
Certified	Yes	NJ	SHW07.04071	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Isopropyltoluene (4-)
Certified	Yes	NJ	SHW07.04072	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Trichlorobenzene (1,2,3-)
Certified	Yes	NJ	SHW07.04073	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Trimethylbenzene (1,2,4-)
Certified	Yes	NJ	SHW07.04074	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Trimethylbenzene (1,3,5-)
Certified	Yes	NJ	SHW07.04080	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Xylenes (total)
Certified	Yes	NJ	SHW07.04081	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Xylene (m-)
Certified	Yes	NJ	SHW07.04082	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Xylene (o-)
Certified	Yes	NJ	SHW07.04083	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Xylene (p-)
Certified	Yes	NJ	SHW07.04087	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	tert-Amylmethyl ether [TAME]
Certified	Yes	NJ	SHW07.04088	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Allyl chloride
Certified	Yes	NJ	SHW07.04089	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Bromochloromethane
Certified	Yes	NJ	SHW07.04090	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Bromodichloromethane
Certified	Yes	NJ	SHW07.04100	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Bromoform
Certified	Yes	NJ	SHW07.04110	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Bromomethane
Certified	Yes	NJ	SHW07.04111	NPW, SCM	GC/MS, P&T, or Direct Injection, Capillary	[SW-846 8260B]	Cyclohexane

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Laboratory Name: ACCUTEST LABORATORIES Laboratory Number: 12129 Activity ID: NLC120003
2235 RT 130
BLDG B
Dayton, NJ 08810

Category: SHW07 – Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW07.04112	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Cyclohexanone
Certified	Yes	NJ	SHW07.04115	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Butadiene (2-chloro-1,3-)
Certified	Yes	NJ	SHW07.04120	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Carbon tetrachloride
Certified	Yes	NJ	SHW07.04130	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Chloroethane
Certified	Yes	NJ	SHW07.04140	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Chloroethyl vinyl ether (2-)
Certified	Yes	NJ	SHW07.04150	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Chloroform
Certified	Yes	NJ	SHW07.04160	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Chloromethane
Certified	Yes	NJ	SHW07.04165	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Diethyl ether (Ethyl ether)
Certified	Yes	NJ	SHW07.04170	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Dichloropropene (trans-1,3-)
Certified	Yes	NJ	SHW07.04180	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Dibromochloromethane
Certified	Yes	NJ	SHW07.04185	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Dibromoethane (1,2-) (EDB)
Certified	Yes	NJ	SHW07.04186	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Dibromomethane
Certified	Yes	NJ	SHW07.04187	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Dibromo-3-chloropropane (1,2-)
Certified	Yes	NJ	SHW07.04190	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Dichlorodifluoromethane
Certified	Yes	NJ	SHW07.04200	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Dichloroethane (1,1-)
Certified	Yes	NJ	SHW07.04210	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Dichloroethane (1,2-)
Certified	Yes	NJ	SHW07.04220	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Dichloroethene (1,1-)
Certified	Yes	NJ	SHW07.04230	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Dichloroethene (trans-1,2-)
Certified	Yes	NJ	SHW07.04235	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Dichloroethene (cis-1,2-)
Certified	Yes	NJ	SHW07.04240	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Dichloropropane (1,2-)
Certified	Yes	NJ	SHW07.04241	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Dichloropropane (1,3-)
Certified	Yes	NJ	SHW07.04242	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Dichloropropane (2,2-)
Certified	Yes	NJ	SHW07.04249	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Dichloropropene (1,1-)
Certified	Yes	NJ	SHW07.04250	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Dichloropropene (cis-1,3-)
Certified	Yes	NJ	SHW07.04255	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Dichloro-2-butene (trans-1,4-)
Certified	Yes	NJ	SHW07.04257	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Diisopropyl Ether [DIPE]
Certified	Yes	NJ	SHW07.04258	NPW, SCM	GC/MS, P&T, or Direct Injection, Capillary	[SW-846 8260B]	Butanol (1-)
Certified	Yes	NJ	SHW07.04259	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Ethanol
Certified	Yes	NJ	SHW07.04260	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Methylene chloride (Dichloromethane)
Certified	Yes	NJ	SHW07.04265	NPW, SCM	GC/MS, P&T, or Direct Injection, Capillary	[SW-846 8260B]	Nitropropane (2-)
Certified	Yes	NJ	SHW07.04270	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Tetrachloroethane (1,1,2,2-)
Certified	Yes	NJ	SHW07.04280	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Tetrachloroethene

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Effective as of 08/22/2012 until 06/30/2013

Laboratory Name: ACCUTEST LABORATORIES Laboratory Number: 12129 Activity ID: NLC120003
2235 RT 130
BLDG B
Dayton, NJ 08810

Category: SHW07 – Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW07.04282	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Tetrahydrofuran
Certified	Yes	NJ	SHW07.04290	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Trichloroethane (1,1,1-)
Certified	Yes	NJ	SHW07.04300	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Trichloroethane (1,1,2-)
Certified	Yes	NJ	SHW07.04310	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Trichloroethene
Certified	Yes	NJ	SHW07.04320	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Trichlorofluoromethane
Certified	Yes	NJ	SHW07.04322	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Trichloro (1,1,2-) trifluoroethane (1,2,2-)
Certified	Yes	NJ	SHW07.04325	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Trichloropropane (1,2,3-)
Certified	Yes	NJ	SHW07.04327	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Vinyl acetate
Certified	Yes	NJ	SHW07.04330	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Vinyl chloride
Certified	Yes	NJ	SHW07.04340	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Acetone
Certified	Yes	NJ	SHW07.04350	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Carbon disulfide
Certified	Yes	NJ	SHW07.04360	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Butanone (2-)
Certified	Yes	NJ	SHW07.04364	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Ethyl-tert-butyl Ether [ETBE]
Certified	Yes	NJ	SHW07.04365	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Ethyl acetate
Certified	Yes	NJ	SHW07.04367	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Ethyl methacrylate
Certified	Yes	NJ	SHW07.04370	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Hexanone (2-)
Certified	Yes	NJ	SHW07.04371	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Methacrylonitrile
Certified	Yes	NJ	SHW07.04372	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Methyl acrylate
Certified	Yes	NJ	SHW07.04373	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Methyl methacrylate
Certified	Yes	NJ	SHW07.04374	NPW, SCM	GC/MS, P&T, or Direct Injection, Capillary	[SW-846 8260B]	Methyl acetate
Certified	Yes	NJ	SHW07.04375	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Methyl iodide
Certified	Yes	NJ	SHW07.04376	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Iso-butyl alcohol
Certified	Yes	NJ	SHW07.04379	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Pentachloroethane
Certified	Yes	NJ	SHW07.04380	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Pentanone (4-methyl-2-) (MIBK)
Certified	Yes	NJ	SHW07.04385	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Propionitrile
Certified	Yes	NJ	SHW07.04390	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Methyl tert-butyl ether
Certified	Yes	NJ	SHW07.04395	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Tert-butyl alcohol
Certified	Yes	NJ	SHW07.04398	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Acetonitrile
Certified	Yes	NJ	SHW07.04400	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Acrolein
Certified	Yes	NJ	SHW07.04410	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Acrylonitrile
Certified	Yes	NJ	SHW07.04420	NPW, SCM	GC/MS, P&T, or Direct Injection, Capillary	[SW-846 8260B]	Heptane (n-)
Certified	Yes	NJ	SHW07.04425	NPW, SCM	GC/MS, P&T, or Direct Injection, Capillary	[SW-846 8260B]	Hexane (n-)

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2235 RT 130
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Dayton, NJ 08810

Category: SHW07 -- Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW07.04500	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Hexachlorobutadiene (1,3-)
Certified	Yes	NJ	SHW07.04530	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Hexachloroethane
Certified	Yes	NJ	SHW07.04535	NPW, SCM	GC/MS, P&T, or Direct Injection, Capillary	[SW-846 8260B]	Methylcyclohexane
Certified	Yes	NJ	SHW07.04540	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260C, Rev. 2, 12/96]	Naphthalene
Certified	Yes	NJ	SHW07.04550	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Styrene
Certified	Yes	NJ	SHW07.04560	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Tetrachloroethane (1,1,1,2-)
Certified	Yes	NJ	SHW07.04570	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Trichlorobenzene (1,2,4-)
Certified	Yes	NJ	SHW07.04572	NPW, SCM	GC/MS, Extract, or Direct Injection, Capillary	[SW-846 8260B]	Trimethylpentane (2,2,4-)
Certified	Yes	NJ	SHW07.04590	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Dioxane (1,4-)
Certified	Yes	NJ	SHW07.04660	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Alpha - terpineol
Certified	Yes	NJ	SHW07.04665	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Acetophenone
Certified	Yes	NJ	SHW07.04670	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Acetylaminofluorene (2-)
Certified	Yes	NJ	SHW07.04675	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Aminobiphenyl (4-)
Certified	Yes	NJ	SHW07.04702	NPW, SCM	GC/MS, Extract, or Direct Injection, Capillary	[SW-846 8270C] [SW-846 8270D]	Biphenyl (1,1'-)
Certified	Yes	NJ	SHW07.04705	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Chlorobenzilate
Certified	Yes	NJ	SHW07.04715	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Diallate (cis)
Certified	Yes	NJ	SHW07.04720	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Diallate (trans)
Certified	Yes	NJ	SHW07.04730	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dibenz(a,h)acridine
Certified	Yes	NJ	SHW07.04755	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dichlorophenol (2,6-)
Certified	Yes	NJ	SHW07.04760	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dimethoate
Certified	Yes	NJ	SHW07.04767	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dimethylaminoazobenzene
Certified	Yes	NJ	SHW07.04770	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dimethylbenz(a)anthracene (7,12-)
Certified	Yes	NJ	SHW07.04780	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dinitrobenzene (1,3-)
Certified	Yes	NJ	SHW07.04785	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dinoseb
Certified	Yes	NJ	SHW07.04790	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Disulfoton
Certified	Yes	NJ	SHW07.04810	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Isodrin
Certified	Yes	NJ	SHW07.04815	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Isosafrole (cis-)
Certified	Yes	NJ	SHW07.04820	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Isosafrole (trans-)
Certified	Yes	NJ	SHW07.04825	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Kepone
Certified	Yes	NJ	SHW07.04830	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Methanesulfonate (Ethyl-)
Certified	Yes	NJ	SHW07.04835	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Methanesulfonate (Methyl-)
Certified	Yes	NJ	SHW07.04845	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Methylcholanthrene (3-)

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New Jersey Department of Environmental Protection

National Environmental Laboratory Accreditation Program

ANNUAL CERTIFIED PARAMETER LIST AND CURRENT STATUS

Effective as of 08/22/2012 until 06/30/2013

Laboratory Name: ACCUTEST LABORATORIES Laboratory Number: 12129 Activity ID: NLC120003
2235 RT 130
BLDG B
Dayton, NJ 08810

Category: SHW07 -- Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW07.04850	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Napthoquinone (1,4-)
Certified	Yes	NJ	SHW07.04855	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Napththylamine (1-)
Certified	Yes	NJ	SHW07.04860	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Napththylamine (2-)
Certified	Yes	NJ	SHW07.04870	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	N-Nitroso-di-n-butylamine
Certified	Yes	NJ	SHW07.04875	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	N-Nitrosomorpholine
Certified	Yes	NJ	SHW07.04880	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	N-Nitrosopiperidine
Certified	Yes	NJ	SHW07.04885	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Parathion
Certified	Yes	NJ	SHW07.04890	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Parathion methyl
Certified	Yes	NJ	SHW07.04895	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Pentachlorobenzene
Certified	Yes	NJ	SHW07.04900	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Pentachloroethane
Certified	Yes	NJ	SHW07.04905	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Pentachloronitrobenzene
Certified	Yes	NJ	SHW07.04910	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Phenacetin
Certified	Yes	NJ	SHW07.04920	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Phenylethylamine (alpha, alpha-Dimethyl)
Certified	Yes	NJ	SHW07.04925	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Phorate
Certified	Yes	NJ	SHW07.04930	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Phosphorothioate (O,O,O-triethyl)
Certified	Yes	NJ	SHW07.04935	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Phosphorothioate (O,O-diethyl-O-2-pyrazinyl) [Thionazin]
Certified	Yes	NJ	SHW07.04940	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Picoline (2-)
Certified	Yes	NJ	SHW07.04945	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Pronamide
Certified	Yes	NJ	SHW07.04950	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Quinoline -1-Oxide (4-Nitro)
Certified	Yes	NJ	SHW07.04955	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Safrole
Certified	Yes	NJ	SHW07.04975	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Tetrachlorobenzene (1,2,4,5-)
Certified	Yes	NJ	SHW07.04980	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Tetrachlorophenol (2,3,4,6-)
Certified	Yes	NJ	SHW07.04985	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Toluidine (2-) (2-Methylaniline)
Certified	Yes	NJ	SHW07.04990	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Toluidine (5-nitro-2-)
Certified	Yes	NJ	SHW07.04995	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Trinitrobenzene (1,3,5-)
Certified	Yes	NJ	SHW07.05004	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	N-Nitrosodiethylamine
Certified	Yes	NJ	SHW07.05005	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	N-Nitrosodimethylamine
Certified	Yes	NJ	SHW07.05006	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	N-Nitroso-di-n-propylamine
Certified	Yes	NJ	SHW07.05010	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	N-Nitrosodiphenylamine
Certified	Yes	NJ	SHW07.05011	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	N-Nitrosomethylethylamine
Certified	Yes	NJ	SHW07.05012	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	N-Nitrosopyrrolidine

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2235 RT 130
BLDG B
Dayton, NJ 08810

Category: SHW07 -- Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW07.05020	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Diphenylamine
Certified	Yes	NJ	SHW07.05030	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Carbazole
Certified	Yes	NJ	SHW07.05038	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Benzidine
Certified	Yes	NJ	SHW07.05040	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dichlorobenzidine (3,3'-)
Certified	Yes	NJ	SHW07.05045	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Diphenylhydrazine (1,2-)
Certified	Yes	NJ	SHW07.05048	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Aniline
Certified	Yes	NJ	SHW07.05050	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Chloroaniline (4-)
Certified	Yes	NJ	SHW07.05060	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Nitroaniline (2-)
Certified	Yes	NJ	SHW07.05062	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Nitroaniline (3-)
Certified	Yes	NJ	SHW07.05063	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Nitroaniline (4-)
Certified	Yes	NJ	SHW07.05070	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Chloronaphthalene (2-)
Certified	Yes	NJ	SHW07.05080	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Hexachlorobenzene
Certified	Yes	NJ	SHW07.05090	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Hexachlorobutadiene (1,3-)
Certified	Yes	NJ	SHW07.05100	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Hexachlorocyclopentadiene
Certified	Yes	NJ	SHW07.05110	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Hexachloroethane
Certified	Yes	NJ	SHW07.05115	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Hexachloropropene
Certified	Yes	NJ	SHW07.05120	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Trichlorobenzene (1,2,4-)
Certified	Yes	NJ	SHW07.05130	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Bis (2-chloroethoxy) methane
Certified	Yes	NJ	SHW07.05132	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Bis (2-chloroethyl) ether
Certified	Yes	NJ	SHW07.05140	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Bis (2-chloroisopropyl) ether
Certified	Yes	NJ	SHW07.05150	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Chlorophenyl-phenyl ether (4-)
Certified	Yes	NJ	SHW07.05160	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Bromophenyl-phenyl ether (4-)
Certified	Yes	NJ	SHW07.05165	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[USER DEFINED SW-846 8270]	Dioxane (1,4-)
Certified	Yes	NJ	SHW07.05170	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dinitrotoluene (2,4-)
Certified	Yes	NJ	SHW07.05180	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dinitrotoluene (2,6-)
Certified	Yes	NJ	SHW07.05190	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Isophorone
Certified	Yes	NJ	SHW07.05200	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Nitrobenzene
Certified	Yes	NJ	SHW07.05210	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Butyl benzyl phthalate
Certified	Yes	NJ	SHW07.05220	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Bis (2-ethylhexyl) phthalate
Certified	Yes	NJ	SHW07.05230	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Diethyl phthalate
Certified	Yes	NJ	SHW07.05240	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dimethyl phthalate
Certified	Yes	NJ	SHW07.05250	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Di-n-butyl phthalate

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2235 RT 130
BLDG B
Dayton, NJ 08810

Category: SHW07 – Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW07.05260	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Di-n-octyl phthalate
Certified	Yes	NJ	SHW07.05270	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Acenaphthene
Certified	Yes	NJ	SHW07.05280	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Anthracene
Certified	Yes	NJ	SHW07.05290	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Acenaphthylene
Certified	Yes	NJ	SHW07.05300	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Benzo(a)anthracene
Certified	Yes	NJ	SHW07.05310	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Benzo(a)pyrene
Certified	Yes	NJ	SHW07.05320	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Benzo(b)fluoranthene
Certified	Yes	NJ	SHW07.05330	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Benzo(ghi)perylene
Certified	Yes	NJ	SHW07.05340	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Benzo(k)fluoranthene
Certified	Yes	NJ	SHW07.05350	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Chrysene
Certified	Yes	NJ	SHW07.05360	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dibenzo(a,h)anthracene
Certified	Yes	NJ	SHW07.05370	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Fluoranthene
Certified	Yes	NJ	SHW07.05380	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Fluorene
Certified	Yes	NJ	SHW07.05390	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Indeno(1,2,3-cd)pyrene
Certified	Yes	NJ	SHW07.05395	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Methylnaphthalene (1-)
Certified	Yes	NJ	SHW07.05400	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Methylnaphthalene (2-)
Certified	Yes	NJ	SHW07.05410	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Naphthalene
Certified	Yes	NJ	SHW07.05420	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Phenanthrene
Certified	Yes	NJ	SHW07.05430	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Pyrene
Certified	Yes	NJ	SHW07.05440	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Methyl phenol (4-chloro-3-)
Certified	Yes	NJ	SHW07.05450	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Chlorophenol (2-)
Certified	Yes	NJ	SHW07.05460	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dichlorophenol (2,4-)
Certified	Yes	NJ	SHW07.05470	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dimethylphenol (2,4-)
Certified	Yes	NJ	SHW07.05480	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dinitrophenol (2,4-)
Certified	Yes	NJ	SHW07.05490	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dinitrophenol (2-methyl-4,6-)
Certified	Yes	NJ	SHW07.05500	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Methylphenol (2-)
Certified	Yes	NJ	SHW07.05510	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Methylphenol (4-)
Certified	Yes	NJ	SHW07.05520	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Nitrophenol (2-)
Certified	Yes	NJ	SHW07.05530	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Nitrophenol (4-)
Certified	Yes	NJ	SHW07.05540	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Pentachlorophenol
Certified	Yes	NJ	SHW07.05550	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Phenol
Certified	Yes	NJ	SHW07.05560	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Trichlorophenol (2,4,5-)

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Certified	Yes	NJ	SHW07.05570	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Trichlorophenol (2,4,6-)
Certified	Yes	NJ	SHW07.05590	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Methylphenol (3-)
Certified	Yes	NJ	SHW07.05600	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dibenzofuran
Certified	Yes	NJ	SHW07.05691	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dichlorobenzene (1,2-)
Certified	Yes	NJ	SHW07.05692	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dichlorobenzene (1,3-)
Certified	Yes	NJ	SHW07.05700	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dichlorobenzene (1,4-)
Certified	Yes	NJ	SHW07.05705	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Benzaldehyde
Certified	Yes	NJ	SHW07.05710	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Benzoic acid
Certified	Yes	NJ	SHW07.05720	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Benzyl alcohol
Certified	Yes	NJ	SHW07.05725	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Decane (n-)
Certified	Yes	NJ	SHW07.05730	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Octadecane (n-)
Certified	Yes	NJ	SHW07.05750	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Pyridine
Certified	Yes	NJ	SHW07.05765	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Caprolactam
Certified	Yes	NJ	SHW07.05990	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Atrazine
Certified	Yes	NJ	SHW07.05995	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Hydroquinone
Certified	Yes	NJ	SHW07.07584	NPW, SCM	GC/MS/SIM, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Benzo(a)anthracene
Certified	Yes	NJ	SHW07.07586	NPW, SCM	GC/MS/SIM, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Benzo(a)pyrene
Certified	Yes	NJ	SHW07.07588	NPW, SCM	GC/MS/SIM, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Benzo(b)fluoranthene
Certified	Yes	NJ	SHW07.07590	NPW, SCM	GC/MS/SIM, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Benzo(k)fluoranthene
Certified	Yes	NJ	SHW07.07594	NPW, SCM	GC/MS/SIM, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dibenzo(a,h)anthracene
Certified	Yes	NJ	SHW07.07596	NPW, SCM	GC/MS/SIM, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Hexachlorobenzene
Certified	Yes	NJ	SHW07.07598	NPW, SCM	GC/MS/SIM, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Indeno(1,2,3-cd)pyrene
Certified	Yes	NJ	SHW07.07616	NPW, SCM	GC/MS/SIM, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Pentachlorophenol

Category: SHW09 -- Miscellaneous Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW09.02000	NPW, SCM	Distillation	[SW-846 9010C]	Cyanide
Certified	Yes	NJ	SHW09.03000	NPW, SCM	Distillation	[SW-846 9010C]	Cyanide - amenable to Cl2
Certified	Yes	NJ	SHW09.05000	NPW, SCM	Colorimetric, Automated	[SW-846 9012B]	Cyanide

KEY: AE = Air and Emissions, BT = Biological Tissues, DW = Drinking Water, NPW = Non-Potable Water, SCM = Solid and Chemical Materials

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New Jersey Department of Environmental Protection

National Environmental Laboratory Accreditation Program

ANNUAL CERTIFIED PARAMETER LIST AND CURRENT STATUS

Effective as of 08/22/2012 until 06/30/2013

Laboratory Name: ACCUTEST LABORATORIES Laboratory Number: 12129 Activity ID: NLC120003
2235 RT 130
BLDG B
Dayton, NJ 08810

Category: SHW09 -- Miscellaneous Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW09.10100	NPW, SCM	Titration	[SW-846 9034]	Sulfides, acid sol. & insol.
Certified	Yes	NJ	SHW09.13050	NPW, SCM	Ion Chromatography	[SW-846 9056] [SW-846 9056A]	Sulfate
Certified	Yes	NJ	SHW09.14000	NPW, SCM	Electrometric	[SW-846 9040C]	pH - waste, >20% water
Certified	Yes	NJ	SHW09.19000	NPW, SCM	Infrared Spectrometry or FID	[SW-846 9060A]	Total organic carbon (TOC)
Certified	Yes	NJ	SHW09.21000	NPW, SCM	Colorimetric, Man, 4AAP Distillation	[SW-846 9065]	Phenols
Certified	Yes	NJ	SHW09.24100	NPW, SCM	Extraction & Gravimetric - LL or SPE	[SW-846 1664A]	Oil & grease - hem
Certified	Yes	NJ	SHW09.30250	NPW, SCM	Ion Chromatography	[SW-846 9056] [SW-846 9056A]	Bromide
Certified	Yes	NJ	SHW09.33100	NPW, SCM	Ion Chromatography	[SW-846 9056] [SW-846 9056A]	Chloride
Certified	Yes	NJ	SHW09.34150	NPW, SCM	Ion Chromatography	[SW-846 9056] [SW-846 9056A]	Fluoride
Certified	No	NJ	SHW09.34160	NPW, SCM	Ion Chromatography	[USER DEFINED EPA 314 (Modified for solid matrices)]	Perchlorate

Category: SHW04 -- Inorganic Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW04.03000	SCM	Acid Digestion, Soil Sediment & Sludge	[SW-846 3050B]	Metals
Certified	Yes	NJ	SHW04.03700	SCM	Chromium VI Digestion	[SW-846 3060A]	Metals
Certified	Yes	NJ	SHW04.33500	SCM	AA, Manual Cold Vapor	[SW-846 7471A] [SW-846 7471B]	Mercury - solid waste

Category: SHW05 -- Organic Parameters, Prep. / Screening

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW05.03000	SCM	Soxhlet Extraction	[SW-846 3540C]	Semivolatile organics
Certified	Yes	NJ	SHW05.04200	SCM	Pressurized Fluid Extraction	[SW-846 3545] [SW-846 3545A]	Semivolatile organics
Certified	Yes	NJ	SHW05.05000	SCM	Ultrasonic Extraction	[SW-846 3550B] [SW-846 3550C]	Semivolatile organics
Certified	Yes	NJ	SHW05.05110	SCM	Microwave Extraction	[SW-846 3546]	Semivolatile organics
Certified	Yes	NJ	SHW05.06000	SCM	Waste Dilution	[SW-846 3580A]	Organics
Certified	Yes	NJ	SHW05.07300	SCM	Closed System Purge & Trap	[SW-846 5035L] [SW-846 5035A]	Volatile organics - low conc.
Certified	Yes	NJ	SHW05.07310	SCM	Methanol Extract, Closed System P & T	[SW-846 5035H] [SW-846 5035A]	Volatile organics - high conc.
Certified	Yes	NJ	SHW05.10000	SCM	Cleanup-Alumina	[SW-846 3610B]	Semivolatile organics

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New Jersey Department of Environmental Protection

National Environmental Laboratory Accreditation Program

ANNUAL CERTIFIED PARAMETER LIST AND CURRENT STATUS

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Laboratory Name: ACCUTEST LABORATORIES Laboratory Number: 12129 Activity ID: NLC120003
2235 RT 130
BLDG B
Dayton, NJ 08810

Category: SHW05 -- Organic Parameters, Prep. / Screening

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW05.11000	SCM	Petroleum Waste, Cleanup Alumina	[SW-846 3611B]	Semivolatile organics
Certified	Yes	NJ	SHW05.12000	SCM	Cleanup-Florisil	[SW-846 3620B] [SW-846 3620C]	Semivolatile organics
Certified	Yes	NJ	SHW05.13000	SCM	Cleanup-Silica Gel	[SW-846 3630C]	Semivolatile organics
Certified	Yes	NJ	SHW05.14000	SCM	Cleanup-Gel Permeation	[SW-846 3640A]	Semivolatile organics
Certified	Yes	NJ	SHW05.15000	SCM	Cleanup-Acid/Base Partition	[SW-846 3650B]	Semivolatile organics
Certified	Yes	NJ	SHW05.16000	SCM	Cleanup-Sulfur Removal	[SW-846 3660B]	Semivolatile organics
Certified	Yes	NJ	SHW05.17000	SCM	Cleanup-Sulfuric Acid/KMnO4	[SW-846 3665A]	Semivolatile organics
Certified	Yes	NJ	SHW05.18000	SCM	Headspace, GC or GC/MS Screen	[SW-846 3810]	Volatile organics

Category: SHW09 -- Miscellaneous Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW09.08100	SCM	Extraction	[SW-846 9023]	Extractable organic halides (EOX)
Certified	Yes	NJ	SHW09.16000	SCM	Mix with Water or Calcium Chloride	[SW-846 9045C]	pH - soil and waste
Certified	Yes	NJ	SHW09.19100	SCM	Pyrolytic	[USER DEFINED Lloyd Kahn modified]	Total organic carbon (TOC)
Certified	Yes	NJ	SHW09.25000	SCM	Extraction & Gravimetric	[SW-846 9071 B]	Oil & grease - sludge-hem
Certified	Yes	NJ	SHW09.26100	SCM	Combustion, Bomb Oxidation	[SW-846 5050]	Chlorine - total, solid waste
Certified	Yes	NJ	SHW09.28350	SCM	Bomb Calorimeter	[ASTM D-240]	Heat of combustion (BTU)
Certified	Yes	NJ	SHW09.29000	SCM	Flow-Through Paint Filter, Observation	[SW-846 9095]	Free liquid
Certified	Yes	NJ	SHW09.40000	SCM	Soils, Sodium Acetate	[SW-846 9081]	Cation-exchange capacity

Joseph F. Aiello, Manager

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Lab Manager _____

QA Manager _____

Effective Date: 12/15/2010

TEST NAME **DETERMINATION OF ORGANOCHLORINE PESTICIDES USING GC SYSTEM**

METHOD REFERENCE SW846 8081B (Revision 2, February 2007)

Revised sections: Table 2, 3.2, Added Section 13.9

1.0 SCOPE AND APPLICATION

1.1 This SOP describes the analytical procedures, which are utilized by Accutest to acquire samples for analysis of organochlorine pesticides and screening of polychlorinated biphenyls (PCBs) by gas chromatography with Electron Capture Detectors (ECD).

1.2 The method is applicable to extracts from solid and liquid matrices. The compounds listed in Table 1 are determined by a dual-column analysis system.

2.0 SUMMARY OF METHOD

2.1 A measured volume or weight of sample (approximately 1 L for liquids, 15 g for solids) is extracted using the appropriate matrix-specific sample extraction technique. Liquid samples are extracted at neutral pH with methylene chloride using Method 3510 (separatory funnel). Solid samples are extracted using Method 3545A, Pressurized Fluid Extraction or Method 3550C, Sonication. A variety of cleanup steps may be applied to the extract, depending on the nature of the matrix interferences and the target analytes. Cleanups include Florisil (Method 3620), silica gel (Method 3630), gel permeation chromatography (Method 3640), and sulfur (Method 3660).

2.2 After cleanup, the extract is analyzed by injecting a 2-µL sample that is split between dual narrow-bore fused silica capillary columns that are mounted in a single gas chromatograph with electron capture detectors (GC/ECD).

2.3 The peaks detected are qualitatively identified by comparison to retention times specific to the known target list of compounds on two different column types (primary and confirmation).

2.4 If sensitivity permits, the positive hit should be confirmed by GC/MS method 8270D.

2.5 Once identified the compound is quantitated by external standard techniques with an average calibration factor generated from a calibration curve.

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3.0 REPORTING LIMIT & METHOD DETECTION LIMIT

3.1 Reporting Limit. The reporting limit for this method is established at the lowest concentration standard in the calibration curve. RL's may vary depending on matrix and sample volumes or weight and percent moisture. Refer to Table 1 for current reporting limits.

3.2 Method Detection Limit. Experimentally determine MDLs using the procedure specified in 40 CFR, Part 136, Appendix B. This value represents the lowest reportable concentration of an individual compound that meets the method qualitative identification criteria.

3.2.1 Experimental MDLs must be determined annually for this method.

3.2.2 Process all raw data for the replicate analysis in each MDL study. Forward the processed data to the QA group for archiving.

4.0 DEFINITIONS

BLANK - an analytical sample designed to assess specific sources of laboratory contamination. The different types of blanks are Method Blank, Instrument Blank, Storage Blank, and Sulfur Blank.

FIELD BLANK – an analytical sample prepared from organic-free water and carried through the sampling handling protocol serves as a check for contamination.

CALIBRATION FACTOR (CF) - a measure of the gas chromatographic response of a target analyte to the mass injected. The calibration factor is analogous to the Relative Response Factor (RRF) used in the Volatile and Semivolatile fractions.

CONTINUING CALIBRATION - analytical standard run every 12 hours and at the end of analytical sequence to verify the initial calibration of the system.

CONTINUOUS LIQUID-LIQUID EXTRACTION - used herein synonymously with the term's continuous extraction, continuous liquid extraction, and liquid extraction. This extraction technique involves boiling the extraction solvent in a flask and condensing the solvent above the aqueous sample. The condensed solvent drips through the sample, extracting the compounds of interest from the aqueous phase.

INITIAL CALIBRATION - analysis of analytical standards for a series of different specified concentrations; used to define the linearity and dynamic range of the response of the electron capture detector to the target compounds.

MATRIX - the predominant material of which the sample to be analyzed is composed. A sample matrix is either water or soil/sediment. Matrix is not synonymous with phase (liquid or solid).

MATRIX SPIKE - aliquot of a matrix (water 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.

MATRIX SPIKE DUPLICATE - a second aliquot of the same matrix as the matrix spike (above) that is spiked in order to determine the precision of the method.

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METHOD BLANK - an analytical control consisting of all reagents and surrogate standards that is carried throughout the entire analytical procedure. The method blank is used to define the level of laboratory, background and reagent contamination.

METHOD DETECTION LIMITS (MDLs) – The minimum concentration of a substance 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. MDLs should be determined approximately once per year for frequently analyzed parameters.

PERCENT DIFFERENCE (%D) - to compare two values, the percent difference indicates both the direction and the magnitude of the comparison, i.e., the percent difference may be either negative, positive, or zero. (In contrast, see relative percent difference.)

PERCENT MOISTURE - an approximation of the amount of water in a soil/sediment sample made by drying an aliquot of the sample at 105°C. The percent moisture determined in this manner also includes contributions from all compounds that may volatilize at or below 105 °C, including water. Percent moisture may be determined from decanted samples and from samples that are not decanted.

REAGENT WATER - water in which an interferant is not observed at or above the minimum detection limit of the parameters of interest.

RELATIVE PERCENT DIFFERENCE (RPD) - to compare two values, 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. (In contrast, see percent difference.)

RELATIVE RESPONSE FACTOR (RRF) - a measure of the instrument response of an analyte. Response Factors are determined by analysis of standards and are used in the calculation of concentrations of analytes in samples.

RETENTION TIME (RT) - the time required (in minutes) for a standard compound to elute from a chromatographic column.

SURROGATES - for semivolatiles and pesticides/Aroclors, compounds added to every blank, sample, matrix spike, matrix spike duplicate, and standard; used to evaluate analytical efficiency by measuring recoveries. Surrogate are brominated, fluorinated, or isotopically labeled compounds not expected to be detected in environmental media.

INSTRUMENT BLANK - a system evaluation sample containing lab reagent grade water with internal standards and/or surrogate standards added. An instrument blank is used to remove and/or evaluate residual carryover from high level standards, spike samples and field samples.

5.0 HEALTH & SAFETY

5.1 The analyst must follow normal safety procedures as outlined in the Accutest Health and Safety Plan and Personal Protection Policy, which includes the use of safety glasses and lab coats. In addition, all acids are corrosive and must be handled with care. Flush spills with plenty of water. If acids contact any part of the body, flush with water and contact the supervisor.

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5.2 The toxicity or carcinogenicity of each reagent used in this method has not been precisely determined; however, each chemical must be treated as a potential health hazard. Exposure to these reagents should be reduced to the lowest possible level. The laboratory is responsible for maintaining a current awareness file of OSHA regulations regarding the safe handling of the chemicals specified in this method. A reference file of data handling sheets must be made available to all personnel involved in these analyses.

5.3 The following analytes covered by this method have been tentatively classified as known or suspected, human or mammalian carcinogens: 4,4'-DDT, 4,4'-DDD, and the BHCs. Primary standards of these toxic compounds should be prepared in a hood. A NIOSH/Mass approved toxic gas respirator should be worn when the analyst handles high concentrations of these toxic compounds.

6.0 INTERFERENCES

6.1 The data from all blanks, samples, and spikes must be evaluated for interferences.

6.2 Method interferences may be caused by contaminants in solvents, reagents, glassware, and other stages of sample processing. Refer to "The Preparation of Glassware for Extraction of Organic Contaminants" SOP for practices utilized in the extraction department.

6.3 Matrix interferences may be caused by contaminants that are co-extracted from the sample. The extent of matrix interferences will vary from source to source. Interferences such as sulfur and phthalate are treated with copper and alumina by organics preparation respectively.

6.3.1 The presence of elemental sulfur will result in broad peaks that interfere with detection of early-eluting organochlorine pesticides. Method 3660 is suggested for removal of sulfur.

6.3.2 Avoiding contact with any plastic materials and checking all solvents and reagents for phthalate contamination can best minimize interference from phthalate esters.

6.4 Waxes, lipids, and other high molecular weight materials can be removed by method-3640 (Gel Permeation Chromatography-GPC column cleanup).

6.5 To reduce carryover when high-concentration samples are sequentially analyzed, the syringe must be rinsed out between samples with solvent.

6.6 In the case where an unusually concentrated sample is encountered, it should be followed by the analysis of an instrument blank. An instrument blank is a sample containing hexane with surrogate standards added at 20 ppb. An instrument blank is used to remove and/or evaluate residual carryover from high level standards, spike samples and field samples.

7.0 SAMPLE PRESERVATION AND HOLDING TIME

7.1 PRESERVATION

7.1.1 Water Samples

7.1.1.1 Collect samples in 1 liter glass amber bottles without preservatives.

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7.1.1.2 A liter of an unpreserved sample is required for extraction. Additional sample volume is necessary for any samples used for matrix spike and matrix spike duplicates. Therefore, 3 liters of at least one sample in every group of 20 field samples are required for analysis to accommodate all quality control requirements.

7.1.2 Soil Samples

7.1.2.1 Samples are collected in a 300-ml amber glass sample bottle. No preservative is required.

7.1.3 Sample should be taken with care so as to prevent any portion of the collected sample coming in contact with the sampler's gloves, thus causing possible phthalate contamination.

7.1.4 The samples must be protected from light and refrigerated at $\leq 6\ ^{0}C$ from the time of receipt until extraction and analysis.

7.2 HOLDING TIME

7.2.1 Aqueous sample must be extracted within 7 days of sampling.

7.2.2 Soil sample must be extracted within 14 days of sampling.

7.2.3 Extracts must be analyzed within 40 days following extraction.

8.0 APPARATUS AND MATERIALS

8.1 GAS CHROMATOGRAPH SYSTEM

8.1.1 Gas Chromatograph – Agilent or Hewlett Packard Models 6890 and 5890. The analytical system is completed with a temperature programmable gas chromatograph and all required accessories including syringes, capillary chromatographic columns, and gases. The capillary column is directly coupled to the source. The injection port is designed for splitless injection with capillary columns.

8.1.2 Columns

8.1.2.1 Column pair 1

8.1.2.1.1 30 m x 0.32 mm ID, 0.5 µm film thickness fused silica, DB-1701 narrow-bore capillary column or equivalent.

8.1.2.1.2 30 m x 0.32 mm ID, 0.5 µm film thickness fused silica, DB-5 narrow-bore capillary column.

8.1.2.2 Column pair 2

8.1.2.2.1 30 m x 0.32 mm ID, 0.5 µm film thickness fused silica, RTX CLPI narrow-bore capillary column or equivalent.

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8.1.2.2.2 30 m x 0.32 mm ID, 0.25 µm film thickness fused silica, RTX CLPII narrow-bore capillary column or equivalent.

8.1.3 Detectors

8.1.3.1 Electron Capture Detectors (HP).

8.1.3.2 Micro Electron Capture Detectors (HP).

8.2 AUTOSAMPLER

8.2.1 Agilent or Hewlett Packard Model 7673A, 7683, 7643A capable of holding 100 of 2-ml crimp vials.

8.3 DATA SYSTEM

8.3.1 MSD iinterfaced to the gas chromatograph which allows the continuous acquisition and storage on machine-readable media (disc) of all chromatographic data obtained throughout the duration of the analysis.

8.3.2 The ENVIROQUANT (PC) data system is capable of quantitation using multipoint calibration.

8.3.3 Legato Networker with lookup database on 4mm DAT tape for long term, off line magnetic storage of data.

8.4 SYRINGES

8.4.1 Manually held ul graduated syringes, various volumes (Hamilton or equiv.).

8.4.2 10 µl graduated, auto sampler (Hamilton or equiv.).

8.5 VOLUMETRIC FLASKS, Class A.

9.0 REAGENTS AND STANDARDS

9.1 Refer to Accutest Sample Preparation SOPs EOP001 and EOP040A for reagents and standards used for sample extraction.

9.2 Solvents - Ultra pure, chromatography graded Hexane.

9.3 Stock Standard Solutions

9.3.1 Two separate sources of commercially prepared standards with traceability documentation are used.

9.3.1.1 Pesticides Mixtures containing one or more of the following compounds: alpha-BHC, beta-BHC, delta-BHC, gamma-BHC(Lindane), Heptachlor, Aldrin, Heptachlor Epoxide, Endosulfan I, Dieldrin, 4,4'-DDE, Endrin, Endosulfan II, 4,4'-

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DDD, Endosulfan sulfate, 4,4—DDT, Methoxychlor, Endrin ketone, Endrin Aldehyde, alpha-Chlordane & gamma-chlordane.

9.3.1.2 Individual standards containing Toxaphene, Chlordane and Mirex.

9.4 Working Solutions

9.4.1 Prepare working solutions, using stock solution, in hexane, as needed, that contain the compounds of interest, either singly or mixed together. Refer to Table 3 for details.

9.5 Calibration Standards

9.5.1 Initial Calibration Standards

9.5.1.1 Calibration standards are prepared at a minimum of five concentrations, including surrogates, from the above working solutions. Suggested levels and preparations are shown in Table 4A.

9.5.1.2 Separate calibration standards are required for each multi-component target analyte (i.e., Toxaphene and Chlordane). Unless otherwise necessary for a specific project, such as Ohio VAP or the Dept. of Defense (DoD), a single calibration standard near the mid-point of the expected calibration range of each multi-component analyte is employed. Refer to Table 4B and 4C for preparation scheme. Optional curves as shown on Table 4D and 4E may also be used for a multi-point calibration per project's specification.

9.5.2 Continuing Calibration Verification (CCV)

9.5.2.1 Continuing calibration checks containing all the single-component analytes are prepared at concentrations of 10 µg/l, 25 ug/l and 50 µg/l as described in Table 5. During analysis, these alternate concentrations are run to check the initial calibration.

9.5.2.2 In situations where only Toxaphene or Chlordane is of interest for a specific project and for Ohio VAP multi-level calibration checks of each multi-component analyte of interest may be prepared and analyzed throughout the analytical sequence.

9.6 Initial Calibration Verification (ICV) - Second Source Calibration Check Standard

9.6.1 Prepare the ICV standards from separate sources of stock standards from the calibration curve following the procedures in Table 6A and 6B.

9.6.2 The ICV must be analyzed immediately following the initial calibration.

9.7 Surrogates

9.7.1 Tetrachloro-m-xylene (TCMX) and decachlorobiphenyl (DCB) are used as surrogate standards for this method.

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9.7.2 A calibration range must be constructed for the surrogate compounds. Accordingly, appropriate amounts of surrogates are mixed with each calibration solution to define a range similar to the target compounds.

9.7.3 Surrogate compounds are also contained in continuing calibration checks, and second source calibration check standard.

9.7.4 Spike each sample, QC sample and blank with an appropriate amount of corresponding surrogate spiking solution, prior to extraction, for a final concentration in the extract of 40 µg/l of each surrogate compound.

9.8 Breakdown Evaluation Solution

9.8.1 The DDT and Endrin breakdown evaluation solution is prepared in hexane as outlined in Table 7.

9.9 Storage of Standards

9.9.1 Store unopened stock standard solutions according to the manufacturer's documented holding time and storage temperature recommendations. Protect from light.

9.9.2 Store all other working standard solutions in glass vials with Teflon lined screw caps at ≤ 6°C in the dark.

9.9.3 Opened stock standard solutions must be replaced after 6 months or sooner if manufacturer's expiration date comes first or comparison with quality control check samples indicates a problem.

9.9.4 All other standards must be replaced after six months or sooner if routine QC indicates a problem or manufacturer's expiration date comes first.

10.0 CALIBRATION

10.1 Initial Calibration

10.1.1 The calibration range covered for all single-component analytes employs at least five of the following standards: 2, 5, 10, 25, 50, and 100* µg/l (*this point may be dropped if it exceeds the linear range of the instrument). The method reporting limit is established by the concentration of the lowest standard analyzed during the initial calibration. Lower concentration standard may be needed to meet the reporting limit requirements of state specific regulatory program. The linear range covered by this calibration is the highest concentration standard. Calibration is performed for both the primary and secondary columns.

10.1.2 A calibration range must be constructed for each surrogate compound. Accordingly, add appropriate amounts of each surrogate compound to the calibration solution to define a range similar to the target compounds.

10.1.3 Unless otherwise necessary for a specific project, the analysis of the multi-component analytes (such as: Toxaphene or Chlordane) employs a single-point calibration. This

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single calibration standard is included with the initial calibration of the single component analytes for pattern and retention time recognition. For Ohio VAP and Dept. of Defense (DoD) projects an initial 5 point calibration is required for these analytes if there are positive hits.

10.1.4 Aliquot proper amount of each calibration standard into a 2-ml crimp top vial.

10.1.5 Each analyte is quantitatively determined using the external standard technique. The Calibration Factor (CF) is defined in Section 14.1.

10.1.6 For the initial calibration to be valid, the percent relative standard deviation (% RSD) (see Section 14.2) must be less than 20 % for each analyte of interest on each column. If any analyte exceeds the 20% RSD acceptance limit for a given calibration other calibration options, such as linear calibration not through the origin may be used or corrective action must be taken.

10.1.6.1 If the problem is associated with a standard, reanalyze the standard and recalculate the RSD.

10.1.6.2 Alternatively, narrow the calibration range by replacing the low or the high calibration standard that cover a narrow range.

10.1.6.2.1 The changes to the upper end of the calibration range will affect the need to dilute samples above the range, while changes to the lower end will affect the overall sensitivity of the method. Consider the regulatory limits or action levels associated with the target analytes when adjusting the lower end of the range.

10.2 Initial Calibration Verification (ICV) - Second Source Calibration Check Standard

10.2.1 The initial calibration is verified with a second source calibration check standard from an external source (Section 9.6). At a minimum, it must be performed right after the initial calibration.

10.2.2 The percent difference (%D) (Section 14.3) for this standard must meet the %D criteria of 20% used for calibration verification on each column.

10.2.2.1 If %D is greater than 20%, reanalyze the ICV second source check or re-prepare using a fresh ampoule and reanalyze the ICV second source check standard.

10.2.2.2 If the %D criteria cannot be achieved after re-injection of the second source check standard. a new calibration curve must be prepared by making fresh calibration standards using one of the two standard sources that match each other.

10.3 Continuing Calibration Verification (CCV)

10.3.1 Continuing calibration check standards (Section 9.5.2) must be acquired at the beginning of each 12 hour shift prior to analyzing samples, after every 10 injections not to exceed 12 hours and at the end of the analysis sequence. Analysts should alternate

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the use of the two different concentration mixtures for calibration verification depending on the range of the curve.

10.3.2 For the continuing calibration to be valid, the percent difference (%D) must be less than 20 % for each compound of interest on each column.

10.3.3 Each sample analysis must be bracketed by periodic analyses of acceptable calibration verification standards followed by an instrument blank, run after 10 injections or 12-hours, whichever is more frequent. If %D criteria fails during a mid sequence calibration check or at the end of the analysis sequence, a continuing calibration check is allowed to be repeated only once; if the second trial fails, a new initial calibration must be performed. In situations where the first check fails to meet the criteria, the instrument logbook should have clear documented notations as to what the problem was and what corrective action was implemented to enable the second check to pass.

10.3.4 When a calibration verification standard fails to meet the QC criteria all samples injected after the last standard that met the QC criteria must be evaluated to prevent misquantitations and possible false negative results. Re-injection of the sample extracts may be required.

10.3.4.1 If the analyte was not detected in the specific samples analyzed during the analytical shift or sequence, the extracts for those samples do not need to be reanalyzed when the calibration standard response is above the initial calibration response, i.e. >20%.

10.3.4.2 If the analyte was detected in the specific samples analyzed during the analytical shift, or the calibration standard response is below the initial calibration response, then the extracts for those samples need to be reanalyzed.

10.3.5 Each subsequent injection of a continuing calibration standard must be checked against the retention time windows established in Section 11.0. If any of these subsequent standards fall outside their absolute retention time windows, the GC system is not in control. Determine the cause of the problem and correct it. If the problem cannot be corrected, a new initial calibration must be performed.

11.0 RETENTION TIME WINDOWS

11.1 Retention time windows must be calculated for each analyte and surrogate on each GC column and whenever a new chromatographic column is installed, when a new initial calibration is analyzed or when there are significant changes in the operating conditions. The retention time windows must be reported with the analysis results in support of the identifications made.

11.2 Employ the following approach to establish retention time windows.

11.2.1 Make three injections of all single component standard mixture and multi-response products at approximately equal intervals during the 72-hr period.

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11.2.2 Calculate the mean and standard deviation of the three absolute retention times-recording the retention time to three decimal places (e.g. 10.015 min) - for each single component pesticide.

11.2.3 For multi-response pesticides, choose five major peaks and calculate the mean and standard deviation of the three retention times for those peaks. The peak chosen should be fairly immune to losses due to degradation and weathering in the samples.

11.2.4 In those cases where the standard deviations of the retention time window for a particular pesticide is <0.01 minutes, the laboratory may either collect data from additional injections of standards or use a default standard deviation of 0.01 minutes.

11.2.5 The width of the retention time window for each analyte and surrogate is defined as ± 3 times the standard deviation of the mean absolute retention time established during the 72-hour period. If the default standard deviation is employed, the width of the window will be 0.03 minutes.

11.2.6 Establish the center of the retention time window for each analyte and surrogate by using the absolute retention time for each analyte and surrogate from the calibration verification standard at the beginning of the analytical shift. For samples run during the same shift as an initial calibration, use the retention time of the mid-point standard of the initial calibration.

12.0 PROCEDURE

12.1 Sample Extraction

12.1.1 In general, water samples are extracted at a neutral pH with methylene chloride using a separate funnel (Method 3510) (Refer to SOP: EOP001). Solid samples are extracted using Method 3545A, Pressurized Fluid Extraction (Refer to SOP: EOP040A) or Method 3550C, Sonication (Refer to SOP: EOP003).

12.2 Sample Cleanup

12.2.1 Cleanup procedures may not be necessary for a relatively clean sample matrix, but most extracts from environmental and waste samples will require additional preparation before analysis. The specific cleanup procedure used will depend on the nature of the sample to be analyzed and the data quality objectives for the measurements. Refer to the appropriate SOPs for details.

12.2.1.1 If a sample is of biological origin, or contains high molecular weight materials, the use of Method 3640 (GPC cleanup - pesticide option) is recommended. Frequently, one of the adsorption chromatographic cleanups (alumina, silica gel, or florisil) may also be required following the GPC cleanup.

12.2.1.2 Method 3610 (alumina) may be used to remove phthalate esters.

12.2.1.3 Method 3620 (florisil) may be used to separate organochlorine pesticides from aliphatic compounds, aromatics, and nitrogen-containing compounds.

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12.2.1.4 Method 3630 (silica gel) may be used to separate single component organochlorine pesticides from some interferants.

12.2.1.5 Elemental sulfur, which may be present in certain sediments and industrial wastes, interferes with the electron capture gas chromatography of certain pesticides. Sulfur should be removed by the technique described in Method 3660.

12.3 Instrument Conditions

12.3.1 Recommended instrument conditions are listed in Table 2. Modifications of parameters specified with an asterisk are allowed as long as criteria of calibration are met. Any modification should be approved by team leader/manager.

12.4 DDT and Endrin Breakdown Evaluation

12.4.1 DDT and Endrin are easily degraded in the injection port. Breakdown occurs when the injection port liner is contaminated high boiling residue from sample injection or when the injector contains metal fittings. Check for degradation problems by injecting a standard containing only 4,4'-DDT and Endrin. Presence of 4,4'-DDE, 4,4'-DDD, Endrin ketone or Endrin aldehyde indicates breakdown.

12.4.2 Before the initial calibration and at the beginning of each 12-hour shift, inject 1 µl of an evaluation standard directly on column. (Refer to Section 9.8).

12.4.3 Calculate the percent breakdown for Endrin and DDT (Section 14.7) and save the breakdown report in the LIMS system.

12.4.4 If degradation of either DDT or Endrin exceeds 15%, injector maintenance should be completed before proceeding with calibration. Refer to EQA036-01 for GC system maintenance utilized in the lab.

12.5 Initial Calibration

12.5.1 See Section 10.1.

12.6 Initial Calibration Verification (ICV)

12.6.1 Refer to Section 10.2.

12.7 Continuing Calibration Verification (CCV)

12.7.1 Refer to Section 10.3.

12.8 Sample Analysis (Primary)

12.8.1 All samples and quality control samples are injected into the Gas Chromatograph using the autosampler. Program the sampler for an appropriate number of syringe rinses and a 1ul or 2 µl injection size. A splitless injection technology is used.

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12.8.2 Sample concentrations are calculated by comparing sample responses with the initial calibration of the system (Section 14.4). If sample response exceeds the limits of the initial calibration range, dilute the extract and reanalyze. Extracts should be diluted so that all peaks are on scale, as overlapping peaks are not always evident when peaks are off scale.

12.8.3 Sample injections may continue for as long as the calibration verification standards meet instrument QC requirements. The sequence ends when the set of samples has been injected or when qualitative and/or quantitative QC criteria are exceeded.

12.8.4 If chromatographic peaks are masked by the presence of interferences, further sample cleanup is necessary. Refer to Section 12.2 for extract cleanup alternatives.

12.8.4.1 If extract cleanup is required, all QC samples must also be processed through the cleanup method.

12.9 Confirmation Analysis

12.9.1 Confirmation analysis is to confirm the presence of all compounds tentatively identified in the primary analysis.

12.9.1.1 All instrument performance quality control criteria for calibration and retention times must be satisfied on the confirmation analysis.

12.9.2 Each tentative identification must be confirmed using either a second GC column of dissimilar stationary phase or using another technique such as GC/MS.

12.9.2.1 The primary and secondary analysis is conducted simultaneously in the dual-column analysis.

12.9.2.2 GC/MS confirmation may be used in conjunction with dual-column analysis if the concentration is sufficient for detection in GC/MS, normally a concentration of approximately 10 ng/µl in the final extract for each single component compound is required. Method 8270 is recommended as a confirmation technique when sensitivity permits.

12.9.3 Once the identification has been confirmed, the agreement between the quantitative results on both columns should be checked.

12.10 Sample Dilution

12.10.1 Establish dilution of sample in order to fall within calibration range or to minimize the matrix interference.

* Utilize screen data (specific project only).
* Utilize acquired sample data.
* Utilize the history program or approval from client/project.
* Sample characteristics (appearance).

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12.10.2 If no lower dilution has been reported, the dilution factor chosen should keep the response of the largest peak for a target analyte in the upper half of the initial calibration range of the instrument.

12.10.3 Preparing Dilutions.

12.10.3.1 Prepare sample dilutions quantitatively. Dilute a stored sample extract, if available with hexane using logical volume to volume ratios, i.e., 1:5, 1:10, 1:50, etc.

12.10.3.2 Syringe dilutions. – Refer to Table 8 for dilutions. A calibrated 1ml syringe must be used to prepare dilutions. Gently shake to disperse the extract throughout the solvent prior to loading on the auto-sampler tray for further analysis.

12.10.3.3 Volumetric Flask Dilutions - Dilutions can also be made with a Class A volumetric flask. Measure the appropriate sample extract volume in a calibrated syringe and bring to final volume with dilution solvent in a Class A volumetric flask. Gently shake to disperse the extract throughout the solvent and transfer to auto-sampler vial for analysis.

12.11 Data interpretation

12.11.1 Qualitative identification

12.11.1.1 Analyst shall identify the targeted compounds with competent knowledge interpreting retention time and/or chromatographic pattern by comparison of the sample to the standard of the suspected compound. The criteria required for a positive identification are:

12.11.1.1.1 The sample component must elute at the absolute retention time window (Refer to Section 11.0) for both primary and confirmation run.

12.11.1.1.2 For the multi-response pesticides, at least five major peaks are selected. The retention time window for each peak is determined from the initial calibration analysis. Identification of a multi-component analyte in the sample is based on pattern recognition in conjunction with the elution of these five peaks within the retention time windows of the corresponding peaks of the standard on both GC columns.

12.11.1.1.3 Be aware of matrix interfering effects on peak shape and relative peak ratios that could distort the pattern. Interpretation of these phenomena may require a highly experienced chromatographer or at least a second opinion.

12.11.2 Quantitative analysis

12.11.2.1 When a target compound has been identified, concentration (see section 14.4) will be based on the integrated area/or height of the peak and calculated by

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external standard technique. Proper quantitation requires the appropriate selection of a baseline from which the peak area or height can be determined.

12.11.2.2 For multi-response pesticides, usually the areas of 5 peaks are used for quantitation to calculate the calibration factors for those peaks, but fewer may be used depending on the extent of matrix interferences. These calibration factors are then used to calculate the concentration of each corresponding peak in the sample chromatogram and the resulting concentrations are averaged to provide the final result for the sample.

12.11.2.3 When sample results are confirmed using two dissimilar columns or with two dissimilar detectors, the agreement between the quantitative results must be evaluated after the identification has been confirmed. Calculate the relative percent difference (RPD) between the two results using the formula in Section 14.6. Report the lower result.

12.11.2.3.1 A program to perform the RPD calculation had been developed and incorporated into ENVIROQUANT software.

12.11.2.3.2 If one result is significantly higher (e.g., >40%), check the chromatograms to see if an obviously overlapping peak is causing an erroneously high result. If no overlapping peaks are noted, examine the baseline parameters established by the instrument data system (or operator) during peak integration.

12.11.2.3.3 If no anomalies are noted, review the chromatographic conditions. If there is no evidence of chromatographic problems, report the lower result with the footnote (remark) indicating "More than 40% RPD for detected concentrations between two GC columns".

13.0 QUALITY CONTROL

13.1 QC Requirements Summary

DDT and Endrin Breakdown Evaluation	Every 12-hour shift
ICV -Second Source Calibration	Following initial calibration
Continuing Calibration Checks	Every 12-hour shift or 10 injections (whichever is more frequent) and at the end of analysis sequence
Method Blank	One per extraction batch* or per day for a running batch
Blank Spike	One per extraction batch* or per day for a running batch
Matrix Spike	One per extraction batch*
Matrix Spike Duplicate	One per extraction batch*
Surrogate	Every sample and standard

*The maximum number of samples per batch is twenty or per project specification.

13.2 DDT and Endrin Breakdown Evaluation

13.2.1 Refer to Section 12.4.

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13.3 Initial Calibration Verification (ICV) - Second Source Calibration Check

13.3.1 Refer to Section 10.2.

13.4 Continuing Calibration Verification (CCV)

13.4.1 Refer to Section 10.3.

13.5 Method Blank

13.5.1 The method blank is either DI water or sodium sulfate (depending upon the sample matrix) which must be extracted with each set of 20 or less samples. For a running batch, a new method blank is required for each different extraction day. The method blank are then extracted and run through any clean-up procedures along with the other samples in that batch.

13.5.2 If the method blank contains a target analyte above its MDL, the entire batch must be re-extracted and re-analyzed.

13.5.3 Surrogate compounds are added to the method blank prior to extraction and analysis. If the surrogate accuracy in the blank does not meet criteria, the entire batch must be re-extracted and re-analyzed.

13.6 Blank Spike

13.6.1 A blank spike must be extracted with each set of 20 or less samples. For a running batch, a new blank spike is required for each different extraction day. The blank spike consists of an aliquot of a clean (control) matrix similar to the sample matrix and of the same weight or volume. A separate blank spike may be needed if the sample requires Chlordane and/or Toxaphene. It is spiked with the same analytes at the same concentrations as the matrix spike/matrix spike duplicate.

13.6.1.1 For single-component analytes, the blank spike is prepared at 0.25 µg/l or 8.33 µg/kg on a dry weight basis.

13.6.1.2 For Toxaphene only analysis or per project specification, the blank spike is prepared at 5 µg/l or 167 µg/kg on a dry weight basis.

13.6.1.3 For Chlordane only analysis or per project specification, the blank spike is prepared at 4 µg/l or 133 µg/kg on a dry weight basis.

13.6.2 The blank spike recoveries should be assessed using in house limits..

13.6.3 If a blank spike is out of control, the following corrective actions must be taken. In the case where the blank spike recovery is high and no hits reported in associated samples and QC batch the sample results can be reported with footnote (remark) and no further action is required.

13.6.3.1 Check to be sure that there are no errors in the calculations, or spike solutions. If errors are found, recalculate the data accordingly.

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13.6.3.2 Check instrument performance. If an instrument performance problem is identified, correct the problem and reanalyze the sample batch.

13.6.3.3 If no problem is found, re-extract and reanalyze the sample batch.

13.7 Matrix Spike (MS)/Matrix Spike Duplicate (MSD)

13.7.1 One sample is randomly selected from each extraction batch of similar matrix types and spiked in duplicate to determine whether the sample matrix contributes bias to the analytical results.

13.7.2 A separate matrix spike and matrix spike duplicate set may be needed if the sample requires Chlordane and/or Toxaphene. Matrix spikes are prepared by spiking an actual sample for a concentration of 0.25 µg/l or 8.33 µg/kg on a dry weight basis for pesticides, 5 µg/l or 167 µg/kg for Toxaphene, 4 µg/l or 133 µg/kg for Chlordane.

13.7.3 Assess the matrix spike recoveries and relative percent difference (RPD) against the in house control limits.

13.7.4 If the matrix spike accuracy of any individual compound is out of control, the accuracy for the compound in the blank spike must be within control. Matrix interference is assumed and the data is reportable. No further corrective action is required.

13.8 Surrogates

13.8.1 Tetrachloro-m-xylene (TCMX) and Decachlorobiphenyl (DCB) are used as surrogate standards. All blanks, samples, QC samples, and calibration standards contain surrogate compounds which are used to monitor performance of the extraction, cleanup (when used), and analytical system.

13.8.2 The recoveries (refer to Section 14.5) of the surrogates must be evaluated versus the surrogate control limits developed by the laboratory.

13.8.3 If surrogate recovery is not within established control limits, corrective action must be performed if surrogate recoveries indicate that a procedural error may have occurred during the analysis of the sample.

13.8.3.1 Check the surrogate calculations for calculation or integration errors and perform corrections if detected.

13.8.3.2 Re-analyze the extract if calculation errors are not detected. If the surrogate recoveries for the re-analyzed extract are in control, report data from the re-analysis only.

13.8.3.3 If data from the reanalysis is also out of control, re-extract and reanalyze the sample.

13.8.3.4 If, upon reanalysis, the surrogate recoveries are acceptable, report the reanalysis data. If the holding time has expired prior to the reanalysis, report both the original and reanalysis results and note the holding time problem.

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13.8.3.5 If the recovery is again not within limits, the problem is considered to be matrix interference. Submit both data sets with the original analysis being reported.

13.8.4 The retention time shift for surrogate must be evaluated after the analysis of each sample. The sample should be reanalyzed when the retention time of any surrogate compound is outside the retention window.

13.8.4.1 Reanalysis may not be required for samples having visible matrix interference, defined as excessive signal levels from target or non-target interfering peaks. This judgment should be approved by team leader or supervisor.

13.9 Refer to Project Specific Bench Notes (GC8081) for additional program or client specific QC requirements.

14.0 CALCULATION

14.1 Calibration Factor (CF).

$$CF = \frac{A_s}{C_s}$$

where:
A_s = Area of the peak for the compound being measured.
C_s = Concentration of the compound being measured (µg/l).

14.2 Percent Relative Standard Deviation (% RSD).

$$\%RSD = \frac{SD}{CF_{av}} \times 100$$

where:
SD = Standard Deviation.
CF_{av} = Average calibration factor from initial calibration.

14.3 Percent Difference (% D).

$$\% D = \frac{|CF_{av} - CF_c|}{CF_{av}} \times 100$$

where:
CF_c = CF from continuing calibration (CBCHK).

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14.4 Concentration (Conc.).

14.4.1 For water:

$$\text{Conc. } (\mu g/l) = \frac{A_c \times M}{CF_{av}}$$

$$M = \frac{V_f \times D}{V_i}$$

14.4.2 For soil/sediment (on a dry weight basis, see EGN007):

$$\text{Conc. } (\mu g/kg) = \frac{A_c \times M}{CF_{av}}$$

$$M = \frac{V_f \times D}{W_s \times S}$$

where:
A_c = Area of peak for compound being measured.
V_f = Final Volume of total extract (ml).
D = Secondary dilution factor.
V_i = Initial volume of water extracted (ml).
W_s = Weight of sample extracted (g).
S = (100 - % moisture in sample) / 100 or % solid/100.
M = Multiplier.

14.5 Percent Recovery (% R).

$$\%\ R = \frac{\text{Concentration found}}{\text{Concentration spiked}} \times 100$$

14.6 Relative Percent Difference (RPD).

$$RPD = \frac{|C_1 - C_2|}{(1/2)(C_1 + C_2)} \times 100$$

where:
C_1 = Matrix Spike Concentration or the result on column 1.
C_2 = Matrix Spike Duplicate Concentration or the result on column 2.

14.7 Percent Breakdown.

$$\%\ \text{Breakdown for DDT} = \frac{\text{Total DDT degradation peak area}}{\text{Total DDT peak area}} \times 100$$

where:
Total DDT degradation peak area = DDE + DDD
Total DDT peak area = DDT + DDE + DDD

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$$\% \text{ Breakdown for Endrin} = \frac{\text{Total Endrin degradation peak area}}{\text{Total Endrin peak area}} \times 100$$

where:
Total Endrin degradation peak area = Endrin aldehyde + Endrin ketone.
Total Endrin peak area = Endrin + Endrin aldehyde + Endrin ketone.

15.0 DOCUMENTATION

15.1 The Analytical Logbook is a record of the analysis sequence; the logbook must be completed daily. Each instrument will have a separate logbook.

15.1.1 If samples require reanalysis, a brief explanation of the reason must be documented in this log. For consistency, if surrogates are high or low indicate it as (↑) for high and (↓) for low.

15.2 The Standard Preparation Logbook must be completed for all standard preparations. All information requested must be completed, the page must be signed and dated by the respective person.

15.2.1 The Accutest Lot Number must be cross-referenced on the standard vial.

15.3 The Instrument Maintenance Logbook must be completed when any type of maintenance is performed on the instrument. Each instrument has a separate log.

15.4 Any corrections to laboratory data must be done using a single line through the error. The initials of the person and date of correction must appear next to the correction.

15.5 Unused blocks of any form must be x'ed or z'ed by the analyst before submitting the data for review.

15.6 Supervisory (or peer) personnel must routinely review (at least once per month) all laboratory logbooks to ensure that information is being recorded properly. Additionally, the maintenance of the logbooks and the accuracy of the recorded information should also be verified during this review.

16.0 DATA REVIEW AND REPORTING

16.1 Initial and continuing calibration check. Verify that all calibration and continuing calibration criteria have been achieved. If the criteria had not been achieved, corrective action must be performed to bring the system in control before analyzing any samples.

16.1.1 If samples had been analyzed under non-compliant calibration criteria, all sample extracts must be re-analyzed once the system is brought into control.

16.2 Quality Control Data Review. Review all QC data. If QC criteria were not achieved, perform corrective action before proceeding with analysis.

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16.2.1 In some situation, corrective action may demand that the entire sample batch be re-extracted and re-analyzed before processing data.

16.3 Chromatogram Review. The chromatogram of each sample is evaluated for target compounds.

16.3.1 Check specific retention time windows for each target compound for the presence of the target compound in each chromatogram.

16.3.1.1 Each sample may require the reporting of different target compounds. Review the login to assure that the correct target compounds are identified.

16.3.2 The compound must be identified on the primary and confirmatory column before assigning a qualitative identification.

16.3.3 Manual integration of chromatographic peaks must be identified by the analysts by initialing and dating the changes made to the report.

16.4 Transfer to LIMS. Following the initial screen review, transfer the processed data to the LIMS.

17.0 POLLUTION PREVENTION & WASTE MANAGEMENT

17.1 Users of this method must perform all procedural steps in a manner that controls the creation and/or escape of wastes or hazardous materials to the environment. The amounts of standards, reagents, and solvents must be limited to the amounts specified in this SOP. All safety practices designed to limit the escape of vapors, liquids or solids to the environment must be followed. All method users must be familiar with the waste management practices described in section 17.2.

17.2 Waste Management. Individuals performing this method must follow established waste management procedures as described in the waste management SOP, EHS004. This document describes the proper disposal of all waste materials generated during the testing of samples as follows:

17.2.1 Non hazardous aqueous wastes.

17.2.2 Hazardous aqueous wastes

17.2.3 Chlorinated organic solvents

17.2.4 Non-chlorinated organic solvents

17.2.5 Hazardous solid wastes

17.2.6 Non-hazardous solid wastes

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Table 1. Target Compound List and Reporting Limits

Compound	CAS No.	Water (µg/l)	Soil (µg/kg)
alpha-BHC	319-84-6	0.02	0.67
beta-BHC	319-85-7	0.02	0.67
delta-BHC	319-86-8	0.02	0.67
Gamma-BHC (Lindane)	58-89-9	0.02	0.67
Heptachlor	76-44-8	0.02	0.67
Aldrin	309-00-2	0.02	0.67
Heptachlor epoxide	1024-57-3	0.02	0.67
Endosu1fan I	959-98-8	0.02	0.67
Dieldrin	60-57-1	0.02	0.67
4,4'-DDE	72-55-9	0.02	0.67
Endrin	72-20-8	0.02	0.67
Endosulfan II	33213-65-9	0.02	0.67
4,4'-DDD	72-54-8	0.02	0.67
Endosulfan sulfate	1031-07-8	0.02	0.67
4,4'-DDT	50-29-3	0.02	0.67
Methoxychlor	72-43-5	0.05	1.70
Endrin ketone	53494-70-5	0.05	1.70
Endrin aldehyde	7421-93-4	0.02	0.67
α-Chlordane	5103-71-9	0.02	0.67
γ-Chlordane	5103-74-2	0.02	0.67
Mirex	2385-85-5	0.02	0.67
Chlordane (technical)	12789-03-6	0.50	17.0
Toxaphene	8001-35-2	0.25	8.50

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Table 2. RECOMMENDED OPERATING CONDITION	
Gas Chromatograph/Electron Capture Detectors	
Carrier Gas	Helium
Make-up gas	5 % Methane/ 95 % Argon
Make-up gas flow	*40 ml/min
Injection port temperature	*280°C
Injection type	Splitless
Detector temperature	*320°C
Column flow	2 ml/min
Gas Chromatograph Temperature Program*	
Initial temperature	*160°C
Time 1	*2 minutes
Column temperature rate 1	*45 degrees/min
Temperature 1	*200°C
Column temperature rate 2	*7 degrees/min
Temperature 2	*260°C
Column temperature rate 3	*50 degrees/min
Final temperature	*305°C
Time 3	*0.8 minutes
Total run time	10-20 minutes

*Parameter modification allowed for performance optimization as long as QC criteria are achieved.

Table 3. Pesticides and Surrogates Working Solution	
Stock Solution	**Volume Added**
Pesticides Mixture (1,000 µg/ml)	0.1 ml
Pesticides Surrogate Std Spiking Solution (200 µg/ml)	0.5ml
Mirex (1000ug/ml) (optional)	0.1ml
Hexane	9.4 ml (or 9.3 ml with Mirex)
Total	10.0 ml

Pesticides Mixture (10 µg/ml) and Surrogates (10 µg/ml) Working Solution: Prepared by measuring 0.1 ml of 1,000 µg/ml of pesticides mixture, 0.5ml of 200 µg/ml pesticides surrogate std spiking solution and bringing to 10 ml with hexane. Note larger or smaller volumes of standards may be prepared, as needed using the same ratios. ICV is prepared in the same way, but a second source is used.

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Table 4A. Pesticides Calibration Standard Solutions

Solution	Working Solution	Concentration (µg/ml)	Volume Added (µl)	Final Volume in Hexane (ml)	Final Concentration(µg/l)
Standard A	Pesticides Mixture	10	500	50	100
	Surrogates	10			100
Standard B	Pesticides Mixture	10	250	50	50
	Surrogates	10			50
Standard C	Pesticides Mixture	10	125	50	25
	Surrogates	10			25
Standard D	Pesticides Mixture	10	50	50	10
	Surrogates	10			10
Standard E	Pesticides Mixture	10	25	50	5
	Surrogates	10			5
Standard F	Pesticides Mixture	10	10	50	2
	Surrogates	10			2

Standard A: Prepared by measuring 500 µl of Pesticides Mixture (10 µg/ml) and Surrogates (10 µg/ml) Working Solution and bringing to 50 ml with hexane.

Standard B: Prepared by measuring 250 µl of Pesticides Mixture (10 µg/ml) and Surrogates (10 µg/ml) Working Solution and bringing to 50 ml with hexane.

Standard C: Prepared by measuring 125 µl of Pesticides Mixture (10 µg/ml) and Surrogates (10 µg/ml) Working Solution and bringing to 50 ml with hexane.

Standard D: Prepared by measuring 50 µl of Pesticides Mixture (10 µg/ml) and Surrogates (10 µg/ml) Working Solution and bringing to 50 ml with hexane.

Standard E: Prepared by measuring 25 µl of Pesticides Mixture (10 µg/ml) and Surrogates (10 µg/ml) Working Solution and bringing to 50 ml with hexane.

Standard F: Prepared by measuring 10 µl of Pesticides Mixture (10 µg/ml) and Surrogates (10 µg/ml) Working Solution and bringing to 50 ml with hexane.

Table 4B. Toxaphene Calibration Standard Solution (20ug/ml)

Stock Solution	Volume Added (µl)
Toxaphene stock (4000 µg/ml)	125
Pesticides Surrogate Std Spiking Solution (200 µg/ml)	100
Hexane	24775
Total	25000

Toxaphene (20 µg/ml) and Surrogates (0.80 µg/l) Calibration Solution: Prepared by measuring 125 µl of 4000 µg/ml of Toxaphene stock solution, 100 µl of 200 µg/ml pesticides surrogate std spiking solution and bringing to 25 ml with hexane.

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Table 4C. Chlordane Calibration Standard Solution (20 µg/ml)	
Stock Solution	**Volume Added (µl)**
Chlordane stock (2000 µg/ml)	250
Pesticides Surrogate Std Spiking Solution (200 µg/ml)	100
Hexane	24650
Total	25000

Chlordane (20 µg/ml) and Surrogates (0.80 µg/ml) Calibration Solution: Prepared by measuring 250 µl of 2000 µg/ml of Chlordane stock solution, 100 µl of 200 µg/ml pesticides surrogate std spiking solution and bringing to 25 ml with hexane.

Table 4D. Multi-point Toxaphene Calibration Standards (optional)					
Solution	**Stock Solution**	**Concentration (µg/ml)**	**Volume Added (µl)**	**Final Volume in Hexane (ml)**	**Final Concentration(µg/l)**
Standard A	Toxaphene	20	3750	25	3000
	Surrogate Spiking	0.8	3750		120
Standard B	Toxaphene	20	2500	25	2000
	Surrogate Spiking	0.8	2500		80
Standard C	Toxaphene	20	1250	25	1000
	Surrogate Spiking	0.8	1250		40
Standard D	Toxaphene	20	625	25	500
	Surrogate Spiking	0.8	625		20
Standard E	Toxaphene	20	312.5	25	250
	Surrogate Spiking	0.8	312.5		10
Standard F	Toxaphene	20	62.5	25	50
	Surrogate Spiking	0.8	62.5		2

Standard A: Prepared by measuring 3750 µl of 20 µg/ml of Toxaphene stock solution, 3750 µl of 0.8 µg/ml pesticides surrogate std spiking solution and bringing to 25 ml with hexane.

Standard B: Prepared by measuring 2500 µl of 20 µg/ml of Toxaphene stock solution, 2500 µl of 0.8 µg/ml pesticides surrogate std spiking solution and bringing to 25 ml with hexane.

Standard C: Prepared by measuring 1000 µl of 20 µg/ml of Toxaphene stock solution, 1000 µl of 0.8 µg/ml pesticides surrogate std spiking solution and bringing to 25 ml with hexane.

Standard D: Prepared by measuring 625 µl of 20 µg/ml of Toxaphene stock solution, 625 µl of 0.8 µg/ml pesticides surrogate std spiking solution and bringing to 25 ml with hexane.

Standard E: Prepared by measuring 312.5 µl of 20 µg/ml of Toxaphene stock solution, 312.5 µl of 0.8 µg/ml pesticides surrogate std spiking solution and bringing to 25 ml with hexane.

Standard F: Prepared by measuring 62.5 µl of 20 µg/ml of Toxaphene stock solution, 32.5 µl of 0.8 µg/ml pesticides surrogate std spiking solution and bringing to 25 ml with hexane.

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Table 4E. Multi-point Chlordane Calibration Standards (optional)

Solution	Stock Solution	Concentration (µg/ml)	Volume Added (µl)	Final Volume in Hexane (ml)	Final Concentration(µg/l)
Standard A	Chlordane	20	3750	25	3000
	Surrogate Spiking	0.8	3750		120
Standard B	Chlordane	20	2500	25	2000
	Surrogate Spiking	0.8	2500		80
Standard C	Chlordane	20	1250	25	1000
	Surrogate Spiking	0.8	1250		40
Standard D	Chlordane	20	625	25	500
	Surrogate Spiking	0.8	625		20
Standard E	Chlordane	20	312.5	25	250
	Surrogate Spiking	0.8	312.5		10
Standard F	Chlordane	20	62.5	25	50
	Surrogate Spiking	0.8	62.5		2

Standard A: Prepared by measuring 3750 µl of 20 µg/ml of Chlordane stock solution, 3750 µl of 0.8 µg/ml pesticides surrogate std spiking solution and bringing to 25 ml with hexane.

Standard B: Prepared by measuring 2500 µl of 20 µg/ml of Chlordane stock solution, 2500 µl of 0.8 µg/ml pesticides surrogate std spiking solution and bringing to 25 ml with hexane.

Standard C: Prepared by measuring 1000 µl of 20 µg/ml of Chlordane stock solution, 1000 µl of 0.8 µg/ml pesticides surrogate std spiking solution and bringing to 25 ml with hexane.

Standard D: Prepared by measuring 625 µl of 20 µg/ml of Chlordane stock solution, 625 µl of 0.8 µg/ml pesticides surrogate std spiking solution and bringing to 25 ml with hexane.

Standard E: Prepared by measuring 312.5 µl of 20 µg/ml of Chlordane stock solution, 312.5 µl of 0.8 µg/ml pesticides surrogate std spiking solution and bringing to 25 ml with hexane.

Standard F: Prepared by measuring 62.5 µl of 20 µg/ml of Chlordane stock solution, 32.5 µl of 0.8 µg/ml pesticides surrogate std spiking solution and bringing to 25 ml with hexane.

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Table 5. Continuing Calibration Check Solutions

Checks	Working Solution	Concentration (µg/ml)	Volume Added (µl)	Final Volume in Hexane (ml)	Final Concentration(µg/l)
Solution 1	Pesticides Mixture	10	250	50	50
	Surrogates	10			50
Solution 2	Pesticides Mixture	10	50	50	10
	Surrogates	10			10
Solution 3	Pesticides Mixture	10	125	50	25
	Surrogates	10			25

Solution 1: Prepared by measuring 250 µl of Pesticides Mixture (10 µg/ml) and Surrogates (10 µg/ml) Working Solution and bringing to 50 ml with hexane.

Solution 2: Prepared by measuring 50 µl of Pesticides Mixture (10 µg/ml) and Surrogates (10 µg/ml) Working Solution and bringing to 50 ml with hexane.

Solution 3: Prepared by measuring 125 µl of Pesticides Mixture (10 µg/ml) and Surrogates (10 µg/ml) Working Solution and bringing to 50 ml with hexane.

Table 6. DDT and Endrin Breakdown Evaluation Standard

Stock Solution	Volume Added (µl)
Pesticides Performance Evaluation Mixture (10-250 µg/ml)	50
Hexane	49950
Total	50000

DDT and Endrin Breakdown Evaluation Standard (10-250 µg/l): Prepared by measuring 50 µl of Pesticides Performance Evaluation Mixture (10-250 µg/ml) and diluting to 50 ml with hexane.

Table 7
Sample Dilution Table

All dilutions must be made using a 1ml calibrated syringe.

Dilution	*Intact Sample*	*Solvent*
1:2	500ul	500ul
1:5	200ul	800ul
1:10	100ul	900ul
1:20	50ul	950ul
1:25	40ul	960ul
1:50	20ul	980ul

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Two Step dilution

Dilution	Step 1		Step 2	
	Intact Sample	*Solvent*	*Sample Aliquot from Step 1*	*Solvent*
1:100	100ul	900ul	100ul	900ul
1:200	100ul	900ul	50ul	950ul
1:250	100ul	900ul	40ul	960ul
1:500	100ul	900ul	20ul	980ul

Three Step Dilution

Dilution	Step 1		Step 2		Step 3	
	Intact Sample	*Solvent*	*Sample Aliquot from Step 1*	*Solvent*	*Sample Aliquot from Step 2*	*Solvent*
1:1000	100ul	900ul	100ul	900ul	100ul	900ul
1:2000	100ul	900ul	100ul	900ul	50ul	950ul
1:2500	100ul	900ul	100ul	900ul	40ul	960ul
1:5000	100ul	900ul	100ul	900ul	20ul	980ul

Four Step Dilution

Dilution	Step 1		Step 2		Step 3		Step 4	
	Intact Sample	*Solvent*	*Sample Aliquot from Step 1*	*Solvent*	*Sample Aliquot from Step 2*	*Solvent*	*Sample Aliquot from Step 3*	*Solvent*
1:10,000	100ul	900ul	100ul	900ul	100ul	900ul	100ul	900ul
1:20,000	100ul	900ul	100ul	900ul	100ul	900ul	50ul	950ul
1:25,000	100ul	900ul	100ul	900ul	100ul	900ul	40ul	960ul
1:50,000	100ul	900ul	100ul	900ul	100ul	900ul	20ul	980ul

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Lab Manager: _____

QA Manager: _____ for Phil Worthy

Effective Date: 11/3/11

TITLE: Total Semivolatile Petroleum Hydrocarbons

METHOD REFERENCE: SW846 Method 8015C (Feb.2007); SW846 8000B

Revised Sections: **1.1, 2.1, 3.1, 6.1.1,6.1.3, .1.4, 8.2, 10.1.1, 10.1.2, 10.2.1, 10.3.1, 12.6.3, 13.2, 13.5.3.1, 13.5.3.2, 13.6.1, 13.6.2, 13.7.1, Table1 Added Section 17(all)**

SCOPE AND APPLICATION

1.1 This method is based on a solvent extraction and gas chromatographic procedure utilizing a flame ionization detector (FID). The method may be utilized to detect hydrocarbons in the Diesel Range Organics (DRO), where the C_8 to C_{44} hydrocarbon range corresponds to a boiling point range between approximately 170 °C and 430 °C. However, the routine reporting range is C_{10} to C_{28}

1.2 The method is suitable for the analysis of the extracts prepared from all types of solid waste matrices, soils, and water samples.

1.0 SUMMARY

2.1 The sample is extracted with methylene chloride and concentrated in a KD apparatus. The extract is analyzed by capillary GC column equipped with a flame ionization detector. The chromatogram is integrated within the C_8 to C_{44} range, or client specified range and quantified with a calibration factor.

3.0 REPORTING LIMIT AND METHOD DETECTION LIMIT

3.1 Reporting Limit. The reporting limit for this method is established at the lowest concentration standard in the calibration curve(100 µg/ml for waters and 10 mg/kg for soils).

3.2 Method Detection Limit. Experimentally determine MDLs using the procedure specified in 40 CFR, Part 136, Appendix B. This value represents the lowest reportable concentration of an individual compound that meets the method qualitative identification criteria.

3.2.1 Experimental MDLs must be determined annually for this method.

3.2.2 Process all raw data for the replicate analysis in each MDL study. Forward the processed data to the QA group for archiving.

4.0 DEFINITIONS

BLANK - an analytical sample designed to assess specific sources of laboratory contamination. See individual types of Blanks: Method Blank; Instrument Blank, Storage Blank, and Sulfur Blank.

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BLANKSPIKE - a blank matrix (reagent water or clean sand) is spiked with the targeted parameters and analyzed using the same method used for samples. Accuracy data is compared to laboratory derived limits to determine if the method is in control.

CALIBRATION FACTOR (CF) - a measure of the gas chromatographic response of a target analyte to the mass injected. The calibration factor is analogous to the Relative Response Factor (RRF) used in the Volatile and Semivolatile fractions.

CONTINUING CALIBRATION - analytical standard run every 12 hours to verify the initial calibration of the system.

CONTINUOUS LIQUID-LIQUID EXTRACTION - used herein synonymously with the terms continuous extraction, continuous liquid extraction, and liquid extraction. This extraction technique involves boiling the extraction solvent in a flask and condensing the solvent above the aqueous sample. The condensed solvent drips through the sample, extracting the compounds of interest from the aqueous phase.

INITIAL CALIBRATION - analysis of analytical standards for a series of different specified concentrations; used to define the linearity and dynamic range of the response of the flame ionization detector to the target compounds.

MATRIX - the predominant material of which the sample to be analyzed is composed. For the purpose of this SOP, a sample matrix is either water or soil/sediment. Matrix is not synonymous with phase (liquid or solid).

MATRIX SPIKE - aliquot of a matrix (water 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.

MATRIX SPIKE DUPLICATE - a second aliquot of the same matrix as the matrix spike (above) that is spiked in order to determine the precision of the method.

METHOD BLANK - an analytical control consisting of all reagents, internal standards and surrogate standards, which is carried throughout the entire analytical procedure. The method blank is used to define the level of laboratory, background and reagent contamination.

METHOD DETECTION LIMITS (MDLs) - The minimum concentration of a substance 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. MDLs should be determined approximately once per year for frequently analyzed parameters.

PERCENT DIFFERENCE (%D) - as used in this SOP and elsewhere to compare two values, the percent difference indicates both the direction and the magnitude of the comparison, i.e., the percent difference may be either negative, positive, or zero. (In contrast, see relative percent difference.)

PERCENT MOISTURE - an approximation of the amount of water in a soil/sediment sample made by drying an aliquot of the sample at 105^{o}C. The percent moisture determined in this manner also includes contributions from all compounds that may volatilize at or below 105 ^{o}C, including water. Percent moisture may be determined from decanted samples and from samples that are not decanted.

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REAGENT WATER - water in which an interferant is not observed at or above the minimum detection limit of the parameters of interest.

RELATIVE PERCENT DIFFERENCE (RPD) - as used in this SOP and elsewhere to compare two values, 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. (In contrast, see percent difference.)

RELATIVE RESPONSE FACTOR (RRF) - a measure of the instrument response of an analyte. Response Factors are determined by analysis of standards and are used in the calculation of concentrations of analytes in samples.

RETENTION TIME (RT) – the time required (in minutes) for a standard compound to elute from a chromatographic column.

INSTRUMENT BLANK – a system evaluation sample containing lab reagent grade water with internal standards and surrogate standards added. An instrument blank is used to remove and/or evaluate residual carryover from high level standards, spike samples and field samples.

5.0 HEALTH & SAFETY

5.1 The analyst must follow normal safety procedures as outlined in the Accutest Laboratory Safety Manual which includes the use of safety glasses and lab coats. In addition, all acids are corrosive and should be handled with care. Flush spills with plenty of water. If acids contact any part of the body, flush with water and contact the supervisor.

5.2 The toxicity or carcinogenicity of each reagent used in this method has not been precisely determined; however, each chemical should be treated as a potential health hazard. Exposure to these reagents should be reduced to the lowest possible level. The laboratory is responsible for maintaining a current awareness file of OSHA regulations regarding the safe handling of the chemicals specified in this method. A reference file of data handling sheets should be made available to all personnel involved in these analyses.

5.3 Primary standards of toxic compounds must be prepared in a hood. A NIOSH/Mass approved toxic gas respirator should be worn when the analyst handles high concentrations of these toxic compounds.

6.0 COLLECTION, PRESERVATION AND HOLDING TIME

6.1 Collection & Preservation

6.1.1 Aqueous samples are collected in 1 liter glass bottle with Teflon lined cap. Samples must be preserved with 5 ml of 50% HCl at the time of collection(acid must be added to the bottle prior to adding the sample)

6.1.2 Soil samples are collected in 300-ml amber jars with Teflon lined cap.

6.1.3 The samples must be protected from light and refrigerated at 0 to $\leq 6^{o}C$ from the time of receipt until extraction and analysis.

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6.1.4 Sample extracts are stored at 0 to $\leq 6^0$ C, protected from light.

6.2 Holding Time

6.2.1 Aqueous sample must be extracted within 7 days of sampling.

6.2.2 Soil sample must be extracted within 14 days of sampling.

6.2.3 All extracts must be analyzed within 40 days following extraction.

7.0 APPARATUS AND MATERIALS

7.1 Microsyringes - 10 ul, 25 ul, 100 ul, 500 ul, and 1000 ul.

7.2 Volumetric flasks - 10 ml, 50 ml, 100 ml.

7.3 Disposable pasteur pipets.

7.4 10 ul graduated syringe, manually held (Hamilton or equiv.).

7.5 10 ul graduated syringe, auto sampler (Hamilton or equiv.).

7.6 Gas Chromatograph, equipped with a flame ionization detector, capable of temperature programming.

7.7 Autosampler

7.8 GC column - 30m x 0.25mm ID, DB-5, 0.5u film or equivalent.

7.9 Data Integrator - Data system capable of summing peaks, re-analyzing data files after revising integration parameters, and manually drawing chromatographic baselines as necessary. The ENVIROQUANT (PC) data system is capable of quantitation using multi-point calibration.

8.0 STANDARDS & REAGENTS

8.1 Solvents - Ultra pure, chromatography grade methylene chloride.

8.2 Diesel stock standard - 50,000 ppm of Absolute Standards or equivalent.

8.3 Surrogate Solution – o-Terphenyl, Tetracosane-d50, 5 α-Androstane 1000 ug/ml, Restek or equivalent.

8.4 Spike solution - Diesel stock standard - 20,000 ppm of Absolute Standards or equivalent.

8.5 C8-C40 Standard Solution 500μg/ml each of the Restek or equivalent.

8.6 Unopened stock must be stored according to manufacturer's documented holding time and storage temperature recommendations.

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8.7 After opened , stock standards must be replaced after 6 months or sooner if manufacturer expiration date comes first or comparison with quality control check samples indicates degradation.

9.0 INTERFERENCES

9.1 The data from all blanks, samples, and spikes must be evaluated for interferences.

9.2 Method interferences may be caused by contaminants in solvents, reagents, glassware, and other stages of sample processing. Refer to "The Preparation of Glassware for Extraction of Organic Contaminants" SOP for practices utilized in the extraction department.

9.3 Contamination from "carry over" may occur when high and low level samples are sequentially analyzed. The sample syringe must be rinsed with reagent water, or a suitable solvent samples. When an unusually concentrated sample encountered, a solvent-blank should be analyzed to check for cross contamination. Low level samples immediately following high level samples should be verified.

9.4 Most polar interferences (animal fats, glycerides, “leaf hydrocarbons”, etc.) may be removed with the silica clean up.

9.5 Sample should be taken with care, to prevent any portion of the collected sample coming in contact with the sampler's gloves. Since this can result in phthalate contamination.

10.0 CALIBRATION

10.1 Initial calibration.

10.1.1 A minimum of five calibration standards are required although six are generally used. The concentrations are 100, 250, 500, 1000, 2000, 5000, 10,000, 50,000µg/l. The standards are prepared in Methylene chloride. Refer to the standards preparation logbook for procedure.

10.1.2 The initial calibration is performed with the alkane standard C8 - C44

- to identify hydrocarbon range for client special requirement and
- for retention marker (see section 11 for detail).

10.1.3 The method reporting limit is established by the concentration of the lowest standard analyzed during initial calibration. The linear range covered by this calibration is equal to the highest concentration standard.

10.1.4 Aliquot proper amount of each calibration standard into a 2 ml crimp top vial.

10.1.5 Analyze the standard solutions using the conditions established in Section 12.0. Establish the calibration factor for each standard solution by dividing the total area of each standard by the total concentration as defined in Section 14.2.

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10.1.6 For the initial calibration to be valid, the percent relative standard deviation (% RSD) (Section 14.3) must be less than 20 %. If the average calibration factor criteria cannot be achieved, corrective action must be taken.

10.1.6.1 If the problem is associated with a single standard, reanalyze the standard and recalculate the RSD.

10.1.6.2 Alternatively, narrow the calibration range by removing one of the calibration standards, but you still must have at least five standards.

10.1.6.2.1 The changes to the upper end of the calibration range will affect the need to dilute samples above the range, while changes to the lower end will affect the overall sensitivity of the method. Consider the regulatory limits or action levels associated with the target analytes when adjusting the lower end of the range.

10.2 Initial calibration verification (ICV) – Second Source calibration check

10.2.1 A second source calibration check prepared at the concentration of 1000 μg/ml must be run immediately after the initial calibration.

10.2.2 The percent different (%D) (Section 14.4) for this standard must meet the criteria of 20% used for the calibration verification.

10.2.2.1 If the %D is greater than 20%, reanalyze the second source check. If the criteria cannot be met upon re-injection, re-prepare the second source solution using a fresh ampoule and repeat the process.

10.2.2.2 If the %D criteria cannot be achieved after re-preparation of the second source, prepare a third source and repeat the process. Make fresh calibration standards by using one of the two standard sources that matches each other.

10.3 Continuing calibration checks verification (CCV)

10.3.1 The initial calibration curve must be verified by a calibration check standards every 12-hrs. The concentration of the calibration check solution is alternated between concentrations of 500 μgml and 1000 μg/ml.

10.3.2 C8-C40 hydrocarbon standard is injected everyday to identify the retention window for integration of DRO range. If the retention time of the daily marker standard is outside the window, refer to section 10.3.6.

10.3.3 For the continuing calibration to be valid, the percent difference (%D) must be within 20% of the initial calibration factor. Calculate the percent difference (%D) using the following formula in Section 14.4.

10.3.4 Each sample analysis must be bracketed by periodic analyses of acceptable calibration verification standards If %D criteria fails during a mid-sequence calibration check or at the end of the analysis sequence, a continuing calibration check is allowed to be

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repeated only once; if the second trial fails, a new initial calibration must be performed and the samples may need to be reanalyzed. In situations where the first check fails to meet the criteria, the instrument logbook should have clear documented notations as to what the problem was and what corrective action was implemented to enable the second check to pass.

10.3.5 When a calibration verification standard fails to meet the QC criteria at the end of the analysis sequence, all samples injected after the last standard that last met the QC criteria must be evaluated to prevent mis-quantitations, and re-injection of the sample extracts may be required.

10.3.5.1 If an analyte was not detected in the specific samples analyzed during the analytical shift, and then the extracts for those samples do not need to be reanalyzed when the calibration standard response is above the initial calibration response.

10.3.5.2 Whether the analyte was detected in the specific samples analyzed during the analytical shift, or the calibration standard response is below the initial calibration response, then the extracts for those samples need to be reanalyzed.

10.3.6 Each subsequent injection of a continuing calibration standard must be checked against the retention time windows established in Section 11.0. If any of these subsequent standards fall outside their absolute retention time windows, the GC system is out of control. Determine the cause of the problem and correct it. If the problem cannot be corrected, a new initial calibration must be performed.

11.0 RETENTION TIME WINDOWS

11.1 The retention time range for DROs is defined during initial calibration. The range is established from the retention times of the C_{10} and C_{28} alkanes. (the standard however contains C_8 –C_{44} hydrocarbons to cover for any special requirement needed.) Use the following procedure to establish the retention time window from retention time studies performed using these two compounds. The retention time range is then calculated based on the lower limit of the RT window for the first eluting component and the upper limit of the RT window for the last eluting component.

11.2 Retention Time Determination

11.2.1 Perform initial retention time study using alkane markers. Analyze three calibration studies over a 72 hour period to maximize the retention time variability

11.2.2 Calculate the average retention time and standard deviation of the retention time for the C_{10} and C_{28} alkane marker compounds.

11.2.2.1 Establish the low end of the retention window for the DRO range using the lower extreme of the C_{10} alkane. Calculate this value at -3 times the standard deviation of the mean absolute retention time from the analysis conducted during the 72-hour period.

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11.2.2.1.1 If the standard deviation is less than 0.01 minutes, employ a default minimum standard deviation of 0.01 minutes. If the default standard is used, the width of the window will be 0.03 minutes.

11.2.2.2 Establish the high end of the retention window for the DRO range using the higher extreme of the C_{28} alkane. Calculate this value at +3 times the standard deviation of the mean absolute retention time from the analysis conducted during the 72-hour period.

11.2.2.2.1 If the standard deviation is less than 0.01 minutes, employ a default minimum standard deviation of 0.01 minutes. If the default standard is used, the width of the window will be 0.03 minutes.

11.2.2.3 Document the retention time study and retain the retention time data as paper copy at the instrument.

11.2.3 Apply retention window data to the marker compound standards injection following initial calibration, using the lower extreme value for the low molecular weight compound and the higher extreme value for the higher molecular weight compound.

11.3 Check the window on calibration verification with the marker compound standard.

11.3.1 Update the retention time data in the quantitation method file using the new information. Use this window for the qualitative identification of diesel range organics in samples, standards, and quality control samples.

11.3.2 If the retention time of the daily marker standard is outside the window, recalibrate the instrument.

11.3.3 Retain documented records of all retention time information. Documentation may include paper file maintained next to each instrument or electronic data files that are archived for future use.

12.0 PROCEDURE

12.1 Instrument conditions. Recommended instrument conditions are listed in Table 1. Modifications are allowed as long as criteria of calibration are met and approved by team leader/manager.

12.2 Sample Preparation.

12.2.1 Aqueous samples are solvent extracted using liquid/liquid extraction procedures following method SW3510 – Separatory Funnel (Accutest EOP-001).
12.2.2 Soil/Sediment samples are solvent extracted using liquid/solid extraction procedure, SW3545-Pressurized Fluid Extraction(Accutest EOP040).
12.2.3 Refer to Accutest Organic Preparation SOPs referenced above for procedural details.

12.3 Initial Calibration. See Section 10.1.

12.4 Independent source calibration check. See Section 10.2.

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12.5 Continuing calibration checks. See Section 10.3.

12.6 Instrument Blank.

12.6.1 An instrument blank is a volume of clean methylene chloride spiked with 5α-Androstane.

12.6.2 At the beginning of each 12-hour shift or immediately after the continuing calibration check, an instrument blank is injected to demonstrate that interferences from the analytical system are under control.

12.6.3 Acceptance Criteria

12.6.3.1 The DRO concentration in the instrument blank must be less than 100 μg/ml.

12.6.4 If the instrument blank does not meet the acceptance criteria above, then corrective action must be taken to locate and reduce the source of contamination. An acceptable instrument blank must be run before the analysis can be proceeded.

12.7 Sample analysis.

12.7.1 Inject 1 or 2 ul of the sample extract.

12.7.2 The DRO concentration (Section 14.5) is based on the total area of all peaks eluting between C_{10} and C_{28} minus the surrogate area and is calculated by external standard technique. If the concentration is greater than full scale of highest standard, then dilute and reanalyze the extract.

12.7.3 Preparing Dilutions.

12.7.3.1 Prepare sample dilutions quantitatively. Dilute the sample extract with methylene chloride using logical volume to volume ratios, i.e.,1:2, 1:5, 1:10, 1:50, etc. See Table 2 for dilution sequence. All dilutions must be made with a calibrated 1ml syringe.

12.8 Baseline correction for gas chromatography hydrocarbon methods is employed for GC methods that quantify total or fractional hydrocarbon ranges by integrating a retention time range that extends over several minutes. The potential for interfering peaks can occur from column bleed or common laboratory fragments, which can result in a positive bias in samples.

12.8.1 Minimize column bleed or chromatographic baseline rise by conditioning and replacing columns when necessary (i.e. when bleed becomes evident that may contribute to a positive bias in samples) .

12.8.2 Integrate samples at a baseline that corresponds with the chromatographic profile of the associated instrument batch's instrument blanks.

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12.8.3 If the instrument blanks display a chromatogram profile that cannot be isolated or may impact the area of associated samples, the blank is integrated and subtracted from samples.

12.8.3.1 Subtraction is performed by multiplying sample concentration the by the ratio of corrected area (sample area – blank area) divided by uncorrected sample area.

12.8.4 Corrected concentrations must be edited in the laboratory database (LIMS). Comparisons must be made between quantitation reports and LIMS printouts to eliminate transcription errors.

13.0 QUALITY ASSURANCE

13.1 QC Requirements Summary.

Ind. Source Calibration Check Std.	Following initial calibration.
Calibration Verification Standards	Every 12 hours or 10 injections not to exceed 12 hours per project request.
Instrument Blank	At the beginning of each 12- hour shift or right after CCV
Method Blank	One per extraction batch
Matrix Spike	One per extraction batch*
Matrix Spike Duplicate	One per extraction batch*
Blank Spike	One per extraction batch*
Surrogate	Every sample and standard

* The maximum number of samples per analytical batch is twenty.

13.2 Initial Calibration Verification (ICV)

13.2.1 Refer to Section 10.2.

13.3 Calibration Verification Standards.

13.3.1 Refer to Section 10.3.

13.4 Instrument Blank.

13.4.1 Refer to Section 12.6.

13.5 Method Blank

13.5.1 A method blank is a volume of a clean reference matrix (reagent water for water samples, or purified sodium sulfate for soil/sediment samples) that is carried through the entire analytical procedure. The volume or weight of the reference matrix must be approximately equal to the volume or weight of samples associated with the blank. The purpose of a method blank is to determine the levels of contamination associated with the processing and analysis of samples.

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13.5.2 A method blank must be extracted each time samples are extracted. The number of samples extracted with each method blank shall not exceed 20 field samples.

13.5.3 Acceptance Criteria

13.5.3.1 The concentration of each target compound in the method blank must be less than its MDL .

13.5.3.2 Surrogate recoveries must fall within the established acceptance criteria for the analysis.

13.5.4 Corrective Action

13.5.4.1 If a method blank does not meet the acceptance criteria, the system is out of control.

13.5.4.1.1 If contamination is a problem, then the source of the contamination must be investigated and appropriate corrective measures must be taken and documented before further sample analysis proceeds. All samples associated with a contaminated method blank must be re-extracted and reanalyzed.

13.5.4.1.2 If the surrogate recoveries in the method blank do not meet the acceptance criteria, first reanalyze the method blank. If surrogate recoveries do not meet the acceptance criteria after reanalysis, the method blank and all samples associated with that method blank must be re-extracted and reanalyzed.

13.6 Blank Spike

13.6.1 A blank spike must be extracted with each set of 20 or less samples. The blank spike consists of an aliquot of a clean matrix (deionized water for aqueous samples or sodium sulfate for soil samples) similar to the sample and of the same weight or volume. It is spiked at the concentration of 1000 μg/l or 33.3mg/kg and is extracted and run through analytical procedures along with the other samples to monitor the efficiency of the extraction.

13.6.2 The blank spike recoveries and surrogates (Section 14.6) should be assessed using in house limits. These limits are determined annually, hard wired into the LIMS and used for QC decision purposes. If a blank spike is out of control, the following corrective action must be taken and all the associated samples may be re-extracted and reanalyzed. The exception is if the blank spike recovery is high and no hits reported in associated samples and QC batch. In that case, the sample results can be reported with footnote (remark) and no further action is required.

13.6.2.1 Check to be sure that there are no errors in the calculations, or spike solutions. If errors are found, recalculate the data accordingly.

13.6.2.2 Check instrument performance. If an instrument performance problem is identified, correct the problem and reanalyze the sample batch.

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13.6.2.3 If no problem is found, re-extract and reanalyze the sample batch.

13.7 Matrix Spikes /Matrix Spike Duplicates.

13.7.1 Documenting the effect of the matrix should include the analysis of at least one matrix spike/matrix spike duplicate (MS/MSD) pair, a matrix spike to assess the impact of sample matrix on spike recovery, and a matrix spike duplicate to evaluate the precision associated with analysis of the matrix. The matrix spikes and matrix spike duplicates are spiked at a concentration in the mid-range of the calibration curve (1000 μg/l or 33.3 mg/kg).

13.7.2 The acceptance range for matrix spike recoveries (Section 14.6) and relative percent difference (RPD) (Section 14.7) are statistically determined using in-house data. These limits (Appendix I) are determined annually, hard wired into the LIMS and used for QC decision purposes.

13.7.3 If matrix spike recovery does not meet acceptance criteria, the laboratory must assess the batch data to determine whether the spike results are attributable to matrix affect, or the result of other problems in the analytical process. If the blank spike is in control, and if there is no evidence that spiking was not properly performed, matrix interference is assumed and the data is reportable. No further corrective action is required. Otherwise, the method is out of control and the matrix spike sample(s) must be re-processed through the entire analytical sequence.

13.8 Surrogates.

13.8.1 All blanks, samples, QC samples, and calibration standards contain surrogate compounds to monitor the efficiency of the extraction and analytical procedures.

13.8.2 The recoveries (Section 14.6) of the surrogates must be evaluated versus the surrogate control limits (Appendix I) developed by the laboratory.

13.8.3 If surrogate recovery is not within established control limits, corrective action must be performed.

13.8.3.1 Check the surrogate calculations for calculation or integration errors and perform corrections if detected. Reanalyze the extract if calculation errors are not detected.

13.8.3.2 Check instrument performance. If an instrument performance problem is identified, correct the problem and reanalyze the extract.

13.8.3.3 If the surrogate recoveries for the reanalyzed extract are in control, report data from the reanalysis only.

13.8.3.4 If data from the reanalysis is also out of control, re-extract and reanalyze the sample.

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13.8.3.5 If, upon reanalysis, the surrogate recoveries are acceptable, report the reanalysis data. If the holding time has expired prior to the reanalysis, report both the original and reanalysis results and note the holding time problem.

13.8.3.6 If the recovery is again not within limits, the problem is considered to be matrix interference. Submit both data sets with the original analysis being reported.

13.8.4 The retention time shift for surrogate must be evaluated after the analysis of each sample. The sample should be reanalyzed when the retention time of any surrogate compound is outside the retention window.

13.8.4.1 If the sample exhibits visible matrix interference, defined as excessive signal levels from target or non-target interfering peaks. In this case, reanalysis may not be required following team leader/manager approval.

14.0 CALCULATIONS

14.1 Sum the areas of all the peaks eluting between the hydrocarbon range of C_{10} to C_{28}. Do not include the area of the surrogate and internal standard, if applicable. Consult the supervisor for any integration questions.

14.2 Calibration Factor (CF).

$$CF = \frac{A_s}{C_s}$$

where:
A_s = Total Area within Retention Time Range minus the Surrogate area.
C_s = Concentration of the compound being measured (μg/ml).

14.3 Percent Relative Standard Deviation (% RSD).

$$\%RSD = \frac{SD}{CF_{av}} \times 100$$

where:
SD = Standard Deviation
CF_{av} = Average calibration factor from initial calibration.

14.4 Percent Difference (%D).

$$\% D = \frac{|CF_{av} - CF_c|}{CF_{av}} \times 100$$

where:
CF_c = Calibration factor from continuing calibration check standard.

14.5 Concentrations (Conc.):

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14.5.1 Aqueous Samples:

$$\frac{As \times Vf \times D}{CF_{av} \times Vi} = \text{Sample Conc. mg/l}$$

where:
As = Area for sample hydrocarbon range of C_{10} to C_{28} (corrected for surrogate)
Vf = Final Volume of total extract (ml).
D = Secondary dilution factor.
Vi = Initial volume of water extracted (ml).

14.5.2 Soil Samples:

$$\frac{As \times Vf \times D}{CF_{av} \times Wt \times \%SOL \times Vi} = \text{Sample Conc. in mg/kg}$$

where:
As = Area for sample (corrected for surrogate)
Wt = sample wt in grams

14.6 Percent Recovery (% R).

$$\%\ R = \frac{\text{Concentration found}}{\text{Concentration spiked}} \times 100$$

14.7 Relative Percent Difference (% RPD).

$$\%\ RPD = \frac{|C_{ms} - C_{msd}|}{(1/2)(C_{ms} + C_{msd})} \times 100$$

Where:
C_{ms} = Matrix Spike Concentration.
C_{msd} = Matrix Spike Duplicate Concentration.

15.0 DOCUMENTATION

15.1 Analytical Logbooks are used to record the analysis sequence; the logbook must be completed daily. Each instrument will have a separate logbook.

15.1.1 If samples require reanalysis, a brief explanation of the reason must be documented in the Comments section.

15.2 The Standards Preparation Logbook must be completed for all standard preparations. All information must be completed, the page must be signed and dated by the appropriate person.

15.2.1 The Accutest lot number must be cross referenced on the standard vial.

15.3 The Instrument Maintenance Logbook must be completed when any type of maintenance is performed on the instrument. Each instrument will have a separate log.

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15.4 Complete the sample data sheet, list the data files applicable to the sample batch, a photocopy of the instrument log in a folder labeled with the analysis, date and instrument number.

16.0 POLLUTION PREVENTION & WASTE MANAGEMENT

16.1 Users of this method must perform all procedural steps in a manner that controls the creation and/or escape of wastes or hazardous materials to the environment. The amounts of standards, reagents, and solvents must be limited to the amounts specified in this SOP. All safety practices designed to limit the escape of vapors, liquids or solids to the environment must be followed. All method users must be familiar with the waste management practices described in section 16.2.

16.2 Waste Management. Individuals performing this method must follow established waste management procedures as described in the waste management SOP, EHS004. This document describes the proper disposal of all waste materials generated during the testing of samples as follows:

16.2.1 Non hazardous aqueous wastes.

16.2.2 Hazardous aqueous wastes

16.2.3 Chlorinated organic solvents

16.2.4 Non-chlorinated organic solvents

16.2.5 Hazardous solid wastes

16.2.6 Non-hazardous solid wastes

17.0 Data Review & Reporting

17.1 Initial and continuing calibration check. Verify that all calibration and continuing If samples had been analyzed under non-compliant calibration criteria, all sample extracts must be re-analyzed once the system is brought into control.

17.2 Quality Control Data Review. Review all QC data. If QC criteria were not achieved, perform corrective action before proceeding with analysis.

17.2.1 In some situation, corrective action may demand that the entire sample batch be re-extracted and reanalyzed before processing data.

17.3 Chromatogram Review. The chromatogram of each sample is evaluated for target compounds.

17.3.1 Check specific retention time windows for each target compound for the presence of the target compound in each chromatogram.

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17.3.1.1 Projects may require the reporting of different hydrocarbon ranges. Review the login to assure that the correct hydrocarbon range is reported.

17.3.2 Manual integration of chromatographic peaks must be identified by the analysts by initialing and dating the changes made to the report.

17.4 Transfer to LIMS. Following the initial screen review, transfer the processed data to the LIMS.

17.4.1 Print the processed data and compare the printed values to the original values to verify transfer accuracy.

17.4.2 If transfer errors occurred, the errors must be corrected before the data is re-submitted.

17.5 Hardcopy Print & Data Package Assembly.

17.5.1 After successful transfer is verified, approve the data and print a hard copy.

17.5.2 Assemble the data package combining the LIMS output and instrumental data.

17.5.3 Pass the entire package forward to the supervisor for final review and release approval.

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TABLE 1 **Instrument Operating Conditions**	
The conditions listed are a guideline, and should be optimized for the instrument and column in use.	
GC Conditions	
Instrument	HP 6890 or 7890
Column	30m x 0.25mm DB-5, 0.5μm film
Carrier	Helium @ 12 psig, 6 mi/min
Temp. Program	35°C for 5 min., 10/min. to 310°C (hold 15mins)
Detector	Flame Ionization
Make-up Gas	Helium @ 25 mi/min
Hydrogen	10 ml/min. Air: 300 ml/min
Injector Temp	300°C
Detector Temp	330°C

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Table 2
Sample Dilution Table

All dilutions must be made using a 1ml calibrated syringe.

Dilution	*Intact Sample*	*Solvent*
1:2	500ul	500ul
1:5	200ul	800ul
1:10	100ul	900ul
1:20	50ul	950ul
1:25	40ul	960ul
1:50	20ul	980ul

Two Step dilution

Diution	**Step 1**		**Step 2**	
	Intact Sample	*Solvent*	*Sample Aliquot from Step 1*	*Solvent*
1:100	100ul	900ul	100ul	900ul
1:200	100ul	900ul	50ul	950ul
1:250	100ul	900ul	40ul	960ul
1:500	100ul	900ul	20ul	980ul

Three Step Dilution

Diution	**Step 1**		**Step 2**		**Step 3**	
	Intact Sample	*Solvent*	*Sample Aliquot from Step 1*	*Solvent*	*Sample Aliquot from Step 2*	*Solvent*
1:1000	100ul	900ul	100ul	900ul	100ul	900ul
1:2000	100ul	900ul	100ul	900ul	50ul	950ul
1:2500	100ul	900ul	100ul	900ul	40ul	960ul
1:5000	100ul	900ul	100ul	900ul	20ul	980ul

Four Step Dilution

Diution	**Step 1**		**Step 2**		**Step 3**		**Step 4**	
	Intact Sample	*Solvent*	*Sample Aliquot from Step 1*	*Solvent*	*Sample Aliquot from Step 2*	*Solvent*	*Sample Aliquot from Step 3*	*Solvent*
1:10,000	100ul	900ul	100ul	900ul	100ul	900ul	100ul	900ul
1:20,000	100ul	900ul	100ul	900ul	100ul	900ul	50ul	950ul
1:25,000	100ul	900ul	100ul	900ul	100ul	900ul	40ul	960ul
1:50,000	100ul	900ul	100ul	900ul	100ul	900ul	20ul	980ul

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Lab Manager: _____

QA Manager: _____

Effective Date: 11/3/14

Title: Total Volatile Petroleum Hydrocarbons

METHOD REFERENCE: SW846 Method 8015C (Feb.2007); SW846 8000B

Revised Sections: **6.1, 6.2.1, 10.1.3, 10.2, 12.5.2, 12.5.4, 13.2, 13.5.2, 13.6.3, 13.7.2**
Added Section 17 (all)

1.0 Scope and Application

1.1 This method is based on a purge and trap gas chromatographic procedure utilizing a flame ionization detector (FID). The method may be utilized to detect hydrocarbons in the Gasoline Range Organics (GRO) in aqueous, soil and waste matrices, which the C6 to C10 hydrocarbon range corresponds to a boiling point range between approximately 60 ° C and 170 ° C.

2.0 Summary

2.1 The sample is introduced onto the GC column by purge and trap technique. A temperature program is used to separate the compounds. The peaks are detected by the flame ionization detector (FID).

3.0 Reporting Limit and Method Detection Limit

3.1 Reporting Limit. The reporting limit for this method is established at the lowest concentration standard in the calibration curve (0.2 µg/ml for both soils and waters)

3.2 Method Detection Limit. Experimentally determine MDLs using the procedure specified in 40 CFR, Part 136, Appendix B. This value represents the lowest reportable concentration of an individual compound that meets the method qualitative identification criteria.

3.2.1 Experimental MDLs must be determined annually for this method.

3.2.2 Process all raw data for the replicate analysis in each MDL study. Forward the processed data to the QA group for archiving.

4.0 Definitions

BLANK(Instrument Blank) - an analytical sample designed to assess specific sources of laboratory contamination.

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BLANK SPIKE - a blank matrix (reagent water or clean sand) is spiked with the targeted parameters and analyzed using the same method used for samples. Accuracy data is compared to laboratory derived limits to determine if the method is in control.

CALIBRATION FACTOR (CF) - a measure of the gas chromatographic response of a target analyte to the mass injected.

CONTINUING CALIBRATION - analytical standard run at the beginning of the 12 hour analytical shift after every 10 injections and at the end of the analytical sequence to verify the initial calibration.

INITIAL CALIBRATION - analysis of analytical standards for a series of different specified concentrations; used to define the linearity and dynamic range of the response of the flame ionization detector to the target compounds.

MATRIX - the predominant material of which the sample to be analyzed is composed. For the purpose of this SOP, a sample matrix is either water or soil/sediment. Matrix is not synonymous with phase (liquid or solid).

MATRIX SPIKE - aliquot of a matrix (water 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.

MATRIX SPIKE DUPLICATE - a second aliquot of the same matrix as the matrix spike (above) that is spiked in order to determine the precision of the method.

METHOD BLANK - an analytical control consisting of all reagents and surrogate standards, which is carried throughout the entire analytical procedure. The method blank is used to define the level of laboratory, background and reagent contamination.

METHOD DETECTION LIMITS (MDLs) - The minimum concentration of a substance 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. MDLs should be determined approximately once per year for frequently analyzed parameters.

PERCENT DIFFERENCE (%D) - As used in this SOP and elsewhere to compare two values, the percent difference indicates both the direction and the magnitude of the comparison, i.e., the percent difference may be either negative, positive, or zero. (In contrast, see relative percent difference.)

PERCENT MOISTURE - an approximation of the amount of water in a soil/sediment sample made by drying an aliquot of the sample at 105^{o}C. The percent moisture determined in this manner also includes contributions from all compounds that may volatilize at or below 105 ^{o}C, including water. Percent moisture may be determined from decanted samples and from samples that are not decanted.

REAGENT WATER - water in which an interferant is not observed at or above the minimum detection limit of the parameters of interest.

RELATIVE PERCENT DIFFERENCE (RPD) - As used in this SOP and elsewhere to compare two values, the relative percent difference is based on the mean of the two values, and is reported as an

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absolute value, i.e., always expressed as a positive number or zero. (In contrast, see percent difference.)

RELATIVE RESPONSE FACTOR (RRF) - a measure of the instrument response of an analyte. Response Factors are determined by analysis of standards and are used in the calculation of concentrations of analytes in samples.

RETENTION TIME (RT) – the time required (in minutes) for a standard compound to elute from a chromatographic column.

INSTRUMENT BLANK – a system evaluation sample containing lab reagent grade water with internal standards and surrogate standards added. An instrument blank is used to remove and/or evaluate residual carryover from high level standards, spike samples and field samples.

5.0 Health and Safety

5.1 The analyst must follow normal safety procedures as outlined in the Accutest Laboratory Safety Manual which includes the use of safety glasses and lab coats. In addition, all acids are corrosive and must be handled with care. Flush spills with plenty of water. If acids contact any part of the body, flush with water and contact the supervisor.

5.2 The toxicity or carcinogenicity of each reagent used in this method has not been precisely determined; however, each chemical must be treated as a potential health hazard. Exposure to these reagents must be reduced to the lowest possible level. The laboratory is responsible for maintaining a current awareness file of OSHA regulations regarding the safe handling of the chemicals specified in this method. A reference file of data handling sheets must be made available to all personnel involved in these analyses.

5.3 Primary standards of toxic compounds must be prepared in a hood. A NIOSH/Mass approved toxic gas respirator should be worn when the analyst handles high concentrations of toxic compounds,

6.0 Collection and Preservation

6.1 Aqueous samples are collected in 40 ml VOA vials, and preserved with 4 drops of HCl. The sample is stored at <6 ^{o} C and must be analyzed within 14 days of sampling.

6.2 Soils, Sediments, and Sludges are collected as follows:

6.2.1 for medium level samples in a wide mouth 4 oz. jar and stored at< 6^{o} C, refer to SOP for SW846 Method 5030. The sample must be analyzed within 14 days of sampling.

6.2.2 for low level samples in Encore™ units are transferred to preservative solution within 48 hours of collection, Refer to the SOP for SW846 Method 5035 for preservation requirement of non-aqueous solids. The sample must be analyzed within 14 days of sampling.

7.0 Apparatus and Materials

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7.1 Syringes - 5 ml luerlock gastight syringe.

7.2 Microsyringes - 10 μl, 25 μl, 100 μl, 500 μl, and 1000 μl.

7.3 Volumetric flasks - 10 ml, 50 ml, 100 ml.

7.4 Disposable pasteur pipets.

7.5 Glass vials - 40 ml screw-cap VOA vials with Teflon-faced silicone septum.

7.6 Top - loading balance, capable of weighing 0.1g.

7.7 Gas Chromatograph, equipped with a flame ionization detector, capable of temperature programming.

7.8 GC column – 75m x 0.53mm ID, DB-624, 1.5 μ film or equivalent. The column selected must resolve 2-methlypentane from the methanol solvent front.

7.9 Autosamplers

7.9.1 O.I. 4560 sample concentrator with 4552 Water/Soil Multi sampler provides unattended automation for up 51 samples, constant heat times mode of operation. The gas tight vials followed by direct injection onto GC column. The syringe is baked and flushed with helium after injection.

7.10 Data Integrator - Data system capable of summing peaks, re-analyzing data files after revising integration parameters, and manually drawing chromatographic baselines as necessary. The ENVIROQUANT data system is capable of quantitation using multi-point calibration.

8.0 Standards and Reagents

8.1 De-ionized water, organic free - Reagent water is generated by using a multi-element deionizing system consisting of a particulate filter, twin mixed bed ion exchange resin columns, and a carbon-polishing column.

8.2 Solvent - Methanol, purge and trap grade. Burdick and Jackson or equivalent.

8.3 Stock standards

8.3.1 Commercially prepared standards used.

8.3.1.1 Accustandard Gasoline Mixture(or equivalent): 20,000 μg/ml,

8.3.1.2 Absolute Gasoline Mixture(or equivalent): 20,000 μg/ml.

8.3.1.3 Surrogate standard - α,α,α -Trifluorotoluene, 2000 μg/ml, Restek or equivalent.

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8.3.1.4 Retention Time Window Solution - Mixture of 15,000ppm 2-Methlypentane and 10,000ppm 1,2,4 trimethylbenzene.

8.3.2 Unopened stock must be stored according to manufacturer's documented holding time and storage temperature recommendations.

8.3.3 After opened, stock standards must be replaced after 6 months or sooner if manufacture expiration date come first or comparison with quality control check samples indicates degradation.

8.4 Working standards - Refer to the Volatile Standard Logbook for the preparations of working standards.

8.4.1 A 400 μg /ml and 4000 μg /ml standard is used for preparation of calibration standards for soils.

8.4.1.1 400 ug/ml gasoline mixture: The mixture is prepared at 400ug/ml by measuring 1 ml of 20,000 ug/ml stock standard and bring to 50 ml final volume with methanol.

8.4.1.2 4000 ug/ml gasoline mixture: The mixture is prepared at 4000ug/ml by measuring 1 ml of 20,000 ug/ml stock standard and bring to 5ml final volume with methanol.

8.4.2 Two solutions at 8 μg /ml and 4 μg /ml are utilized as the continuing calibration check standards. Another 8 μg /ml working standard from different source is used as the independent source calibration check and blank spike.

9.0 Interferences

9.1 High levels of heavier petroleum fractions may contain some volatile components within the range of retention times for gasoline. Other volatile organic components may elute in this range as well. As defined by the method, gasoline range organics (GRO) include these compounds.

9.2 Samples may become contaminated by diffusion of volatile organics through the container septum during shipment and storage. A reagent water trip blank may serve as a check on shipping and storage conditions.

9.3 Contamination from "carry over" may occur when high and low level samples are sequentially analyzed. The sample syringe and purging device must be rinsed with reagent water, or a suitable solvent (methanol) between samples. When an unusually concentrated sample encountered, a reagent water-blank should be analyzed to check for cross contamination. Low level samples immediately following high level samples should be verified.

10.0 Calibration

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10.1 Initial calibration. Calibration standards, at a minimum of five concentrations. The calibration range covered by the standards is 0.2, 0.8, 4, 8, 20, and 40 µg/ml. Separate calibration curves are used for aqueous and solid samples.

10.1.1 To establish a one-point retention window, use a spike solution of 1ul of 15,000 ppm 2-methylpentane and 10,000 ppm 1,2,4 trimethylbenzene into a final volume of 50 ml for a final concentration of 300 ppb 2-methylpentane and 200 ppb 1,2,4 trimethylbenzene.

10.1.2 For aqueous samples, add 0.5 µl, 2 µl, 10 µl, 20ul, 50 µl, 75 µl and 100 µl of 20,000 µg/ml Accustandard (or equivalent) with surrogate solution (see table below for detail) individually into each 50 ml reagent water contained in volumetric flasks. Transfer each standard into a 40 ml VOA vials.

using DI water bring to 50 ml final volume:

Standard / Surrogate Concentration	GRO Mix (20000 ppm)	Surrogate Mix (2000ppm)
200 / s 100 ppb	0.5 µl	2.5 µl
800 / s 200 ppb	2.0 µl	5 µl
4000 / s 300 ppb **	10 µl	7.5 µl
* **8000 /** s 300 ppb **	20 µl	7.5 µl
20000 / s 400 ppb	50 µl	10 µl
30000 / s 500 ppb***	75 µl	12.5 µl
40000 / s 600 ppb	100 µl	15 µl

**for continuing calibration check.
* second source calibration check and BS
*** For instrument LM only use 30000 ppb in place of 40000 ppb standard.

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10.1.3 For solid samples, add 2.5µl, 10 µl of 400 µg/ml and 5 µl, 10 µl, 25 µl and 50 µl of 4000 µg/ml working standard with surrogate solution (see table below for detail) individually into each 5 ml reagent water contained in 40 ml VOA vials.

using DI water bring to 5.0 ml final volume:

Standard / Surrogate Concentration	**GRO Mix (400 ppm)**	**Surrogate Mix (200ppm)**
200 / s 100 ppb	2.5 µl	2.5 µl
800 / s 200 ppb	10 µl	5 µl
Standard / Surrogate Concentration	**GRO Mix (4000 ppm)**	**Surrogate Mix (200ppm)**
4000 / s 300 ppb **	5 µl	7.5 µl
* **8000 /** s 300 ppb **	10 µl	7.5 µl
20000 / s 400 ppb	25 µl	10 µl
40000 / s 500 ppb	50 µl	12.5 µl

*for continuing calibration check.
* second source calibration check and BS

- When calibrating for Method 5035 low-level soil samples, add 1g of sodium bisulfate to the 40-ml vial before aliquot 5 ml of each standard into vial if sodium bisulfate was used in the samples. This is equivalent to the amount of sodium bisulfate added to the samples and will maintain a consistent purging efficiency of the compounds.

10.1.4 Place the vials in the autosampler tray. Program the autosampler to add 1 µl of 1500 µg/ml surrogate solution automatically to each standard prior to analysis.

10.1.5 Analyze the standard solutions using the conditions established in Section 12.0. Establish the calibration factor for each standard solution by dividing the total area of each standard by the total concentration as defined in Section 14.2.

10.1.6 For the initial calibration to be valid, the percent relative standard deviation (% RSD) (Section 14.3) must be less than 20 %. If the average calibration factor criteria cannot be achieved, corrective action must be taken.

10.1.6.1 If the problem is associated with specific standards, reanalyze the standards and recalculate the RSD.

10.1.6.2 Alternatively, narrow the calibration range by removing the high or low calibration standard, but at least five standards must be used.

10.1.6.2.1 The changes to the upper end of the calibration range will affect the need to dilute samples above the range, while changes to the lower end will affect the overall sensitivity of the method. Consider the

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regulatory limits or action levels associated with the target analytes when adjusting the lower end of the range.

10.2 Initial Calibration Verification (ICV)

10.2.1 A second source calibration check prepared at the concentration of 8 μg/ml must be run immediately after the initial calibration.

- Standard preparation refers to section 10.1.2 (water) and 10.1.3 (soil).

10.2.2 The percent different (%D) (Section 14.4) for this standard must meet the criteria of 20% used for the calibration verification.

10.2.2.1 If the %D is greater than 20%, reanalyze the second source check. If the criteria cannot be met upon re-injection, re-prepare the second source solution using a fresh ampoule and repeat the process.

10.2.2.2 If the %D criteria cannot be achieved after re-preparation of the second source, prepare a third source and repeat the process. If the third source passes then the calibration is verified. If not, make fresh calibration standards by using one of the two standard sources that matches each other.

10.3 Continuing calibration checks

10.3.1 Continuing calibration verification standards are prepared at concentrations of 4 μg/ml and 8 μg/ml. Alternate the use of these standards for calibration verification at the beginning of each run, and after 10 injections (not to exceed 12 hours) and at the end of the sequence, to verify that the initial calibration is still valid.

- Standard preparations refer to section 10.1.2 (water) and 10.1.3 (soil).

10.3.2 For the continuing calibration to be valid, the percent difference (% D) (Section 14.4) must be less than 20%.

10.3.3 If %D criteria fail, remedial action must be taken which may require recalibration. A continuing calibration check is allowed to be repeated only once; if the second trial fails, a new initial calibration must be performed and the samples must be reanalyzed. In situations where the first check fails to meet the criteria, the instrument logbook should have clear documented notations as to what the problem was and what corrective action was implemented to enable the second check to pass.

10.3.3.1 If the calibration standard analyzed at the end of the sequence does not meet the criteria, the samples bracketed by the previous CCV should be evaluated. If the CCV recoveries are biased high and the samples do not have target compounds detected, then the sample results can be reported. If the CCV recoveries are biased low or the samples have target compounds detected, then the samples must be re-analyzed.

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10.3.4 Each subsequent injection of a continuing calibration standard must be checked against the retention time windows established in Section 11.0. If any of these subsequent standards fall outside their absolute retention time windows, the GC system is out of control. Determine the cause of the problem and correct it. If the problem cannot be corrected, a new initial calibration must be performed and the samples must be reanalyzed.

11.0 Retention Time Windows

11.1 The retention time range for GROs is defined during initial calibration. Two specific gasoline components are used to establish the range. The GRO retention time window is defined as beginning with 2-methylpentane and ending with 1,2,4-trimethyl benzene. The data must be retained in the laboratory.

11.2 Retention Time Determination : Employ the following approach to establish retention time windows.

11.2.1 Analyze three calibration standard studies over a 72 hour period to maximize the retention time variability.

11.2.2 Calculate the average retention time and standard deviation of the retention time for beginning with 2-methylpentane and ending with 1,2,4-trimethyl benzene.

11.2.2.1 Establish the low end of the retention window for the GRO range using the lower extreme of 2-methylpentane. Calculate this value at -3 times the standard deviation of the mean absolute retention time from the analysis conducted during the 72-hour period.

11.2.2.1.1 If the standard deviation is less than 0.01 minutes, employ a default minimum standard deviation of 0.01 minutes. If the default standard is used, the width of the window will be 0.03 minutes.

11.2.2.2 Establish the high end of the retention window for the GRO range using the higher extreme of 1,2,4-trimethyl benzene. Calculate this value at +3 times the standard deviation of the mean absolute retention time from the analysis conducted during the 72-hour period.

11.2.2.2.1 If the standard deviation is less than 0.01 minutes, employ a default minimum standard deviation of 0.01 minutes. If the default standard is used, the width of the window will be 0.03 minutes.

11.2.2.3 Document the retention time study and retain the retention time data as paper copy at the instrument.

11.2.3 Update the retention time data in the quantitation method file using the new information. Use this window for the qualitative identification of target compounds in samples, standards, and quality control samples.

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11.2.4 Retain documented records of all retention time information. Documentation may include paper file maintained next to each instrument or electronic data files that are archived for future use.

11.3 Check the window on calibration verification with the marker compound standard. The marker standard should be run prior to analyzing the CCV.

11.3.1 Update the retention time data in the quantitation method file using the new information. Use this window for the qualitative identification of gasoline range organics in samples, standards, and quality control samples.

11.3.2 If the retention time of the VPH daily marker standard is outside the window, recalibrate the instrument.

11.3.3 Retain documented records of all retention time information. Documentation may include paper file maintained next to each instrument or electronic data files that are archived for future use.

12.0 Procedure

12.1 Instrument conditions. Recommended instrument conditions are listed in Table 1. Modifications of parameters specified with an asterisk are allowed as long as criteria of calibration are met. Any modification should be approved by team leader/manager.

12.2 Initial Calibration. See Section 10.1.

12.3 Second source calibration check (LCS). See section 10.2.

12.4 Continuing calibration checks. See section 10.3.

12.5 Method blank (reagent water):

12.5.1 A method blank must be analyzed every 12-hours or sooner. The method blank is analyzed immediately following the continuing calibration standards and before any field or QC samples are analyzed.

12.5.2 Use 5 ml DI water as a method blank. Add 1 gram of sodium bisulfate for low level soils if sodium bisulfate was used in the samples. Analyze as per 12.6.

12.5.3 No target compound can be present above the RL of 0.2 ug/ml.

12.5.4 Surrogates must meet recovery criteria specified in Appendix I.

12.5.5 If a method blank does not meet the acceptance criteria, the system is out of control. The following corrective actions must be taken:

12.5.5.1 If contamination is a problem, then the source of the contamination must be investigated and appropriate corrective measures must be taken and

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documented before further sample analysis proceeds. All samples associated with a contaminated method blank must be reanalyzed.

12.5.5.2 If the surrogate recoveries in the method blank do not meet the acceptance criteria, first reanalyze the method blank. If surrogate recoveries do not meet the acceptance criteria after reanalysis, the method blank and all samples associated with that method blank must be reanalyzed.

12.6 Sample Analysis

12.6.1 Aqueous Samples

12.6.1.1 Load the 40 ml sample vials to the autosampler tray. Program the autosampler to add 1 μl of 1500 μg/ml surrogate automatically to each sample before analysis.

12.6.1.2 Program the autosampler and GC system to analyze the loaded samples.

12.6.1.3 Reanalyze any samples that require dilutions. Target the dilution to approximate the mid-range concentration of the calibration curve.

12.6.1.4 Once the sample analysis is completed or before preparing sample dilution, the pH of the sample must be determined to ensure that all samples were properly preserved in the field. Put one or two drops of sample directly on a piece of pH paper. Check the pH. Any sample with a pH greater than 2 will be recorded accordingly on the instrument run log and will be reported with a footnote indicating the sample preservation deficiency.

12.6.2 Soil/Sediment Samples (Intact Sample -Slurry Technique-SW-5030 for NY only)

12.6.2.1 Weigh a 40 ml VOA vial on a properly calibrated top loading balance. Set the tare to zero.

12.6.2.2 Open the sample container, and remove the top 3-5 ml of sample and discard. Quickly weigh 5 grams of the sample to the nearest 0.1 grams.

12.6.2.3 Cap the sample container. Add a 5.0 ml aliquot of DI water into the sample vial and immediately load it on the autosampler for analysis. Repeat the above process as needed for subsequent samples.

12.6.2.3.1 NOTE: The area around the balance must remain clean and free of sample spillage and residues, as volatile analytes will contaminate the air and subsequent samples.

12.6.2.4 Program the autosampler to add 1 μl of 1500 μg/ml surrogate automatically to each sample before analysis.

12.6.2.5 Program the autosampler and GC system to analyze the loaded samples. Stir and heat the sample at the time of analysis.

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12.6.2.6 Re-analyze samples requiring dilutions by either weighing less sample (not less than 0.5 gram) or extracting a 5 gram aliquot of the soil with 5 ml of methanol and analyzing an aliquot of the methanol (not more than 100 ul).

12.6.3 Sediment/Soil Samples (SW5035)

12.6.3.1 Low-level soil method

12.6.3.1.1 Collect the sample using the procedures detailed in the SOP for SW846 Method 5030 for intact soil samples (NY only) or 5035 for encore low - level soil samples.

12.6.3.1.2 Weigh out 5 g of each sample into a labeled vial. Add 5 ml of reagent water and cap the vial quickly. Transfer the 40ml vial to the autosampler tray. Stir and heat the sample at the time of analysis.

12.6.3.2 Medium-level soil method

12.6.3.2.1 Collect the sample using the procedures detailed in the SOP for SW846 Method 5035 medium - level soil samples.

12.6.3.2.2 Select a methanol aliquot of appropriate volume (see Table 2) determined via screening and transfer to 40 ml of reagent water.

12.6.4 Sample dilutions

If the concentration of GRO in any sample exceeds the initial calibration range, a new aliquot of that sample must be diluted and re-analyzed. Until the diluted sample is in a sealed sample vial, all steps in the dilution procedure must be performed without delay.

12.6.4.1 Water Samples.

12.6.4.1.1 Prepare all dilutions of water samples in volumetric flasks (10 ml to 100 ml). Intermediate dilutions may be necessary for extremely large dilutions.

12.6.4.1.2 Calculate the approximate volume of reagent water, which will be added to the volumetric flask, and add slightly less than this quantity to the flask. Refer to Table 2 for dilution guideline.

12.6.4.1.3 Inject the proper sample aliquot from a syringe into the volumetric flask. Dilute the flask to the volume mark with reagent water. Cap the flask and invert the flask three times.

12.6.4.1.4 Fill a 40 ml sample vial and seal with a Teflon baked silicon septa, load the diluted sample into the autosampler and analyze according to Section 12.6.

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12.6.4.2 Low-level Soil Samples.

12.6.4.2.1 The screening data are used to determine which is the appropriate sample preparation procedure for the particular sample, the low-level soil method or the medium-level soil method.

12.6.4.2.2 If any target compound exceeds the initial calibration range from the analysis of 5 g sample,

12.6.4.2.2.1 For Encore sample: analyze the sample from medium MeOH preparation.

12.6.4.2.2.2 For intact sample: a smaller sample size must be analyzed. However, the smallest sample size permitted is 0.5 g. If smaller than 0.5 g sample size is needed to prevent any target compounds from exceeding the initial calibration range, the medium level method must be used.

12.7 Data Interpretation

12.7.1 Qualitative Identification

12.7.1.1 The sample hydrocarbons must fall within the retention time range established during the initial calibration.

12.7.2 Quantitative Analysis

12.7.2.1 The GRO concentration (Section 14.5) is based on the total area of all peaks eluting between 2-methylpentane and 1,2,4-trimethyl benzene and calculated by external standard technique.

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13.0 Quality Control

13.1 QC Requirements Summary.

Ind. Source Calibration Check Std.	Following initial calibration
Calibration Verification Standards	Every 10 injections not to exceed 12 hours
Method Blank	Every 10 injections not to exceed 12 hours
Matrix Spike	One per analytical batch*
Matrix Spike Duplicate	One per analytical batch*
Blank Spike	One per analytical batch*
Surrogate	Every sample and standard

* The maximum number of samples per analytical batch is twenty.

13.2 Initial Calibration Verification.

13.2.1 Refer to Section 10.2.

13.3 Calibration Verification Standards.

13.3.1 Refer to Section 10.3.

13.4 Method Blank.

13.4.1 Refer to Section 12.5.

13.5 Blank Spike.

13.5.1 One blank spike from the second source is analyzed with each batch of 20 or less samples. It consists of an aliquot of a clean (control) matrix similar to the sample matrix and of the same weight or volume. The blank spike is spiked with the target analytes at a detectable concentration, usually the mid-point concentration of the calibration range (8 μg/ml).

13.5.2 The percent recovery (Section 14.6) must fall within the control limits in LIMS complied by Accutest annually. If the blank spikes are not within that range, then the entire batch must be re-analyzed. The exception is if the blank spike recovery is high and no hits reported in associated samples and QC batch. In that case, the sample results can be reported with footnote (remark) and no further action is required.

13.6 Matrix Spike/Matrix Spike Duplicate.

13.6.1 One sample is selected at random from each analytical batch of similar matrix types and spiked in duplicate to check precision and accuracy.

13.6.2 The matrix spikes and matrix spike duplicates are spiked at a concentration in the mid-range of the calibration curve (8 μg/ml).

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13.6.3 Assess the matrix spike recoveries (Section 14.6) and relative percent difference (RPD) (Section 14.7) against the control limits in LIMS.

13.6.4 If the matrix spike recoveries do not meet the criteria, check the blank spike recovery to verify that the method is in control. If the blank spike meets criteria, matrix interference is assumed and the data is reportable. No further corrective action is required.

13.7 Surrogate

13.7.1 All standards, blanks, samples, and matrix spikes contain surrogate compound, which is used to monitor method performance.

13.7.2 The surrogate recoveries (Section 14.6) must fall within in house control limits in LIMS for the results to be acceptable.

13.7.3 If the recovery does not meet the control limits, the following corrective actions must be performed.

13.7.3.1 Check to be sure that there are no errors in the calculations, or surrogate solutions. If errors are found, recalculate the data accordingly.

13.7.3.2 Check instrument performance. If an instrument performance problem is identified, correct the problem and reanalyze the sample.

13.7.3.3 If surrogate recoveries are acceptable upon reanalysis, the data from the reanalysis is reported. If the reanalysis date did not meet the hold time, then report both the original and reanalysis results and note the holding time problem.

13.7.3.4 If surrogates are still outside control limits upon reanalysis, the problem is considered to be matrix interference. Submit both sets of data with the first analysis being reported.

14.0 Data Handling and Calculations

14.1 Sum the areas of all peaks eluting from the low end of the retention window of 2-methylpentane to the high end of the retention window of 1,2,4-trimethyl benzene. Do not include the area of the surrogate or internal standard, if applicable, in the area sum. Consult supervisor with any questions.

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14.2 Calibration Factor (CF).

$$CF = \frac{A_s}{C_s}$$

where:
A_s = Total Area within Retention Time Range.
C_s = Concentration of the compound being measured (μg/ml).

14.3 Percent Relative Standard Deviation (% RSD).

$$\%RSD = \frac{SD}{CF_{av}} \times 100$$

where:
SD = Standard Deviation
CF_{av} = Average calibration factor from initial calibration.

14.4 Percent Difference (%D).

$$\% D = \frac{|CF_{av} - CF_c|}{CF_{av}} \times 100$$

where: CF_c = Calibration factor from continuing calibration check standard.

14.5 Concentration (Conc.).

14.5.1 Aqueous Samples

$$\frac{As}{CF_{av} \times Vol} = \text{Sample Conc. mg/l}$$

where:
As = Area for sample (corrected for surrogate)
Vol = sample volume in ml

14.5.2 Soil Samples

$$\frac{As \times Vm}{CF_{av} \times Wt \times \%SOL \times D_a} = \text{Sample Conc. in mg/kg}$$

where:
As = Area for sample (corrected for surrogate)
Wt = sample wt in grams
Vm = Volume of methanol extract (if dilution is necessary)
D_a = Dilution aliquot from methanol extract, in ml.

14.6 Percent Recovery (% R).

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$$\% R = \frac{\text{Concentration found}}{\text{Concentration spiked}} \times 100$$

14.7 Relative Percent Difference (% RPD).

$$\% RPD = \frac{|C_{ms} - C_{msd}|}{(1/2)(C_{ms} + C_{msd})} \times 100$$

Where:
C_{ms} = Matrix Spike Concentration.
C_{msd} = Matrix Spike Duplicate Concentration.

15.0 Documentation

15.1 Analytical Logbooks are used to record the analysis sequence; the logbook must be completed daily. Each instrument will have a separate logbook.

15.1.1 If samples require reanalysis, a brief explanation of the reason must be documented in the comments section.

15.2 The Standards Preparation Logbook must be completed for all standard preparations. All information must be completed, the page must be signed and dated by the appropriate person.

15.2.1 The Accutest lot number must be cross-referenced on the standard vial.

15.3 The Instrument Maintenance Logbook must be completed when any type of maintenance is performed on the instrument. Each instrument will have a separate log.

16.0 Pollution Prevention and Waste Management

16.1 Users of this method must perform all procedural steps in a manner that controls the creation and/or escape of wastes or hazardous materials to the environment. The amounts of standards, reagents, and solvents must be limited to the amounts specified in this SOP. All safety practices designed to limit the escape of vapors, liquids or solids to the environment must be followed. All method users must be familiar with the waste management practices described in section 16.2.

16.2 Waste Management. Individuals performing this method must follow established waste management procedures as described in the waste management SOP, EHS004. This document describes the proper disposal of all waste materials generated during the testing of samples as follows:

16.2.1 Non hazardous aqueous wastes.

16.2.2 Hazardous aqueous wastes

16.2.3 Chlorinated organic solvents

16.2.4 Non-chlorinated organic solvents

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16.2.5 Hazardous solid wastes

16.2.6 Non-hazardous solid wastes.

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TABLE 1. RECOMMENDED OPERATING CONDITION	
Gas Chromatograph	
Instrument	HP 5890
Column	75m x 0.53mm DB-624, 1.5u film
Carrier	Helium @ 12 psig, 6 mi/min
Temp.Program	*40°C for 2 min., 15/min. to 100°C (hold 3mins), then 25/min. to 200°C(hold 6 min).
Detector	Flame Ionization
Make-up Gas	Helium @ 25 mi/min
Hydrogen	10 ml/min. Air: 300 ml/min
Injector Temp	275°C
Detector Temp	280°C
Purge and Trap Device	
Purge Gas	Helium @ 30 ml/min - 40 ml/min.
Trap	Tenax/Silica/charcoal or Tenax only
Sample Temp	Aqueous-Ambient, Soil-40°C (3 min. preheat).
Trap Temp	<35°C
Purge Time	15 min.
Preheat	175°C
Desorb	1.5 min. @ 190°C.
Bake	11 min. @ 210°C, with bake bypass on

* Parameter modification allowed for performance optimization provided operational and QC criteria is achieved.

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Table 2. GUIDELINE FOR DILUTION PREPARATION

Water Sample

Dilution	Sample amount taken	Final volume A (volumetric)	Take from final volume A	Final volume B (volumetric)
1:2	25 ml	50 ml		
1:5	10 ml	50 ml		
1:10	5 ml	50 ml		
1:20	2.5 ml	50 ml		
1: 25	2 ml	50 ml		
1:50	1 ml	50 ml		
1:100	0.5 ml	50 ml		
1:200	250 µl	50 ml		
1:250	200 µl	50 ml		
1:500	100 µl	50 ml		
1:1000	50 µl	50 ml		
1:2000	25 µl	50 ml		
1:2500	20 µl	50 ml		
1:5000	10 µl	50 ml		
1:10000	0.5 ml	50 ml	0.5 ml	50 ml
1:20000	0.5 ml	50 ml	250 µl	50 ml
1:25000	0.5 ml	50 ml	200 µl	50 ml
1:50000	0.5 ml	50 ml	100 µl	50 ml
1:100000	0.5 ml	50 ml	50 µl	50 ml

Soil-Low level (Non-Encore sample)

Dilution	Sample amount taken	Final volume
1:2	2.5 gram	5 ml
1:5	1 gram	5 ml
1:10	0.5 gram	5 ml

Soil-medium level

Additional Dilution	Sample in Methanol amount taken	Final volume (volumetric)
1:1	1 ml	50 ml
1:2	0.5 ml	50 ml
1:5	200 µl	50 ml
1:10	100 µl	50 ml
1:20	50 µl	50 ml
1: 25	40 µl	50 ml
1:50	20 µl	50 ml
1:100	10 µl	50 ml
1:200	5 µl	50 ml
1:250	4 µl	50 ml

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Lab Manager: Jenny Cole

QA Manager: [signature]

Effective Date: 5/8/12

TEST NAME: HEXAVALENT CHROMIUM IN SOILS BY ION CHROMATOGRAPHY

METHOD REFERENCE: SW846 Methods 3060A and 7199

Revised Sections: ***3.1, 10.6, 10.8.4, 11.10.2, 12.7.2, 13.8.1, 16.1***

1.0 SCOPE AND APPLICATION

1.1 This method is used to determine the concentration of hexavalent chromium in soils, sludges, brick, concrete, and other solid matrices. The solid sample is digested in an alkaline digestion solution to solubilize both water soluble and water insoluble hexavalent chromium compounds. Magnesium chloride in a phosphate buffer is added to suppress oxidation of Cr(III). The hexavalent chromium is separated from the other sample constituents in the digestate by an ion exchange column and then determined in the sample by reaction with diphenylcarbazide in acid solution. The diphenylcarbazide complex produces a characteristic pink color that can be measured by a UV/VIS detector at 530 nm.

2.0 SUMMARY

2.1 This method uses an alkaline digestion to solubilize both water-insoluble (with the exception of partial solubility of barium chromate in some soil matrices), and water soluble Cr(VI) compounds in solid waste samples. The sample is digested using 0.28M Na_2CO_3 /0.5M NaOH solution and heating at 90- 95°C for 60 minutes to dissolve the Cr(VI) and stabilize it against reduction to Cr(III).The digestate is then buffered to a pH of 9.0 to 9.5 and then the dissolved hexavalent chromium is separated from interfering substances using an ion exchange column on an ion chromatograph. The separated sample is then reacted with diphenylcarbazide in acid solution to form a red-violet color. The intensity of this color is measured by a UV/VIS detector at a wavelength of 530 nm and is quantitated against a calibration curve.

3.0 REPORTING LIMIT AND METHOD DETECTION LIMIT

3.1 Reporting Limit. The reporting limit for this method is dependent upon the instrument used for analysis. Analyses done on the DX500 or the ICS3000 have a normal reporting limit of 0.4 mg/kg, based on an instrument level of 0.010 mg/l, a final volume of 100 ml, and an initial weight of 2.5 g. Analyses done on the Metrohm have a normal reporting limit of 0.8 mg/kg as soil digestates must be analyzed at a 1:2 dilution on the Metrohm in order to obtain good chromatography. Note: The reporting limit must be based on a level greater than or equal to the low standard and higher than the calculated MDL.

3.2 Method Detection Limit. Experimentally determine MDLs using the procedure specified in 40 CFR, Part 136, Appendix B. This value represents the lowest reportable concentration of an individual compound

that meets the method qualitative identification criteria. When multiple instruments are used for an analysis, a pooled MDL is reported.

3.2.1 Experimental MDLs must be determined annually for this method.

3.2.2 Process all raw data for the replicate analysis in each MDL study.

4.0 DEFINITIONS

BATCH: A group of samples which behave similarly with respect to the sampling or the testing procedures being employed and which are processed as a unit. For QC purposes, if the number of samples in a group is greater than 20, then each group of 20 samples or less will all be handled as a separate batch.

CALIBRATION CHECK STANDARD. The calibration check standard is a mid-range calibration standard. The calibration check standard must be run at a frequency of 10 percent. For most methods, the mid-level calibration check standard criteria is ± 10 percent of the true value. The exception to this rule is if the recovery on the calibration check standard is high and the samples to be reported are less than the detection limit.

EXTERNAL CHECK STANDARD. The external check standard is a standard from a separate source than the calibration curve that is used to verify the accuracy of the calibration standards. An external check must be run with each calibration. The laboratory should assess laboratory performance of a check standard using the method defined control limits.

SPIKE BLANK OR LAB CONTROL SAMPLE. Digest and analyze a laboratory control sample or spike blank with each set of samples. A minimum of one lab control sample or spike blank is required for every 20 samples. Assess laboratory performance against the control limits specified in the SOP. In house limits should also be generated once sufficient external check standard data is available to generate limits (usually a minimum of 20 to 30 analyses). If the lab control is outside of the control limits for a parameter, all samples must be redigested or redistilled and reanalyzed for that parameter. The exception is if the lab control recovery is high and the results of the samples to be reported are less than the reporting limit. In that case, the sample results can be reported with no flag. Note: If control limits are not specified in the SOP, then default limits of 80 to 120 percent should be used.

MATRIX: The component or substrate (e.g., water, soil) which contains the analyte of interest.

MATRIX DUPLICATE: A duplicate sample is digested at a minimum of 1 in 20 samples. The relative percent difference (RPD) between the duplicate and the sample should be assessed. The duplicate RPD is calculated as shown below. Assess laboratory performance against the control limits that are specified in the SOP. In house limits are generated once sufficient duplicate data is available to generate limits (usually a minimum of 20 to 30 analyses). If a duplicate is out of control, flag the results with the appropriate footnote. If the sample and the duplicate are less than 5 times the reporting limits and are within a range of ± the reporting limit, then the duplicate is considered to be in control. Note: If control limits are not specified in the SOP, use default limits of ± 20% RPD.

$$\frac{(|\text{Sample Result} - \text{Duplicate Result}|) \times 100}{(\text{Sample Result} + \text{Duplicate Result})/2} = \text{Duplicate RPD}$$

MATRIX SPIKE: The laboratory must add a known amount of each analyte to a minimum of 1 in 20 samples. The matrix spike recovery is calculated as shown below. Assess laboratory performance against the control

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limits that are specified in the SOP. In house limits are generated once sufficient matrix spike data is available to generate limits (usually a minimum of 20 to 30 analyses). If a matrix spike is out of control, then the results should be flagged with the appropriate footnote. If the matrix spike amount is less than one fourth of the sample amount, then the sample cannot be assessed against the control limits and should be footnoted to that effect. Note: If control limits are not specified in the SOP, then default limits of 75 to 125 percent should be used.

$$\frac{\text{(Spiked Sample Result - Sample Result)}}{\text{(Amount Spiked)}} \times 100 = \text{Matrix Spike Recovery}$$

METHOD BLANK. The laboratory must digest and analyze a method blank with each set of samples. A minimum of one method blank is required for every 20 samples. For a running batch, a new method blank is required for each different digestion day. If no digestion step is required, then the method blank is equivalent to the reagent blank. The method blank must contain the parameter of interest at levels of less that the reporting limit for that parameter. If the method blank contains levels over the reporting limits, the samples must be redigested or redistilled and reanalyzed. The exception to this rule is when the samples to be reported contain greater than 10 times the method blank level. In addition, if all the samples are less than a client required limit and the method blank is also less than that limit, then the results can be reported as less than that limit.

METHOD DETECTION LIMITS (MDLS). - The minimum concentration of a substance 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. MDLs should be determined approximately once per year for frequently analyzed parameters.

REAGENT BLANK: The reagent blank is a blank that has the same matrix as the samples, i.e., all added reagents, but did not go through sample preparation procedures. The reagent blank is an indicator for contamination introduced during the analytical procedure. (Note: for methods requiring no preparation step, the reagent blank is equivalent to the method blank.) Either a reagent blank or a method blank must be analyzed with each batch of 20 samples or less. The concentration of the analyte of interest in the reagent blank must be less than the reporting limit for that analyte. If the reagent blank contains levels over the reporting limits, the samples must be reanalyzed. The exception to this rule is when the samples to be reported contain greater than 10 times the reagent blank level. In addition, if all the samples are less than a client required limit and the reagent blank is also less than that limit, then the results can be reported as less than that limit.

REAGENT GRADE: Analytical reagent (AR) grade, ACS reagent grade, and reagent grade are synonymous terms for reagents which conform to the current specifications of the Committee on Analytical Reagents of the American Chemical Society.

REAGENT WATER: Water that has been generated by any method which would achieve the performance specifications for ASTM Type II water. For organic analyses, see the definition of organic-free reagent water.

REFERENCE MATERIAL: A material containing known quantities of target analytes in solution or in a homogeneous matrix. It is used to document the bias of the analytical process.

STANDARD CURVE: A plot of concentrations of known analyte standards versus the instrument response to the analyte. Calibration standards are prepared by successively diluting a standard solution to produce working standards which cover the working range of the instrument. Standards should be prepared at the frequency specified in the appropriate section. The calibration standards should be prepared using the same

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type of acid or solvent and at the same concentration as will result in the samples following sample preparation. This is applicable to organic and inorganic chemical analyses.

5.0 HEALTH & SAFETY

5.1 The analyst must follow normal safety procedures as outlined in the Accutest Laboratory Safety Manual which includes the use of safety glasses and lab coats. In addition, all acids are corrosive and must be handled with care. Flush spills with plenty of water. If acids contact any part of the body, flush with water and contact the supervisor.

5.2 The toxicity or carcinogenicity of each reagent used in this method has not been precisely determined; however, each chemical must be treated as a potential health hazard. Exposure to these reagents must be reduced to the lowest possible level. The laboratory is responsible for maintaining a current awareness file of OSHA regulations regarding the safe handling of the chemicals specified in this method. A reference file of data handling sheets must be made available to all personnel involved in these analyses.

5.3 The following analytes covered by this method have been tentatively classified as known or suspected, human or mammalian carcinogens: hexavalent chromium.

6.0 PRESERVATION & HOLDING TIME

6.1 Soil samples should be kept under refrigeration at 4^0 C until time of digestion.

6.2 All samples that are analyzed following this method must be analyzed within 30 days of sample collection. The alkaline digestate is stable for up to 168 hours after extraction from soil.

7.0 INTERFERENCES

7.1 Several types of interferences are possible with this method.

7.1.1 Contamination. Trace levels of Cr may sometimes be found in reagent salts. Reagent blanks must be analyzed to assess for potential Cr(VI) contamination.

7.1.2 Reduction of Cr(VI) to Cr(III) can occur in the presence of reducing species in an acidic medium. However, at a pH of 6.5 or greater, CrO_4^{2-}, which is less reactive than $HCRO_4^-$, is the predominant species.

7.1.3 Waste material suspected of containing soluble Cr(III) concentrations greater than 4 times the laboratory Cr(VI) reporting limit may have Cr(VI) results that are biased high due to method induced oxidation. Mg (II) salts, in a phosphate buffer, are added to suppress this oxidation.

7.1.4 Overloading of the analytical column capacity with high concentrations of anionic species can cause a loss of Cr(VI). This is particularly a problem with chloride and sulfate. The column specified in this method can handle samples containing up to 5% of sodium sulfate or 2% of sodium chloride.

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8.0 APPARATUS

8.1 Ion Chromatograph with a guard column, an analytical column, a post-column delivery system, a knitted reaction coil and a UV/Vis absorbance detector. Three instruments are available for this analysis; the Dionex ICS5000, the Dionex ICS3000, or the Metrohm 844 UV/Vis Compact IC.

8.2 Either the Dionex ICS3000 or the Dionex ICS5000 with the GP50 gradient pump and the AD25 absorbance detector, capable of reading the absorbance at 530 nm can be used with the specific parts listed below. Alternate columns may be used if all method requirements can be met.

8.2.1 Guard Column, IONPAC NG1-10um Guard column, 4 x 35 mm. Dionex part number 039567.

8.2.2 Analytical Column, IONPAC AS7 Analytical column, 4 x 250 mm. Dionex part number 035393.

8.2.3 PC10 Postcolumn Pneumatic Delivery Package, 4 mm. Dionex part number 050601 for the ICS3000 or additional pump for post-column delivery in the ICS5000.

8.2.4 Knitted Reaction Coil, 750ul, unpotted. Dionex part number 042631.

8.2.5 25 ul injection loop. A different size sample loop may be used if method verification is performed before running samples.

8.3 The Metrohm 844 UV/Vix Compact IC can be used with the specific parts lists below. Alternate columns may be used if all method requirements can be met.

8.3.1 Guard Discs (Metrohm part number 6.1011.120) and guard disc holder (Metrohm part number 6.1011.020)

8.3.2 Analytical Column, Metrosep A Supp 10 250/4.0, part number 6.1020.030.

8.3.3 Postcolumn pump, Metrohm 818 IC pump.

8.3.4 Post Column Reactor (Knitted Reaction Coil), Metrohm part number 6.2836.000.

8.3.5 40 ul injection loop. A different size sample loop may be used if method verification is performed before running samples.

8.4 Helium tank and regulator for Dionex ICS3000 system. Gas pressure must be at > 100 PSI for the injectors to work properly.

8.5 Volumetric flasks, class A.

8.6 Volumetric pipets, class A or autopipeters. Note: If autopipeters are used, make sure that the calibration is checked before use as specified in the autopipeter SOP.

8.7 0.45 um membrane filters, that can be attached to the end of the syringe or 0.45 um filters to use in the in-line filter system for the Metrohm system.

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8.8 Disposable syringes.

8.9 pH meter. Orion pH/ISE Meter Model 710A or equivalent.

8.10 Four-place analytical balance.

8.11 One or two place balance. Ohaus Galaxy 4000 or equivalent.

8.12 50 and 250 ml glass beakers with watch glasses. All glassware should be washed with soap and tap water and then well rinsed with deionized water.

8.13 Filter paper, 0.45 um. Acceptable filter papers include the following: MSI cellulostic white grid filters, 0.45 um, 47 mm (catalog number E04WG047S1).

8.14 Filter pump and vacuum filtration apparatus.

8.15 Hot plate, capable of maintaining the digestion solutions at 90 to 95 C, with constant stirring ability.

8.16 Thermometer, calibrated to an NIST certified thermometer a minimum of once per year.

8.17 Graduated plastic beakers.

9.0 REAGENTS

9.1 All reagents should be made from ACS grade reagents unless otherwise noted. Deionized water should be used whenever water is needed. The expiration date for standards and reagents is the date supplied by the manufacturer or if no expiration date is given, a default of 6 months is used. For acid solutions (nitric, sulfuric, hydrochloric) the expiration date is 2 years from the date of preparation of the solution.

9.2 Nitric acid, HNO_3, concentrated, trace metals grade.

9.3 Nitric acid, HNO_3, 5.0 M, trace metals grade. Add 32 ml of concentrated nitric acid to approximately 50 ml of DI water. Dilute to a final volume of 100 ml with DI water and mix well. Store at 20-25°C in the dark. Do not use concentrated nitric acid to make up the 5.0 M solution if it has a yellow tinge. The yellow color is indicative of a photo reduction of nitrate to nitrite, a reducing agent for Cr(VI).

9.4 Sodium Carbonate, Na_2CO_3, anhydrous.

9.5 Sodium Hydroxide, NaOH.

9.6 Magnesium Chloride, $MgCl_2$ (anhydrous). Note: 392.18 mg of $MgCl_2$ is equivalent to 100 mg of Mg^{2+}.

9.7 Phosphate Buffer Solution (0.5 M K_2HPO_4/0.5 M KH_2PO_4 buffer at pH 7): Dissolve 87.09 g of K_2HPO_4 and 68.04 g of KH_2PO_4 into 700 ml of distilled deionized water. Transfer to a 1 liter volumetric flask and dilute to volume.

9.8 Digestion Solution: Dissolve 20.0 g of NaOH and 30.0 g of Na_2CO_3 in distilled deionized water in a one-liter volumetric flask and dilute to the mark. Store the solution in a tightly capped polyethylene

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bottle at 20 to 25°C and prepare fresh monthly. The pH of this digestion solution must be checked before using. If the pH is not greater than or equal to 11.5, then the digestion solution should be discarded and a new solution should be made up.

9.9 Insoluble hexavalent chromium spike, lead chromate, $PbCrO_4$. The insoluble matrix spike is prepared by adding 10 to 20 mg of $PbCrO_4$ to the insoluble matrix spike aliquot.

9.10 Soluble hexavalent chromium spiking solution stock. A 1000 mg/l stock solution of potassium dichromate can be used as the stock solution for the spiking solution. (Available as 1000 mg/l chromium solution, AAS grade from Fisher or equivalent).

9.11 Soluble hexavalent chromium spiking solution, 100 mg/l. Add 10.0 ml of the 1000 mg/l hexavalent chromium to a 100 ml volumetric flask and dilute to volume with DI water. Mix well. One (1.00) ml of this spiking solution can be used to spike the soluble matrix spike aliquot. The approximate level of the spike in the spiked sample will be 40 mg/kg.

9.12 Hexavalent Chromium Calibration Standard Solutions. The calibration standards must be prepared fresh daily or each time the analysis is run. For instrument calibration, prepare the standards from the stocks as shown below. Note that both calibration standards and continuing calibration verification standards are prepared in digestion solution.

9.12.1 Hexavalent Chromium 10.00 mg/L stock solution. Add 1.00 ml of 1000 mg/L hexavalent chromium to a 100 ml volumetric flask and dilute to volume with dilution water (section 9.16). Mix well.

9.12.2 Hexavalent Chromium 1.00 mg/L stock solution. Dilute 10.0 ml of the 10 mg/L stock solution to a final volume of 100 ml with dilution water (section 9.16) and mix well.

9.12.3 Daily Standards. Add the amount of stock specified below to the 100 ml volumetrics containing 50 ml of digestion solution(section 9.8). Adjust the pH to between 9.0 and 9.5 with nitric acid and bring to a final volume of 100 ml with deionized water.

Blank: No spike is added to the blank.
0.005 mg/L: Add 0.50 ml of 1.00 mg/L.
0.050 mg/L: Add 5.00 ml of 1.00 mg/L.
0.100 mg/L: Add 1.00 ml of 10.0 mg/L.
0.500 mg/L: Add 5.00 ml of 10.0 mg/L.

9.12.4 Hexavalent Chromium CCV (Continuing Calibration Verification) Solutions. The check standards must be prepared fresh daily or each time the analysis is run. Prepare the standards from the stocks as shown below. All check standards must go through the entire digestion process, starting at step 10.3. A minimum of 4 check standards should be made for a batch of 20 samples. Note: The check standards must be made from a different source than the calibration standards.

9.12.4.1 Hexavalent Chromium 5.0 mg/l stock solution. Add 1.00 ml of 1000 mg/l hexavalent chromium to a 200 ml volumetric flask and dilute to volume with DI water. Mix well.

9.12.4.2 For initial calibration curves that have the 0.500 mg/l standard as the upper limit, a calibration check at 0.250 mg/l must be used. Therefore, add the amount of stock solution specified below to 50 ml of digestion solution. Do not dilute to a final volume.

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This entire solution should be digested. After digestion and pH adjustment, the final volume will be 100 ml.

0.250 mg/L: Add 10.00 ml of 5.0 mg/L.

9.13 Eluent. Dissolve 33 g of ammonium sulfate in 500 ml of DI water and add 6.5 ml of ammonium hydroxide. Dilute to one liter with DI water. Filter the solution through a 0.45 um filter and then degas the solution with helium gas for 5 to 10 minutes before use.

9.14 Post-Column Reagent. Dissolve 0.5 g of 1,5 diphenylcarbazide in 100 ml of HPLC grade methanol in a 1000 ml volumetric flask. Make sure to dissolve all of the 1,5 diphenylcarbazide in methanol before proceeding. In a separate container, add 28 ml of concentrated sulfuric acid (96 to 98%) into 500 ml of DI water, mix and degas with helium gas for 5 to 10 minutes prior to adding the diphenylcarbazide solution. Dilute to volume with DI water. This reagent is stable for 4 to 5 days.

9.15 Buffer Solution. Dissolve 33 g of ammonium sulfate in 75 ml of DI water and add 6.5 ml of ammonium hydroxide. Dilute to 100 ml with DI water. Degas the solution with helium gas for 5 to 10 minutes before use.

9.16 Dilution Water. A batch of DI water must be prepared by adjusting the pH within the range of 9.0 to 9.5 using the buffer solution. Use this solution for diluting working standards and high level samples.

9.17 Digestate Dilution Solution A. If samples or quality control points are over the range of the calibration curve, they must be diluted with a solution containing a similar matrix to the digested samples. This digestion dilution solution is used if the original analysis is undiluted. Take 500 ml of digestion solution and adjust the pH to between 9.0 and 9.5 with nitric acid. Then dilute to a final volume of 1000 ml with deionized water.

9.18 Digestate Dilution Solution B. . If samples or quality control points are over the range of the calibration curve, they must be diluted with a solution containing a similar matrix to the digested samples. This digestion dilution solution is used if the original analysis is diluted by a factor of 2. Take 250 ml of digestion solution and adjust the pH to between 9.0 and 9.5 with nitric acid. Then dilute to a final volume of 1000 ml with deionized water.

9.19 Quality Control Sample (lab control sample). A solid quality control sample obtained and prepared from an independent source is required.

9.19.1 An NIST standard must be used if available. SRM 2701 is the only currently available NIST standard for use as the recommended quality control sample. The Certificate of Analyses provided with this SRM provides a certified value of 551.2 mg/kg +/- 34.5 as determined via EPA Method 6800, an alternately available method utilizing Speciated Isotope Dilution Mass Spectrometry. The observed range for EPA Method 7199 as referenced in the Certificate of Analysis is 270 mg/kg to 557 mg/kg. The Certificate of Analysis does not offer a certified range for this material.

9.19.1.1 When using an NIST standard without a certified range, such as NIST SRM 2701, a solid lead chromate lab control is also required.

9.19.2 If the NIST standard is not available (i.e. backordered or discontinued), then an alternate independent solid lab control must be used. A recommended source is ERA Catalog number

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921, Hexavalent Chromium in soil. Solid lead chromate may also be used as an alternate solid lab control source.

10.0 DIGESTION PROCEDURE

Below is a step-by-step procedure for the digestion of samples for the determination of hexavalent chromium.

10.1 For each sample to be analyzed, weight out 2.5 ± 0.10 g of the sample into a clean, labeled glass beaker. A one or two place balance may be used for this weighing. The sample should be well mixed before the aliquot is removed as described below.

10.1.1 Mix each sample by turning the sample job end over end for 30 seconds. Then stir each sample for 30 seconds. If the sample jar is filled too full, it may be difficult to stir the sample in the jar. In that case, the sample should be transferred to a larger container and stirred.

10.1.2 For the sample that is to be used for the quality control sample, first follow the steps outlined in Then remove 20 grams of sample from the jar and place it in a beaker and mix well. Take the mixed soil and place it on a large piece of weighing paper. Divide the soil into 6 sections and weigh out a 2.5 ± 0.10 g aliquot from each section. One aliquot will be for the soluble Cr(VI) matrix spike, one aliquot will be for the insoluble Cr(VI) matrix spike, one aliquot will be for the original sample analysis, one aliquot will be for the duplicate sample analysis, and the remaining two aliquots will be used to complete the procedures required if the initial post-digest spike does not meet the ± 15 criteria.

10.2 Add the spikes to the matrix spikes and the spike blanks. Prepare the solid lab control.

10.2.1 Spike the soluble Cr(VI) matrix spike with 1.0 ml of the 100 mg/l Cr(VI) spiking solution. (Check with the area supervisor or manger before starting to see if an additional spike level will be needed.)

10.2.2 Spike the soluble Cr(VI) spike blank with 1.0 ml of the 100 mg/l Cr(VI) spiking solution.

10.2.3 Using an analytical balance, weigh out 0.010 to 0.020 g of $PbCrO_4$ onto a clean piece of weighing paper and carefully add the spike into the insoluble matrix spike sample. Make sure to record the weight used.

10.2.4 Using an analytical balance, weigh out 0.010 to 0.020 g of $PbCrO_4$ onto a clean piece of weighing paper and carefully add the spike into the insoluble blank spike. Make sure to record the weight used.

10.2.5 Weigh out an appropriate weight of the solid lab control. For NIST SRM 2701, normally weigh out from 0.450 to 0.550 g of sample. If a different solid lab control is used, then check with the area supervisory team for more information on appropriate weights to use.

10.3 Add 50 ml of digestion solution to each sample. Also add approximately 0.392 g of $MgCl_2$ (from 0.38 to 0.42 g) and 0.5 ml of the 1.0 M phosphate buffer. In addition to the samples, 3 extra beakers should be prepared for the method blank, the soluble Cr(VI) spike blank, and the insoluble Cr(VI) spike blank.

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10.4 In addition to the samples, the CCV (continuing calibration check) standards should also be digested. Add the entire CCV solution (refer to step 9.12.4) into a clean, labeled glass beaker. Also add approximately 0.392 g of $MgCl_2$ (from 0.38 to 0.42 g) and 0.5 ml of the 1.0 M phosphate buffer.

10.5 Cover all samples and quality control (including the calibration check samples) with watch glasses. Add a stirring bar to each sample and stir the samples for at least 5 minutes without heating.

10.6 Place the samples on a stirring hot plate that has been preheated to 90 to 95°C. Heat the samples with constant stirring for 60 minutes, maintaining a temperature range of 90 to 95°C. The temperature must be measured by placing a calibrated thermometer in an extra beaker containing digestion reagent on the hot plate. The temperature must be recorded at 30 minutes and 60 minutes during the digestion process. Both the start and the stop time of the digestion must be recorded. A second analyst must sign off on the digestion worksheet to verify that all of the proper times and temperatures are documented.

10.7 Cool the samples to room temperature. Filter them through 0.45 um filter paper. Rinse the filter and filtration apparatus with DI water and transfer the filtrate into labeled graduated plastic beakers.

10.7.1 If the filters become clogged using the 0.45 um filter paper, a larger size filter paper (Whatman GFB or GFF) may be used to prefilter the samples. However, the final filtration must be through the 0.45 um filters. If a pre-filtration is required, it should be recorded on the digestion log.

10.7.2 The solids and the filter remaining after the filtration of the matrix spikes may need to be saved in a labeled plastic beaker and stored in the refrigerator. If low recoveries are obtained on the matrix spikes, these solids may be needed for additional analyses. Check with the area supervisor or manager for further instructions.

10.7.3 At this point, the digestates are stable and may be held for up to 168 hours before proceeding with step 10.8.

10.8 Before starting the analysis, the pH of the digestates must be adjusted.

10.8.1 Place a stirring bar in the sample and place it on a stirring plate. Adjust the pH of the solution between 9.00 and 9.50 by carefully adding 5.0 M nitric acid to the digestate while constantly measuring the pH. Do **not** let the pH of the solution go below 9.00. If the pH goes below 9.00, then the digestate must be discarded and a new digestate prepared. Make sure to record the final pH.

10.8.2 If the pH is changing too rapidly with 5.0 M nitric acid, then a more dilute solution of nitric acid may be used for the pH adjustment.

10.8.2.1 Carbon dioxide and nitric acid fumes will be evolved during this process. Therefore, this step must be performed in a hood or well ventilated area.

10.8.3 Quantitatively transfer the contents of the beaker to a 100 ml volumetric flask and adjust the sample volume to the mark with DI water. Mix well. At this point, a brief description of each sample (color, turbidity, etc.) can be added to the digestion log.

10.8.4 A second analyst must verify and sign off on the worksheet to verify that all pH adjustments are properly documented.

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10.9 If a precipitate or turbidity is observed after filtration, then filter the sample a second time through a 0.45 um filter. Let the sample come to room temperature before analysis.

11.0 ION CHROMATOGRAPHY ANALYSIS PROCEDURE FOR THE DIONEX ICS3000.

11.1 Check to make sure that the helium tank pressure is > 100 PSI and the pressure gauge by the eluent bottles is set at 6 PSI.

11.2 Fill the eluent bottle(s) that are to be used with eluent. Make sure to close the corner knob before opening the eluent bottle. Note: It is recommended that 2 bottles be filled with eluent and 50% taken from each bottle during the analysis so that the eluent lasts longer. Fill the reagent delivery bottle with post-column reagent.

11.2.1 Note: The post-column reagent is off-line when it is set to valve A. It is on-line when it is set to valve B. When not running, set the valve to A.

11.2.2 The eluent should be filtered through a 0.45 um filter before use.

11.3 Set the GP50 (pump control) and the AD25 (detector control) to local control and direct read. Press local, direct, and enter).

11.4 Turn on the GP50 and go to the diagnostics menu and look at the pressure statistics. The pressure should be constant for 1 minute and the values for the left and right pressure points should be close. If the pressure is fluctuating or the left and right pressure points are far apart, then the pump should be primed.

11.5 Prime the pump using the procedure described below.

11.5.1 On the GP50 screen, change the pressure limit to 0. Set the instrument to use 100% of eluent A. Open up the pressure transducer on the pump. This is very important – the instrument may be damaged if the transducer head is not open when the pump is being primed.

11.5.2 Put the syringe in the priming valve, open the syringe port, and hit prime. Liquid will slowly be pushed out into the syringe. Let 10 ml of liquid collect in the syringe. Turn the prime off, tighten the syringe port, and close the transducer head. The pressure should climb back up.

11.5.3 Allow the instrument conditions to settle and then check the pressure statistics in the diagnostics menu again. If there is still a problem, the priming procedure may be repeated using isopropyl alcohol. If alcohol is used, push the IPA through the pump without the prime on and then turn the pump on and push the liquid out for several minutes. Make sure that the transducer is open so that the IPA does not go into the column and suppressor.

11.5.4 If using two eluent bottles, then repeat the above procedure using 100% of eluent B. Note: The pump must be primed for each eluent bottle used.

11.6 Set the flow rate of the eluent pump to 1.5 ml/min and adjust the pressure of the reagent delivery system so that the final flow rate from the detector is 2.0 ml/min. Normally the pressure required for this flow rate is approximately 40 psi. The flow should be checked from the wastelline that is

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downstream from the AD25 detector with a graduated cylinder and a stop watch after it is initially set and again after the instrument has warmed up for approximately 30 minutes. The flow rate should always be verified prior to calibration and sample analysis.

11.7 Once the pump is ready to go, set up a schedule in the software. Refer to the instrument manuals or help screens in the program for help in using the software. Note: a method is required for each analysis. If a new method is required, check with the area supervisor or manager for additional help. A new method is required each time the instrument is recalibrated as the calibration is stored in the method.

11.8 The digestates are normally analyzed undiluted on the DX500 and ICS3000 instrumentation, but some difficult matrices may require dilution before analysis. If dilution is required, it should be done with dilution water (Section 9.16) and the dilution factor must be entered into the autosampler tables.

11.8.1 Digestates which are black or viscous may need to be started on dilution. Check with supervisory staff for further guidance.

11.9 Load the autosampler and turn it on. The autosampler should then move to the first sample. A manual run log or a printout of the instrument schedule should be generated to show the order that the samples are loaded into the autosampler.

11.10 Load the schedule in the software and start the run. Make sure that all results are being printed so that the problems can be easily identified while the run is going.

11.10.1 Data files on the DX500 must be saved using the naming scheme of year, month, day, run number followed by the extension of .ic. For example, the second IC run on October 11, 2006 would be named 06101102.ic. This name must always be used in the workgroup description in the LIMS system. Data files on the ICS3000 must be saved using the naming scheme of instrument number, year, month, day, and run number followed by the extension of txt. For example, the second IC run on 4/24/07 on the ICS3000 (instrument 6), would be named 607042402.txt.

11.10.2 For this method, a daily calibration is required. The calibration must consist of a minimum of 3 standards and a blank and must not cover more than 2 orders of magnitude. Calibrations standards may be varied from the ones stated in this SOP depending on the levels of hexavalent chromium that are to be reported. A low standard must be at or below 0.010 mg/l for soil analysis for hexavalent chromium. (0.005 mg/l is the normal low standard). A correlation coefficient of 0.999 is required. If this correlation coefficient is not met, than the instrument must be recalibrated.

11.10.3 After the calibration, the continuing calibration verification check standard (CCV) and a continuing calibration blank (CCB) must be run. The CCV must be from a separate source than the calibration curve and must have recoveries within a range of 90 to 110 percent. The CCB must have results of less than the reporting limit. If either of these QC points does not meet criteria, then all samples bracketed by this quality control must be reanalyzed. The exception is if there is a high bias in the CCV check and the associated sample results are less than the reporting limit.

11.10.4 After the CCV, CCB pair, then begin analyzing the samples and run QC. All samples as associated quality control (method blanks, spike blanks, matrix spikes, duplicate) must be

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analyzed in duplicate. The RSD between each duplicate must be checked and be within 20% or within ± reporting limit for hexavalent chromium. If this criteria is not met, then reanalyze the affected sample in duplicate.

11.10.4.1 Duplicate analyses are not required for the calibration curve or CCV and CCB checks.

11.10.4.2 Report the highest value from the two duplicate injections for each sample.

11.10.5 After every 10 samples (or every 20 injections of samples in duplicate) the CCV and CCB checks must be run. The continuing calibration checks must have recoveries in the range of 90 to 110 percent. If the CCV or CCB fails to meet criteria, then all samples bracketed by the out of compliant QC should be rerun if possible.

11.10.5.1 Note: If the hexavalent chromium samples are close to holding time, then a single injection of each sample may be run to meet holding time criteria. If single sample injections are done, then run a CCV, CCB after every 10 single injections. The duplicate injections for each sample are still required and should be run as soon as possible after the completion of the initial injections. This is not normally an issue for hexavalent chromium soil digests.

11.10.6 After the quality control sample analysis is completed, prepare a post-digest spike on this sample. The sample should be spiked at 2 times the concentration found in the original sample aliquot or 40 mg Cr(VI)/kg, whichever is greater.

11.10.6.1 The 40 mg/kg spike can be made by spiking a 20 ml aliquot of digestate containing 0.50 g of digested sample with 0.20 ml of 100 mg/l Cr(VI) standard (Section 9.10).

11.10.7 After the run is completed, review all of the chromatograms and check for interferences, dilutions, etc.

11.10.8 For large or overlapping peaks, make dilutions using the digestate dilution solution. If the samples were originally run undiluted, use digestion dilution solution A for dilutions. If the standards and samples were originally run with a factor of 2 dilution, then they should be diluted with digestion dilution solution B (section 9.17).

11.11 If no additional batches are to be analyzed on the instrument, then the instrument should be shut down by running the stop method, which switches the eluent over to DI water on the DX-500. On the ICS3000, the eluent must be switched to DI water manually. The lines should not be left filled with the alkaline eluent.

11.12 Review all data and update the appropriate tests in the LIMS system. A write-up including a run log, a calibration summary, batch quality control summary, and copies of all chromatograms should be turned into the area supervisor for each batch.

11.12.1 If edits are needed in the calibration after the data has been calculated, the run can be reprocessed using the batch function in the software. Refer to the instrument manuals or on-screen help for addition information.

11.12.2 If manual integrations are needed for any reason, then all requirements from the manual integration SOP, EQA044, must be followed.

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11.12.3 Calculations are done using the equations shown below. Sample concentration calculations are automated in the LIMS system. Sample values less than the MDL are treated as zero in all calculations

11.12.3.1 Calculation of the sample result (automated calculation).

Conc. Cr(VI) in the sample in mg/kg =

$$\frac{\text{(conc. in digestate in ug/ml) x (final volume in ml) x DF}}{\text{(initial sample weight in g) x (\%solids/100)}}$$

11.12.3.2 Calculation of amount spiked.

Spike amount (SA) in mg/kg =

$$\frac{\text{(conc. of spiking solution, ug/ml) x (vol. of spike, ml)}}{\text{(initial sample weight in g) x (\%solids/100)}}$$

11.12.3.3 Calculation of matrix spike recovery

$$\text{Percent recovery} = \frac{\text{(SSR - SR) x 100}}{\text{SA}}$$

where SSR = Spiked sample result
SR = Sample result
SA = Spike added

11.12.3.4 Calculation of CCV recovery.

$$\text{Percent recovery} = \frac{\text{CCV result x 100}}{\text{True Value}}$$

11.12.3.5 Calculation of RPD.

$$\text{Dup RPD.} = \frac{\text{(SR - DR) x 100}}{\text{\{(SR + DR)/2\}}}$$

where SR = Sample result and
DR = Duplicate result.

12.0 ION CHROMATOGRAPHY ANALYSIS PROCEDURE FOR THE DIONEX ICS5000.

12.1 Fill the eluent bottle(s) that are to be used with eluent. Fill the reagent delivery bottle with post-column reagent.

12.1.1 The eluent should be filtered through a 0.45 um filter before use.

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12.2 Prime the pump using the procedure described below.

12.2.1 Go to the instrument tab in Chromeleon and open the prime valves for both pump 1 and 2 and then hit the prime button. Do the eluent pump first and then the color pump

12.2.2 Allow the instrument conditions to settle and then check the pressure statistics in the diagnostics menu again. If there is still a problem, the priming procedure may be repeated. When completed, make sure to close the prime valves.

12.3 Set the flow rate of the eluent pump to 1.5 ml/min and set the flow for the color pump to 0.5 ml/min. The final flow rate from the detector is 2.0 ml/min. Make sure that the pressure is steady.

12.4 Once the pump is ready to go, set up a schedule in the software. Click on the data tab to go to the screen needed for the schedule. Refer to the instrument manuals or help screens in the program for help in using the software. Note: a method is required for each analysis. If a new method is required, check with the area supervisor or manager for additional help. A new method is required each time the instrument is recalibrated as the calibration is stored in the method.

12.5 The digestates are normally analyzed undiluted on the ICS5000 and ICS3000 instrumentation, but some difficult matrices may require dilution before analysis. If dilution is required, it should be done with dilution water (Section 9.16) and the dilution factor must be entered into the autosampler tables.

12.5.1 Digestates which are black or viscous may need to be started on dilution. Check with supervisory staff for further guidance.

12.6 Load the autosampler and turn it on. The autosampler should then move to the first sample. A manual run log or a printout of the instrument schedule should be generated to show the order that the samples are loaded into the autosampler.

12.7 Load the schedule in the software and start the run. .

12.7.1 Data files on the ICS5000 must be saved using the naming scheme of instrument number, year, month, day, and run number followed by the extension of txt. For example, the second IC run on 6/29/11 on the ICS5000 (instrument 8), would be named 811062902.txt. This name must always be used in the workgroup description in the LIMS system

12.7.2 For this method, a daily calibration is required. The calibration must consist of a minimum of 3 standards and a blank and must not cover more than 2 orders of magnitude. Calibrations standards may be varied from the ones stated in this SOP depending on the levels of hexavalent chromium that are to be reported. A low standard must be at or below 0.010 mg/l for soil analysis for hexavalent chromium. (0.005 mg/l is the normal low standard.) A correlation coefficient of 0.999 is required. If this correlation coefficient is not met, than the instrument must be recalibrated.

12.7.3 After the calibration, the continuing calibration verification check standard (CCV) and a continuing calibration blank (CCB) must be run. The CCV must be from a separate source than the calibration curve and must have recoveries within a range of 90 to 110 percent. The CCB must have results of less than the reporting limit. If either of these QC points does not meet criteria, then all samples bracketed by this quality control must be reanalyzed. The

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exception is if there is a high bias in the CCV check and the associated sample results are less than the reporting limit.

12.7.3.1 Note: If the run will finish when there is no analyst present to monitor it, then it should be set up to run the smart standby. This is done by going to the instrument tab and under queue, select run smart standby.

12.7.4 After the CCV, CCB pair, then begin analyzing the samples and run QC. All samples as associated quality control (method blanks, spike blanks, matrix spikes, duplicate) must be analyzed in duplicate. The RSD between each duplicate must be checked and be within 20% or within ± reporting limit for hexavalent chromium. If this criteria is not met, then reanalyze the affected sample in duplicate.

12.7.4.1 Duplicate analyses are not required for the calibration curve or CCV and CCB checks.

12.7.4.2 Report the highest value from the two duplicate injections for each sample.

12.7.5 After every 10 samples (or every 20 injections of samples in duplicate) the CCV and CCB checks must be run. The continuing calibration checks must have recoveries in the range of 90 to 110 percent. If the CCV or CCB fails to meet criteria, then all samples bracketed by the out of compliant QC should be rerun if possible.

12.7.5.1 Note: If the hexavalent chromium samples are close to holding time, then a single injection of each sample may be run to meet holding time criteria. If single sample injections are done, then run a CCV, CCB after every 10 single injections. The duplicate injections for each sample are still required and should be run as soon as possible after the completion of the initial injections. This is not normally an issue for hexavalent chromium soil digests.

12.7.6 After the quality control sample analysis is completed, prepare a post-digest spike on this sample. The sample should be spiked at 2 times the concentration found in the original sample aliquot or 40 mg Cr(VI)/kg, whichever is greater.

12.7.6.1 The 40 mg/kg spike can be made by spiking a 20 ml aliquot of digestate containing 0.50 g of digested sample with 0.20 ml of 100 mg/l Cr(VI) standard (Section 9.10).

12.7.7 After the run is completed, review all of the chromatograms and check for interferences, dilutions, etc.

12.7.8 For large or overlapping peaks, make dilutions using the digestate dilution solution. If the samples were originally run undiluted, use digestion dilution solution A for dilutions. If the standards and samples were originally run with a factor of 2 dilution, then they should be diluted with digestion dilution solution B (section 9.17).

12.8 To shut down the instrument, manually switch the eluent to DI water and completely shut off the color pump. Change the eluent flow rate to 0.3 ml/min.

12.9 Review all data and update the appropriate tests in the LIMS system. A write-up including a run log,

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a calibration summary, batch quality control summary, and copies of all chromatograms should be turned into the area supervisor for each batch.

12.9.1 If edits are needed in the calibration after the data has been calculated, the run can be reprocessed using the batch function in the software. Refer to the instrument manuals or on-screen help for addition information.

12.9.2 If manual integrations are needed for any reason, then all requirements from the manual integration SOP, EQA044, must be followed.

12.9.3 Calculations are done using the equations shown below. Sample concentration calculations are automated in the LIMS system. Sample values less than the MDL are treated as zero in all calculations.

12.9.3.1 Calculation of the sample result (automated calculation).

$$\text{Conc. Cr(VI) in the sample in mg/kg} = \frac{(\text{conc. in digestate in ug/ml}) \times (\text{final volume in ml}) \times DF}{(\text{initial sample weight in g}) \times (\%\text{solids}/100)}$$

12.9.3.2 Calculation of amount spiked.

$$\text{Spike amount (SA) in mg/kg} = \frac{(\text{conc. of spiking solution, ug/ml}) \times (\text{vol. of spike, ml})}{(\text{initial sample weight in g}) \times (\%\text{solids}/100)}$$

12.9.3.3 Calculation of matrix spike recovery

$$\text{Percent recovery} = \frac{(SSR - SR) \times 100}{SA}$$

where SSR = Spiked sample result
SR = Sample result
SA = Spike added

12.9.3.4 Calculation of CCV recovery.

$$\text{Percent recovery} = \frac{\text{CCV result} \times 100}{\text{True Value}}$$

12.9.3.5 Calculation of RPD.

$$\text{Dup RPD.} = \frac{(SR - DR) \times 100}{\{(SR + DR)/2\}}$$

where SR = Sample result and

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DR = Duplicate result.

13.0 ION CHROMATOGRAPHY ANALYSIS PROCEDURE FOR THE METROHM.

13.1 Fill the eluent bottle(s) that are to be used with degassed eluent. Attach drying tube and put on system. Fill the reagent delivery bottle with post-column reagent. Fill the large plastic bottles on the autosampler with DI water.

13.1.1 The eluent should be filtered through a 0.45 um filter before use.

13.1.2 Make sure that the in-line autosampler filter is changed approximately once per day or every 100 injections. If you are going to be running hold-time critical waters, then the filter should be changed before the calibration to prevent possible problems during the run.

13.1.3 The guard disc must normally be changed every 300 to 400 injections. Check and change the guard disc before starting up the instrument if necessary.

13.2 Start up the instrument by first opening the ICNET software.

13.2.1 Open the CR6 icon first and then, when the hardware window opens, you can change properties as needed by double clicking on each hardware picture.

13.2.2 Go to control and select "start-up hardware". Then select "measure baseline from the dropdown window. The instrument hardware will start and the baseline measuring window will open. To view the pressure and temperature of the 844 (main) unit and the 818 (reagent addition) unit, double click on the monitor icon. The column temperature should be preset to 30 deg. C and the pressure should be approximately 2100 psi for the 844 unit and 160 psi for the 818 unit. The flow rate for the eluent pump should be 1.0 ml/min and the flow rate for the PCR pump should be 0.5 ml/min.

13.2.3 Let the system equilibrate for approximately 30 minutes.

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13.3 If the instrument lines did not run dry, then priming the pump should not be needed. If the lines were dry, then prime the pump using the procedure described below.

13.3.1 Open up the pressure transducer knob which can be found on the box wall of the 844 box, right beneath the pump head and behind the column box. This is very important – the instrument may be damaged if the transducer head is not open when the pump is being primed.

13.3.2 Attach the syringe to the left port on outside (front) of the 844 unit. Pull air through the syringe until eluent starts flowing steadily into the syringe and then wait for several minutes.

13.3.3 Remove the syringe and close the knob on the pressure transducer.

13.4 If any system changes have been made in the start-up process, then the top (blue) line of the CR6 window will have an asterisk after "Cr6.smt". Go to "system" and choose "save" to save the new information.

13.5 Next open the MagIC Net Software. There will be 5 large icons on the left of the screen.

13.5.1 The "configuration" icon shows devices, columns, eluents, and solutions used. These are all preset.

13.5.2 The "manual" icon is for manual injections and will not normally be used.

13.5.3 The "method" icon contains the methods that have been developed to run soil and water matrices. New methods can also be set up using this icon, but this will not normally have to be done.

13.5.4 The "workplace" icon is where autosampler schedules can be set-up before starting a run.

13.5.5 The "database" icon is where the data processing and reporting is done.

13.6 Go to the "workplace" icon. Set up the schedule in the "run" window. When setting up the schedule, the following information must be entered: sample ID under IDENT, dilution factor, and autosampler position. Name the schedule using the naming convention of instrument number, year, month, day, and run number. For example, the second IC run on 4/24/07 on the Metrohm (instrument 7), would be named 707042402. Make sure to save the schedule after it is completed.

13.6.1 Note: when the in-line filter is being used, a separate autosampler tube will be needed for each injection.

13.6.2 The autosampler is random access so samples do not have to be set up in the order that they are going to be run in the schedule.

13.7 The digestion solution matrix in the samples and standards can cause salting and clogging in the instrumentation and, on this instrument, often results in poor peak shape. To minimize these problems, the initial analysis of the samples and standards should be done by diluting the standards and samples by a factor of 2 with dilution water (Section 8.16). This dilution will minimize interferences while retaining a low detection limit. Make sure to enter this dilution factor of 2 in the autosampler tables.

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13.8 Load the autosampler and run the sample table test under the sample table option to make sure that the file is correct. Then start the run. A manual run log or a printout of the instrument schedule should be generated to show the order that the samples are loaded into the autosampler.

13.8.1 For this method, a daily calibration is required. The calibration must consist of a minimum of 3 standards and a blank and must not cover more than 2 orders of magnitude. Calibrations standards may be varied from the ones stated in this SOP depending on the levels of hexavalent chromium that are to be reported. A low standard must be at or below 0.010 mg/l for soil analysis for hexavalent chromium. (0.005 mg/l is the normal low standard). A correlation coefficient of 0.999 is required. If this correlation coefficient is not met, than the instrument must be recalibrated.

13.8.2 After the calibration, the continuing calibration verification check standard (CCV) and a continuing calibration blank (CCB) must be run. The CCV must be from a separate source than the calibration curve and must have recoveries within a range of 90 to 110 percent. The CCB must have results of less than the reporting limit. If either of these QC points does not meet criteria, then all samples bracketed by this quality control must be reanalyzed. The exception is if there is a high bias in the CCV check and the associated sample results are less than the reporting limit.

13.8.3 After the CCV, CCB pair, then begin analyzing the samples and run QC. All samples as associated quality control (method blanks, spike blanks, matrix spikes, duplicate) must be analyzed in duplicate. The RSD between each duplicate must be checked and be within 20% or within ± reporting limit for hexavalent chromium. If this criteria is not met, then reanalyze the affected sample in duplicate.

13.8.3.1 Duplicate analyses are not required for the calibration curve or CCV and CCB checks.

13.8.3.2 Report the highest value from the two duplicate injections for each sample.

13.8.4 After every 10 samples (or every 20 injections of samples in duplicate) the CCV and CCB checks must be run. The continuing calibration checks must have recoveries in the range of 90 to 110 percent. If the CCV or CCB fails to meet criteria, then all samples bracketed by the out of compliant QC should be rerun if possible.

13.8.4.1 Note: If the hexavalent chromium samples are close to holding time, then a single injection of each sample may be run to meet holding time criteria. If single sample injections are done, then run a CCV, CCB after every 10 single injections. The duplicate injections for each sample are still required and should be run as soon as possible after the completion of the initial injections. This is not normally an issue for hexavalent chromium soil digests.

13.8.5 After the quality control sample analysis is completed, prepare a post-digest spike on this sample. The sample should be spiked at 2 times the concentration found in the original sample aliquot or 40 mg Cr(VI)/kg, whichever is greater.

13.8.5.1 The 40 mg/kg spike can be made by spiking a 20 ml aliquot of digestate containing 0.50 g of digested sample with 0.20 ml of 100 mg/l Cr(VI) standard (Section 9.10).

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13.8.6 After the run is completed, review all of the chromatograms and check for interferences, dilutions, etc.

13.8.7 For large or overlapping peaks, make dilutions using the digestate dilution solution. If the samples were originally run undiluted, use digestion dilution solution A for dilutions. If the standards and samples were originally run with a factor of 2 dilution, then they should be diluted with digestion dilution solution B (section 9.17).

13.9 If no additional batches are to be analyzed on the instrument, then the instrument should be switched over to DI Water. For short periods of time (< 1 week), the eluent may be left in the column. For longer periods of time, put a 1:10 dilution of eluent into the column and cap both ends. To switch all other lines in the instrument to DI water, change the connections so that the column is off line. Then fill the eluent and PCR bottles with DI waters and set the flow rate to 0.5 ml/min for the eluent. Pump DI water through the system for at least 15 minutes.

13.10 Review all data and update the appropriate tests in the LIMS system. A write-up including a run log, a calibration summary, batch quality control summary, and copies of all chromatograms should be turned into the area supervisor for each batch.

13.10.1 If edits are needed in the data, select the samples and go the reprocessing menu. Make the appropriate changes and then update and reprocess the data. Generate the export file as described below. Go to Tools, Template and SOEXPORT. Edit the file name to the correct name (as outlined in 12.6 above) and hit OK. Then go to Determinations, export, and SOEXPORT. The csv file will be saved on the general chemistry network drive under the Metrohm folder.

13.10.2 If manual integrations are needed for any reason, then all requirements from the manual integration SOP, EQA044, must be followed.

13.11 Calculations are done using the equations summarized in 11.12.3.

13.11.1 **The actual value for the NIST lab control must be manually corrected in LIMS for the % solids correction.**

14.0 INSTRUMENT MAINTENANCE FOR THE DIONEX DX-500 and the DIONEX ICS2000.

13.1 The digestion solution can cause problems with clogging and leaking of the system. Putting a 100 mM HCl rinse through the system helps remove the alkaline salts. Fill the autosampler tubes with 100 mM HCl rinse and put the cap in the rinse position. After the rinse is complete, also run a DI water rinse. It is recommended that this rinse procedure be done after every run.

13.2 Periodically, due to the matrix of samples, both guard and analytical columns become degraded and cleaning them becomes necessary. This is evidenced in changing retention times, round-shaped peaks, tailing peaks and overall poor integration. Column clean-ups should be done on an as needed basis. There are 3 recommended cleanup solutions for the NG1 and AS7 columns.

13.2.1 Metal contamination column clean-up: Use 500 ml of 0.1M oxalic acid solution.

13.2.2 Low valency hydrophilic ionic contamination column clean-up. Use 500 ml of 10X eluent concentrate.

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13.2.3 High valency hydrophobic ion 200 mM HCl in 5% acetonitrile: The acetonitrile solution is stored in a separate eluent bottle because acetonitrile slowly breaks down in acidic aqueous solutions. Prepare 2 bottles (E1 and E2) with the following 500-mL solutions: E1: 5% Acetonitrile and E2: 200 mM HCl using DI water.

13.2.4 Column Clean-up Procedure.

13.2.4.1 Prepare 500 mL solution of the appropriate cleanup solution from 12.1

13.2.4.2 Reverse the order of the guard and analytical column in the eluent flow path. Contaminants that have accumulated on the guard column can be eluted onto the analytical column and irreversibly damage it. If in doubt, clean each column separately. Double check that the eluent flows in the direction designated on each of the column labels.

13.2.4.3 Set the pump flow rate to 0.5 mL/min for an AS7 analytical and NG1 guard column.

13.2.4.4 Rinse the column for 15 minutes with DI water before pumping the chosen cleanup solution over the columns.

13.2.4.5 Pump the cleanup solution through the column for at least 60 minutes.

13.2.4.6 If using the 200 mM HCl in 5% acetonitrile, use a gradien to introduce the clean-up solution into the columns. (i.e. – gradually increase the concentration until you are at the full solution concentration. After clean-up, also gradually decrease the concentration.)

13.2.4.7 Rinse the column for 15 minutes with DI water before pumping eluent over the column.

13.2.4.8 Equilibrate the columns with eluent before resuming normal operation for at least 30 minutes.

13.2.4.9 Reconnect analytical and guard columns in the normal run configuration.

14.0 INSTRUMENT MAINTENANCE FOR THE METROHM

14.1 Change the in-line filter every 100 injections. If running holding time critical samples, make sure to change the filter before starting the run.

14.2 Change the column guard frit every 300 to 400 injections

14.3 Change the pump seals as needed, when leaking or pressure problems are observed.

14.4 The digestion solution can cause problems with clogging and leaking of the system. Putting a 100 mM HCl rinse through the system helps remove the alkaline salts. Fill the autosampler tubes with 100 mM HCl rinse. Take the column and the guard frit off line and pump through the HCl rinse and a DI water rinse. It is recommended that this rinse procedure be done after every run.

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14.5 Periodically, due to the matrix of samples, the analytical columns become degraded and cleaning them becomes necessary. This is evidenced in changing retention times, round-shaped peaks, tailing peaks and overall poor integration. Column clean-ups should be done on an as needed basis following the recommendations in the Metrohm column documentation. If the column cannot be adequately cleaned, then it may need to be replaced.

15.0 QC REQUIREMENTS

15.1 Analyze a new calibration curve, at a minimum, on each analysis day. The curve must be made up of a minimum of 3 points and a blank, but more standards may be run if needed. The calibration curve is required to have a correlation coefficient greater than or equal to 0.999.

$$r = \frac{\Sigma(x - \bar{x})(y - \bar{y})}{\sqrt{\Sigma(x - \bar{x})^2 \Sigma(y - \bar{y})^2}}$$

Where r = correlation coefficient
x = amount of analyte
y = response of instrument

$\bar{x}$ = average of x values

$\bar{y}$ = average of y values

15.2 Initially analyze all samples either undiluted or at a low (normally a factor of 2) dilution. (This low dilution is done to minimize the impact of the digestion solution matrix on the system.) If the sample concentration is higher than the highest standard, then reanalyze the sample as a (larger) dilution. Prepare the dilution so that the sample is in the mid-range of the calibration curve. Each sample must be analyzed with at least two duplicate injections and the RSD between the two injections must be less than 20% or the results must be within a window of plus or minus the detection limit from each other. The duplicate injections should normally be run concurrently, but may be run sequentially if needed to meet holding time requirements. The higher of the two replicate injections must be reported. If the replicate injections do not meet the RSD criteria stated above, then analysis should be repeated with additional replicate injections.

15.3 One preparation blank is required for each set of 20 samples or less or with each batch. The preparation blank is required to contain all the reagents in the same volumes as used in the preparation of the samples. The preparation blank is required to be less than the RL. If it is over the RL, correct the problem and restart the analysis if this is possible within holding time. If it will be outside of holding time, then complete the initial analysis within holding time and check with the area supervisor for further instructions.

15.4 A soluble spike blank and a solid lab control sample must be prepared and analyzed for each set of 20 samples of a similar matrix or with each batch, whichever is smaller.

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15.4.1 A spike blank prepared using soluble hexavalent chromium as the spike is required. If the spike blank is not within the acceptance range, then the entire batch must be redigested and reanalyzed. The acceptance range for the soluble spike blank is 80 to 120 percent recovery.

15.4.2 A solid lab control has been obtained from NIST; however an alternate commercial supplier may be utilized if not available from NIST. When using the NIST lab control, a solid lead chromate lab control should also be prepared.

15.4.2.1 For the NIST SRM 2701, the certified value is 551.2 mg/kg +/- 34, when corrected for %solids. The Certificate of Analysis for this SRM does not provide a certified acceptance range for EPA Method 7199; however Appendix A 2 references an observed range of 270 mg/kg to 557 mg/kg. Until such time that a certified range is available for this SRM for this method, the laboratory shall utilize in-house limits developed from a minimum of 20 data points. The in-house acceptance criteria must be equal to or tighter than the observed data referenced in Table A2 in the Certificate of Analysis for the SRM.

15.4.2.2 A solid lead chromate lab control is also required when running SRM 2701. The acceptance range for the solid lead chromate lab control is 80 to 120% of the true value.

15.4.2.3 If either the NIST SRM 2701 or the lead chromate lab control are outside of the ranges indicated in Section 15.4.2.1 and 15.4.2.2, then the entire batch must be redigested and reanalyzed.

15.5 After every 10 samples, every 20 readings (10 samples with duplicate injections) and at the end of the sample analysis sequence a mid-level calibration check (CCV) and a calibration blank (CCB) must be analyzed. Prepare the mid-point calibration check from a different stock than the calibration curve. This calibration check standard must also be analyzed at the beginning of the analysis immediately after the calibration curve. The acceptance criteria for the mid-range calibration check standard is 90 – 110% of the true value of the standard. If the CCV fails this criteria, correct the problem and then reanalyze all samples in the area bracketed by the non-compliant CCV. The acceptance criteria for the CCB is less than the reporting limit. If the CCB fails this criteria, correct the problem and then reanalyze all samples in the area bracketed by the non-compliant CCB.

15.6 A duplicate sample must be prepared and analyzed for each set of 20 samples of a similar matrix or with each batch, whichever is smaller. An acceptance criteria of 20 percent relative percent difference should be applied if the original and duplicate sample values are greater than or equal to 4 times the reporting detection limit. If the values are less than 4 times the reporting detection limit, then a control limit of $\pm$ the reporting detection limit should be applied.

15.7 Both a soluble and an insoluble hexavalent chromium matrix spike must be prepared and analyzed for each set of 20 samples of a similar matrix or with each batch, whichever is smaller. The acceptance range for matrix spike recoveries is 75 to 125 percent recovery. If the matrix spike recoveries for either the soluble or the insoluble spikes are not within these recovery limits, then the lab supervisor or manager must be immediately notified. The client services department will then be notified to contact the client. The method requires additional testing as listed below, but the lab should not proceed with this testing until client approval is obtained and the testing is logged into the LIMS system.

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15.7.1 All samples and quality control must be rehomogenized, redigested and reanalyzed to verify the original sample results.

15.7.2 Additional tests, such as oxidation-reduction potential, pH, sulfide, ferrous iron, etc., may be requested to help quantify the reducing nature of the sample. For some projects, eH and pH analysis may be specified for all samples at the start of the project.

15.7.3 A mass balance study for total chromium may be done, using the digested solids remaining after the alkaline digestion and filtration of the matrix spike and from an unspiked aliquot of the sample.

15.8 A post-digest spike must be prepared and analyzed for each set of 20 samples of a similar matrix or with each batch, whichever is smaller. The post-spike should be spiked at 40 mg/kg or twice the level in the sample, whichever is greater. The acceptance range for post digest spike recoveries is 85 to 115 percent recovery. No additional action is necessary if the post-digest spike is outside of this recovery range.

15.9 Retention Time Windows. Because the hexavalent chromium is separated in the column and then colorimetrically reacted before detection, retention time identification is not as critical as with other ion chromatographic methods. However, a significant shift in retention time may point to analytical problems. Therefore, the hexavalent chromium peak must be within a reasonable retention time window to be considered valid. A criterion of 5% is normally applied. However, sample concentration and matrix can greatly affect retention time and the experience of the analyst and reviewer should weigh heavily in the interpretation of a chromatogram. Values in a window of 10% can be accepted at the discretion of a senior reviewer. Values outside of the 10 % window cannot be reported unless that peak is confirmed with a post-digest spike.

16.0 DOCUMENTATION REQUIREMENTS

16.1 The analyst should document all relevant information, including all sample weights and volumes, digestion times and temperatures, all intermediate and final pH values, all times relevant to the pH adjustment process, all sample and background analysis results, and any relevant comments for any section of the digestion or analysis. Sample digestion and analysis sheets are provided. It is required that a second analyst sign off and verify that digestion times and temperatures and pH adjustment documentation is accurate and complete.

16.2 For the analysis, all reagent identification numbers should be recorded on the sample worksheets. In addition, all reagent information such as lot numbers should also be recorded in the reagent logbook.

17.0 DATA REVIEW AND REPORTING

17.1 All samples should be updated to GP and GN batches in the LIMS system. The analyst should calculate all matrix spike, duplicate, external, and CCV recoveries and review the results of all blanks. These calculations may be automated or manual.

17.2 All documentation must be completed, including reagent references and spike amounts and spiking solution references.

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17.3A data file should be exported to the LIMS system and the spike amounts should be entered into the file at the GNAPP process step.

17.4A final data package, consisting of the prep and analysis raw data, the LIMS cover page, the reagent reference pages, and the QC summary pages must be turned into the area supervisor or other senior reviewer for review.

17.5After review by the supervisor, the data is released in the LIMS for access to the clients.

17.6Additional reviews are periodically done by the manager of the department for technical completeness. The raw data is then electronically filed in the report generation department.

18.0POLLUTION PREVENTION & WASTE MANAGEMENT

18.1Users of this method must perform all procedural steps in a manner that controls the creation and/or escape of wastes or hazardous materials to the environment. The amounts of standards, reagents, and solvents must be limited to the amounts specified in this SOP. All safety practices designed to limit the escape of vapors, liquids or solids to the environment must be followed. All method users must be familiar with the waste management practices described in section 18.2.

18.2Waste Management. Individuals performing this method must follow established waste management procedures as described in the waste management SOP, EHS004. This document describes the proper disposal of all waste materials generated during the testing of samples as follows:

18.2.1 Non hazardous aqueous wastes

18.2.2 Hazardous aqueous wastes

18.2.3 Chlorinated organic solvents

18.2.4 Non-chlorinated organic solvents

18.2.5 Hazardous solid wastes

18.2.6 Non-hazardous solid wastes

19.0ADDITIONAL REFERENCES

19.1Refer to the DIONEX DX500 instrument manual or the DIONEX ICS3000 manual and the AS7 and NG1 column manuals.

19.2Refer to the Metrohm instrumentation manuals.

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Lab Manager: Nancy Cole

QA Manager:

Effective Date: 9/27/11

TEST NAME: HEXAVALENT CHROMIUM IN WATERS BY ION CHROMATOGRAPHY

METHOD REFERENCE: SW846 Method 7199

Revised Sections: 8.1, 8.2(all), 11.0, 12(all), renumbering

1.0 SCOPE AND APPLICATION

1.1 This method is used to determine the concentration of hexavalent chromium in aqueous matrices. The hexavalent chromium is separated from the other sample constituents by an anion exchange column and then the determined in the sample by reaction with diphenylcarbazide in acid solution. The diphenylcarbazide complex produces a characteristic pink color that can be measured by a UV/VIS detector at 530 nm.

2.0 SUMMARY

2.1 The sample is first buffered to a pH of 9.0 to 9.5 and then the dissolved hexavalent chromium is separated from interfering substances using an anion exchange column on an ion chromatograph. The separated sample is then reacted with diphenylcarbazide in acid solution to form a red-violet color. The intensity of this color is measured by a UV/VIS detector at a wavelength of 530 nm and is quantitated against a calibration curve.

3.0 REPORTING LIMIT AND METHOD DETECTION LIMIT

3.1 Reporting Limit. The reporting limit for this method is established at 0.005 mg/l.

3.2 Method Detection Limit. Experimentally determine MDLs using the procedure specified in 40 CFR, Part 136, Appendix B. This value represents the lowest reportable concentration of an individual compound that meets the method qualitative identification criteria.

3.2.1 Experimental MDLs must be determined annually for this method.

3.2.2 Process all raw data for the replicate analysis in each MDL study.

4.0 DEFINITIONS

BATCH: A group of samples which behave similarly with respect to the sampling or the testing procedures being employed and which are processed as a unit. For QC purposes, if the number of samples in a group is greater than 20, then each group of 20 samples or less will all be handled as a separate batch.

CALIBRATION CHECK STANDARD. The calibration check standard is a mid-range calibration standard. The calibration check standard must be run at a frequency of 10 percent. For most methods, the mid-level calibration check standard criteria is ± 10 percent of the true value. The exception to this rule is if the recovery on the calibration check standard is high and the samples to be reported are less than the detection limit.

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the recovery on the calibration check standard is high and the samples to be reported are less than the detection limit.

EXTERNAL CHECK STANDARD. The external check standard is a standard from a separate source than the calibration curve that is used to verify the accuracy of the calibration standards. An external check must be run with each calibration. The laboratory should assess laboratory performance of a check standard using the method defined control limits.

SPIKE BLANK OR LAB CONTROL SAMPLE. Digest and analyze a laboratory control sample or spike blank with each set of samples. A minimum of one lab control sample or spike blank is required for every 20 samples. Assess laboratory performance against the control limits specified in the SOP. In house limits should also be generated once sufficient external check standard data is available to generate limits (usually a minimum of 20 to 30 analyses). If the lab control is outside of the control limits for a parameter, all samples must be redigested or redistilled and reanalyzed for that parameter. The exception is if the lab control recovery is high and the results of the samples to be reported are less than the reporting limit. In that case, the sample results can be reported with no flag. Note: If control limits are not specified in the SOP, then default limits of 80 to 120 percent should be used.

MATRIX: The component or substrate (e.g., water, soil) which contains the analyte of interest.

MATRIX DUPLICATE: A duplicate sample is digested at a minimum of 1 in 20 samples. The relative percent difference (RPD) between the duplicate and the sample should be assessed. The duplicate RPD is calculated as shown below. Assess laboratory performance against the control limits that are specified in the SOP. In house limits are generated once sufficient duplicate data is available to generate limits (usually a minimum of 20 to 30 analyses). If a duplicate is out of control, flag the results with the appropriate footnote. If the sample and the duplicate are less than 5 times the reporting limits and are within a range of ± the reporting limit, then the duplicate is considered to be in control. Note: If control limits are not specified in the SOP, use default limits of ± 20% RPD.

$$\frac{(|\text{Sample Result} - \text{Duplicate Result}|) \times 100}{(\text{Sample Result} + \text{Duplicate Result})/2)} = \text{Duplicate RPD}$$

MATRIX SPIKE: The laboratory must add a known amount of each analyte to a minimum of 1 in 20 samples. The matrix spike recovery is calculated as shown below. Assess laboratory performance against the control limits that are specified in the SOP. In house limits are generated once sufficient matrix spike data is available to generate limits (usually a minimum of 20 to 30 analyses). If a matrix spike is out of control, then the results should be flagged with the appropriate footnote. If the matrix spike amount is less than one fourth of the sample amount, then the sample cannot be assessed against the control limits and should be footnoted to that effect. Note: If control limits are not specified in the SOP, then default limits of 75 to 125 percent should be used.

$$\frac{(\text{Spiked Sample Result} - \text{Sample Result}) \times 100}{(\text{Amount Spiked})} = \text{Matrix Spike Recovery}$$

METHOD BLANK. The laboratory must digest and analyze a method blank with each set of samples. A minimum of one method blank is required for every 20 samples. For a running batch, a new method blank is required for each different digestion day. If no digestion step is required, then the method blank is equivalent to the reagent blank. The method blank must contain the parameter of interest at levels of less that the reporting limit for that parameter. If the method blank contains levels over the reporting limits, the samples must be redigested or redistilled and reanalyzed. The exception to this rule is when

the samples to be reported contain greater than 10 times the method blank level. In addition, if all the samples are less than a client required limit and the method blank is also less than that limit, then the results can be reported as less than that limit.

METHOD DETECTION LIMITS (MDLS). The minimum concentration of a substance 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. MDLs are determined approximately once per year for frequently analyzed parameters.

REAGENT BLANK: The reagent blank is a blank that has the same matrix as the samples, i.e., all added reagents, but did not go through sample preparation procedures. The reagent blank is an indicator for contamination introduced during the analytical procedure. (Note: for methods requiring no preparation step, the reagent blank is equivalent to the method blank.) Either a reagent blank or a method blank must be analyzed with each batch of 20 samples or less. The concentration of the analyte of interest in the reagent blank must be less than the reporting limit for that analyte. If the reagent blank contains levels over the reporting limits, the samples must be reanalyzed. The exception to this rule is when the samples to be reported contain greater than 10 times the reagent blank level. In addition, if all the samples are less than a client required limit and the reagent blank is also less than that limit, then the results can be reported as less than that limit.

REAGENT GRADE: Analytical reagent (AR) grade, ACS reagent grade, and reagent grade are synonymous terms for reagents which conform to the current specifications of the Committee on Analytical Reagents of the American Chemical Society.

REAGENT WATER: Water that has been generated by any method which would achieve the performance specifications for ASTM Type II water. For organic analyses, see the definition of organic-free reagent water.

REFERENCE MATERIAL: A material containing known quantities of target analytes in solution or in a homogeneous matrix. It is used to document the bias of the analytical process.

STANDARD CURVE: A plot of concentrations of known analyte standards versus the instrument response to the analyte. Calibration standards are prepared by successively diluting a standard solution to produce working standards which cover the working range of the instrument. Standards should be prepared at the frequency specified in the appropriate section. The calibration standards should be prepared using the same type of acid or solvent and at the same concentration as will result in the samples following sample preparation. This is applicable to organic and inorganic chemical analyses.

5.0 HEALTH & SAFETY

5.1 The analyst must follow normal safety procedures as outlined in the Accutest Laboratory Safety Manual which includes the use of safety glasses and lab coats. In addition, all acids are corrosive and must be handled with care. Flush spills with plenty of water. If acids contact any part of the body, flush with water and contact the supervisor.

5.2 The toxicity or carcinogenicity of each reagent used in this method has not been precisely determined; however, each chemical must be treated as a potential health hazard. Exposure to these reagents must be reduced to the lowest possible level. The laboratory is responsible for maintaining a current awareness file of OSHA regulations regarding the safe handling of the chemicals specified in this method. A reference file of data handling sheets must be made available to all personnel involved in these analyses.

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5.3 The following analytes covered by this method have been tentatively classified as known or suspected, human or mammalian carcinogens: hexavalent chromium.

6.0 PRESERVATION & HOLDING TIME

6.1 Refrigerate all samples at 4°C until the time of analysis.

6.2 The holding time for this method is 24 hours from the time of collection. Analyze all samples within 24 hours.

7.0 INTERFERENCES

7.1 Several types of interferences are possible with this method.

7.1.1 Contamination. Trace levels of Cr may sometimes be found in reagent salts. Reagent blanks must be analyzed to assess for potential Cr(VI) contamination.

7.1.2 Reduction of Cr(VI) to Cr(III) can occur in the presence of reducing species in an acidic medium. However, at a pH of 6.5 or greater, CrO42-, which is less reactive than HCRO4-, is the predominant species.

7.1.3 Overloading of the analytical column capacity with high concentrations of anionic species can cause a loss of Cr(VI). This is particularly a problem with chloride and sulfate. The column specified in this method can handle samples containing up to 5% of sodium sulfate or 2% of sodium chloride.

8.0 APPARATUS

8.1 Ion Chromatograph with a guard column, an analytical column, a post-column delivery system, a knitted reaction coil and a UV/Vis absorbance detector. Three instruments are available for this analysis; the Dionex ICS5000, the Dionex ICS3000, or the Metrohm 844 UV/Vis Compact IC.

8.2 Either the Dionex ICS3000 or the Dionex ICS5000 with the GP50 gradient pump and the AD25 absorbance detector, capable of reading the absorbance at 530 nm can be used with the specific parts listed below. Alternate columns may be used if all method requirements can be met.

8.2.1 Guard Column, IONPAC NG1-10um Guard column, 4 x 35 mm. Dionex part number 039567.

8.2.2 Analytical Column, IONPAC AS7 Analytical column, 4 x 250 mm. Dionex part number 035393.

8.2.3 PC10 Postcolumn Pneumatic Delivery Package, 4 mm. Dionex part number 050601 for the ICS3000 or additional pump for post-column delivery in the ICS5000.

8.2.4 Knitted Reaction Coil, 750ul, unpotted. Dionex part number 042631.

8.2.5 25 ul injection loop. A different size sample loop may be used if method verification is performed before running samples.

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8.3 The Metrohm 844 UV/Vix Compact IC can be used with the specific parts lists below. Alternate columns may be used if all method requirements can be met.

8.3.1 Guard Discs (Metrohm part number 6.1011.120) and guard disc holder (Metrohm part number 6.1011.020)

8.3.2 Analytical Column, Metrosep A Supp 10 250/4.0, part number 6.1020.030.

8.3.3 Postcolumn pump, Metrohm 818 IC pump.

8.3.4 Post Column Reactor (Knitted Reaction Coil), Metrohm part number 6.2836.000.

8.3.5 30 ul injection loop. A different size sample loop may be used if method verification is performed before running samples.

8.4 Volumetric flasks, class A.

8.5 Volumetric pipets, class A or autopipeters. Note: If autopipeters are used, make sure that the calibration is checked before use as specified in the autopipeter SOP.

8.6 Helium tank and regulator. Gas pressure must be at > 100 PSI for the injector to work properly.

8.7 0.45 um membrane filters, that can be attached to the end of the syringe.

8.8 Disposable syringes.

8.9 pH meter. Orion pH/ISE Meter Model 710A or equivalent.

8.10 Four-place analytical balance.

8.11 One or two place balance. Ohaus Galaxy 4000 or equivalent.

9.0 REAGENTS

All chemicals listed below are reagent grade unless otherwise specified. Use deionized water whenever water is required. The expiration date for standards and reagents is the date supplied by the manufacturer or if no expiration date is given, a default of 6 months is used. For acid solutions (nitric, sulfuric, hydrochloric) the expiration date is 2 years from the date of preparation of the solution.

9.1 Hexavalent Chromium Stock Solution. A 1000 mg/L (as Cr(VI))stock solution of potassium dichromate can be used as the stock solution for the spiking solutions and calibration standards. (Available as 1000 mg/L chromium solution, AAS grade from Fisher.)

9.2 Hexavalent Chromium Calibration Standard Solutions: Prepare the calibration standards fresh daily or each time the analysis is run. For instrument calibration, prepare the standards from the stocks as shown below.

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9.2.1 Hexavalent Chromium 10.00 mg/L stock solution. Add 1.00 ml of 1000 mg/L hexavalent chromium to a 100 ml volumetric flask and dilute to volume with dilution water (see 9.7 below). Mix well.

9.2.2 Hexavalent Chromium 1.00 mg/L stock solution. Dilute 10.0 ml of the 10 mg/L stock solution to a final volume of 100 ml with dilution water (see 9.7 below) and mix well.

9.2.3 Add the amount of stock specified below to the 100 ml volumetrics and bring to a final volume of 100 ml with dilution water (see 9.7 below).

Blank: No spike is added to the blank.
0.005 mg/L: Add 0.50 ml of 1.00 mg/L.
0.050 mg/L: Add 5.00 ml of 1.00 mg/L.
0.100 mg/L: Add 1.00 ml of 10.0 mg/L.
0.500 mg/L: Add 5.00 ml of 10.0 mg/L.

9.3 Hexavalent Chromium Check Standard Solutions: Prepare the check standards fresh daily or each time the analysis is run. Prepare the standards from the stocks as shown below. NOTE: Prepare the check standards from a different source than the calibration standards.

9.3.1 Hexavalent Chromium 10.0 mg/L stock solution. Add 1.00 ml of 1000 mg/L hexavalent chromium to a 100 ml volumetric flask and dilute to volume with dilution water (see 9.7 below). Mix well.

9.3.2 Hexavalent Chromium 1.00 mg/L stock solution. Dilute 10.0 ml of the 10 mg/L stock solution to a final volume of 100 ml with dilution water (see 9.7 below) and mix well.

9.3.3 Add the amount of stock specified below to a 200 ml volumetric and bring to a final volume of 200 ml with dilution water (see 9.7 below). This is used as the CCV solution.

0.250 mg/L: Add 5.00 ml of 10.00 mg/L.

9.3.4 For the matrix spike and the blank spike, add 0.250 ml of 10.0 mg/l to 50 ml of sample. (For the blank spike, deionized water should be used in place of sample).

9.4 Eluent. Dissolve 33 g of ammonium sulfate in 500 ml of DI water and add 6.5 ml of ammonium hydroxide. Dilute to one liter with DI water. Filter the eluent through a 0.45 um filter and then degas the solution with helium gas for 5 to 10 minutes before use.

9.5 Post-Column Reagent. Dissolve 0.5 g of 1,5 diphenylcarbazide in 100 ml of HPLC grade methanol in a 1000 ml volumetric flask. Make sure that all of the 1,5 diphenylcarbazide is dissolved in the methanol before proceeding. In a separate container, add 28 ml of concentrated sulfuric acid (96 to 98%) into 500 ml of DI water, mix and degas with helium gas for 5 to 10 minutes prior to adding the diphenylcarbazide solution. Dilute to volume with DI water. This reagent is stable for 4 to 5 days.

9.6 Buffer Solution. Dissolve 33 g of ammonium sulfate in 75 ml of DI water and add 6.5 ml of ammonium hydroxide. Dilute to 100 ml with DI water. Degas the solution with helium gas for 5 to 10 minutes before use.

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9.7 Dilution Water. A batch of DI water must be prepared by adjusting the pH within the range of 9 to 9.5 using the buffer solution. Use this solution for diluting working standards and high level samples.

10.0 SAMPLE PREPARATION PROCEDURE

10.1 For water samples, filter all samples through 0.45 um filters before analysis. Use a portion of the sample to rinse the syringe filtration unit and then filter the sample and collect the filtrate. Then adjust the pH of the sample to 9.0 to 9.5 by dropwise addition of buffer solution (section 9.6). Measure the final pH with a pH meter or with narrow range pH paper and record the pH value obtained.

10.1.1 Matrix spikes must be spiked before filtration.

10.2 If a precipitate or turbidity is observed after filtration, then filter the sample a second time through a 0.45 um filter. Let the sample come to room temperature before analysis.

11.0 ION CHROMATOGRAPHY ANALYSIS PROCEDURE FOR THE DIONEX ICS3000.

11.1 Check to make sure that the helium tank pressure is > 100 PSI and the pressure gauge by the eluent bottles is set at 6 PSI.

11.2 Fill the eluent bottle(s) that are to be used with eluent. Make sure to close the corner knob before opening the eluent bottle. Note: It is recommended that 2 bottles be filled with eluent and 50% taken from each bottle during the analysis so that the eluent lasts longer. Fill the reagent delivery bottle with post-column reagent.

11.1.1 Note: The post-column reagent is off-line when it is set to valve A. It is on-line when it is set to valve B. When not running, set the valve to A.

11.1.2 The eluent should be filtered through a 0.45 um filter before use.

11.3 Set the GP50 (pump control) and the AD25 (detector control) to local control and direct read. (Press local, direct, and enter).

11.4 Turn on the GP50 and go to the diagnostics menu and look at the pressure statistics. The pressure should be constant for 1 minute and the values for the left and right pressure points should be close. If the pressure is fluctuating or the left and right pressure points are far apart, then the pump should be primed.

11.5 Prime the pump using the procedure described below.

11.5.1 On the GP50 screen, change the pressure limit to 0. Set the instrument to use 100% of eluent A. Open up the pressure transducer on the pump. This is very important – the instrument may be damaged if the transducer head is not open when the pump is being primed.

11.5.2 Put the syringe in the priming valve, open the syringe port, and hit prime. Liquid will slowly be pushed out into the syringe. Let 10 ml of liquid collect in the syringe. Turn the prime

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off, tighten the syringe port, and close the transducer head. The pressure should climb back up.

11.5.3 Allow the instrument conditions to settle and then check the pressure statistics in the diagnostics menu again. If there is still a problem, the priming procedure may be repeated using isopropyl alcohol. If alcohol is used, push the IPA through the pump without the prime on and then turn the pump on and push the liquid out for several minutes. Make sure that the transducer is open so that the IPA does not go into the column and suppressor.

11.5.4 If using two eluent bottles, then repeat the above procedure using 100% of eluent B. Note: The pump must be primed for each eluent bottle used.

11.6 Set the flow rate of the eluent pump to 1.5 ml/min and adjust the pressure of the reagent delivery system so that the final flow rate from the detector is 2.0 ml/min. Normally the pressure required for this flow rate is approximately 40 psi. The flow should be checked from the wasteline downstream from the AD25 detector with a graduated cylinder and a stop watch after it is initially set and again after the instrument has warmed up for approximately 30 minutes. The flow rate should always be verified prior to calibration and sample analysis.

11.7 Once the pump is ready to go, set up a schedule in the software. Refer to the instrument manuals or help screens in the program for help in using the software. Note: a method is required for each analysis. If a new method is required, check with the area supervisor or manager for additional help. A new method is required each time the instrument is recalibrated as the calibration is stored in the method.

11.8 Load the autosampler and turn it on. The autosampler should then move to the first sample. A manual run log or a printout of the instrument schedule should be generated to show the order that the samples are loaded into the autosampler.

11.9 Load the schedule in the software and start the run. Make sure that all results are being printed so that the problems can be easily identified while the run is going.

11.9.1 Data files must be saved using the naming scheme of year, month, day, run number followed by the extension of .ic. For example, the second IC run on October 11, 1999 would be named 99101102.ic. This name must always be used in the workgroup description in the LIMS system.

11.9.2 For this method, a daily calibration is required. The calibration must consist of a minimum of 3 standards and a blank and must not cover more than 2 orders of magnitude. Calibrations standards may be varied from the ones stated in this SOP depending on the levels of hexavalent chromium that are to be reported. A low standard must be at the reporting limit for hexavalent chromium (0.005 mg/l). A correlation coefficient of 0.999 is required. If this correlation coefficient is not met, than the instrument must be recalibrated.

11.9.3 After the calibration, the continuing calibration verification check standard (CCV) and a continuing calibration blank (CCB) must be run. The CCV must be from a separate source than the calibration curve and must have recoveries within a range of 90 to 110 percent. The CCB must have results of less than the reporting limit. If either of these QC points does not meet criteria, then all samples bracketed by this quality control must be

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reanalyzed. The exception is if there is a high bias in the CCV check and the associated sample results are less than the reporting limit.

11.9.4 After the CCV, CCB pair, then begin analyzing the samples and run QC. All samples as associated quality control (method blanks, spike blanks, matrix spikes, duplicate) must be analyzed in duplicate. The RSD between each duplicate must be checked and be within 20% or within ± reporting limit for hexavalent chromium. If this criteria is not met, then reanalyze the affected sample in duplicate.

11.9.4.1 Duplicate analyses are not required for the calibration curve or CCV and CCB checks.

11.9.4.2 Report the highest value from the two duplicate injections for each sample.

11.9.5 After every 10 samples (or every 20 injections of samples in duplicate) the CCV and CCB checks must be run. The continuing calibration checks must have recoveries in the range of 90 to110 percent. If the CCV or CCB fails to meet criteria, then all samples bracketed by the out of compliant QC should be rerun if possible.

11.9.5.1 Note: If the hexavalent chromium samples are close to holding time, then a single injection of each sample may be run to meet holding time criteria. If single sample injections are done, then run a CCV, CCB after every 10 single injections. The duplicate injections for each sample are still required and should be run as soon as possible after the completion of the initial injections.

11.9.6 After the run is completed, review all of the chromatograms and check for interferences, dilutions, etc.

11.9.7 For large or overlapping peaks, make dilutions using the buffered dilution water.

11.10 If no additional batches are to be analyzed on the instrument, then the instrument should be shut down by running the stop method, which switches the eluent over to DI water. The lines should not be left filled with the alkaline eluent.

11.11 Review all data and update the appropriate tests in the LIMS system. A write-up including a run log, a calibration summary, batch quality control summary, and copies of all chromatograms should be turned into the area supervisor for each batch.

11.11.1 If edits are needed in the calibration after the data has been calculated, the run can be reprocessed using the batch function in the software. Refer to the instrument manuals or on-screen help for addition information.

11.11.2 If manual integrations are needed for any reason, then all requirements from the manual integration SOP, EQA044, must be followed.

11.11.3 Calculations are done using the equations shown below. Sample concentration calculations are automated in the LIMS system.

11.11.3.1 Calculation of the sample result (automated calculated).

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conc. of hexavalent chromium in the sample (mg/l)=

$$\frac{\text{(conc. in ext.(mg/l) x (final ext. vol.(ml)}}{\text{(initial sample vol. (ml))}}$$

11.11.3.2 Calculation of amount spiked.

Amount spiked of hexavalent chromium (SA)=

$$\frac{\text{(conc. of spiking solution (ug/ml)) x (vol. of spike (ml)}}{\text{(sample volume in ml)}}$$

11.11.3.3 Calculation of Matrix Spike Recovery

$$\text{Percent recovery} = \frac{\text{(SSR - SR) x 100}}{\text{SA}}$$

12.0 ION CHROMATOGRAPHY ANALYSIS PROCEDURE FOR THE DIONEX ICS5000.

12.1 Fill the eluent bottle(s) that are to be used with eluent. Fill the reagent delivery bottle with post-column reagent.

12.1.1 The eluent should be filtered through a 0.45 um filter before use.

12.2 Prime the pump using the procedure described below.

12.2.1 Go to the instrument tab in Chromeleon and open the prime valves for both pump 1 and 2 and then hit the prime button. Do the eluent pump first and then the color pump

12.2.2 Allow the instrument conditions to settle and then check the pressure statistics in the diagnostics menu again. If there is still a problem, the priming procedure may be repeated. When completed, make sure to close the prime valves.

12.3 Set the flow rate of the eluent pump to 1.5 ml/min and set the flow for the color pump to 0.5 ml/min. The final flow rate from the detector is 2.0 ml/min. Make sure that the pressure is steady.

12.4 Once the pump is ready to go, set up a schedule in the software. Click on the data tab to go to the screen needed for the schedule. Refer to the instrument manuals or help screens in the program for help in using the software. Note: a method is required for each analysis. If a new method is required, check with the area supervisor or manager for additional help. A new method is required each time the instrument is recalibrated as the calibration is stored in the method.

12.5 Load the autosampler and turn it on. The autosampler should then move to the first sample. A manual run log or a printout of the instrument schedule should be generated to show the order that the samples are loaded into the autosampler.

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12.6 Load the schedule in the software and start the run. .

12.6.1 Data files on the ICS5000 must be saved using the naming scheme of instrument number, year, month, day, and run number followed by the extension of txt. For example, the second IC run on 6/29/11 on the ICS5000 (instrument 8), would be named 811062902.txt. This name must always be used in the workgroup description in the LIMS system

12.6.2 For this method, a daily calibration is required. The calibration must consist of a minimum of 3 standards and a blank and must not cover more than 2 orders of magnitude. Calibrations standards may be varied from the ones stated in this SOP depending on the levels of hexavalent chromium that are to be reported. A low standard must be at the reporting limit for hexavalent chromium (0.005 mg/l). A correlation coefficient of 0.999 is required. If this correlation coefficient is not met, than the instrument must be recalibrated.

12.6.3 After the calibration, the continuing calibration verification check standard (CCV) and a continuing calibration blank (CCB) must be run. The CCV must be from a separate source than the calibration curve and must have recoveries within a range of 90 to 110 percent. The CCB must have results of less than the reporting limit. If either of these QC points does not meet criteria, then all samples bracketed by this quality control must be reanalyzed. The exception is if there is a high bias in the CCV check and the associated sample results are less than the reporting limit.

12.6.3.1 Note: If the run will finish when there is no analyst present to monitor it, then it should be set up to run the smart standby. This is done by going to the instrument tab and under queue, select run smart standby.

12.6.4 After the CCV, CCB pair, then begin analyzing the samples and run QC. All samples as associated quality control (method blanks, spike blanks, matrix spikes, duplicate) must be analyzed in duplicate. The RSD between each duplicate must be checked and be within 20% or within $\pm$ reporting limit for hexavalent chromium. If this criteria is not met, then reanalyze the affected sample in duplicate.

12.6.4.1 Duplicate analyses are not required for the calibration curve or CCV and CCB checks.

12.6.4.2 Report the highest value from the two duplicate injections for each sample.

12.6.5 After every 10 samples (or every 20 injections of samples in duplicate) the CCV and CCB checks must be run. The continuing calibration checks must have recoveries in the range of 90 to 110 percent. If the CCV or CCB fails to meet criteria, then all samples bracketed by the out of compliant QC should be rerun if possible.

12.6.5.1 Note: If the hexavalent chromium samples are close to holding time, then a single injection of each sample may be run to meet holding time criteria. If single sample injections are done, then run a CCV, CCB after every 10 single injections. The

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duplicate injections for each sample are still required and should be run as soon as possible after the completion of the initial injections.

12.6.6 After the run is completed, review all of the chromatograms and check for interferences, dilutions, etc.

12.6.7 For large or overlapping peaks, make dilutions using the buffered dilution water.

12.7 To shut down the instrument, manually switch the eluent to DI water and completely shut off the color pump. Change the eluent flow rate to 0.3 ml/min.

12.8 Review all data and update the appropriate tests in the LIMS system. A write-up including a run log, a calibration summary, batch quality control summary, and copies of all chromatograms should be turned into the area supervisor for each batch.

12.8.1 If edits are needed in the calibration after the data has been calculated, the run can be reprocessed using the batch function in the software. Refer to the instrument manuals or on-screen help for addition information.

12.8.2 If manual integrations are needed for any reason, then all requirements from the manual integration SOP, EQA044, must be followed.

12.8.3 Calculations are done using the equations shown in section 11.11.3. Sample concentration calculations are automated in the LIMS system. Sample values less than the MDL are treated as zero in all calculations.

13.0 ION CHROMATOGRAPHY ANALYSIS PROCEDURE FOR THE METROHM.

13.1 Fill the eluent bottle(s) that are to be used with degassed eluent. Attach drying tube and put on system. Fill the reagent delivery bottle with post-column reagent. Fill the large plastic bottles on the autosampler with DI water/

13.1.1 The eluent should be filtered through a 0.45 um filter before use.

13.1.2 Make sure that the in-line autosampler filter is changed approximately once per day or every 100 injections. If you are going to be running hold-time critical waters, then the filter should be changed before the calibration to prevent possible problems during the run.

13.1.3 The guard frit must normally be changed every 300 to 400 injections. Check and change the guard disc before starting up the instrument if necessary.

13.2 Start up the instrument by first opening the ICNET software.

13.2.1 Open the CR6 icon first and then, when the hardware window opens, you can open properties as needed by double clicking on each hardware picture.

13.2.2 Go to control and select “start-up hardware (measure baseline)” from the dropdown window. The instrument hardware will start and the baseline measuring window will open. To view the pressure and temperature of the 844 (main) unit and the 818 (reagent

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addition) unit, double click on the monitor icon. The column temperature should be pre-set to 30 deg. C and the pressure should be approximately 2100 psi for the 844 unit and 160 psi for the 818 unit. The flow rate for the eluent pump should be 1.0 ml/min and the flow rate for the PCR pump should be 0.5 ml/min.

13.2.3 Let the system equilibrate for approximately 30 minutes.

13.3 If the instrument lines did not run dry, then priming the pumps should not be needed. If the lines were dry, then prime the pumps using the procedure described below.

13.3.1 Procedure for the 844 unit:

13.3.1.1 Open up the pressure transducer knob, which can be found on the box wall of the 844 box, right beneath the pump head and behind the column box. This is very important – the instrument may be damaged if the transducer head is not open when the pump is being primed.

13.3.1.2 Attach the syringe to the left port on outside (front) of the 844 unit. Pull air through the syringe until eluent starts flowing steadily into the syringe and then wait for several minutes.

13.3.1.3 Remove the syringe and close the knob on the pressure transducer.

13.3.2 Procedure for the 818 unit.

13.3.2.1 Attach the syringe to the outlet capillary.

13.3.2.2 Open the purge valve of the 818 unit.

13.3.2.3 Allow reagent to flow into the syringe for several minutes.

13.3.2.4 Close the purge valve and remove the syringe.

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13.4 If any system changes have been made in the start-up process, then the top (blue) line of the CR6 window will have an asterisk after “Cr6.smt”. Go to “system” and choose “save” to save the new information.

13.5 Next open the MagIC Net Software. There will be 5 large icons on the left of the screen.

13.5.1 The “configuration” icon shows devices, columns, eluents, and solutions used. These are all preset.

13.5.2 The “manual” icon is for manual injections and will not normally be used.

13.5.3 The “method” icon contains the methods that have been developed to run soil and water matrices. New methods can also be set up using this icon, but this will not normally have to be done.

13.5.4 The “workplace” icon is where autosampler schedules can be set up before starting a run.

13.5.5 The “database” icon is where the data processing and reporting is done.

13.6 Go to the “workplace” icon. Set up the schedule in the “run” window. When setting up the schedule, the following information must be entered: sample ID under IDENT, dilution factor, and autosampler position. Name the schedule using the naming convention of instrument number, year, month, day, and run number. For example, the second IC run on 4/24/07 on the Metrohm (instrument 7), would be named 707042402. Make sure to save the schedule after it is completed.

13.6.1 Note: when the in-line filter is being used, a separate autosampler tube will be needed for each injection.

13.6.2 The autosampler is random access so samples do not have to be set up in the order that they are going to be run in the schedule.

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13.7 Load the autosampler and run the sample table test under the sample table option to make sure that the file is correct. Then start the run.

13.7.1 For this method, a daily calibration is required. The calibration must consist of a minimum of 3 standards and a blank and must not cover more than 2 orders of magnitude. Calibrations standards may be varied from the ones stated in this SOP depending on the levels of hexavalent chromium that are to be reported. A low standard must be at the reporting limit for hexavalent chromium (0.005 mg/l). A correlation coefficient of 0.999 is required. If this correlation coefficient is not met, than the instrument must be recalibrated.

13.7.2 After the calibration, the continuing calibration verification check standard (CCV) and a continuing calibration blank (CCB) must be run. The CCV must be from a separate source than the calibration curve and must have recoveries within a range of 90 to 110 percent. The CCB must have results of less than the reporting limit. If either of these QC points does not meet criteria, then all samples bracketed by this quality control must be reanalyzed. The exception is if there is a high bias in the CCV check and the associated sample results are less than the reporting limit.

13.7.3 After the CCV, CCB pair, then begin analyzing the samples and run QC. All samples and associated quality control (method blanks, spike blanks, matrix spikes, duplicate) must be analyzed in duplicate. The RSD between each duplicate must be checked and be within 20% or within $\pm$ reporting limit for hexavalent chromium. If this criteria is not met, then reanalyze the affected sample in duplicate.

13.7.3.1 Duplicate analyses are not required for the calibration curve or CCV and CCB checks.

13.7.3.2 Report the highest value from the two duplicate injections for each sample.

13.7.4 After every 10 samples (or every 20 injections of samples in duplicate) the CCV and CCB checks must be run. The continuing calibration checks must have recoveries in the range of 90 to110 percent. If the CCV or CCB fails to meet criteria, then all samples bracketed by the out of compliant QC should be rerun if possible.

13.7.4.1 Note: If the hexavalent chromium samples are close to holding time, then a single injection of each sample may be run to meet holding time criteria. If single sample injections are done, then run a CCV, CCB after every 10 single injections. The duplicate injections for each sample are still required and should be run as soon as possible after the completion of the initial injections.

13.7.5 After the run is completed, review all of the chromatograms and check for interferences, dilutions, etc.

13.7.6 For large or overlapping peaks, make dilutions using the buffered dilution water.

13.8 If no additional batches are to be analyzed on the instrument, then the instrument should be switched over to DI Water. For short periods of time (< 1 week), the eluent may be left in the column. For longer periods of time, put a 1:10 dilution of eluent into the column and cap both ends. To switch all other lines in the instrument to DI water, change the connections so that the column is off line. Then fill the eluent and PCR bottles with DI waters and set the flow rate to 0.5 ml/min for the eluent. Pump DI water through the system for at least 15 minutes.

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13.9 Review all data and update the appropriate tests in the LIMS system. A write-up including a run log, a calibration summary, batch quality control summary, and copies of all chromatograms should be turned into the area supervisor for each batch.

13.9.1 If edits are needed in the data, select the samples and go to the reprocessing menu. Make the appropriate changes and then update and reprocess the data. Generate the export file as described below. Go to Tools, Template, Export Template, and SOEXPORT. Edit the file name to the correct name (as outlined in 12.6 above) and hit OK. Then go to Determinations, export, and SOEXPORT. The csv file will be saved on the general chemistry network drive under the Metrohm folder.

13.9.2 If manual integrations are needed for any reason, then all requirements from the manual integration SOP, EQA044, must be followed.

13.10 Calculations are done using the equations summarized in 11.11.3

14.0 INSTRUMENT MAINTENANCE FOR THE DX-500 or ICS3000.

14.1 Periodically, due to the matrix of samples, both guard and analytical columns become degraded and cleaning them becomes necessary. This is evidenced in changing retention times, round-shaped peaks, tailing peaks and overall poor integration. Column clean-ups should be done on an as needed basis. There are 3 recommended cleanup solutions for the NG1 and AS7 columns.

14.1.1 Metal contamination column clean-up: Use 500 ml of 0.1M oxalic acid solution.

14.1.2 Low valency hydrophilic ionic contamination column clean-up. Use 500 ml of 10X eluent concentrate.

14.1.3 High valency hydrophobic ion 200 mM HCl in 5% acetonitrile: The acetonitrile solution is stored in a separate eluent bottle because acetonitrile slowly breaks down in acidic aqueous solutions. Prepare 2 bottles (E1 and E2) with the following 500-mL solutions: E1: 5% Acetonitrile and E2: 200 mM HCl using DI water.

14.1.4 Column Clean-up Procedure.

14.1.4.1 Prepare 500 mL solution of the appropriate cleanup solution from 12.1

14.1.4.2 Reverse the order of the guard and analytical column in the eluent flow path. Contaminants that have accumulated on the guard column can be eluted onto the analytical column and irreversibly damage it. If in doubt, clean each column separately. Double check that the eluent flows in the direction designated on each of the column labels.

14.1.4.3 Set the pump flow rate to 0.5 mL/min for an AS7 analytical and NG1 guard column.

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14.1.4.4 Rinse the column for 15 minutes with DI water before pumping the chosen cleanup solution over the columns.

14.1.4.5 Pump the cleanup solution through the column for at least 60 minutes.

14.1.4.6 If using the 200 mM HCl in 5% acetonitrile, use a gradient to introduce the clean-up solution into the columns. (i.e. – gradually increase the concentration until you are at the full solution concentration. After clean-up, also gradually decrease the concentration.)

14.1.4.7 Rinse the column for 15 minutes with DI water before pumping eluent over the column.

14.1.4.8 Equilibrate the columns with eluent before resuming normal operation for at least 30 minutes.

14.1.4.9 Reconnect analytical and guard columns in the normal run configuration.

15.0 INSTRUMENT MAINTENANCE FOR THE METROHM

15.1 Change the in-line filter every 100 injections. If running holding time critical samples, make sure to change the filter before starting the run.

15.2 Change the column guard frit every 300 to 400 injections

15.3 Change the pump seals as needed, when leaking or pressure problems are observed.

15.4 The digestion solution can cause problems with clogging and leaking of the system. Putting a 100 mM HCl rinse through the system helps remove the alkaline salts. Fill the autosampler tubes with 100 mM HCl rinse. Take the column and the guard frit off line and pump through the HCl rinse and a DI water rinse. It is recommended that this rinse procedure be done after every run.

15.5 Periodically, due to the matrix of samples, the analytical columns become degraded and cleaning them becomes necessary. This is evidenced in changing retention times, round-shaped peaks, tailing peaks and overall poor integration. Column clean-ups should be done on an as needed basis following the recommendations in the Metrohm column documentation. If the column cannot be adequately cleaned, then it may need to be replaced.

16.0 QC REQUIREMENTS

16.1 Analyze a new calibration curve, at a minimum, on each analysis day. The curve must be made up of a minimum of 3 points and a blank, but more standards may be run if needed. The calibration curve is required to have a correlation coefficient greater than or equal to 0.999.

$$r = \frac{\Sigma(x - \bar{x})(y - \bar{y})}{\sqrt{\Sigma(x - \bar{x})^2 \Sigma(y - \bar{y})^2}}$$

Where r = correlation coefficient

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x = amount of analyte
y = response of instrument

$\bar{x}$ = average of x values

$\bar{y}$ = average of y values

16.2 Initially analyze all samples undiluted. If the sample concentration is higher than the highest standard, then reanalyze the sample as a dilution. Prepare the dilution so that the sample is in the mid-range of the calibration curve. Each sample must be analyzed with at least two duplicate injections and the RSD between the two injections must be less than 20% or the results must be within a window of plus or minus the detection limit from each other. The duplicate injections should normally be run concurrently, but may be run sequentially if needed to meet holding time requirements. The higher of the two replicate injections must be reported. If the replicate injections do not meet the RSD criteria stated above, then analysis should be repeated with additional replicate injections.

16.3 One preparation blank is required for each set of 20 samples or less or with each batch. The preparation blank is required to contain all the reagents in the same volumes as used in the preparation of the samples. The preparation blank is required to be less than the RL. If it is over the RL, correct the problem and restart the analysis if this is possible within holding time. If it will be outside of holding time, then complete the initial analysis within holding time and check with the area supervisor for further instructions.

16.4 After every 10 samples, every 20 readings (10 samples with duplicate injections) and at the end of the sample analysis sequence a mid-level calibration check (CCV) and a calibration blank (CCB) must be analyzed. Prepare the mid-point calibration check from a different stock than the calibration curve. This calibration check standard must also be analyzed at the beginning of the analysis immediately after the calibration curve. The acceptance criteria for the mid-range calibration check standard is 90 – 110% of the true value of the standard. If the CCV fails this criteria, correct the problem and then reanalyze all samples in the area bracketed by the non-compliant CCV. The acceptance criteria for the CCB is less than the reporting limit. If the CCB fails this criteria, correct the problem and then reanalyze all samples in the area bracketed by the non-compliant CCB.

16.5 Prepare and analyze a duplicate sample (i.e. two sets of duplicate injections) for each set of 20 samples of a similar matrix or with each batch, whichever is smaller. An acceptance criteria of 20 percent relative percent difference or + the RL is applied.

16.6 Prepare and analyze a matrix spike for each set of 20 samples of a similar matrix or with each batch, whichever is smaller. An acceptance criteria of 85 to 115 percent recovery is applied if the spike amount is greater than one fourth of the sample amount. If the matrix spike does not meet this criteria, then flag the matrix spike results as indicating possible matrix interference.

16.7 A spike blank or lab control must be prepared and analyzed for each set of 20 samples of a similar matrix or with each batch, whichever is smaller. The spike blank or lab control can be prepared using either soluble or insoluble hexavalent chromium as the spike. The acceptance range for the spike blank is 90 to 110 percent recovery. If the spike blank is not within that range, do not proceed. Check with the laboratory supervisor or manager for further directions.

16.8 Retention Time Windows. Because the hexavalent chromium is separated in the column and then

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colorimetrically reacted before detection, retention time identification is not as critical as with other ion chromatographic methods. However, a significant shift in retention time may point to analytical problems. Therefore, the hexavalent chromium peak must be within a reasonable retention time window to be considered valid. A criterion of 5% is normally applied. However, sample concentration and matrix can greatly affect retention time and the experience of the analyst and reviewer should weigh heavily in the interpretation of a chromatogram. Values in a window of 10% can be accepted at the discretion of a senior reviewer. Values outside of the 10 % window cannot be reported unless that peak is confirmed with a post-digest spike.

17.0 DOCUMENTATION REQUIREMENTS

17.1 The analyst should document all relevant information, including pH values, all times relevant to the pH adjustment process, any relevant comments for any section of the analysis. Spiking amounts and traceability on all reagents must also be documented.

18.0 DATA REVIEW AND REPORTING

18.1 All samples should be updated to QC batches in the LIMS system. The analyst should calculate all duplicate RPD's and spike recoveries. The data should be processed through the GNAPP step in the LIMS.

18.2 All documentation must be completed. The data report should be turned in to the senior review staff for final review.

19.0 POLLUTION PREVENTION & WASTE MANAGEMENT.

19.1 Users of this method must perform all procedural steps in a manner that controls the creation and/or escape of wastes or hazardous materials to the environment. The amounts of standards, reagents, and solvents must be limited to the amounts specified in this SOP. All safety practices designed to limit the escape of vapors, liquids or solids to the environment must be followed. All method users must be familiar with the waste management practices described in section 18.2.

19.2 Waste Management. Individuals performing this method must follow established waste management procedures as described in the waste management SOP, EHS004. This document describes the proper disposal of all waste materials generated during the testing of samples as follows:

19.2.1 Non hazardous aqueous wastes.

19.2.2 Hazardous aqueous wastes

19.2.3 Chlorinated organic solvents

19.2.4 Non-chlorinated organic solvents

19.2.5 Hazardous solid wastes

19.2.6 Non-hazardous solid wastes

20.0 ADDITIONAL REFERENCES.

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20.1 Refer to the appropriate instrument and column manuals.

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Lab Manager:_____

QA Manager:_____

Effective Date:_____

TITLE: SAMPLE AND WASTE DISPOSAL

Revised : Sections 2.6; 4.0 format "should" to "must"; 4.3; 5.1.1.6; 5.1.1.7; 5.2.2.5; 5.6.1 removed old 5.1.2

1.0 Scope

1.1 This document describes the procedures used by Accutest Laboratories to dispose of samples and solvent waste.

2.0 Summary

2.1 All samples including CLP samples performed for commercial clients are kept in storage for a minimum of 30 days after the completion of the analysis report. Samples may be stored for a longer period or returned to client for disposal upon client request.

2.2 Data from each sample is compared to the Hazardous waste criteria established by the NJDEP. Samples with concentrations above the criteria are segregated for disposal

2.3 Non-hazardous aqueous samples are diluted and disposed into the lab sink, which pass through a neutralization system prior to entering the municipal system.

2.4 Non-hazardous solids are disposed of by the waste disposal contractor

2.5 All glass and plastic sample bottles are segregated and recycled. Following recycle, glass sample bottles are crushed and plastic bottles are acid washed and shredded to destroy sample labels and minimize waste volumes.

2.6 Solvent waste is collected from specified locations in the lab. The solvents are separated as chlorinated, non-chlorinated and waste oil, transferred into plastic drums, then removed from the premises and disposed of by the hazardous waste contractor.

2.7 Accutest Laboratories is classified as a Small Quantity Generator (SQG) under RCRA. As such, all waste disposal operations shall operate under the guidelines set forth in this act for SQGs.

3.0 Definitions

CHAIN OF CUSTODY: An unbroken trail of accountability that ensures the physical security of samples and includes the signatures of all who handle the samples.

CORRECTIVE ACTION: The action taken to eliminate the causes of an existing nonconformity, defect or other undesirable situation in order to prevent recurrence.

DOCUMENT CONTROL: The act of ensuring that documents, and revisions thereto, are proposed, reviewed for accuracy, approved for release by authorized personnel, distributed properly and

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controlled to ensure the correct version is at the location where the prescribed activity is being performed.

MATRIX: The component or substrate (e.g., water, soil) which contains the analyte of interest.

QUALITY ASSURANCE: An integrated system of activities involving planning, quality control, quality assessment, reporting and quality improvement to ensure that a product or service meets defined standards of quality with a stated level of confidence.

QUALITY CONTOL: The overall system of technical activities whose purpose is to measure and control the quality of a product or service so that it meets the needs of users.

REAGENT WATER: Water that has been generated by any method, which would achieve the performance specifications for ASTM Type II water. For organic analyses, see the definition of organic-free reagent water.

SUPERVISOR: The individual designated as being responsible for a particular area or category of scientific analysis. This responsibility includes direct day-to-day supervision of technical employees, supply and instrument adequacy and upkeep, quality assurance/quality control duties and ascertaining that technical employees have the required balance of education, training and experience to perform the required analyses.

TRACEABILITY: The property of a result of a measurement whereby it can be related to appropriate standards, generally international or nation standards, through an unbroken chain of comparisons.

4.0 **Health & Safety**

4.1 The analyst should follow normal safety procedures as outlined in the Accutest Laboratories Health and Safety Program Manual, the Chemical Hygiene Plan and the Personal Protection Policy, which includes the use of safety glasses, lab coats and gloves. In addition, all acids are corrosive and should be handled with care. Flush spills with plenty of water. If acids contact any part of the body, flush with water for at least fifteen minutes and contact the department supervisor or the Health and Safety Manager immediately.

4.2 The toxicity or carcinogenicity of each reagent used in this method has not been precisely determined; however, each chemical should be treated as a potential health hazard. Exposure to these reagents should be reduced to the lowest possible level. The laboratory is responsible for maintaining a current awareness file of OSHA regulations regarding the safe handling of the chemicals specified in this method. A reference file of material safety data sheets (MSDS's) has been made available to all personnel involved in these analyses.

4.3 The reference file of MSDSs is maintained in the neutral zone area outside the general chemistry lab, for the analyst's use.

4.4 Analysts should wear safety glasses, splash goggles or a shield for eye protection, protective clothing, and observe proper mixing techniques when working with these reagents.

5.0 **Procedure**

5.1 Laboratory Sample Disposal. Samples are kept in storage for approximately thirty (30) days after completion of the analytical report, unless otherwise specified.

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5.1.1 A Sample Disposal Sheet is generated by the laboratory information management system (LIMS) and is printed minimally on a weekly basis by the Sample Management Department. The sheet only lists the samples that have been reported 30 days prior.

5.1.1.1 (Attachment A). Samples with concentrations greater than these levels are reported on the disposal sheet as **hazardous**. Samples with results less than these levels are reported on the disposal sheet as **normal**, indicating it is **not hazardous**.

5.1.1.2 Samples on the disposal sheet are removed from the refrigerators and disposed of based on their hazardous or non-hazardous status. The sample custodian signs and dates this sheet to document the disposal.

5.1.1.3 Non-hazardous aqueous samples are disposed through the laboratory drain as municipal waste and diluted with copious amounts of water. All aqueous liquids pass through a neutralization tank before entering the sewer system.

5.1.1.4 Hazardous aqueous samples are poured into a properly labeled mixed aqueous sample waste drum. When the drum is full, an aliquot is removed, assigned an Accutest job number and submitted to the lab for TCLP and RCRA/ID27 analyses. The results are submitted to the waste disposal contractor. The waste disposal contractor picks up the drum, the manifests are maintained by the Health, Safety and Facilities Manager. Manifests are kept for three years.

5.1.1.5 The waste disposal contractor follows the same procedure for hazardous soil samples when disposing of non-hazardous soil samples.

5.1.1.6 Glass sample bottles are processed through a commercial recycling operation where they are crushed to minimize volume and destroy the sample labels.

5.1.1.6.1 Sample bottles (clear and brown glass), the contents of which have been emptied, are placed into the co-mingled recyclables dumpster.

5.1.1.6.2 The dumpster is emptied once a week and the bottles are transported to the recylcler's transfer station, where they are loaded into trailers.

5.1.1.6.3 The trailers are delivered to a recycling center where the recyclables are separated into categories (i.e.- glass, plastics and aluminum). The glass containers are further separated by color.

5.1.1.6.4 The glass containers are transported to a processing facility in Bridgeport, NJ.

5.1.1.6.5 The glass is ground up into chunks, no bigger than ½ inch and the ground glass is transported to an end-product" processor.

5.1.1.7 Plastic sample bottles are processed through a commercial recycling operation where they are acid washed and shredded to minimize waste volume and destroy the labels.

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5.1.1.7.1 Plastic containers, after being emptied, are placed in the co-mingled recyclable dumpster with the recyclable glass and aluminum cans.

5.1.1.7.2 After being separated from the glass and aluminum at a transfer transfer station, they are loaded onto trailers.

5.1.1.7.3 The trailers are taken to a recycling center for processing.

5.1.1.7.3.1 The recycling center performs an acid wash on the containers to remove the labels and stickers.

5.1.1.7.3.2 The containers are then boiled to further sterilize them.

5.1.1.7.3.3 Once the containers are sterilized, they are shredded.

5.1.1.7.4 The shredded plastic is baled and shipped to an end-user.

5.1.1.8 Hazardous soil samples are placed into a designated solids waste drum. When the drum is filled, an aliquot is removed, assigned an Accutest job number and submitted to the lab for TCLP and RCRA/ID27 analyses. The results are submitted to the waste disposal contractor. The waste disposal contractor picks up the drum, the manifests are maintained for a period, not less than three years, by the Health, Safety and Facilities Manager.

5.1.2 Disposal is performed according to State and Federal guidelines, as applicable, as well as any criteria set forth by the hazardous waste disposal contractor.

5.1.3 Samples may also be returned to the client for disposal upon request or held longer than 30 days upon client request.

5.2 Solvent Waste Disposal

5.2.1 Laboratory wastes, by-products of analyses, are collected in designated areas throughout the lab. Hazardous waste containers are collected by the waste custodian and transferred to specific drums for disposal. The drums are stored in an enclosed area, separate from the laboratory.

5.2.2 In order to control solvent waste accumulation in the lab, hazardous waste pickups are scheduled at designated areas, throughout the laboratory, by the waste custodian, on an “as needed” basis.

5.2.2.1 Properly labeled, one-gallon, hazardous waste containers, for chlorinated and non-chlorinated waste, are strategically located throughout the laboratory.

5.2.2.2 The Hazardous Waste Custodian collects these items and places them in the respective drums.

5.2.2.3 There are four satellite areas: two hoods in the GC/MS lab, one hood in the extraction lab and one hood in the general chemistry lab.

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5.2.2.4 Each analyst is responsible for disposing hazardous waste into the designated, hazardous waste container(s). Analysts may not store waste at the bench for more than one 8-hour work shift.

5.2.2.5 Volatile Screening Area. The number of boxes of spent vials kept at the bench shall be kept at a minimum. The waste custodian will frequently check this area and removes boxes as necessary. Analysts may notify the hazardous waste custodian that a pickup is needed.

5.3 Solvent Extracts and Digestates.

5.3.1 Solvent extracts are collected for disposal following the 30-day holding period and drummed according to the extractant solvent.

5.3.1.1 Chlorinated solvent extracts are drummed as chlorinated wastes (i.e., methylene chloride)

5.3.1.2 Non-chlorinated solvent extracts are drummed as non-chlorinated wastes (i.e., acetone, hexane, methanol, and mixed solvents)

5.3.2 Digestates are collected for disposal following the 30-day holding period and drummed as corrosive liquid containing metals.

5.4 PCB Waste Disposal

5.4.1 Samples that are over the regulatory limit for PCB concentration (>50 ppm) are considered PCB hazardous waste and must be segregated from other types of hazardous waste.

5.4.1.1 Disposal technicians use a LIMS generated disposal list to identify those samples that are over the regulatory limit for PCB.

5.4.1.2 A PCB label (Small mark, see Fig. 1) is affixed to all sample bottles containing PCB hazardous waste. These marked containers are then placed into boxes that have similar PCB labels on their exterior. (Large mark, see Fig. 2).

5.4.1.2.1 Containers and/or articles holding PCB hazardous waste are labeled according to 40 CFR 761 Subpart C.

5.4.1.3 All boxes with PCB hazardous waste are brought to a storage area where a waste technician combines the sample material in drums specifically labeled for PCB hazardous waste.

5.4.1.4 PCB waste is then lab packed for removal by the hazardous waste disposal contractor.

5.5 Waste drums. The types of waste drums generated are summarized below.

5.5.1 Organic Extracts (separated as chlorinated and non-chlorinated waste)

5.5.2 Waste Oil

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5.5.3 Hazardous Soil
5.5.4 Hazardous Mixed Aqueous

5.5.5 Hazardous Sludge

5.5.6 Corrosive Liquid Containing Metals

5.5.7 Chlorinated Waste (i.e., Methylene Chloride)

5.5.8 PCB Hazardous Soil

5.5.9 PCB Hazardous Liquid Waste

5.5.10 Non-Chlorinated Waste (i.e., Acetone hexane, methanol, and mixed solvents)

5.5.11 Non-Regulated Soil

5.5.12 The contents of the waste drums are tested prior to release to the hazardous waste contractor.

5.5.12.1 Once a drum is filled, it is assigned an identification number, that consists of the last 2 digits of the current year and the next chronological number (e.g.-the first drum filled in 2002 is assigned ID: 02-001).

5.5.12.2 An aliquot is removed from the drum, assigned an Accutest job number and submitted to the laboratory for TCLP and RCRA/ID 27 analysis.

5.5.12.3 The results are reviewed by the Health, Safety and Facilities Manager and submitted to the waste disposal contractor for waste classification.

5.5.12.4 The drum-IDs are documented on the Waste Drum Tracking Form (Attachment A) when they are picked up by the hazardous waste disposal contractor. The Health, Safety and Facilities Manager maintains the manifests for a period, not less than three years. All drums are stored for no longer than the 180-day allowance as stated in the RCRA regulations.

5.5.13 The waste drums that have been sampled, analyzed and classified are released to the hazardous waste contractor. The Health, Safety and Facilities Manager maintains the manifests for a period, not less than three years.

5.6 USDA Soil Importation Agreement

5.6.1 Soil samples received at the lab from outside the continental United States must be disposed in accordance with Accutest's USDA Soil Permit. A copy of the agreement is on file with the Health & Safety Office.

5.6.2 Refer to SOP EHS006, Handling, Treatment and Disposal of Foreign Soils, for the proper procedures concerning the decontamination and disposal of foreign soils.

6.0 Documentation

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6.1 Hazardous Waste Storage Shed Inspection Logbook. This logbook is kept up by the Hazardous Waste Custodian or the Health, Safety and Facilities Manager to document the condition(s) in the Hazardous Waste Storage Area. The inspection of the Hazardous Waste Storage Shed must be completed and documented, minimally, on a weekly basis. The logbook is stored in the Hazardous Waste Area.

6.2 Waste Drum Tracking. This form is completed each time a waste drum is started or the waste disposal contractor collects sample drum. (Attachment C)

6.3 Sample Disposal Sheet. This form is generated by the laboratory information system (LIMS). It is printed weekly by the sample management department. The sheet lists only the samples that have been reported minimally 30 days prior and identifies the job number, sample number, matrix, sample storage location, received date, release date, account name, project and a hazardous or non-hazardous status. The sheet is signed and dated by the sample custodian when readying the samples for disposal.

7.0 Quality Control

7.1 The Hazardous Waste Custodian or the Health, Safety and Facilities Manager checks the waste storage shed weekly. The drums are checked for integrity and to assure they are secure and the storage area is verified to provide proper ventilation. Overall cleanliness and lack of unnecessary hazards are also part of the weekly inspection. The logbook is initialed and dated by the inspector.

7.2 Drums that hold liquid waste are placed on a safety deck to contain potential leaks.

7.3 To ensure the safety of the facility and personnel, it is required that the Hazardous Waste Custodian and the Health, Safety and Facilities Manager be certified in OSHA's 40 hour Hazardous Waste Operations.

7.3.1 The certification requires a refresher course to be taken annually.

8.0 Pollution Prevention & Waste Management

8.1 Users of this method must perform all procedural steps in a manner that controls the creation and/or escape of wastes or hazardous materials to the environment. The amounts of standards, reagents, and solvents must be limited to the amounts specified in this SOP. All safety practices designed to limit the escape of vapors, liquids or solids to the environment must be followed.

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Figure 1- Large PCB Mark (label).

Figure 2- Small PCB mark (label).

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Lab Manager: Nancy Cole

QA Manager:

Effective Date: 5/21/12

TITLE: COLD VAPOR ANALYSIS OF MERCURY FOR WATER SAMPLES

REFERENCE: EPA 245.1, revision 3.0 (1994) and SW846 7470A (modified)

Revised Sections: ***8.1***

1.0 SCOPE AND APPLICATION

1.1 This method can be applied for the analysis of mercury for all potable and non-potable water samples. This SOP is based on the May 1994 revision of EPA method 245.1. The reporting limit for mercury water samples based on the procedures outlined in this SOP, is 0.0002 mg/l.

1.2 Aqueous wastewater may also be analyzed following method 7470A. The modification to this method are a direct scale-down of the reagents and the use of an automated analyzer.

2.0 SUMMARY

2.1 Cold vapor mercury is a flameless AA procedure based on the absorption of radiation at 253.7 by mercury vapor. Organic mercury compounds are oxidized and the mercury is reduced to the elemental state and aerated from solution in a closed system. The mercury vapor passes through a cell positioned in the light path of an atomic absorption spectrophotometer. Results are quantitated by comparison to a daily calibration curve.

3.0 REPORTING LIMIT AND METHOD DETECTION LIMIT

3.1 Reporting Limit. The reporting limit for this method is established at the lowest concentration standard in the calibration curve. Detected concentrations below this concentration cannot be reported without qualification.

3.2 Method Detection Limit. Experimentally determine MDLs using the procedure specified in 40 CFR, Part 136, Appendix B. This value represents the lowest reportable concentration of an individual compound that meets the method qualitative identification criteria.

3.2.1 Experimental MDLs must be determined annually for this method.

3.2.2 Process all raw data for the replicate analysis in each MDL study.

4.0 DEFINITIONS

BATCH: A group of samples which behave similarly with respect to the sampling or the

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testing procedures being employed and which are processed as a unit. For QC purposes, if the number of samples in a group is greater than 20, then each group of 20 samples or less will all be handled as a separate batch.

CALIBRATION CHECK STANDARD. The calibration check standard is a mid-range calibration standard. The calibration check standard must be run at a frequency of 10 percent or less.
The mid-level calibration check standard criteria is either ± 5 or ± 10 percent of the true value.

EXTERNAL CHECK STANDARD. The external check standard is a standard from a separate source than the calibration curve that is used to verify the accuracy of the calibration standards. An external check must be run a minimum of once per quarter for all analyses where a check is commercially available. The laboratory should initially assess laboratory performance of a check standard using the control limits generated by the external check supplier. In house limits should also be generated once sufficient external check standard data is available to generate limits (usually a minimum of 20 to 30 analyses). If the external check is outside of the control limits for a given parameter, all samples must be reanalyzed for that parameter after the problem has been resolved.

SPIKE BLANK OR LAB CONTROL SAMPLE. Digest and analyze a laboratory control sample or spike blank with each set of samples. A minimum of one lab control sample or spike blank is required for every 20 samples. Assess laboratory performance against the control limits specified in the SOP. In house limits should also be generated once sufficient external check standard data is available to generate limits (usually a minimum of 20 to 30 analyses). If the lab control is outside of the control limits for a parameter, all samples must be redigested or redistilled and reanalyzed for that parameter. The exception is if the lab control recovery is high and the results of the samples to be reported are less than the reporting limit. In that case, the sample results can be reported with no flag.

MATRIX: The component or substrate (e.g., water, soil) which contains the analyte of interest.

MATRIX DUPLICATE: A duplicate sample is digested at a minimum of 1 in 20 samples. The relative percent difference (RPD) between the duplicate and the sample should be assessed. The duplicate RPD is calculated as shown below. Assess laboratory performance against the control limits that are specified in the SOP. In house limits are generated once sufficient duplicate data is available to generate limits (usually a minimum of 20 to 30 analyses). If a duplicate is out of control, flag the results with the appropriate footnote. If the sample and the duplicate are less than 5 times the reporting limits and are within a range of ± the reporting limit, then the duplicate is considered to be in control.
Note: If control limits are not specified in the SOP, use default limits of ± 20% RPD.

$$\frac{(|\text{Sample Result} - \text{Duplicate Result}|) \times 100}{(\text{Sample Result} + \text{Duplicate Result})/2} = \text{Duplicate RPD}$$

MATRIX SPIKE: The laboratory must add a known amount of each analyte to a minimum of 1 in 10 samples. The matrix spike recovery is calculated as shown below. Assess laboratory performance against the control limits that are specified in the SOP. In house limits are generated once sufficient matrix spike data is available to generate limits (usually

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a minimum of 20 to 30 analyses). If a matrix spike is out of control, then the results should be flagged with the appropriate footnote. If the matrix spike amount is less than one fourth of the sample amount, then the sample cannot be assessed against the control limits and should be footnoted to that effect.

$$\frac{\text{(Spiked Sample Result - Sample Result)}}{\text{(Amount Spiked)}} \times 100 = \text{Matrix Spike Recovery}$$

MATRIX SPIKE DUPLICATES: Intralaboratory split samples spiked with identical concentrations of target analyte(s). The spiking occurs prior to sample preparation and analysis. They are used to document the precision and bias of a method in a given sample matrix.

$$\frac{\text{(|MS Result - MSD Result|)} \times 100}{\text{(MS Result + MSD Result)/2}} = \text{MSD RPD}$$

METHOD BLANK. The laboratory must digest and analyze a method blank with each set of samples. A minimum of one method blank is required for every 20 samples. For a running batch, a new method blank is required for each different digestion day. If no digestion step is required, then the method blank is equivalent to the reagent blank. The method blank must contain the parameter of interest at levels of less that the reporting limit for that parameter. If the method blank contains levels over the reporting limits, the samples must be redigested or redistilled and reanalyzed. The exception to this rule is when the samples to be reported contain greater than 10 times the method blank level. In addition, if all the samples are less than a client required limit and the method blank is also less than that limit, then the results can be reported as less than that limit.

METHOD DETECTION LIMITS (MDLS). The minimum concentration of a substance 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. MDLs should be determined approximately once per year for frequently analyzed parameters.

REAGENT BLANK: The reagent blank is a blank that has the same matrix as the samples, i.e., all added reagents, but did not go through sample preparation procedures. The reagent blank is an indicator for contamination introduced during the analytical procedure. (Note: for methods requiring no preparation step, the reagent blank is equivalent to the method blank.) Either a reagent blank or a method blank must be analyzed with each batch of 20 samples or less. The concentration of the analyte of interest in the reagent blank must be less than the reporting limit for that analyte. If the reagent blank contains levels over the reporting limits, the samples must be reanalyzed. The exception to this rule is when the samples to be reported contain greater than 10 times the reagent blank level. In addition, if all the samples are less than a client required limit and the reagent blank is also less than that limit, then the results can be reported as less than that limit.

REAGENT GRADE: Analytical reagent (AR) grade, ACS reagent grade, and reagent grade are synonymous terms for reagents which conform to the current specifications of the Committee on Analytical Reagents of the American Chemical Society.

REAGENT WATER: Water that has been generated by any method which would achieve

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the performance specifications for ASTM Type II water. For organic analyses, see the definition of organic-free reagent water.

REFERENCE MATERIAL: A material containing known quantities of target analytes in solution or in a homogeneous matrix. It is used to document the bias of the analytical process.

STANDARD CURVE: A plot of concentrations of known analyte standards versus the instrument response to the analyte. Calibration standards are prepared by successively diluting a standard solution to produce working standards which cover the working range of the instrument. Standards should be prepared at the frequency specified in the appropriate section. The calibration standards should be prepared using the same type of acid or solvent and at the same concentration as will result in the samples following sample preparation. This is applicable to organic and inorganic chemical analyses.

5.0 HEALTH & SAFETY

5.1 The analyst must follow normal safety procedures as outlined in the Accutest Laboratory Safety Manual which includes the use of safety glasses and lab coats. In addition, all acids are corrosive and must be handled with care. Flush spills with plenty of water. If acids contact any part of the body, flush with water and contact the supervisor.

5.2 The toxicity or carcinogenicity of each reagent used in this method has not been precisely determined; however, each chemical must be treated as a potential health hazard. Exposure to these reagents should be reduced to the lowest possible level. The laboratory is responsible for maintaining a current awareness file of OSHA regulations regarding the safe handling of the chemicals specified in this method. A reference file of data handling sheets must be made available to all personnel involved in these analyses.

5.3 After the mercury digestate is reduced to Hg vapor, it must be handled in a closed system or in a hood to prevent inhalation of the toxic vapor. Make sure that the Hg instrument is vented directly to a hood.

6.0 PRESERVATION AND HOLDING TIME

6.1 All water samples must be preserved by acidification with nitric acid to a pH of 2 or lower and stored in a polyethylene or glass container.

6.2 All samples must be analyzed within 28 days of the date of collection.

7.0 INTERFERENCES

7.1 Possible interference from sulfide is eliminated by the addition of potassium permanganate. Concentrations of sulfide as sodium sulfide as high as 20 mg/l do not interfere with mercury recoveries when following this method. High copper concentrations (> 10 mg/l) may also interfere with mercury recoveries.

7.2 Samples that are high in chloride such as seawater, brine, and industrial effluent may

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require as much as 25 ml of additional permanganate. NOTE: When chloride concentrations are high, hydroxylamine sulfate and stannous sulfate should be used in place of the corresponding chlorides.

7.3 Finally, certain volatile organic materials will also absorb at this wavelength and can interfere. It can be determined if this type of interference is present by doing a preliminary run without reagents.

8.0 APPARATUS

8.1 Three Leeman instruments are available for analysis. Two are Leeman Hydra II AA automated analyzers and the other is a Leeman Hydra AA automated analyzer. Refer to the instrument manuals for further details on this instrumentation, including proper venting and safety requirements. Instrument maintenance is outlined below.

8.1.1 Change the sample tubing as needed.

8.1.2 Change the drying tubing as needed.

8.1.3 Clean the exterior of the instrument as needed.

8.1.4 Adjust the Hg lamp as needed. This can be done in the software on both instruments.

8.1.5 Complete any other maintenance required to maintain the instrument in good running order including, but not limited to, cleaning the cell, changing other tubing, changing the Hg lamp, etc.

8.2 Heating Equipment.

8.2.1 Graphite heating block. Capable of heating at 95 °C for 2 hours.

8.3 Digestion Bottles. Disposable plastic digestion tubes are used with the graphite heating block.

8.3.1 Disposable plastic digestion tubes (65 ml volume) with tops for graphite heating block.

8.4 Calibrated glass tubes with verified 60.0 ml and 100.0 ml final volume calibration mark for bringing graphite heating block digestates to their final volume. (The 100 ml calibration is only required for soil digestions).

8.4.1 At a minimum of once per year, the calibration of these bottles must be verified and documented in the Hg Bottle calibration log following the procedure outlined below.

8.4.2 Carefully measure 60.0 ml of room temperature (20 to 25 deg. C) deionized water with a class A to deliver volumetric cylinder and pour into the calibrated Hg bottle.

8.4.3 If the bottom of the meniscus is on the calibration line, then the bottle

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passes calibration and can be used.

8.4.4 If the bottom of the meniscus is not on the line, then the bottle should be removed from service and replaced with a newly calibrated bottle. New bottles are calibrated following the same procedure as above, except that a line must be etched into the bottle at the bottom of the meniscus of the 60 ml of DI water.

8.4.4.1 Two different lines for the same volume (i.e. 60 ml) cannot be etched on the same bottle as that may lead to confusion in the measurement of the final volume.

8.4.5 Repeat the steps in 8.4.2 through 8.4.4 using a 100 ml final volume instead of the 60 ml final volume.

8.5 Class A, to deliver, volumetric cylinders for measuring initial sample volumes and for calibrating glass tubes as outlined above.

8.6 Automatic pipettor bottles. Refer to EQA063 for calibration information.

9.0 REAGENTS

All chemicals listed below are reagent grade unless otherwise specified. Deionized water should be used whenever water is required. All solutions listed below may be scaled up or down proportionally as needed.

9.1 Sulfuric acid, concentrated.

9.2 Nitric acid, concentrated. This acid must have a low mercury content.

9.3 Dilution acid. To approximately 400 ml of DI water, add 33.4 ml of concentrated sulfuric and 16.6 ml of concentrated nitric. Dilute to a final volume of 1000 ml. This dilution acid is used for making dilutions of digested samples.

9.4 Stannous chloride. Add 7.5 ml of concentrated sulfuric acid to approximately 400 ml of DI water. Dilute to 500 ml with DI water and mix well. Add 50 g of stannous chloride and dissolve. Make sure that this solution is dissolved while in use.

9.4.1 Stannous sulfate may be used in place of stannous chloride.

9.5 Sodium chloride-Hydroxylamine hydrochloride. Add 240 g of sodium chloride and 240 g of hydroxylamine hydrochloride to 2000 ml of water. Mix well. Hydroxylamine sulfate may be used in place of hydroxylamine hydrochloride.

9.6 Potassium Permanganate, 5 percent solution, w/v. Add 50 g of potassium permanganate to 1000 ml of water and mix well. **Caution** - Potassium permanganate is a strong oxidizing agent. Handle with care.

9.7 Potassium Persulfate, 5 percent solution, w/v. Dissolve 50.0 g of potassium persulfate in 1000 ml of water and mix well. **Caution** - Potassium persulfate is a

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strong oxidizing agent. Handle with care.

9.8 Mercury standard solutions.

9.8.1 10 ppm Hg solution. Using a 1.00 ml volumetric pipet or autopipet, add 1.00 ml of 1000 ppm stock (to be purchased from a vendor such as Fisher) to a 100 ml volumetric flask containing approximately 75 ml of water and 2.0 ml of concentrated nitric acid. Dilute to volume with water and mix well. This standard may be held for up to 28 days.

9.8.1.1 The 10 ppm external source should be made up following the directions in 9.8.1.

9.8.2 40.0 ppb Hg solution. Using an autopipet, add 0.400 ml of 10 ppm Hg solution to a 100 ml volumetric flask containing approximately 75 ml of water and 2.0 ml of concentrated nitric acid. Dilute to volume with deionized water and mix well. This standard must be made fresh daily.

9.8.2.1 The 40.0 ppb external source should be made up following the directions in 9.8.2.

9.8.3 4 ppb Hg solution. Using volumetric pipets or autopipets, add 10.0 ml of 40.0 ppb Hg solution to a 100 ml volumetric flask containing approximately 75 ml of DI water and 2.0 ml of concentrated nitric acid. Dilute to volume with deionized water and mix well. This standard must be made fresh daily.

10.0 WATER DIGESTION FOR GRAPHITE HEATING BLOCK

Below is a step-by-step procedure for the digestion and analysis of water samples for mercury.

10.1 If necessary, acid rinse disposable digestion tubes with 10% nitric acid and deionized water before use.

10.2 Make up a standard curve consisting of 5 standards and a blank. Suggested concentrations are shown below. All standards are made up to a final volume of 40 ml. Different concentrations may also be used, as long as all of the method requirements are met. Make sure to clearly label each bottle. Calibration standards must be prepared fresh with each digestion batch.

ml of 4 ppb Hg solution	ml of 40 ppb Hg solution	Ml of DI water	Total ug of Hg	ug/L of Hg
0.000	0.000	40	0.000	0.000
2.00	0.000	38.0	0.008	0.20
5.00	0.000	35.0	0.020	0.50
0.00	1.00	39.0	0.040	1.00
0.00	2.50	37.5	0.100	2.50
0.00	5.00	35.0	0.200	5.00

10.3 Samples. For each sample, homogenize the sample well and measure out a

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representative 40.0 ml aliquot of the sample into the digestion tube using a class A, to deliver, graduated cylinder. A smaller volume may be used if there are matrix problems or high levels of mercury in the sample.

10.4 Make up additional quality control samples as shown below, using a final volume of 40 ml for each check standard. (Note: if a different standard curve is run, then the levels of the CCV and ICV standards should be adjusted accordingly in accordance with the requirements in the methods) Make sure to clearly label each bottle. Make sure to prepare enough CCV checks for the entire run. The ICV check must be from an alternate source of standards than the calibration curve. The CCV must be made from the same source as the calibration curve. A low check standard at the level of the CRDL (0.20 ug/l) is also required. This 0.20 ug/l check can be made up as outlined for the standard curve.

Sample ID	ml of 40 ppb Hg solution	ml of DI water	Total ug of Hg
CCV Check(s)	2.5	37.5	0.25
MB	0.0	40	0.0
MS	2.0	(a)	0.20 (b)
MSD	2.0	(a)	0.20 (b)
ICV	3.0	37.0	0.30
LCS	2.0	38.0	0.20

a (a) 40 ml of sample
(b) plus the level of Hg in the sample.

10.5 To all samples, QC, and standards add the reagents listed below, swirling the samples well after each addition of reagent. Allow the samples to stand for at least 15 minutes after the addition of the permanganate. If the sample decolorizes, add additional permanganate until the purple color persists.

- 2.0 ml of conc. sulfuric acid.
- 1.0 ml of conc. nitric acid.
- 6.0 ml of 5% permanganate solution.

Wait 15 minutes, then

- 3.2 ml of potassium persulfate solution.

10.5.1 All of the additions shown can be done with a bottle pipettor which must be accurate to within a range of 90 to 110%.

10.6 Cap the samples and place them in the graphite heating block and heat for 2 hours at 95 °C. Record the digestion times and temperature.

10.7 Enter the prep data into the LIMS system, double checking all volumes and spike amounts. After the prep data is checked, it can be approved and is available for use in the final calculations.

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11.0 COLD VAPOR ANALYSIS PROCEDURE HYDRA AA

11.1 While the samples are digesting, begin setting up the Leeman analyzer following the steps outlined below. Additional instructions are available in the instrument operators' manual.

11.1.1 Turn on the nitrogen and adjust to 60 to 90 psi. Turn on the instrument power if it is not already on.

11.1.2 Check the pump tubing and make sure that it is not flattened. Change if appropriate. Put the tubing in the clamps on the pump. Check the drying line and make sure that it is clean. Put fresh stannous chloride solution in the stannous chloride bottle. Fill the rinse bath or rinse bottle with fresh 10% nitric acid. The bath should be filled no more than ¾ full. Place the autosampler line and the stannous chloride line in the rinse container.

11.1.3 Turn on the analyzer and allow it to warm up.

11.1.3.1 In the software, go to the Runner section and select the control tab. Click on the Hg lamp and the pump. The gas will turn on automatically when the pump is turned off. If can also be turned on separately if necessary. The pump rates and gas pressure are set in the protocol. Refer to the instrument maintenance manual for more information on setting up a new protocol. If the Hg lamp needs to be optimized, it can be done using the lab adjust on this page.

11.1.4 Tighten the pump clamps until the flow is coming evenly through the lines. Do not overtighten.

11.1.4.1 In the software, go to the Utility tab and pick the gas control test option. The output should be approximately 7 psi and the input should be between 60 to 90 psi. If the pressures are not correct, check with the area supervisor or manager before proceeding.

11.1.5 Start a batch to save your data.

11.1.5.1 Go to the sample runner tab and click on start new batch. The batch name is limited to 8 characters. The batch should normally be named H1 or H2 followed by the month and date, followed by the matrix designation for the batch, following by the run number. For example, the first water batch on instrument 2 for 3/24/03 would be named H20324w1. The realtime print option can also be turned on from this tab.

11.1.6 Set up autosampler racks containing the samples that are going to be run.

11.1.6.1 Go to main tab and click on the rack editor button. Enter your samples and the appropriate QC. CCV and CCB checks can be entered in the macro column. This tab may also be reached by clicking on the autosampler icon at the top of the page.

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11.1.7 Set up the calibration.

11.1.7.1 Enter or verify the standard values. From the runner menu click on the standard tab. Click the buttons to the left of the standards that are to be run. Also click on the number of replicates to be run for each standard. Normally one replicate is run per standard. The standard concentrations are defined under the database menu under the line info tab. The check standard concentrations and acceptance ranges are also defined under this line info tab. Make sure to always click apply when any changes are made in a tab.

11.2 Add hydroxylamine hydrochloride to all samples and standards as outlined below.

11.2.1 Add 2.4 ml of hydroxylamine hydrochloride solution to each standard and sample and swirl until the solution has been completely decolorized. Transfer to a calibrated glass cylinder and dilute to a final volume of 60 ml and swirl to mix.

11.2.2 They hydroxylamine hydrochloride can be added using a bottle pipettor which is accurate in a range of 90 to 110%.

11.3 Measure out aliquots of the digested standards and samples into the autosampler cups. Work from the prep log and double check all transfers. Let all samples sit uncovered in the open autosampler vials for a minimum of one minute. Place the racks in the autosampler. Move the stannous chloride line into the stannous chloride bottle.

11.4 Start the calibration.

11.4.1 Turn on the real time report by checking the real time printing option on the runner menu either under main or under sample. Then go to the runner menu and the standard tab. Push the standard auto button. The calibration curve will be run by the autosampler. When the curve is complete, go to the database menu and click the calibration curve tab. Check to make sure that all acceptance criteria are met and then accept the curve. See section 13.3 for calibration curve criteria. Make sure that the curve is printed as soon as it is accepted.

11.5 After the calibration has been accepted, start to run the samples.

11.5.1 Go to the runner menu and the sample tab. Pick the autosampler rack that is to be run and type in the start cup and the end cup. Then push the button for run auto.

11.6 Review the data. Any samples that are over the range of the curve should be diluted with the dilution acid (see Section 9.3) and reanalyzed. It is recommended that any sample analyzed after a sample with a value over the curve be reanalyzed for confirmation. Make sure to bracket every 10 samples with CCV and CCB checks.

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11.7 Both paper and electronic reports can be generated using the report option. Never delete any samples from the reports. Electronic reports should be transferred into the LIMS system where the final calculations are done.

11.7.1 Go to the data base menu and pick the report tab. Make sure that the correct report specification has been chosen (normally Accutest). Pick the batch that is to be printed and then push the generate report button. Generate both the electronic reports (prn file) and printed reports (report) from this menu.

11.8 The calculations are done in the LIMS as described below. A final volume of 40.0 ml is used for calculation purposes for graphite heating block digestions. (The volume of 60.0 ml is factored out since all standards and samples are brought up to the same final volume and standard concentrations are calculated based on 40.0 ml.)

Final sample concentration in mg/L =

$$\frac{\text{concentration in the digestate in ug/l x final volume in ml}}{\text{Initial volume in ml}}$$

11.9 Review the data in the LIMS, adding comments and accepting results as appropriate.

11.10 Shut down the instruments.

11.10.1 To shut down the Hydra AA instrument, move the stannous chloride line from the stannous chloride bottle to the rinse container. Let the system rinse with 10% nitric for several minutes. Then switch the bath to DI water and let rinse for several more minutes. Then empty the rinse bath and let the pump and gas run until the lines are completely dry. Go to Taskmaster and select the standby mode option. Release the tension on all of the pump clamps.

12.0 COLD VAPOR ANALYSIS PROCEDURE HYDRA AA II

12.1 While the samples are digesting, begin setting up the Leeman analyzer following the steps outlined below. Additional instructions are available in the instrument operators' manual.

12.1.1 Turn on the nitrogen and adjust to 60 to 90 psi. Turn on the instrument power if it is not already on.

12.1.2 Check the pump tubing and make sure that it is not flattened. Change if appropriate. Put the tubing in the clamps on the pump. Check the drying line and make sure that it is clean. Put fresh stannous chloride solution in the stannous chloride bottle. Fill the rinse bath or rinse bottle with fresh 10% nitric acid. The bath should be filled no more than ¾ full. Place the autosampler line and the stannous chloride line in the rinse container.

12.1.3 Turn on the analyzer and allow it to warm up.

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12.1.3.1 For the Hydra AA II, open the Envoy software. Go to Method and click Instrument Control. On the Instrument Control page, click the startup icon. This will turn on the lamp, gas, and pump. You may also turn on/off the lamp, gas and pump individually on the Instrument Control Page.

12.1.4 Tighten the pump clamps until the flow is coming evenly through the lines. Do not overtighten.

12.1.4.1 Go to the Instrument control tab and pick the gas control test option. The input should be approximately 0.25 LPM. If the pressures are not correct, check with the area supervisor or manager before proceeding.

12.1.5 Start a batch to save your data.

12.1.5.1 Create a new chapter (Data File) by clicking Analysis. The batch should normally be named H5 followed by the month date and year, followed by the matrix designation for the batch, following by the run number. For example, the first water batch on instrument for 3/24/03 would be named H5032411w1. The realtime print option can also be turned on from this tab.

12.1.6 Set up autosampler racks containing the samples that are going to be run.

12.1.6.1 Create a new sequence by clicking sequence-new. Type the sequence name. After typing the samples in to sequence page make sure to click update and save. CCV and CCB checks can be entered in the macro column of the sequence page.

12.1.7 Set up the calibration.

12.1.7.1 Go to the Method menu, enter or verify the standard concentration by clicking on the standard tab. Also select number of replicates to be run for each standard. Normally one replicate is run per standard. The check standard concentrations and acceptance ranges are also defined under this standard info tab. Make sure to always click apply when any changes are made in a tab.

12.2 Add hydroxylamine hydrochloride to all samples and standards as outlined below.

12.2.1 Add 2.4 ml of hydroxylamine hydrochloride solution to each standard and sample and swirl until the solution has been completely decolorized. Transfer to a calibrated glass cylinder and dilute to a final volume of 60 ml and swirl to mix.

12.2.2 They hydroxylamine hydrochloride can be added using a bottle pipettor which is accurate in a range of 90 to 110%.

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12.3 Measure out aliquots of the digested standards and samples into the autosampler cups. Work from the prep log and double check all transfers. Let all samples sit uncovered in the open autosampler vials for a minimum of one minute. Place the racks in the autosampler. Move the stannous chloride line into the stannous chloride bottle.

12.4 Start the calibration.

12.4.1 Click run sequence. The instrument will run the calibration and then pause. Click stop. Go to the Calibration page. Accept the calibration and then print the calibration. Click the Document icon, then choose HG5-PDF. Rename the file as MA*****_cal.

12.5 After the calibration has been accepted, start to run the samples.

12.5.1 For the Hydra AA II, go to the Sequence page. Right click on the first sample (ie. ICV) and click start from here.

12.6 Review the data. Any samples that are over the range of the curve should be diluted with the dilution acid (see Section 9.3) and reanalyzed. It is recommended that any sample analyzed after a sample with a value over the curve be reanalyzed for confirmation. Make sure to bracket every 10 samples with CCV and CCB checks.

12.7 Both paper and electronic reports can be generated using the report option. Never delete any samples from the reports. Electronic reports should be transferred into the LIMS system where the final calculations are done.

12.7.1 Go to analysis-Click result-Click chapter. Then go to report and select report spec. The normal report spec is "ACCUTEST". Click OK. Click on chapter in order to select all samples. Then click report output and then csv.file. Save as MA*****.csv. To print, select printer output and then type the report title (i.e. MA*****) and enter OK.

12.8 The calculations are done in the LIMS as described below. A final volume of 40.0 ml is used for calculation purposes for graphite heating block digestions. (The volume of 60.0 ml is factored out since all standards and samples are brought up to the same final volume and standard concentrations are calculated based on 40.0 ml.)

Final sample concentration in mg/L =

$$\frac{\text{concentration in the digestate in ug/l x final volume in ml}}{\text{Initial volume in ml}}$$

12.9 Review the data in the LIMS, adding comments and accepting results as appropriate.

12.10 Shut down the instruments.

12.10.2 To shut down the Hydra AA II, move the stannous chloride line from the stannous chloride bottle to the 10% HNO3 rinse bottle. Let the system rinse with 10% HNO3 for several minutes. Then switch the line to DI water bottle

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and let rinse for several more minutes. Let the pump and gas run until the lines are completely dry. Then go to instrument control menu and click off icon for Lamp, Gas and Pump.

13.0 QUALITY CONTROL

Below is a summary of the quality control requirements for this method. Make sure to check with the laboratory supervisor or manager for any additional client specific quality control requirements.

13.1 Instrument Detection Limits (IDLs). The instrument detection limits must be done a minimum of once per year or when instrument conditions change significantly. The IDL is generated by running 10 replicates of a digested blank. The IDL is then defined as 3 times the standard deviation of the 10 replicates of the blank.

13.2 Method Detection Limits (MDLs). MDLs should be established using a solution spiked at approximately 3 times the estimated detection limit. To determine the MDL values, take seven replicate aliquots of the spiked sample and process through the entire analytical method. The MDL is calculated by multiplying the standard deviation of the replicate analyses by 3.143, which is the student's t value for a 99% confidence level. MDLs should be determined approximately once per year or whenever there is a significant change in the background or instrument response.

13.3 Instrument Calibration. The instrument must be calibrated daily or at a minimum of once every 24 hours and each time the instrument is set up. Calibration standards should be prepared fresh with each preparation batch. A minimum of a blank and 5 standards are required. The correlation coefficient of the curve must be a minimum of 0.995. No samples should be analyzed until all of the calibration criteria are met. Resloping is acceptable as long as it is immediately preceded and immediately followed by a complaint CCV and CCB.

13.4 Linear Dynamic Range (LDR). For each instrument, the upper limit of the linear dynamic range must be established. A linear calibration should be prepared from 3 standards, one of which is close to the upper limit of the linear range. The LDR is determined by analyzing succeedingly higher standard concentrations of mercury until the observed analyte concentration is no more than 10 percent below the true value of the standard. Sample concentrations that are greater than 90% of the determined upper LDR limit must be analyzed using dilutions. The LDR should be verified annually or whenever there is a significant change in the instruments analytical performance.

13.5 Quality Control Sample (also referred to as Initial Calibration Verification Standard (ICV)). At a minimum of once per quarter, a standard from a different source than the calibration standard must be analyzed. Normally this is analyzed at the beginning of the run after the CCV and CCB checks. The ICV must be within 10 percent of the true value. It is recommended that this standard be analyzed with each run so that it is included with all client reports. For SW846 7470A, this standard should be at a concentration near the midpoint of the calibration curve. If the ICV is outside of the acceptance limits, then the problem must be corrected and the ICV reanalyzed and

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shown to be within QC limits before any samples can be reported. All reported samples must be bracketed by an ICV which meets acceptance criteria.

13.5.1 If the ICV is biased high and all sample results are < RL, then, at the discretion of the data reviewer, data may be reported.

13.6 Method Blank. The laboratory must digest and analyze a method blank with each set of samples. A minimum of one method blank is required for every 20 samples. For a running batch, a new method blank is required for each different digestion day. The method blank must contain mercury at less that the reporting limit. If the method blank contains over that limit, the samples must be redigested or reanalyzed. The exception to this rule is when the samples to be reported contain greater than 10 times the method blank level. In addition, if all the samples are less than a client required limit and the method blank is also less than that limit, then the results can be reported as less than that limit.

13.7 Lab Control Sample. The laboratory must digest and analyze a laboratory control sample (spike blank) with each set of samples. A minimum of one lab control sample is required for every 20 samples. For a running batch, a new lab control sample is required for each different digestion day. For method 245.1, the laboratory must assess laboratory performance of an aqueous lab control against recovery limits of 85 to 115 percent. For method 7470A, the laboratory must assess laboratory performance of an aqueous lab control against recovery limits of 80 to 120 percent. In either case, if the lab control recovery is high and the results of the samples to be reported are less than the reporting limit, then the sample results can be reported with no flag. If the lab control recovery is low or there are samples above the reporting limit, then all affected samples must be redigested and reanalyzed.

13.8 Matrix Spike.

13.8.1 For method 245.1, the laboratory must add a known amount of each analyte to a minimum of 1 in 10 samples. The spike recovery should be within the limits of 70 to 130. If a matrix spike is out of control, then the results should be flagged with the appropriate footnote. If the matrix spike amount is less than one fourth of the sample amount, then the sample cannot be assessed against the control limits and should be footnoted to that effect.

13.8.2 For method 7470A, the laboratory must add a known amount of each analyte to a minimum of 1 in 20 samples. The laboratory should assess the matrix spike recovery against limits of 75 to 125. (In house control limits are also generated on an annual basis and are used to support the default limits.) An exception to this rule occurs where the sample concentration exceeds the spike concentration by a factor of 4 or more. If the matrix spike fails this criterion, then the sample should be flagged as showing possible matrix interferences.

13.8.3 Both the matrix spike amount and the sample amount are calculated to the IDL for any given element. Any value less than the IDL is treated as zero. Refer to the calculation shown below.

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$$\frac{\text{(Spiked Sample Result - Sample Result)}}{\text{(Amount Spiked)}} \times 100 = \text{MS Recovery}$$

13.9 Matrix Spike Duplicate or Matrix Duplicate. The laboratory must digest a matrix spike duplicate or a duplicate sample for a minimum of 1 in 20 samples. Matrix spike duplicates are normally used unless otherwise specified by client requirements. The relative percent difference (rpd) between the matrix spike duplicate and the matrix spike or between the duplicate and the sample should be assessed. The calculations for both rpds are shown below.

13.9.1 For method 245.1, the control limits for the matrix spike duplicates or the duplicates are calculated on an annual basis and are used to assess whether a matrix spike duplicate or a duplicate is in control. If it is out of control, then the results should be flagged with the appropriate footnote. If the sample and the duplicate are less than 5 times the reporting limits and are within a range of ± the reporting limit, then the duplicate is considered to be in control.

13.9.2 For method 7470A, the duplicate or matrix spike duplicate RPD must be assessed against a limit of 20% RPD. (In house control limits are also generated on an annual basis and are used to support the default limits.) If it is out of control, then the results should be flagged with the appropriate footnote. If the sample and the duplicate are less than 5 times the reporting limits and are within a range of ± the reporting limit, then the duplicate is considered to be in control.

13.9.3 Both the duplicate amount and the sample amount are calculated to the IDL for any given element. Any value less than the IDL is treated as zero. Refer to the calculations shown below.

$$\frac{\text{(Sample Result - Duplicate Result)} \times 100}{\text{(Sample Result + Duplicate Result)} \times 0.5} = \text{\% RPD}$$

or

$$\frac{\text{(|MS Result - MSD Result|)} \times 100}{\text{(MS Result + MSD Result)/2}} = \text{MSD RPD}$$

13.10 Continuing Calibration Verification. (Also known as the instrument performance check solution.) The CCV must be from the same source as the calibration curve.

13.10.1 Analyze the continuing calibration verification solution and the continuing calibration blank after every tenth sample and at the end of the sample run. If the CCV solution is not within a method specified range of the true value, then no samples can be reported in the area bracketed by that CCV. (Note: the exception is if the CCV is biased high and the samples are less than the detection limit. In that case, the samples can be reported with no flag.) The CCV concentration should be at or near the mid-range of the calibration curve.

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13.10.1.1 For method 245.1, the CCV must be within 10 percent of the true value.

13.10.1.2 For method 7470A, the CCV must be within 20 percent of the true value.

32.10.2 The ICCV check must also be analyzed at the beginning of the run, immediately after the instrument is calibrated. For method 245.1, this first check must be within 5 percent of the true value. If it is not and there is not a problem with the standard solution, the instrument should be recalibrated and rechecked.

13.10.2.1 This check is not required for method SW846 7470A.

13.11 Continuing Calibration Blank. Analyze the continuing calibration verification solution and the continuing calibration blank after every tenth sample and at the end of the sample run. If the CCB is not less than the reporting limit, then no samples can be reported in the area bracketed by the failing CCB.

13.12 CRA (Low) Check. For all runs, a low check at the level of the CRDL (0.20 ug/l) or reporting limit must be analyzed at the beginning of the run before analyzing any samples, but not before the ICV. No specific acceptance criteria are listed in any of the methods for this standard at this time. An in-house criterion of 50 to 150% recovery is applied to this low check standard. If this criterion is not met, then all samples associated with this CRA check must be reanalyzed along with a compliant CRA check.

13.12.1 If the CRA is biased high and there is no mercury found in the samples, then the sample results may be reported for mercury. If the CRA is biased high and there is mercury found in the samples, then the samples with Hg at levels ranging from the CCV to the high standard may be reported. Samples with levels of mercury between the CRA and the CCV standard may be biased high and cannot be reported.

13.12.2 Some client may require additional bracketing low checks to be analyzed. Client specific limits may also be required. Check with the area supervisor or manager for more information.

14.0 DOCUMENTATION REQUIREMENTS

Refer to the laboratory Quality Assurance Manual for additional documentation requirements.

14.1 Sample Worksheets. Digestion data sheets for the Hg water samples must show all digestion information including the sample ID's, sample volumes, bottle numbers, start times, end times, and pressure or temperature, as appropriate for all digestions. The digestion method (i.e digestion block) must be indicated on the digestion sheet. All sample information should be clearly entered on these sheets. In addition, any unusual characteristics of the samples or the digestion procedure should be noted in the Comments sections. Make sure also that all dilutions are clearly documented.

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14.2 Standards and Reagents. All stocks and reagents must be recorded in the reagent logbook. All standards should be recorded on the digestion log with the samples.

14.3 Any run comments should be written on the raw data for the analysis and on the run log in the LIMS.

14.4 Annual bottle calibration verifications must be documented in the Mercury Bottle calibration log.

15.0 DATA REVIEW AND REPORTING

15.1 All samples should be updated to QC batches in the LIMS system. The analyst is responsible for reviewing all data for compliance with the QC outlined in this SOP. They are responsible for making sure that the raw data is fully documented and it is loaded into the LIMS system. They are responsible for submitting samples for redigestion and reanalysis, when appropriate.

15.2 After the analyst review is completed, the supervisor or a designated reviewer shall review the run for technical compliance to the SOP. The reviewer is also responsible for making sure that the QC calculations are done correctly and that appropriate flags are added.

15.3 After the reviewer completes their review, the data is released for client access in the LIMS. The raw data and the run log are submitted to the area manager. The manager periodically does an additional review on data for technical completeness. Any hardcopy raw data is transferred to the report generation department for scanning and storage. Instrument data is transferred electronically.

16.0 POLLUTION PREVENTION & WASTE MANAGEMENT

16.1 Users of this method must perform all procedural steps in a manner that controls the creation and/or escape of wastes or hazardous materials to the environment. The amounts of standards, reagents, and solvents must be limited to the amounts specified in this SOP. All safety practices designed to limit the escape of vapors, liquids or solids to the environment must be followed. All method users must be familiar with the waste management practices described in section 16.2.

16.2 Waste Management. Individuals performing this method must follow established waste management procedures as described in the waste management SOP, EHS 004. This document describes the proper disposal of all waste materials generated during the testing of samples as follows:

16.2.1 Non hazardous aqueous wastes.

16.2.2 Hazardous aqueous wastes.

16.2.3 Chlorinated organic solvents.

16.2.4 Non-chlorinated organic solvents.

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16.2.5 Hazardous solid wastes.

16.2.6 Non hazardous aqueous wastes.

17.0 ADDITIONAL REFERENCES

17.1 Leeman Hydra II AA instrument manual.

17.2 Leeman Hydra AA instrument manual.

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Lab Manager Nancy Cole

QA Manager David Duffy Robert Worley

Effective Date: 9-12-12

TEST NAME: METALS BY INDUCTIVELY COUPLED PLASMA ATOMIC EMISSION SPECTROMETRY (ICP) USING SOLID STATE ICP.

METHOD REF: SW846 6010C

Revised Sections: ***8.1, Table 5***

1.0 SCOPE AND APPLICATION

1.1 This method is applicable for the determination of metals in water, wipes, sludges, sediments, and soils. Sample matrices are pretreated following SW846 methods for digestion of soil, sediment, sludge, wipe or water samples. Refer to specific digestion SOP's for more information on digestion techniques.

1.2 A variety of metals can be analyzed by ICAP. These include, but are not limited to, Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, S, Se, Si, Ag, Na, Sr, Tl, Sn, Ti, Pd, V, W, Zn, and Zr.

2.0 SUMMARY

2.1 Prior to analysis, samples must be solubilized or digested using appropriate Sample Preparation Methods. When analyzing groundwater samples for dissolved constituents, acid digestion is not necessary if the samples are filtered and acid preserved prior to analysis.

2.2 This SOP describes operation of the ICAP 6500 Spectrometer following method SW846 6010C.

2.2.1 This inductively coupled argon plasma optical emission spectrometers (ICP-OES) uses an Echelle optical design and a Charge Injection Device (CID) solid-state detector to provide elemental analysis. Control of the spectrometer is provided by PC based iTEVA software.

2.2.2 In the instrument, samples are nebulized and the resulting aerosol is transported to the plasma torch. Element-specific emission spectra are produced by a radio-frequency inductively coupled plasma. The spectra are dispersed by a spectrometer, and the intensities of the emission lines are monitored the solid state detector.

2.2.3 Background correction is required for trace element determination. Background must be measured adjacent to analyte lines on samples during analysis. The position selected for the background-intensity measurement, on either or both sides of the analytical line, will be determined by the complexity of the spectrum adjacent to the analyte line. In one mode of analysis the position used should be as free as possible from spectral interference and should reflect the same change in

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background intensity as occurs at the analyte wavelength measured. Background correction is not required in cases of line broadening where a background correction measurement would actually degrade the analytical result. Interferences which cannot be addressed with background correction must be corrected using the appropriate interelement correction factors.

3.0 REPORTING LIMIT AND METHOD DETECTION LIMIT

3.1 Reporting Limit. The normal reporting limits for this method have been established at the concentrations listed in Table 1. Reporting limits may vary depending on client needs and lab protocols, but the reporting limits must always be verified with a low check which meets the criteria outlined in this SOP. In addition, the reporting limits must always be greater than the MDL. Refer to the scheduling sheets and check with the metals supervisor for further information.

3.2 Method Detection Limit. Experimentally determine MDLs using the procedure specified in 40 CFR, Part 136, Appendix B. This value represents the lowest reportable concentration of an individual compound that meets the method qualitative identification criteria.

3.2.1 Experimental MDLs must be determined annually for this method.

4.0 DEFINITIONS

BATCH: A group of samples which behave similarly with respect to the sampling or the testing procedures being employed and which are processed as a unit. For QC purposes, if the number of samples in a group is greater than 20, then each group of 20 samples or less will all be handled as a separate batch.

CALIBRATION CHECK STANDARD. The calibration check standard is a mid-range calibration standard. It is recommended that the calibration check standard be run at a frequency of approximately 10 percent during an analysis run, whichever is more frequent, and at the end of the analysis sequence. For this method, the mid-level calibration check standard criteria is ± 10 percent of the true value and the relative standard deviation for the replicates that are greater than 5 times the reporting limit is less than 5 percent. The exception to this rule is if the recovery on the calibration check standard is high and the samples to be reported are less than the reporting limit.

EXTERNAL CHECK STANDARD. The external check standard is a standard from a separate source than the calibration curve that is used to verify the accuracy of the calibration standards. An external check must be run with each calibration. For this method, the external check standard criteria is ± 10 percent of the true value and the replicates that are greater than 5 times the reporting limit should have a relative standard deviation of less than 5 percent. If the external check is outside of the control limits for a given parameter, all samples must be reanalyzed for that parameter after the problem has been resolved.

SPIKE BLANK OR LAB CONTROL SAMPLE. Digest and analyze a laboratory control sample or spike blank with each set of samples. A minimum of one lab control sample or spike blank is required for every 20 samples. For a running batch, a new lab control sample or spike blank is required for each different digestion day. Assess laboratory performance against the control limits of 80 to 120 percent. In house limits should also be generated once sufficient data (usually a minimum of 20 to 30 analyses) is available to support the default limits. For solid lab controls, the elements should be within the range given by the lab control supplier. If the lab control or spike

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blank is outside of the control limits for a parameter, all samples must be redigested and reanalyzed for that parameter. The exception is if the lab control or spike blank recovery is high and the results of the samples to be reported are less than the reporting limit. In that case, the sample results can be reported with no flag.

MATRIX: The component or substrate (e.g., water, soil) which contains the analyte of interest.

MATRIX SPIKE DUPLICATE: A matrix spike duplicate sample is digested at a minimum of 1 in 20 samples. The relative percent difference (RPD) between the matrix spike duplicate and the matrix spike should be assessed. A duplicate may be used in place of the matrix spike duplicate on client request. The matrix spike duplicate RPD is calculated as shown below. The control limit for the duplicate is 20% rpd. If a duplicate is out of control, flag the results with the appropriate footnote. If the sample and the duplicate are less than 5 times the reporting limits and are within a range of ± the reporting limit, then the duplicate is considered to be in control.

$$\frac{(|\text{Matrix Spike Result} - \text{Matrix SpikeDuplicate Result}|) \times 100}{(\text{Matrix Spike Result} + \text{Matrix Spike Duplicate Result})/2} = \text{Duplicate RPD}$$

MATRIX SPIKE: The laboratory must add a known amount of each analyte to a minimum of 1 in 20 samples. The matrix spike recovery is calculated as shown below. Assess laboratory performance against the default limits of 75 to 125 percent. If a matrix spike is out of control, then the results should be flagged with the appropriate footnote. If the matrix spike amount is less than one fourth of the sample amount, then the sample cannot be assessed against the control limits and should be footnoted to that effect.

$$\frac{(\text{Spiked Sample Result} - \text{Sample Result}) \times 100}{(\text{Amount Spiked})} = \text{Matrix Spike Recovery}$$

METHOD BLANK. The laboratory must digest and analyze a method blank with each set of samples. A minimum of one method blank is required for every 20 samples. For a running batch, a new method blank is required for each different digestion day. If no digestion step is required, then the method blank is equivalent to the reagent blank. The method blank must contain the parameter of interest at levels of less than ½ of the reporting limit for that parameter. If the method blank contains levels over this level, then the samples must be redigested and reanalyzed. The exception to this rule is when the samples to be reported contain greater than 10 times the method blank level. In addition, if all the samples are less than a client required limit and the method blank is also less than that limit, then the results can be reported as less than that limit.

METHOD DETECTION LIMITS (MDLS). The minimum concentration of a substance 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. MDLs should be determined approximately once per year for frequently analyzed parameters.

REAGENT BLANK: The reagent blank is a blank that has the same matrix as the samples, i.e., all added reagents, but did not go through sample preparation procedures. The reagent blank is an indicator for contamination introduced during the analytical procedure. (Note: for methods requiring no preparation step, the reagent blank is equivalent to the method blank.) Either a reagent blank or a method blank must be analyzed with each batch of 20 samples or less. The concentration of the analyte of interest in the reagent blank must be less than the reporting limit for that analyte. If the reagent blank contains levels over the reporting limits, the samples must be reanalyzed. The exception to this rule is when the samples to be reported contain greater than 10 times the reagent

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blank level. In addition, if all the samples are less than a client required limit and the reagent blank is also less than that limit, then the results can be reported as less than that limit.

REAGENT GRADE: Analytical reagent (AR) grade, ACS reagent grade, and reagent grade are synonymous terms for reagents which conform to the current specifications of the Committee on Analytical Reagents of the American Chemical Society.

REAGENT WATER: Water that has been generated by any method which would achieve the performance specifications for ASTM Type II water.

STANDARD CURVE: A plot of concentrations of known analyte standards versus the instrument response to the analyte. Calibration standards are prepared by successively diluting a standard solution to produce working standards which cover the working range of the instrument. Standards should be prepared at the frequency specified in the appropriate section. The calibration standards should be prepared using the same type of acid or solvent and at the same concentration as will result in the samples following sample preparation. This is applicable to organic and inorganic chemical analysis.

LOW LEVEL CALIBRATION VERIFICATION (CRI or LLCCV). The LLCCV or CRI standard is a check standard containing the elements of interest at (or below) the reporting level for each element. For this method, the CRI (LLCV) must be analyzed at the beginning and end of each calibration (analysis) batch. The acceptance criterion for the CRI check is 70 to 130% recovery. If an element does not meet this criterion, then all bracketed samples for that element in the concentration range between the CRI and the CCV must be reanalyzed. Samples containing concentrations higher than the CCV may be reported as long as CCV criteria are met.

5.0 HEALTH & SAFETY

5.1 The analyst must follow normal safety procedures as outlined in the Accutest Health and Safety Plan and Personal Protection Policy, which include the use of safety glasses and lab coats. In addition, all acids are corrosive and must be handled with care. Flush spills with plenty of water. If acids contact any part of the body, flush with water and contact the supervisor.

5.2 The toxicity or carcinogenicity of each reagent used in this method has not been precisely determined; however, each chemical must be treated as a potential health hazard. Exposure to these reagents must be reduced to the lowest possible level. The laboratory is responsible for maintaining a current awareness file of OSHA regulations regarding the safe handling of the chemicals specified in this method. A reference file of data handling sheets must be made available to all personnel involved in these analyses.

6.0 PRESERVATION & HOLDING TIME

6.1 All water samples should be preserved with nitric acid to a pH of 2 or less. All solid samples should be stored in a refrigerator at 4 degrees C.

6.2 All samples should be analyzed within 6 months of the date of collection.

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7.0 INTERFERENCES

7.1 Several types of interferences can cause inaccuracies in trace metals determinations by ICP. These interferences are discussed below.

7.2 Spectral interferences are caused by overlap of a spectral line from another element, unresolved overlap of molecular band spectra, background contribution from continuous or recombination phenomena, and background contribution from stray light from the line emission of high concentration elements. Corrections for these interferences can be made by using interfering element corrections, by choosing an alternate analytical line, and/or by applying background correction points.

7.3 Physical interferences can be caused by changes in sample viscosity or surface tension, by high acid content in a sample, or by high dissolved solids in a sample. These interferences can be reduced by using an internal standard, by making sample dilutions or by analyzing a sample using the method of standard additions.

7.4 Chemical interferences are not pronounced with ICAP due to the high temperature of the plasma, however if they are present, they can be reduced by optimizing the analytical conditions (i.e. power level, torch height, etc.).

8.0 EQUIPMENT AND SUPPLIES

8.1 Currently there are four solid state ICPs available for use in the lab. All are Thermo 6500 ICP units. These units have been optimized to obtain low detection limits for a wide range of elements. Since they are solid state systems, different lines may be included for elements to obtain the best analytical results. However, the lines which are normally included in the normal analysis program are shown in Table 2.

8.2 Instrument autosamplers. For random access during sample analysis.

8.3 Class A volumetric glassware and pipets.

8.3.1 All glassware must be washed with soap and tap water and then soaked in a 10% nitric acid bath for a minimum of 2 hours. It must then be rinsed at least 3 times with deionized water.

8.4 Glass autosampler tubes

8.4.1 Autosampler tubes must be washed with soap and tap water and then soaked in a 10% nitric acid bath for a minimum of 2 hours. They must then be rinsed at least 3 times with deionized water.

8.5 Autopipeters with tips. These must be calibrated and checked as outlined in the autopipeter SOP, EQA004.

9.0 REAGENTS

9.1 All chemicals listed below are reagent grade unless otherwise specified. Deionized water must be used whenever water is required. The expiration date for standards and reagents is the date supplied by the manufacturer or if no expiration date is given, a default of 6 months is used. For

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acid solutions (nitric, sulfuric, hydrochloric) the expiration date is 2 years from the date of preparation of the solution.

9.2 Hydrochloric acid, trace metals grade.

9.3 Nitric Acid, Baker instra-analyzed or equivalent.

9.4 Standard stock solutions available from Absolute, Inorganic Ventures, MV Laboratories, Ultra Scientific or equivalent. Note: All standards must be ICP quality standards.

9.5 Calibration Standards. These can be made up by diluting the stock solutions to the appropriate concentrations . It is recommended that fresh calibration standards should be prepared a minimum of every two weeks. They must be monitored on a daily basis by comparison to an ICV. Standards which are going to be stored for several days should be transferred to FEP fluorocarbon or previously unused polyethylene or polypropylene bottles for long term storage.

9.5.1 Standards should be approximately matrix matched to the samples. For most samples, a 5 percent nitric acid and 5 percent hydrochloric acid will approximate the acid matrix of the sample and limit nebulization problems. If it is known that the samples contain a significantly different acid matrix, then the matrix of the standards should be modified or the samples should be diluted so that they are in a similar matrix to the curve.

9.5.2 Standards should be prepared so that there is minimal spectral interference between analytes.

9.5.3 Refer to the standards book for the make-up and concentrations of standards and stock solutions being used to calibrate the ICP. The standard curve consists of a blank and 3 non-zero standards at the levels shown in Table 3.

9.6 Calibration/Rinse Blank. The calibration blank is prepared by diluting a mixture of 50 ml of concentrated nitric acid and 50 ml of concentrated hydrochloric acid to a final volume of 1 liter with deionized water.

9.7 Analytical Quality Control Solutions. All of the solutions below are prepared by adding either mixed or single element metals solutions to a solution containing 5 percent nitric acid and 5 percent hydrochloric acid and diluting to a fixed final volume with this acid mixture. All of these solutions should be placed in FEP fluorocarbon or previously unused polyethylene or polypropylene bottles for long term storage.

9.7.1 Initial Calibration Verification solution. This standard solution must be made from a different source than the calibration curve. The values for each element should be near the midpoint of the calibration curve. This solution is used to verify the accuracy of the initial calibration. See Table 4 for suggested ICV concentrations.

9.7.2 Continuing Calibration Verification solution. The metals concentrations for this standard should be at approximately the mid-point of the calibration curve for each element. This standard should be prepared from the same source that is used for the calibration curve. See Table 4 for suggested CCV concentrations.

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9.7.3 Interference Element Check Solutions. These solutions should be used on a periodic basis to check the interfering element corrections on the instruments. Note: If interferences from different elements than those listed below are a problem, the interfering element solutions may be modified. Two acceptable solutions are outlined below.

9.7.3.1 ICSA Solution. The ICSA solution contains only the interfering elements. The recommended concentrations are shown below. If the linear ranges on a given instrument are lower than these levels, the concentrations may be set near the top of the linear range for those elements.

Al	500 mg/L
Ca	400 mg/L
Fe	200 mg/L
Mg	500 mg/L

9.7.3.2 ICSAB Solution. The ICSAB solution contains both the interferents and the analytes of interest. The recommended concentrations are shown below. If the linear ranges on a given instrument are lower than these levels, the concentrations may be set near the top of the linear range for those elements

Ag	1.0 mg/L	Zn	1.0 mg/L
Ba	0.50 mg/L	As	1.0 mg/L
Be	0.50 mg/L	Se	1.0 mg/L
Cd	1.0 mg/L	Sb	1.0 mg/L
Co	0.50 mg/L	Tl	1.0 mg/L
Cr	0.50 mg/L	Mo	0.5 mg/L
Cu	0.50 mg/L	Pd	0.5 mg/L
Mn	0.50 mg/L	Al	500 mg/L
Ni	1.0 mg/L	Ca	400 mg/L
Pb	1.0 mg/L	Fe	200 mg/L
V	0.50 mg/L	Mg	500 mg/L
W	0.50 mg/L	Zr	0.50 mg/L
Li	0.50 mg/l	Sr	0.5 mg/l
Bi	0.50 mg/l	Ti	0.5 mg/l
B	0.50 mg/l	S	0.5 mg/l
Sn	0.50 mg/l	Si	0.5 mg/l

9.7.4 CRI Standards (also referred to as LLCCV). The CRI standard must contain the elements of interest at (or below) the reporting limit for each element. The CRI level is at the reporting limit as shown in Table 1. This should be prepared by diluting calibration standard(s) to the reporting limit level for each element. They should be made in the same matrix as the calibration standards. Note: The CRI must be verified at the RL before any dilutions are applied

9.8 Matrix Spike and Spike Blank Solution (For soil samples). The final concentrations suggested for the matrix spike and spike blank solutions are shown in Table 5. The spiking solution is prepared by adding either mixed or single element metals solutions to a solution containing 2 percent nitric acid and diluting to a fixed final volume with this acid mixture. Two mls of this stock

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solution should be added to the spike blank and the matrix spike before they are digested and brought to a final volume of 100 ml.

9.9 Matrix Spike and Lab Control Solution (For aqueous samples and TCLP leachates).

9.9.1 The final concentrations suggested for the matrix spike are shown in Table 5. Two spiking solutions, which are used for aqueous samples and TCLP leachates respectively, are prepared by adding either mixed or single element metals solution to solutions containing 2 percent nitric acid and diluting to a fixed final volume with this acid mixture. 0.5 ml of the resulting stock solution is added to the matrix spike sample before they are digested.

9.9.2 A lab control sample should be digested and analyzed for every batch of 20 samples or less. The LCS is prepared by adding either mixed or single element metals solutions to DI water and bringing up to a fixed final volume. For TCLP samples, the lab control should be made using blank leachate solution rather than DI water. 50 ml of this solution is digested and brought to a final volume of 50 ml. In situations where any odd elements, such as B, Si, Sr, Sn, and Pd, is of interest for a specific project, besides a lab control, a spike blank is also digested.

9.10 Liquid Argon or Argon Gas. Argon is provided by Air Products in the large outdoor tank. No lab monitoring of the tank is normally necessary

9.11 Internal Standard Solution (with matrix modifier). To a 1 liter flask containing approximately 800 ml of DI water, add 20.0 ml of 10,000 mg/l Cesium solution, 5.0 ml of 10000 mg/l indium, and 1.000 ml of 10000 mg/l yttrium. Add 50 ml concentrated nitric acid and 50 ml concentrated hydrochloric acid and bring to a final volume of 1000 ml and mix well. This solution is added to all samples and standards as the instrument is running using a split line on the peristallic pump

10.0 PROCEDURE

10.1 General procedure on how to operate the SS Trace1 is described below. Refer to the Thermo 6500 operation manual for further details.

10.2 Before bringing up the instrument, make sure that the lines, the torch, the nebulizer, and the spray chamber are clean, the dehumidifier is filled with DI water up to the level between Minimum and Maximum, and that there are no leaks in the torch area.

10.3 Turn on the recirculating cooler. Verify that the liquid argon is turned on.

10.4 Set up the pump tubing and engage the peristaltic pump.

10.5 Put a new solution of acid rinse into the rinse reservoir. (Note: the composition of the rinse solution may be periodically changed to minimize sample introduction problems and sample carryover.) If internal standard is being used, make sure that sufficient internal standard solution is prepared.

10.6 Start up the instrument following the sequence shown below.

10.6.1 Double click the **iTEVA Control Center** Icon on desktop. Type ***admin*** in User Name field, and then click OK.

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10.6.2 Once the iTEVA Control Center window is opened, click on **Plasma** Icon at status bar area. Then click on **Instrument Status** to check the interlock indicators (torch compartment, purge gas supply, plasma gas supply, water flow and exhaust should be in green; drain flow and busy should be in gray) and the Optics Temperature. (It should be around 38°C.) Click on the Close box.

10.6.3 Click **Plasma On**. When the plasma is on, click close. Let the instrument warm up for 15 to 20 minutes before starting the analysis. New tubing may take an hour to stabilize .

10.7 Torch Alignment and Auto Peak

10.7.1 If the torch has been cleaned, then it has to be realligned after it is replaced

10.7.1.1 Open the method and then click on **Sequence** tab, then click on List View Icon until you reach rack display.

10.7.1.2 Go to S-6 position (you can assign any position in the rack for torch alignment), then right click to select Go to empty sample S:6. (Now, the autosampler tip moves from Rinse to this position)

10.7.1.3 Click on **Analysis** tab, then select **Torch Alignment** from **Instrument** drop down menu. There will be a pop up dialog box present. Click RUN. Then there will be another dialog box pop up (This is a reminder for Torch Alignment Solution (2 ppm Zn)), click Ok. Now, the instrument is initiating an automated torch alignment. It takes about 7 minutes to complete this step. Progress is indicated in the progress bar.

10.7.1.4 After Torch Alignment is done, click Close. Click on **Sequence** tab, then follow by **List View** Icon.

10.7.1.5 Go to Rinse position at rack display, right click to select Go to rinse and let it rinse for 2 minutes.

10.7.2 Perform Auto Peak.

10.7.2.1 It is recommended that the Auto Peak Adjust procedure be performed monthly or whenever the peak shape has shifted for any element. A standard that contains all of the lines of interest is used and the system automatically makes the appropriate fine adjustment. (CCV solution is used for this process.)

10.7.2.2 Click **Sequence** tab, then click on **List View** Icon till the rack is displayed.

10.7.2.3 Go to S-5 position (you can assign any position in the rack for auto peak adjust), then right click to select Go to empty sample S:5. (Now, the autosampler tip moves from Rinse to this position). Click on **Analysis** tab. All elements' result is showed in the display area. From **Instrument** drop down menu, select **Perform Auto Peak**. There will be a pop up dialog box present. Highlight _All Elements_, then click RUN. Then there will be another

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dialog box pop up (This is a reminder for Perform Auto Peak Solution), click Ok. Now, the instrument is performing auto peak adjust. It takes about 5 minutes to complete this process. The Auto Peak dialog box will show a green " √" in front of All Elements, which indicates Auto Peak is completed.

10.8 Open the method and start up the run.

10.8.1 Click on **Analyst** Icon at the workspace. Go the Method and choose Open from the drop down menu. Select the method with a Revision (usually select the last revision used).

10.8.2 Go to **Method** tab at the bottom of left-hand corner to click on **Automated Output** at the workspace area. Type a filename in Filename field in the data display area (i.e.: SA073107M1: starts with SA, then follow by MM-DD, then M1; M1 indicates the first analytical run for that day, then follow by M2, M3 and so on for the second and third runs).

10.8.3 Click on **Sequence** tab at the bottom of left-hand corner. From **Auto-Session** drop down menu bar, click on **New Autosampler** to create a sequence. This will pop up a dialog box , then click on **New** and fill number of samples (i.e.: 100) in the Number of Samples field and the sample ID (usually leave this field empty) in Sample Name field. Type a sequence name (i.e.: SEQ073107M1: starts with SEQ, then MM-DD-YY, then M1; M1 indicates the first analytical run for that day, then follow by M2, M3 and so on for the second and third runs) in the Sequence Name field. Click OK, then put in "0" on Settle Time Between Sequences box, click OK.

10.8.4 Right click on **Untitled** (CETAC ASX-520 Enviro 5 Named Rack is the rack that currently using) at the workspace area, click on **Auto-Locate ALL** to locate all samples.

10.8.5 Double click on **Untitled** again, then click on the sequence name (i.e.: SEQ073107M1), on the data display area, type the sequence in Samplename column, dilution factor (if needed) in CorrFact column, check the box in front of Check column, and select an appropriate check table.

10.8.6 Once done with creating sequence, go to **Method** drop down menu and save all changes as **Save As**. There will be a Save a Method dialog box present, go to Save Option to check on "Overwrite Method and bump revision number" box, then click OK.

10.8.7 Go to **Sequence** tab, click on **List View** Icon from tool bar, then click on **Connect Autosampler to PC and Initialize** Icon. (Now, the autosampler tip is up and sits on the top of the rinse cup.)

10.8.8 The sequence includes the calibration and run quality control.

10.8.8.1 Calibrate the instrument as outlined below using the standards shown in Table 3. This calibration procedure is done a minimum of once every 24 hours. The calibration standards may be included in the autosampler program or they may be run separately. A correlation coefficient of 0.998 or

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better must be obtained using a first order curve fit. Second and third order curve fits are not acceptable.

10.8.8.2 Run the CRI (LLCCV) solution after the calibration is completed and before any samples are analyzed.

10.8.8.2.1 For all samples, the CRI check solution must be at the reporting limit for each element. If special client reporting limits are requested, then low checks corresponding to those reporting limits must also be analyzed.

10.8.8.2.2 Method limits of 70 to 130% are applied to the CRI standard, but tighter criteria may be needed in some client or project specific situations.

10.8.8.3 Then continue by analyzing the ICV check standard followed by the CCV, CCB, ICSA, ICSAB, and CCV, CCB every 10 samples. (An ICB may be run following the ICV, but is not required.) For mixed runs (EPA 200.7 and SW846 6010C), the first CCV is designated the ICCV. For samples and quality control, insert the list pointer after a space after the sample. Check with the metals supervisors for additional information on the use of listpointers. In general, listpointer 2 refers to the SW846 6010 method and listpointer 1 refers to EPA 200.7 method.

10.8.8.3.1 For the ICV, all elements to be reported must be within 10 percent of the true values. After the ICV (and ICB, if run) and before any actual samples are analyzed, the CCV and CCB must be analyzed. For the CCV, all elements to be reported must be within 10 percent of the true values. For both ICV and CCV, all replicates exceed 5 times the reporting limit should have a relative standard deviation of less than 5 percent. Both ICB and CCB results should be less than the reporting limits for the every element.

10.8.8.4 Before analyzing any real samples, an interference check solution must be checked. For all spiked elements, the analyzed results must be within 20 percent of the true results. For unspiked elements, the interfering element solutions should contain less than two times the absolute value of the reporting limit for each element.

10.8.8.5 If the interfering element solution is not within specifications and that element must be reported, then new interfering element correction (IEC) factors will need to be generated following the procedure outlined in Section 11 below. If new IEC's are generated, then the run must be restarted from the ICSA, ICSAB quality control samples and new CCV checks must be run before any samples can be reported.

10.8.8.6 After the initial analytical quality control has been analyzed, the samples and the preparation batch quality control should be analyzed. Each sample analysis should be a minimum of 2 readings using at least a 5 second integration time. For samples containing levels of elements greater than approximately 5 times the reporting limits, the relative standard deviations for

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the replicates should be less than 5%. If not, reanalyze the sample. If, upon reanalysis, the RSDs are acceptable, then report the data from the reanalysis. If RSD's are not acceptable on reanalysis, then the results for that element should be evaluated by the data reviewer and footnoted if necessary. In some cases, an additional dilution analysis may be needed. Check with the area supervisor or manager for additional information.

10.8.8.7 Between each sample, flush the nebulizer and solution uptake system with a blank rinse solution for the required period of time to ensure that analyte memory effects are not occurring. A time of 120 seconds is recommended for most analyses with the current autosampler set-up.

10.8.8.8 Analyze the continuing calibration verification solution and the continuing calibration blank after every tenth samples during an analysis run, whichever is more frequent, and at the end of the sample run.

10.8.8.9 If the CCV solution is not within 10 percent of the true value, no samples can be reported in the area bracketed by the failing CCV for the failing element. Additionally, for the elements with a CCV greater than 5 times the reporting limit, the relative standard deviation for the replicates should be less than 5 percent.

10.8.8.10 The CCB results must be less than the reporting limit or limit of quantitation for each desired target analyte. If this criterion is not met, then no samples can be reported in the area bracketed by the failing CCB for the failing element and all samples should be submitted for reanalysis.

10.8.8.10.1 However, if the samples are high relative to the CCB (> 10 X the CCB level) and a higher reporting limit is acceptable for the final end use of the data, then the samples may be evaluated using a higher reporting limit to meet the CCB criteria. This must be clearly documented on the run if a higher reporting limit is applied.

10.8.8.10.2 In addition, at the reviewer's discretion, samples that are < RL may be reported when the CCB is biased high. Analysts should assume that samples bracketed by a failing CCB must be reanalyzed unless instructed otherwise.

10.8.8.10.3 If a CCB fails, if possible, the analyst should stop the run and run a new CCV, CCB pair before proceeding with the analysis of any additional samples.

10.8.8.11 For one sample per preparation batch, or whenever matrix interferences are suspected for a batch of samples, a serial dilution should be prepared. Normally the sample used for the serial dilution is the sample that is used for the matrix spike and matrix spike duplicate. For the serial dilution, a 1:5 dilution must be made on the sample. The results of the 1:5 dilution should agree within 10 percent of the true value as long as the sample is greater than 50 times the reporting limit for that element before dilution (or 10 times the reporting limit after dilution) and the sample results are within the linear range. If not, an interference effect must be suspected and the serial dilution

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result for the element with the suspected interference must be footnoted. The serial dilution is calculated as shown below

10.8.8.12 If the matrix spike or matrix spike duplicate is out of acceptable limits, then it is recommended that post-digest spikes be prepared to determine potential interferences. For the post-spike, the sample should be spiked with approximately 2 times the sample level or two times the reporting limits, whichever is greater. Limits of 80 to 120 percent are applied. The serial dilution is used to confirm any matrix effects. The post-digest spike recovery must be footnoted on the matrix spike recovery or otherwise noted in the quality control summary report.

10.8.8.13 For any readings that exceed the linear range for a given element, a dilution is required. After a high reading, the sample following the high one must be examined for possible carryover. A verification may be necessary by rinsing the lines with an acid solution and then rereading the sample. A limit check table may be built into the autosampler file so that samples exceeding the linear range are flagged on the raw data.

10.8.8.14 For the interelement spectral interference corrections to remain valid during sample analysis, the interferent concentration must not exceed its linear range. If the interferent exceeds its linear range or its correction factor is big enough to affect the element of interest even at a lower concentration, sample dilution with reagent blank and reanalysis is required. In these circumstance analyte detection limits are raised. Check with metals supervisor for more information.

10.8.8.15 Anytime that the interference is large relative to the sample, dilution may be required. Check with the metals supervisor for more information.

10.8.8.16 For any readings where the internal standard is outside of the range of 70 to 130% of the internal standard level in the calibration blank, then the sample should be diluted until the internal standard is within that range.

10.8.9 The CRI (LLCCV) must be analyzed at the end of each calibration (analysis) batch. The acceptance criterion for the CRI check is 70 to 130% recovery. If an element does not meet this criterion, then all samples for that element in the concentration range between the CRI and the CCV must be reanalyzed. Samples containing concentrations higher than the CCV may be reported as long as CCV criteria are met. Multiple levels of CRI checks may be analyzed if different reporting limits are being applied to samples on the run.

10.8.9.1 More frequent CRI (LCCV) checks may be analyzed during the course of the run if system stability at the low end of the calibration is questionable or if the lab wants to ensure that fewer samples will have to be submitted for reanalysis if there is a failed CRI at the end of a run.

10.8.9.2 It is recommended that the CRI check be run bracketing every 4 to 8 hour period of analysis. It may be run as frequently as every 10 samples if the supervisory staff deems that this is necessary.

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10.8.10 This method does not require the analysis of an interfering element check solution at the end of the run. However, this may be required to meet other method and/or client requirements. Run the ICSA and ICSAB solutions as instructed by the metals lab supervisor or manager or as noted in the program code instructions.

10.8.11 After the instrument is optimized, click **Run Auto-Session** Icon to start the run.

10.8.12 If you need to add or delete samples once the run is started, follow the steps shown below.

10.8.12.1 Adding Samples.

10.8.12.1.1 Click on **Sequence** tab, then click on **List View** Icon at the tool bar. There is the sequence table on the data display area.

10.8.12.1.2 Click on **Add Samples** Icon. This will pop up the dialog box, then fill number of samples that need to add in field. Click OK. By doing this, samples will be added at the end of sequence without a location the rack.

10.8.12.1.3 Go to the added samples, on the to position ID column, assign a number for each sample. This number will be the position in the rack. On the Samplename column, type in sample IDs, fill in Corr Fact (if needed) and Check Table.

10.8.12.1.4 The added samples will be analyzed at the end of the original sequence run order unless you assign them to run under different order.

10.8.12.2 Deleting Samples.

10.8.12.2.1 Click on **Sequence** tab, then click on **List View** Icon under the sequence display area.

10.8.12.2.2 To the sample that need to be deleted, on the to position ID column, change the number to "0". By doing this, that sample will be unlocated in the rack and the autosampler tip will go to the next sample.

10.9 When the analysis is completed export the data to LIMS following the procedure outlined below.

10.9.1 Double click on **ePrint** Icon on desktop. There will be a LEADTOOLS ePRINT dialog box pop up, then click **Finish Jobs** and **OK** boxes.

10.9.2 Double click the **PDF** Icon on desktop, the PDF file will present as Document_#. Right click on that file, select **Rename** to change the file name to an assigned analytical run ID. (i.e.: MA8324). This is the raw data for MA8324.

10.9.3 Drop the raw data to Lims.

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10.9.4 By completing above steps, the raw data (i.e: MA8324) can be pulled up in the Raw Data Search function.

10.10 The data must be reviewed in the LIMS as outlined in the inorganic data review SOP, EQA034. Calculations for water samples are done automatically in the LIMS using the equation shown below.

original sample concentration of metal (µg/l) =

$$\frac{\text{(conc. in the digestate (µg/l)) x (final digestate volume (ml))}}{\text{(Initial sample volume (ml))}}$$

10.11 Aft the end of the analysis day, the ICP must be brought down using the following sequence:

10.11.1 Place the autosampler tip in rinse cup and rinse in a mixed solution of 5% nitric acid and 5% hydrochloric acid for 10 minutes and in DI water for 20 minutes. **Note**: A stronger acid may be needed depending on the matrix of the samples that were analyzed.

10.11.2 Turn off the plasma by click on the **Plasma** Icon and click on **Plasma Off**.

10.11.3 Close all iTEVA programs/ windows.

10.11.4 Release the tension on the sample pump platen.

10.11.5 Switch off recirculating chiller.

11.0 PROCEDURE FOR GENERATION OF INTERFERING ELEMENT CORRECTION FACTORS

11.1 All IEC's must be verified and updated a minimum of once every 6 months or whenever instrument conditions change significantly. It is recommended that elements with frequent high concentrations or with large IEC's should be checked more frequently.

11.2 Calculate the IEC correction factors and enter them into the method. Verify that the recalculated sample results are within QC limits. Calculate the correction factor using the equation shown below. This correction factor must be added to the correction factor already in place in the method for a given element.

$$\text{IEC} = \frac{\text{Concentration Result of the element with the interference}}{\text{Concentration result of the interfering element}}$$

11.3 Analyze the ICSA/ICSAB solutions and/or SIE solutions and verify that the combined standards are within QC limits. If they are not, make additional changes to the IEC factors and then re-verify both the individual and combined solution values.

11.4 Save and update the method.

11.5 Interfering element correction factors saved as raw data along with the run printouts on a daily basis so that the IEC's for a given run are traceable.

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12.0 QC REQUIREMENTS

12.1 This section outlines the minimum QA/QC operations necessary to satisfy the analytical requirements for method SW846 6010C.

12.2 Method Detection Limits (MDLs). MDLs should be established for all analytes, using a solution spiked at approximately 3 to 5 times the estimated detection limit. To determine the MDL values, take seven replicate aliquots of the spiked sample and process through the entire analytical method. The MDL is calculated by multiplying the standard deviation of the replicate analyses by 3.14, which is the student's t value for a 99% confidence level. MDLs should be determined approximately once per year or whenever there is a significant change in the background or instrument response.

12.3 Instrument Detection Limits (IDLs). Instrument Dection Limits (IDLs). It is required that IDL's be completed a minimum of every 3 months for all analytes or whenever instrument conditions have significantly changed. The Instrument Detection Limits (in ug/L) are determined by analyzing 7 replicates of a reagent blank solution on 3 non-consecutive days. The IDL is defined as 3 times the average of the standard deviations of the 3 days. For the IDL, each measurement shall be performed as though it were a separate analytical sample (i.e., each measurement shall be followed by a rinse and/or any other procedure normally performed between the analysis of separate samples). IDLs shall be determined and reported for each wavelength used in the analysis of the samples.

12.4 Linear Calibration ranges. The upper limit of the linear calibration ranges should be established for each analyte by determining the signal responses from a minimum of three concentration standards, one of which is close to the upper limit of the linear range. The linear calibration range which may be used for the analysis of samples should be judged by the analyst from the resulting data. Linear calibration ranges should be determined whenever there is a significant change in instrument response and every six months for those analytes that periodically approach their linear limit.

12.4.1 For work following the Army Corp of Engineers Shell document, the linear range cannot exceed the level of the high calibration standard on that run. All elements to be reported that exceed the high standard must be reanalyzed on dilution and the results reported from the dilution.

12.5 Initial Calibration Verification (ICV) and Initial Calibration Blank (ICB). After every new calibration, an ICV must be analyzed. The analysis of the ICV may be followed by the analysis of the ICB, although this is not required by the method.

12.5.1 For the ICV, all elements to be reported must be within 10 percent of the true value and the replicates that exceed 5 times the reporting limit should have a relative standard deviation of less than 5 percent. The ICV must be from a different source than the calibration standards and must be near the mid-point of the calibration curve. If the ICV does not meet criteria, then the problem must be identified and corrected before samples can be run and reported for the element(s) that are outside of criteria. Correction of the problem can be verified by rerunning the check standard and showing that it meets QC criteria.

12.5.2 If an ICB is analyzed, than all elements to be reported must be less than the RL (LLOQ). If the ICB is outside of criteria, then the problem must be identified and

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corrected before samples can be run and reported for the element(s) that are outside of criteria. Correction of the problem can be verified by rerunning the check standard and showing that it meets QC criteria. Analysis of a CCB before running any reportable samples can be used to verify that the system meets calibration blank requirements.

12.6 Continuing Calibration Verification (CCV) and Continuing Calibration Blank (CCB). Analyze the continuing calibration verification solution and the continuing calibration blank after every tenth sample and at the end of the sample run.

12.6.1 For the CCV, all elements to be reported must be within 10 percent of the true value and the replicates that are greater than 5 times the reporting limit should have a relative standard deviation of less than 5 percent. The CCV should be made from the same source as the calibration standards at a concentration near the mid-level of the calibration curve. If an element does not meet the recovery criteria of the CCV (90 to 110%), than no samples can be reported for that element in the area bracketed by the CCV.

12.6.1.1 If the replicate rsd is high, but all replicates are within the recovery limits, then the results can be accepted at the discretion of the reviewer.

12.6.2 For the CCB, all elements to be reported must be less than the reporting limit (LLOQ). If an element does not meet this criteria, then no samples can be reported for that element in the area bracketed by the CCB.

12.7 Interference Check Standard. An interference check standard must be analyzed at the beginning of each analytical run. For all spiked elements, the analyzed results must be within 20 percent of the true values. For unspiked elements, the interfering element solutions should contain less than the absolute value of two times the reporting limit for each element. If this criteria is not met, then no samples containing the elements in question can be reported in the area bracketed by this QC unless the samples contain no significant interferents. This method does not require the analysis of an interfering element check solution at the end of the run. However, this may be required due to meet other method and/or client requirements. Run the ICSA and ICSAB as instructed by the metals lab supervisor or manager or as noted in the program code requirements.

12.8 Low Level Calibration Verification (CRI or LLCCV). The CRI standard containing the elements of interest at (or below) the reporting level for each element. The CRI (LLCV) must be analyzed at the beginning and end of each calibration (analysis) batch. The acceptance criterion for the CRI check is 70 to 130% recovery. If an element does not meet this criterion, then all bracketed samples for that element in the concentration range between the CRI and the CCV must be reanalyzed. Samples containing concentrations higher than the CCV may be reported as long as CCV criteria are met.

12.8.1 More frequent CRI (LCCV) checks may be analyzed during the course of the run if system stability at the low end of the calibration is questionable or if the lab wants to ensure that fewer samples will have to be submitted for reanalysis if there is a failed CRI at the end of a run.

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12.8.2 It is recommended that the CRI check be run bracketing every 4 to 8 hour period of analysis. It may be run as frequently as every 10 samples if the supervisory staff deems that this is necessary.

12.9 Method Blank. The laboratory must digest and analyze a method blank with each set of samples. A minimum of one method blank is required for every 20 sample batch. If the method blank does not contain target analytes at a level that interferes with the project-specific DQOs, then the method blank is considered acceptable.

12.9.1 The default SOP limit for the method blank is that is must be less than one half of the reporting limit.

12.9.2 In addition, the blank is considered acceptable if it is less than 10% of the regulatory limit, or less than 10% of the lowest sample concentration for each analyte in a given preparation batch, whichever is greater.

12.9.3 If the method blank does not meet criteria, then it can be reanalyzed along with any associated samples. If it is still unacceptable, then all associated samples must be redigested and reanalyzed along with the other appropriate batch QC samples

12.10 Lab Control Sample or Spike Blank. The laboratory must digest and analyze a laboratory control sample or spike blank with each set of samples. A minimum of one lab control sample or spike blank is required for every 20 sample batch. The laboratory should assess laboratory performance of the lab control and spike blank against recovery limits of 80 to 120 percent. In house lab control and spike blank limits may also be generated to support these default limits. If the lab control or spike blank is outside of the control limits for a given element, all samples must be redigested and reanalyzed for that element.

12.10.1 If solid lab controls are used, then the manufacturer's limits should be applied.

12.11 Matrix Spike. The laboratory must add a known amount of each analyte to a minimum of 1 in 20 samples. The matrix spike recovery is calculated as shown below. Recoveries should be assessed against default limits of 75 to 125 percent. In house limits may be generated for this method for informational purposes only. If a matrix spike is out of control, then the results should be flagged with the appropriate footnote and it is recommended that a post-digest spike be analyzed for the out of control element(s). If the matrix spike amount is less than one fourth of the sample amount, then the sample cannot be assessed against the control limits and should be footnoted to that effect. Note: Both the matrix spike amount and the sample amount are calculated to the IDL for any given element. Any value less than the IDL is treated as zero.

((Spiked Sample Result - Sample Result) / Amount Spiked) x 100 = matrix spike recovery

12.11.1 If a post-digest spike is required, the sample should be spiked with approximately 2 times the sample level or two times the reporting limits, whichever is greater. Limits of 80 to 120 percent are applied. The serial dilution is used to confirm any matrix effects. The post-digest spike recovery must be footnoted on the matrix spike recovery or otherwise noted in the quality control summary report. If the post-spike recoveries are out of the range of 80 to 120%, then the matrix

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spike results should be footnoted with a comment that the post-digest spike recovery indicates possible matrix interference.

12.12 Matrix Spike Duplicate (MSD) or Matrix duplicate (DUP). The laboratory must digest a matrix spike duplicate or matrix duplicate sample for a minimum of 1 in 20 samples. The relative percent difference (rpd) between the MSD and the MS or between the DUP and the sample should be assessed. The rpd is calculated as shown below. The control limit for the duplicate rpd is method defined as 20%. If the sample and the duplicate are less than 5 times the reporting limits and are within a range of ± the reporting limit, then the duplicate is considered to be in control. Note: Both the duplicate amount and the sample amount are calculated to the IDL for any given element. Any value less than the IDL is treated as zero.

12.12.1 If a MSD or duplicate is out of control, then the data should be checked carefully to confirm that the high rpd for a given element is not a result of an analytical problem. If an analytical problem is suspected, the MSD or duplicate must be reanalyzed for confirmation. If the initial and reanalysis are in agreement (within 20%), then the high rpd is a result of preparation or sample issues and further analysis of the initial preparation is not required. If the initial and reanalysis are not in agreement due to an analytical problem, then any affected samples in the associated batch should also be reanalyzed for that element.

12.12.2 If more than 50% of the elements in a sample (that have levels of at least 5 times the reporting limit) have a high RPD, then the MSD or duplicate should be redigested for confirmation, unless the sample matrix is such that the non-homogeneity of the sample is visually apparent. If the results confirm, the results from the original MSD or duplicate should be flagged as indicative of possible sample non-homogeneity. If the results do not confirm, then the whole batch should be digested and reanalyzed.

12.12.3 If 50% or less of the elements in a sample (that have levels of at least 5 times the reporting limit) have a high rpd, then the high rpd(s) should be footnoted as indicating possible sample non-homogeneity unless other problems are suspected. If problems are suspected, the reviewer will initiate redigestion and reanalysis of the batch.

12.12.4 The calculations used to calculate RPD are shown below.

$$\frac{(|\text{MS Result} - \text{MSD Result}|) \times 100}{(\text{MS Result} + \text{MSD Result})/2} = \text{MSD RPD}$$

$$\frac{(|\text{Sample Result} - \text{Duplicate Result}|) \times 100}{(\text{Sample Result} + \text{Duplicate Result})/2} = \text{Duplicate RPD}$$

12.13 Serial Dilution. A serial dilution is required on a frequency of one in 20 samples. For one sample per preparation batch, or whenever matrix interferences are suspected for a batch of samples, a serial dilution should be prepared. Normally the sample used for the serial dilution is the sample that is used for the matrix spike and matrix spike duplicate. For the serial dilution, a 1:5 dilution must be made on the sample. The results of the 1:5 dilution should agree within 10 percent of the true value as long as the sample is greater than 50 times the reporting limit for that element before dilution (or 10 times the reporting limit after dilution) and the sample results are within the linear range. If not, an interference effect must be

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suspected and the serial dilution result for the element with the suspected interference must be footnoted. The serial dilution is calculated as shown below.

$$\frac{100 \times ((\text{Sample result} - \text{Serial dilution result}))}{\text{Sample result}} = \text{Serial dilution percent difference}$$

12.14 Post Digestion Spike Addition. Post-digest spikes may also be used to determine potential interferences. Check with the metals supervisor for further information on when a post-digest spike should be performed. Recovery limits of 80 to 120 percent should be used to assess post-digest spikes.

12.15 IEC Correction Factor Generation. All interfering element correction factors (IEC's), must be verified and updated a minimum of once every 6 months or whenever instrument conditions change significantly.

12.16 Lower Limit of Quantitation check sample (LLQC). The LLQC is a sample at the reporting limit that is taken through the entire preparation and analytical process. This standard must be analyzed when reporting limits are initial established and on an as needed basis after that. The LLQC is equivalent to the LOQ (Limit of quantitation) standard which must be analyzed quarterly for the DOD QSM 4.1 program. The limits of quantitation are verified when all analytes in the LLQC sample are detected within 30% of their true value. If the limits cannot be verified at the spiked level, then the quantitation limit must be adjusted to a level where verification is successful.

12.17 Calibration Curve. The calibration curve should be prepared daily using a minimum of a calibration blank and three non-zero standards that bracket the desired sample concentration ranges. The calibration curve must have a correlation coefficient greater than or equal to 0.998 and must be verified with initial low level and mid level calibration verification standards before any samples can be analyzed. If the curve does not meet the correlation coefficient requirements or is not verified as described in section 12.5 or 12.8, then no results can be reported for those elements which did not meet quality control criteria.

13.0 CALCULATIONS

13.1 For water samples, the following calculations should be used. Refer to the QC section for the calculations to be used for the QC samples.

$$\text{original sample concentration of metal } (\mu g/l) = \frac{(\text{conc. in the digestate } (\mu g/l)) \times (\text{final digestate volume (ml)})}{(\text{Initial sample volume (ml)})}$$

13.2 For soil samples, the following calculations should be used.

$$\text{concentration of the metal in the dry sample (mg/kg)} =$$

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$$\frac{\text{(conc. in the digestate (mg/l) x final digestate volume(L))}}{\text{(sample wt. (kg)) x (\% solids/100)}}$$

14.0 DOCUMENTATION REQUIREMENTS

14.1 If any samples or QC checks require reanalysis, a brief explanation of the reason must be documented in the raw data. All instrument data should be exported to the LIMS system and a copy of the run log should be included in the logbook by the instrument.

14.2 The Standard Preparation Logbook must be completed for all standard preparations. All information requested must be completed. The Accutest Lot Number must be cross-referenced on the standard vial.

14.3 The Instrument Maintenance Logbook must be completed when any type of maintenance is performed on the instrument. A copy of any outside maintenance reports should also be kept in the log. In addition to the maintenance, the maintenance log should also contain daily information on such items as the profile intensity. Each instrument has a separate log.

14.4 Any corrections to laboratory data must be done using a single line through the error and a reason for the correction. The initials of the person and date of correction must appear next to the correction.

14.5 Supervisory (or peer) personnel must routinely review (at least once per month) all laboratory logbooks to ensure that information is being recorded properly. Additionally, the maintenance of the logbooks and the accuracy of the recorded information should also be verified during this review.

15.0 INSTRUMENT MAINTENANCE

15.1 Recommended periodic maintenance includes the items outlined below.

15.1.1 Change the pump tubing weekly or as needed.

15.1.2 Clean the filter on the recirculating pump approximately once a month and dust off the power supply vents every one to two weeks.

15.1.3 Clean the radial view quartz surface weekly or more often if needed.

15.1.4 Clean the nebulizer, torch, and injector tube every two to four weeks or more often as needed.

15.1.5 Change the sampler tip as needed (every one to two months).

15.1.6 Clean the recirculating pump lines every 3 months or more often if needed.

15.1.7 Clean the slides on the autosampler with methanol and wipe them with a KimWipe saturated with Teflon spray a minimum of once per day.

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16.0 POLLUTION PREVENTION & WASTE MANAGEMENT

16.1 Users of this method must perform all procedural steps in a manner that controls the creation and/or escape of wastes or hazardous materials to the environment. The amounts of standards, reagents, and solvents must be limited to the amounts specified in this SOP. All safety practices designed to limit the escape of vapors, liquids or solids to the environment must be followed. All method users must be familiar with the waste management practices described in section 16.2.

16.2 Waste Management. Individuals performing this method must follow established waste management procedures as described in the waste management SOP, EHS004. This document describes the proper disposal of all waste materials generated during the testing of samples as follows:

16.2.1 Non hazardous aqueous wastes.

16.2.2 Hazardous aqueous wastes

16.2.3 Chlorinated organic solvents

16.2.4 Non-chlorinated organic solvents

16.2.5 Hazardous solid wastes

16.2.6 Non-hazardous solid wastes

17.0 ADDITIONAL REFERENCES

17.1 Refer to other SOP's for ICP analysis (CLP, and EPA 200.7 for both DW and WW).

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TABLE 1: NORMAL REPORTING LIMITS BY ELEMENT			
Analyte	**Water & Wipe Reporting Limit (µg/l)**	**Soil Reporting Limit (mg/kg)**	**TCLP Reporting Limit (mg/l)**
Aluminum	200	50	
Antimony	6	2	
Arsenic	3	2	0.50
Barium	200	20	1.0
Beryllium	1	0.2	
Cadmium	3	0.5	0.005
Calcium	5000	500	
Chromium	10	1	0.010
Cobalt	50	5	
Copper	10	2.5	
Iron	100	50	
Lead	3	2	0.50
Magnesium	5000	500	
Manganese	15	1.5	
Nickel	10	4.0	
Potassium	10000	1000	
Selenium	10	2	0.50
Silver	10	0.5	0.010
Sodium	10000	1000	
Thallium	2	1	
Vanadium	50	5	
Zinc	20	2	
Boron	100	10	
Molybdenum	20	1	
Palladium	50	5.0	
Sulfur	50	NA	
Silicon	200	20	
Strontium	10	1	
Tin	10	5	
Titanium	10	1	
Tungsten	50	5	
Zirconium	10	2	

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TABLE 2: ANALYTICAL LINES ON THE SSTRACE1 AND SSTRACE2	
Element	**Wavelength**
Al	396.1
As	189.0
Ca	317.9
Fe	259.9
Mg	279.0
Mn	257.610
Pb	220.3
Se	196.0
Tl	190.8
V	292.4
Ag	328.0
Ba	455.4
Be	313.0
Cd	228.8
Co	228.6
Cr	267.7
Cu	324.7
K	766.4
Na	589.5
Ni	231.6
Sb	206.8
Zn	206.2
B	208.9
Mo	202.0
Pd	340.4
S	182.0
Sr	407.7
Sn	189.9
Ti	334.9
Si	212.4
W	207.9
Zr	339.1

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TABLE 3: CALIBRATION STANDARD LEVELS in ug/l				
Element	**STD A (Blank)**	**STD B**	**STD C**	**STD D**
Ba	0	1000	2000	4000
Be	0	1000	2000	4000
Cd	0	1000	2000	4000
Cr	0	1000	2000	4000
As	0	1000	2000	4000
Se	0	1000	2000	4000
Pb	0	1000	2000	4000
Tl	0	1000	2000	4000
Mn	0	1000	2000	4000
Co	0	1000	2000	4000
Zn	0	1000	2000	4000
Cu	0	1000	2000	4000
Ni	0	1000	2000	4000
Sb	0	1000	2000	4000
Mo	0	1000	2000	4000
B	0	1000	2000	4000
Sn	0	1000	2000	4000
Ti	0	1000	2000	4000
Ag	0	125	250	500
V	0	1000	2000	4000
Sr	0	1000	2000	4000
Si	0	2500	5000	10000
Pd	0	1000	2000	4000
W	0	1000	2000	4000
Zr	0	1000	2000	4000
S	0	1000	2000	4000
Al	0	20000	40000	80000
Ca	0	20000	40000	80000
Fe	0	20000	40000	80000
Mg	0	20000	40000	80000
K	0	20000	40000	80000
Na	0	20000	40000	80000

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TABLE 4: ICV, and CCV LEVELS		
Element	**ICV Suggested Level in ug/l**	**CCV Suggested Level in ug/l**
Al	40000	40000
As	2000	2000
Ca	40000	40000
Fe	40000	40000
Mg	40000	40000
Mn	2000	2000
Pb	2000	2000
Se	2000	2000
Tl	2000	2000
V	2000	2000
Ag	250	250
Ba	2000	2000
Be	2000	2000
Cd	2000	2000
Co	2000	2000
Cr	2000	2000
Cu	2000	2000
K	40000	40000
Na	40000	40000
Ni	2000	2000
Sb	2000	2000
Zn	2000	2000
B	2000	2000
Mo	2000	2000
Pd	2000	2000
Sr	2000	2000
Sn	2000	2000
Ti	2000	2000
Si	5000	5000
W	2000	2000
Zr	2000	2000
S	2000	2000

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TABLE 5: SUGGESTED CONCENTRATIONS OF METALS IN THE MATRIX SPIKE AND SPIKE BLANK			
Element	**Soils Final Concentration in mg/kg**	**Aqueous Final Concentration in µg/l**	**TCLP Leachates Final Concentration in mg/l**
Ag	10	50	0.05
Al	5400	2000	
As	400	2000	2.0
B	100	2000	
Ba	400	2000	10.0
Be	10	50	
Ca	1250	25000	
Cd	10	50	0.05
Co	100	500	
Cr	40	200	0.20
Cu	50	250	
Fe	5200	1000	
K	1250	25000	
Mg	1250	25000	
Mn	100	500	
Mo	100	2000	
Na	1250	25000	
Ni	100	500	
Pb	100	500	2.0
Sb	100	500	
Se	400	2000	2.0
Tl	400	2000	
V	100	500	
Zn	100	500	
S	100	2000	
Sn	100	2000	
Sr	100	2000	
Ti	100	2000	
Si	200	4000	
Pd	100	2000	
W	100	2000	
Zr	100	2000	

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Lab Manager Henry Cole

QA Manager

Effective Date: 5/21/12

TITLE: COLD VAPOR ANALYSIS OF MERCURY FOR SOIL SAMPLES

REFERENCES: SW846 7471B

Revised Sections: *7.1*

1.0 SCOPE AND APPLICATION

1.1 This method can be applied for the analysis of mercury in soils, sediments, bottom deposits, and sludge type materials. The reporting limit for mercury soil samples, based on a 0.6 g sample size, is 0.033 mg/kg.

2.0 SUMMARY

2.1 Cold vapor mercury is a flameless AA procedure based on the absorption of radiation at 253.7 by mercury vapor. Organic mercury compounds are oxidized and the mercury is reduced to the elemental state and aerated from solution in a closed system. The mercury vapor passes through a cell positioned in the light path of an atomic absorption spectrophotometer. Results are quantitated by comparison to a daily calibration curve.

3.0 REPORTING LIMIT AND METHOD DETECTION LIMIT

3.1 Reporting Limit. The reporting limit for this method is established at the lowest concentration standard in the calibration curve. Detected concentrations below this concentration cannot be reported without qualification.

3.2 Method Detection Limit. Experimentally determine MDLs using the procedure specified in 40 CFR, Part 136, Appendix B. This value represents the lowest reportable concentration of an individual compound that meets the method qualitative identification criteria.

3.2.1 Experimental MDLs must be determined annually for this method.

3.2.2 Process all raw data for the replicate analysis in each MDL study.

4.0 DEFINITIONS

BATCH: A group of samples which behave similarly with respect to the sampling or the testing procedures being employed and which are processed as a unit. For QC purposes, if the number of samples in a group is greater than 20, then each group of 20 samples or less will all be handled as a separate batch.

CALIBRATION CHECK STANDARD. The calibration check standard is a mid-range calibration standard. It is recommended that the calibration check standard be run at a frequency of approximately 10 percent. Recovery requirements vary by method. For this method a recovery from

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80 to 120% is required. (For some methods this is mandatory and for some it is a recommendation only. Refer to individual method SOP's)

EXTERNAL CHECK STANDARD. The external check standard is a standard from a separate source than the calibration curve that is used to verify the accuracy of the calibration standards. An external check must be run a minimum of once per quarter for all analyses where a check is commercially available. If the external check is outside of the control limits for a given parameter, all samples must be reanalyzed for that parameter after the problem has been resolved.

SPIKE BLANK OR LAB CONTROL SAMPLE. Digest and analyze a laboratory control sample or spike blank with each set of samples. A minimum of one lab control sample or spike blank is required for every 20 samples. Assess laboratory performance against the control limits specified in the SOP. If the lab control is outside of the control limits for a parameter, all samples must be redigested or redistilled and reanalyzed for that parameter. The exception is if the lab control recovery is high and the results of the samples to be reported are less than the reporting limit. In that case, the sample results can be reported with no flag. Note: If control limits are not specified in the SOP, then default limits of 80 to 120 percent should be used.

MATRIX: The component or substrate (e.g., water, soil) which contains the analyte of interest.

MATRIX DUPLICATE: A duplicate sample is digested at a minimum of 1 in 20 samples. The relative percent difference (RPD) between the duplicate and the sample should be assessed. The duplicate RPD is calculated as shown below. Assess laboratory performance against the control limits that are specified in the SOP. In house limits are generated once sufficient duplicate data is available to generate limits (usually a minimum of 20 to 30 analyses). If a duplicate is out of control, flag the results with the appropriate footnote. If the sample and the duplicate are less than 5 times the reporting limits and are within a range of ± the reporting limit, then the duplicate is considered to be in control. Note: If control limits are not specified in the SOP, use default limits of ± 20% RPD.

$$\frac{(|\text{Sample Result} - \text{Duplicate Result}|) \times 100}{(\text{Sample Result} + \text{Duplicate Result})/2} = \text{Duplicate RPD}$$

MATRIX SPIKE: The laboratory must add a known amount of each analyte to a minimum of 1 in 20 samples. The matrix spike recovery is calculated as shown below. Assess laboratory performance against the control limits that are specified in the SOP. In house limits are generated once sufficient matrix spike data is available to generate limits (usually a minimum of 20 to 30 analyses). If a matrix spike is out of control, then the results should be flagged with the appropriate footnote. If the matrix spike amount is less than one fourth of the sample amount, then the sample cannot be assessed against the control limits and should be footnoted to that effect. Note: If control limits are not specified in the SOP, then default limits of 75 to 125 percent should be used.

$$\frac{(\text{Spiked Sample Result} - \text{Sample Result}) \times 100}{(\text{Amount Spiked})} = \text{Matrix Spike Recovery}$$

MATRIX SPIKE DUPLICATES: Intralaboratory split samples spiked with identical concentrations of target analyte(s). The spiking occurs prior to sample preparation and analysis. They are used to document the precision and bias of a method in a given sample matrix.

$$\frac{(|\text{MS Result} - \text{MSD Result}|) \times 100}{(\text{MS Result} + \text{MSD Result})/2} = \text{MSD RPD}$$

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METHOD BLANK. The laboratory must digest and analyze a method blank with each set of samples. A minimum of one method blank is required for every 20 samples. If no digestion step is required, then the method blank is equivalent to the reagent blank. The method blank must contain the parameter of interest at levels of less that the reporting limit for that parameter. If the method blank contains levels over the reporting limits, the samples must be redigested or redistilled and reanalyzed. The exception to this rule is when the samples to be reported contain greater than 10 times the method blank level. In addition, if all the samples are less than a client required limit and the method blank is also less than that limit, then the results can be reported as less than that limit.

METHOD DETECTION LIMITS (MDLS). The minimum concentration of a substance 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. MDLs should be determined approximately once per year for frequently analyzed parameters.

REAGENT BLANK: The reagent blank is a blank that has the same matrix as the samples, i.e., all added reagents, but did not go through sample preparation procedures. The reagent blank is an indicator for contamination introduced during the analytical procedure. (Note: for methods requiring no preparation step, the reagent blank is equivalent to the method blank.) Either a reagent blank or a method blank must be analyzed with each batch of 20 samples or less. The concentration of the analyte of interest in the reagent blank must be less than the reporting limit for that analyte. If the reagent blank contains levels over the reporting limits, the samples must be reanalyzed. The exception to this rule is when the samples to be reported contain greater than 10 times the reagent blank level. In addition, if all the samples are less than a client required limit and the reagent blank is also less than that limit, then the results can be reported as less than that limit.

REAGENT GRADE: Analytical reagent (AR) grade, ACS reagent grade, and reagent grade are synonymous terms for reagents which conform to the current specifications of the Committee on Analytical Reagents of the American Chemical Society.

REAGENT WATER: Water that has been generated by any method which would achieve the performance specifications for ASTM Type II water. For organic analyses, see the definition of organic-free reagent water.

STANDARD CURVE: A plot of concentrations of known analyte standards versus the instrument response to the analyte. Calibration standards are prepared by successively diluting a standard solution to produce working standards which cover the working range of the instrument. Standards should be prepared at the frequency specified in the appropriate section. The calibration standards should be prepared using the same type of acid or solvent and at the same concentration as will result in the samples following sample preparation.

LOWER LIMIT OF QUANTITATION CHECK (also referred to as CRI, CRA, or LLQC). For all runs, a low check at the level of the reporting limit must be analyzed at the beginning of the run before analyzing any samples, but not before the ICV. A method criterion of 50 to 150% recovery is applied to this low check standard. If this criterion is not met, then all samples associated with this CRA check must be reanalyzed along with a compliant CRA check.

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5.0 HEALTH & SAFETY

5.1 The analyst must follow normal safety procedures as outlined in the Accutest Laboratory Safety Manual which includes the use of safety glasses and lab coats. In addition, all acids are corrosive and must be handled with care. Flush spills with plenty of water. If acids contact any part of the body, flush with water and contact the supervisor.

5.2 The toxicity or carcinogenicity of each reagent used in this method has not been precisely determined; however, each chemical must be treated as a potential health hazard. Exposure to these reagents should be reduced to the lowest possible level. The laboratory is responsible for maintaining a current awareness file of OSHA regulations regarding the safe handling of the chemicals specified in this method. A reference file of data handling sheets must be made available to all personnel involved in these analyses.

5.3 After the mercury digestate is reduced to Hg vapor, it must be handled in a closed system or in a hood to prevent inhalation of the toxic vapor. Make sure that the Hg instrument is vented directly to a hood.

6.0 PRESERVATION AND HOLDING TIME

6.1 All solid samples should be stored at 4 ± 2°C until the time of digestion.

6.2 All samples should be analyzed within 28 days of the date of sampling.

7.0 APPARATUS

7.1 Three Leeman instruments are available for analysis. Two are Leeman Hydra II AA automated analyzers and the other is a Leeman Hydra AA automated analyzer. Refer to the instrument manuals for further details on this instrumentation, including proper venting and safety requirements. Instrument maintenance is outlined below.

7.1.1 Change the sample tubing as needed.

7.1.2 Change the drying tubing as needed.

7.1.3 Clean the exterior of the instrument as needed.

7.1.4 Adjust the Hg lamp as needed. This can be done in the software on both instruments.

7.1.5 Complete any other maintenance required to maintain the instrument in good running order including, but not limited to, cleaning the cell, changing other tubing, changing the Hg lamp, etc.

7.2 Graphite heating block. Capable of heating at 95 ± 3 °C for 2 hours.

7.3 Digestion Bottles . Disposable plastic digestion tubes (65 ml volume) with tops for graphite heating block.

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7.4 Calibrated glass tubes with verified 60.0 ml and 100.0 ml final volume calibration mark for bringing graphite heating block digestates to their final volume. (The 60.0 ml calibration is only required for water digestions).

7.4.1 At a minimum of once per year, the calibration of these bottles must be verified and documented in the Hg Bottle calibration log following the procedure outlined below.

7.4.2 Carefully measure 60.0 ml of room temperature (20 to 25 deg. C) deionized water with a class A to deliver volumetric cylinder and pour into the calibrated Hg bottle.

7.4.3 If the bottom of the meniscus is on the calibration line, then the bottle passes calibration and can be used.

7.4.4 If the bottom of the meniscus is not on the line, then the bottle should be removed from service and replaced with a newly calibrated bottle. New bottles are calibrated following the same procedure as above, except that a line must be etched into the bottle at the bottom of the meniscus of the 60 ml of DI water.

7.4.4.1 Two different lines for the same volume (i.e. 60 ml) cannot be etched on the same bottle as that may lead to confusion in the measurement of the final volume.

7.4.5 Repeat the steps in 7.4.2 through 7.4.4 using a 100 ml final volume instead of the 60 ml final volume.

7.5 Class A , to deliver, volumetric cylinders for measuring initial sample volumes and for calibrating glass tubes as outlined above.

7.6 Analytical Balance, 4 place. Calibration must be verified daily before use with NIST traceable weights.

7.7 Automatic pipettor bottles. The calibration on these bottles must be verified as outlined in EQA063.

7.8 Volumetric pipets, class A.

8.0 REAGENTS

All chemicals listed below are reagent grade unless otherwise specified. Deionized water should be used whenever water is required. All solutions listed below may be scaled up or down proportionally as needed. Different reagents are required for the different heating techniques.

8.1 Digestion Block Reagents.

8.1.1 Aqua Regia: Prepare immediately before use by carefully adding three volumes of concentrated HCl to one volume of concentrated nitric.

8.1.1.1 Make sure to only prepare the amount of acid that will be needed for the prep and analysis.

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8.1.1.2 This preparation must be done in a hood.

8.1.2 Dilution Acid: To approximately 800 ml of DI water, add 37.5 ml of concentrated HCl and 12.5 ml of concentrated nitric acid. Dilute to 1000 ml with DI water and mix well. This dilution acid is used for making dilutions of digested samples from the digestion block digestion procedures.

8.1.3 Potassium permanganate, 5% solution: Dissolve 50 g of potassium permanganate in 1000 ml of DI water. **Caution** - Potassium permanganate is a strong oxidizing agent. Handle with care.

8.1.4 Stannous chloride. Add 7.5 ml of concentrated sulfuric acid to approximately 400 ml of DI water. Dilute to 500 ml with DI water and mix well. Add 50 g of stannous chloride and dissolve. Make sure that this solution is dissolved while in use.

8.1.4.1 Stannous sulfate may be used in place of stannous chloride.

8.1.4.2 If clogging occurs during analysis using the automated analyzer, then a less concentrated solution may be used.

8.1.5 Sodium chloride-Hydroxylamine hydrochloride or Sodium chloride-Hydroxylamine hydrosulfate. Add 240 g of sodium chloride and 240 g of hydroxylamine hydrochloride to 2000 ml of water. Mix well. Hydroxylamine sulfate may be used in place of hydroxylamine hydrochloride.

8.2 Mercury standard solutions.

8.2.1 10 ppm Hg solution. Using a 1.00 ml volumetric pipette, add 1.00 ml of 1000 ppm stock (to be purchased from a vendor such as Fisher) to a 100 ml volumetric flask containing approximately 75 ml of water and 2.0 ml of concentrated nitric acid. Dilute to volume with water and mix well. This standard may be held for up to 28 days.

8.2.1.1 The 10 ppm external source should be made up using a different mercury stock, and following the directions in 8.2.1.

8.2.2 100 ppb Hg solution. Using a 1.00 ml volumetric pipette, add 1.00 ml of 10 ppm Hg solution to a 100 ml volumetric flask containing approximately 75 ml of water and 2.0 ml of concentrated nitric acid. Dilute to volume with deionized water and mix well. This standard must be made fresh daily.

8.2.2.1 The 100 ppb external source should be made up following the directions in 8.2.2.

8.2.3 10 ppb Hg solution. Using a 10.0 ml volumetric pipette, add 10.0 ml of 100 ppb Hg solution to a 100 ml volumetric flask containing approximately 75 ml of DI water and 2.0 ml of concentrated nitric acid. Dilute to volume with deionized water and mix well. This standard must be made fresh daily.

9.0 INTERFERENCES

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9.1 Potassium permanganate is added to eliminate possible sulfide interferences. Concentrations as high as 20 mg/kg of sulfide, as sodium sulfide, do not interfere with the recovery of added inorganic mercury in reagent water. High copper concentrations (> 10 mg/kg) may also interfere with mercury recoveries.

9.2 Samples that are high in chlorides may require additional permanganate because, during the oxidation step, chlorides are converted to free chlorine, which also absorbs radiation at 254 nm. Care must be taken to assure that free chlorine is absent before the mercury is reduced and analyzed. This may be accomplished by using an excess of the hydroxylamine hydrosulfate.

9.3 Certain volatile organics may also absorb at this wavelength and can interfere.

10.0 GRAPHITE DIGESTION BLOCK PROCEDURE FOR SOIL DIGESTION

10.1 Make up a standard curve consisting of 5 standards and a blank. Suggested concentrations are shown below. Different concentrations may also be used, as long as all of the method requirements are met. Make sure to clearly label each digestion tube. Calibration standards must be prepared fresh each day. Add 5 ml of DI water to each standard before digestion. The final concentration of Hg is calculated in the final digestate.

Ml of 10 ppb Hg solution	ml of 100 ppb Hg solution	Total ug of Hg	ug/L of Hg
0.000	0.000	0.000	0.000
2.00	0.000	0.020	0.20
5.00	0.000	0.050	0.50
0.00	1.00	0.100	1.00
0.00	2.50	0.250	2.50
0.00	5.00	0.500	5.00

10.2 Samples. For each sample, homogenize the sample well and weigh out a 0.5 to 0.6 g aliquot of the sample into one labeled digestion tube. A solid lab control should be prepared in the same manner.

10.3 Make up additional quality control samples as shown below. (Note: if a different standard curve is run, then the levels of the CCV and ICV standards should be adjusted accordingly in accordance with the requirements in the method.) Make sure to clearly label each digestion tube. Make sure to prepare enough CCV checks for the entire run. The ICV check must be from an alternate source of standards than the calibration curve and at a different level than the CCV or the calibration standards. A low check standard is also required. This 0.20 ug/l check can be made up as outlined for the standard curve.

Sample ID	ml of 100 ppb Hg solution	ml of DIwater	µg/l of Hg
CCV Check(s)	2.5	7.5	2.5
MB	0.0	10.0	0.0
MS	2.0	0.0	2.0
MSD	2.0	0.0	2.0
Duplicate*	0.0	0.0	0.0
ICV	3.0	7.0	3.0

*Per project specification.

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10.4 To all samples, QC, and standards add 5 ml of DI water and 5 ml of aqua regia and then heat for 2 minutes in a digestion block at 95 ± 3 °C. These reagents can be added with a bottle pipettor that is accurate to within 90 to 110%.

10.5 Cool the samples and then add 25 ml of DI water and 15 ml of potassium permanganate solution to each sample and mix thoroughly. Allow the samples to stand for at least 15 minutes after the addition of the permanganate. If the sample decolorizes, add additional permanganate until the purple color persists.

10.5.1 These reagents can be added with a bottle pipettor that is accurate to within 90 to 110%.

10.5.2 For samples containing a mixture of solvent and water, take a sample aliquot of approximately 20 g (lower for higher solvent samples) of sample and add the reagents listed above. Pour the sample in a beaker and heat on a hot plate at 95 ± 3 °C until no solvent layer is visible. Then transfer the digestate to a digestion tube and proceed as outlined below. A method blank and spike blank must also be taken through this entire procedure.

10.6 Cap the samples and place them in the graphite digestion block for 30 minutes at 95 ± 3 °C. Record the temperature and time for each digestion batch on the analysis sheet. Remove and cool.

10.7 Enter the prep data into the LIMS system, double checking all weights and spike amounts. After the prep data is checked, it can be approved and is available for use in the final calculation.

11.0 MERCURY ANALYSIS PROCEDURE HYDRA AA

11.1 While the samples are digesting, begin setting up the Leeman analyzer following the steps outlined below. Additional instructions are available in the instrument operators manual.

11.1.1 Turn on the nitrogen and adjust to 60 to 90 psi. Turn on the instrument power if it is not already on.

11.1.2 Check the pump tubing and make sure that it is not flattened. Change if appropriate. Put the tubing in the clamps on the pump. Check the drying line and make sure that it is clean. Put fresh stannous chloride solution in the stannous chloride bottle. Fill the rinse bath or rinse bottle with fresh 10% nitric acid. The bath should be filled no more than ¾ full. Place the autosampler line and the stannous chloride line in the rinse container.

11.1.3 Turn on the analyzer and allow it to warm up.

11.1.3.1 In the software, go to the Runner section and select the control tab. Click on the Hg lamp and the pump. The gas will turn on automatically when the pump is turned off. If can also be turned on separately if necessary. The pump rates and gas pressure are set in the protocol. Refer to the instrument maintenance manual for more information on setting up a new protocol. If the

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Hg lamp needs to be optimized, it can be done using the lab adjust on this page.

11.1.4 Tighten the pump clamps until the flow is coming evenly through the lines. Do not overtighten.

11.1.5 In the software, go to the Utility tab and pick the gas control test option. The output should be approximately 7 psi and the input should be between 60 to 90 psi. If the pressures are not correct, check with the area supervisor or manager before proceeding.

11.1.6 Start a batch to save your data.

11.1.6.1 Go to the sample runner tab and click on start new batch. The batch name is limited to 8 characters. The batch should normally be named H1 or H2 followed by the month and date, followed by the matrix designation for the batch, following by the run number. For example, the first water batch on instrument 2 for 3/24/03 would be named H20324w1. The realtime print option can also be turned on from this tab.

11.1.7 Set up autosampler racks containing the samples that are going to be run.

11.1.7.1 Go to main tab and click on the rack editor button. Enter your samples and the appropriate QC. CCV and CCB checks can be entered in the macro column. This tab may also be reached by clicking on the autosampler icon at the top of the page.

11.1.8 Set up the calibration.

11.1.8.1 Enter or verify the standard values. From the runner menu click on the standard tab. Click the buttons to the left of the standards that are to be run. Also click on the number of replicates to be run for each standard. Normally one replicate is run per standard. The standard concentrations are defined under the database menu under the line info tab. The check standard concentrations and acceptance ranges are also defined under this line info tab. Make sure to always click apply when any changes are made in a tab.

11.2 Finish the preparation of the samples and standards as outlined below.

11.2.1 For samples that were digested in the water bath or the graphite digestion block, add 6 ml of hydoxylamine hydrochloride or hydroxylamine hydrosulfate to each sample and standard and mix well. Transfer the entire digestate to a calibrated glass tube. Rinse the digestion tube 3 times with approximately 10 ml aliquots of DI water and add them to the digestate in the calibrated glass tube. Then bring the sample to a final volume of 100 ml with DI water and mix well.

11.2.1.1 These reagents can be added with a bottle pipettor that is accurate to within 90 to 110%.

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11.3 Measure out aliquots of the digested standards and samples into the autosampler cups. Work from the prep log and double check all transfers. Let all samples sit uncovered in the open autosampler vials for a minimum of one minute. Place the racks in the autosampler. Move the stannous chloride line into the stannous chloride bottle.

11.4 Start the calibration.

11.4.1 Turn on the real time report by checking the real time printing option on the runner menu either under main or under sample. Then go to the runner menu and the standard tab. Push the standard auto button. The calibration curve will be run by the autosampler. When the curve is complete, go to the database menu and click the calibration curve tab. Check to make sure that all acceptance criteria are met and then accept the curve. See section 13.3 for calibration curve criteria. Make sure that the curve is printed as soon as it is accepted.

11.5 After the calibration has been accepted, start to run the samples.

11.5.1 Go to the runner menu and the sample tab. Pick the autosampler rack that is to be run and type in the start cup and the end cup. Then push the button for run auto.

11.5.2 Review the data. Any samples that are over the range of the curve should be diluted with the dilution acid (see 8.1.2) and reanalyzed. It is recommended that any sample analyzed after a sample with a value over the curve be reanalyzed for confirmation. Make sure to bracket every 10 samples with CCV and CCB checks.

11.6 Both paper and electronic reports can be generated using the report option. Never delete any samples from the reports. Electronic reports should be transferred into the LIMS system where the final calculations are done.

11.6.1 Go to the data base menu and pick the report tab. Make sure that the correct report specification has been chosen (normally Accutest). Pick the batch that is to be printed and then push the generate report button. Generate both the electronic reports (prn file) and printed reports (report) from this menu.

11.7 The calculations are done in the LIMS as described below. . For soils, the calculation shown below is used. A final volume of 100 ml is used for calculation purposes. (The final volume is factored out since all standards and samples are brought up to the same final volume and standard concentrations are calculated based on 100 ml.)

$$\text{Final sample concentration in mg/kg} = \frac{\text{concentration in the digestate in ug/l x final volume}}{\text{Initial weight in g x (\%solids/100)}}$$

11.8 Review the data in the LIMS, adding comments and accepting results as appropriate.

11.9 Shut down the instruments.

11.9.1 To shut down the Hydra AA instrument, move the stannous chloride line from the stannous chloride bottle to the rinse container. Let the system rinse with 10% nitric for several minutes. Then switch the bath to DI water and let rinse for several more

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minutes. Then empty the rinse bath and let the pump and gas run until the lines are completely dry. Go to Taskmaster and select the standby mode option. Release the tension on all of the pump clamps.

12.0 MERCURY ANALYSIS PROCEDURE HYDRA AA II

12.1 While the samples are digesting, begin setting up the Leeman analyzer following the steps outlined below. Additional instructions are available in the instrument operators manual.

12.1.1 Turn on the nitrogen and adjust to 60 to 90 psi. Turn on the instrument power if it is not already on.

12.1.2 Check the pump tubing and make sure that it is not flattened. Change if appropriate. Put the tubing in the clamps on the pump. Check the drying line and make sure that it is clean. Put fresh stannous chloride solution in the stannous chloride bottle. Fill the rinse bath or rinse bottle with fresh 10% nitric acid. The bath should be filled no more than ¾ full. Place the autosampler line and the stannous chloride line in the rinse container.

12.1.3 Turn on the analyzer and allow it to warm up.

12.1.3.1 Open the Envoy software. Go to Method and click Instrument Control. On the Instrument Control page, click the startup icon. This will turn on the lamp, gas, and pump. You may also turn on/off the lamp, gas and pump individually on the Instrument Control Page.

12.1.4 Tighten the pump clamps until the flow is coming evenly through the lines. Do not overtighten.

12.1.5 Go to the Instrument control tab and pick the gas control test option. The input should be approximately 0.25 LPM. If the pressures are not correct, check with the area supervisor or manager before proceeding.

12.1.6 Start a batch to save your data.

12.1.6.1 Create a new chapter (Data File) by clicking Analysis. The batch should normally be named H5 followed by the month date and year, followed by the matrix designation for the batch, following by the run number. For example, the first water batch on instrument for 3/24/03 would be named H5032411w1. The realtime print option can also be turned on from this tab.

12.1.7 Set up autosampler racks containing the samples that are going to be run.

12.1.7.1 Create a new sequence by clicking sequence-new. Type the sequence name. After typing the samples in to sequence page make sure to click update and save. CCV and CCB checks can be entered in the macro column of the sequence page.

12.1.8 Set up the calibration.

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12.1.8.1 For the Hydra AA II, go to the Method menu, enter or verify the standard concentration by clicking on the standard tab. Also select number of replicates to be run for each standard. Normally one replicate is run per standard. The check standard concentrations and acceptance ranges are also defined under this standard info tab. Make sure to always click apply when any changes are made in a tab.

12.2 Finish the preparation of the samples and standards as outlined below.

12.2.1 For samples that were digested in the water bath or the graphite digestion block, add 6 ml of hydoxylamine hydrochloride or hydroxylamine hydrosulfate to each sample and standard and mix well. Transfer the entire digestate to a calibrated glass tube. Rinse the digestion tube 3 times with approximately 10 ml aliquots of DI water and add them to the digestate in the calibrated glass tube. Then bring the sample to a final volume of 100 ml with DI water and mix well.

12.2.1.1 These reagents can be added with a bottle pipettor that is accurate to within 90 to 110%.

12.3 Measure out aliquots of the digested standards and samples into the autosampler cups. Work from the prep log and double check all transfers. Let all samples sit uncovered in the open autosampler vials for a minimum of one minute. Place the racks in the autosampler. Move the stannous chloride line into the stannous chloride bottle.

12.4 Start the calibration.

12.4.1 Click run sequence. The instrument will run the calibration and then pause. Click stop. Go to the Calibration page. Accept the calibration and then print the calibration. Click the Document icon, then choose HG5-PDF. Rename the file as MA*****_cal.

12.5 After the calibration has been accepted, start to run the samples.

12.5.1 For the Hydra AA II, go to the Sequence page. Right click on the first sample (i.e. ICV) and click start from here.

12.5.2 Review the data. Any samples that are over the range of the curve should be diluted with the dilution acid (see 8.1.2) and reanalyzed. It is recommended that any sample analyzed after a sample with a value over the curve be reanalyzed for confirmation. Make sure to bracket every 10 samples with CCV and CCB checks.

12.6 Both paper and electronic reports can be generated using the report option. Never delete any samples from the reports. Electronic reports should be transferred into the LIMS system where the final calculations are done.

12.6.1 Go to analysis-Click result-Click chapter. Then go to report and select report spec. The normal report spec is "ACCUTEST". Click OK. Click on chapter in order to select all samples. Then click report output and then csv.file. Save as MA*****.csv. To print, select printer output and then type the report title (i.e. MA*****) and enter OK.

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12.7 The calculations are done in the LIMS as described below. For soils, the calculation shown below is used. A final volume of 100 ml is used for calculation purposes. (The final volume is factored out since all standards and samples are brought up to the same final volume and standard concentrations are calculated based on 100 ml.)

$$\text{Final sample concentration in mg/kg} = \frac{\text{concentration in the digestate in ug/l x final volume}}{\text{Initial weight in g x (\%solids/100)}}$$

12.8 Review the data in the LIMS, adding comments and accepting results as appropriate.

12.9 Shut down the instruments.

12.9.1 To shut down the Hydra AA II, move the stannous chloride line from the stannous chloride bottle to the 10% HNO3 rinse bottle. Let the system rinse with 10% HNO3 for several minutes. Then switch the line to DI water bottle and let rinse for several more minutes. Let the pump and gas run until the lines are completely dry. Then go to instrument control menu and click off icon for Lamp, Gas and Pump.

13.0 QUALITY CONTROL

Below is a summary of the quality control requirements for this method. Make sure to check with the laboratory supervisor or manager for any additional client specific quality control requirements.

13.1 Instrument Detection Limits (IDLs). The instrument detection limits are determined by multiplying by 3, the average of the standard deviations obtained on three nonconsecutive days from the analysis of 7 consecutive replicates of a standard solution at a concentration from 3 to 5 times the estimated detection limit. IDLs must be done quarterly (every 3 months) for each instrument.

13.2 Method Detection Limits (MDLs). MDLs should be established using a solution spiked at approximately 3 times the estimated detection limit. To determine the MDL values, take seven replicate aliquots of the spiked sample and process through the entire analytical method. The MDL is calculated by multiplying the standard deviation of the replicate analyses by 3.143, which is the student's t value for a 99% confidence level. MDLs should be determined approximately once per year or whenever there is a significant change in the background or instrument response.

13.3 Instrument Calibration. The instrument must be calibrated daily or at a minimum of once every 24 hours and each time the instrument is set up. Calibration standards must be digested using the same procedure as the samples. A minimum of a blank and 5 standards are required. The correlation coefficient of the curve must be a minimum of 0.995. No samples should be analyzed until all of the calibration criteria are met.

13.3.1 A linear calibration using the equation $y = mx + b$ is applied where m is the slope and b is the intercept. The calibration is not forced through zero.

13.3.2 The correlation coefficient is calculated using the following equation:

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$$Correl(X,Y) = \frac{\sum(x-\bar{x})(y-\bar{y})}{\sqrt{\sum(x-\bar{x})^2\sum(y-\bar{y})^2}}$$

where x is the measured absorbance and y is the standard concentration.

13.3.3 If the calibration curve does not meet criteria, and is redigestion, then any samples digested along with that calibration curve must also be redigested.

13.4 Initial Calibration Verification Standard (ICV)). During each analysis, a standard from a different source than the calibration standard should be analyzed. Normally this is analyzed at the beginning of the run. For this method, the ICV should be within 10 percent of the true value. When the measurements exceed these control limits, the analysis shall be terminated, and the problem corrected before proceeding. All reported results must be bracketed by compliant QC. The exception is, if the ICV is biased high (110 to 150 % recovery) and no mercury is found in the samples, then the sample results may be reported for mercury.

13.5 Continuing Calibration Verification. Analyze the continuing calibration verification solution and the continuing calibration blank after every tenth sample and at the end of the sample run. If the CCV solution is not within 20 percent of the true value, then no samples can be reported in the area bracketed by that CCV. (Note: the exception is if the CCV is biased high and the samples are less than the detection limit. In that case, the samples can be reported with no flag.)

13.6 Continuing Calibration Blank. Analyze the continuing calibration verification solution and the continuing calibration blank after every tenth sample and at the end of the sample run. If the CCB is not less than the reporting limit, then no samples can be reported in the area bracketed by the failing CCB.

13.7 CRA (Low) Check or LLQC (Lower Limit of Quantitation Check). For all runs, a low check at the level of the reporting limit must be analyzed at the beginning of the run before analyzing any samples, but not before the ICV. A criterion of 50 to 150% recovery is applied to this low check standard. If this criterion is not met, then all samples associated with this CRA check must be reanalyzed along with a compliant CRA check.

13.7.1 A number of clients have specific program requirements for frequency and recovery ranges on CRA checks. Check with the metals supervisor for additional information on these programs.

13.7.2 If the CRA is biased high and there is no mercury found in the samples, then the sample results may be reported for mercury. If the CRA is biased high and there is mercury found in the samples, then the samples with Hg at levels ranging from the CCV to the high standard may be reported. Samples with levels of mercury between the CRA and the CCV standard may be biased high and cannot be reported.

13.8 Method Blank. The laboratory must digest and analyze a method blank with each batch of 20 samples. A minimum of one method blank is required for every 20 samples. A sample batch is defined as a maximum of 20 field samples in a preparation batch over a time period of 24 hours. A matrix spike/matrix spike duplicate, matrix spikes and/or duplicate is required

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every 20 samples. The method blank must contain mercury at less that the reporting limit. If the method blank contains over that limit, the samples must be redigested or reanalyzed. The exception to this rule is when the samples to be reported contain greater than 10 times the method blank level. In addition, if all the samples are less than a client required limit and the method blank is also less than that limit, then the results can be reported as less than that limit.

13.9 Lab Control Sample. The laboratory must digest and analyze a laboratory control sample or spike blank with each set of samples. A minimum of one lab control or spike blank is required for every 20 samples. Note: For soils, if a lab control is not available, a spike blank can be used. For a running batch, a new lab control sample is required for each different digestion day. The laboratory should assess laboratory performance of an aqueous lab control against recovery limits of 80 to 120%. In house lab control limits may also be generated to support these default limits. For solid lab controls, the elements should be within the range given by the lab control supplier. If the lab control is outside of the control limits for a given element, all samples must be redigested and reanalyzed for that element. The exception is if the lab control recovery is high and the results of the samples to be reported are less than the reporting limit. In that case, the sample results can be reported with no flag.

13.10 Matrix Spike. The laboratory must add a known amount of each analyte to a minimum of 1 in 20 samples. The matrix spike recovery is calculated as shown below. The laboratory should assess the matrix spike recovery against control limits of 80 to 120. (In house control limits are generated annually for information purposes only.). If a matrix spike is out of control, then the results should be flagged with the appropriate footnote. If the matrix spike amount is less than one fourth of the sample amount, then the sample cannot be assessed against the control limits and should be footnoted to that effect. Note: Both the matrix spike amount and the sample amount are calculated to the IDL for any given element. Any value less than the IDL is treated as zero.

((Spiked Sample Result - Sample Result)/Amount Spiked) x 100 = matrix spike recovery

13.11 Matrix Spike Duplicate or Matrix Duplicate. The laboratory must digest a matrix spike duplicate or a duplicate sample for a minimum of 1 in 20 samples. Matrix spike duplicates are normally used unless otherwise specified by client requirements. The relative percent difference (rpd) between the matrix spike duplicate and the matrix spike or between the duplicate and the original sample should be assessed. The rpds are calculated as shown below and should be assessed against a limit of 20% RPD. (In house control limits are generated annually for information purposes only.). If a matrix spike duplicate or a duplicate is out of control, then the results should be flagged with the appropriate footnote. If the sample and the duplicate are less than 5 times the reporting limits and are within a range of $\pm$ the reporting limit, then the duplicate is considered to be in control. Note: Both the duplicate amount and the sample amount are calculated to the IDL for any given element. Any value less than the IDL is treated as zero.

$$\frac{\text{(Sample Result - Duplicate Result) x 100}}{\text{(Sample Result + Duplicate Result) x 0.5}} = \text{\% RPD}$$

or

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$$\frac{(|\text{MS Result} - \text{MSD Result}|) \times 100}{(\text{MS Result} + \text{MSD Result})/2} = \text{MSD RPD}$$

14.0 DOCUMENTATION REQUIREMENTS

Refer to the laboratory Quality Assurance Manual for additional documentation requirements.

14.1 Sample Worksheets. Digestion data sheets for the Hg soil samples must show all digestion information including the sample ID's, sample weights, bottle numbers, type of heating used, start times, end times, and pressure or temperature, as appropriate for all digestions. All sample information should be clearly entered on these sheets. In addition, any unusual characteristics of the samples or the digestion procedure should be noted in the comments sections. Make sure also that all dilutions are clearly documented.

14.2 Make sure to record thermometer ID, correction factor, and corrected and uncorrected temperatures for all temperature measurements.

14.3 Standards and Reagents. All stocks and reagents must be recorded in the reagent log book. All standards should be recorded on the digestion log with the samples.

14.4 Any run comments should be written on the raw data for the analysis and on the run log in the LIMS.

14.5 Annual bottle calibration verifications must be documented in the Mercury Bottle calibration log.

15.0 DATA REVIEW AND REPORTING

15.1 All samples should be updated to QC batches in the LIMS system. The analyst is responsible for reviewing all data for compliance with the QC outlined in this SOP. They are responsible for making sure that the raw data is fully documented and it is loaded into the LIMS system. They are responsible for submitting samples for redigestion and reanalysis, when appropriate.

15.2 After the analyst review is completed, the supervisor or a designated reviewer shall review the run for technical compliance to the SOP. The reviewer is also responsible for making sure that the QC calculations are done correctly and that appropriate flags are added.

15.3 After the reviewer completes their review, the data is released for client access in the LIMS. The raw data and the run log are submitted to the area manager. The manager periodically does an additional review on data for technical completeness. Any hardcopy raw data is transferred to the report generation department for scanning and storage. Instrument data is transferred electronically.

16.0 POLLUTION PREVENTION & WASTE MANAGEMENT

16.1 Users of this method must perform all procedural steps in a manner that controls the creation and/or escape of wastes or hazardous materials to the environment. The amounts of standards, reagents, and solvents must be limited to the amounts specified in this SOP.

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All safety practices designed to limit the escape of vapors, liquids or solids to the environment must be followed. All method users must be familiar with the waste management practices described in section 16.2.

16.2 Waste Management. Individuals performing this method must follow established waste management procedures as described in the waste management SOP, EHS004. This document describes the proper disposal of all waste materials generated during the testing of samples as follows:

16.2.1 Non hazardous aqueous wastes.

16.2.2 Hazardous aqueous wastes.

16.2.3 Chlorinated organic solvents.

16.2.4 Non-chlorinated organic solvents.

16.2.5 Hazardous solid wastes.

16.2.6 Non hazardous aqueous wastes.

17.0 ADDITIONAL REFERENCES

17.1 Leeman Hydra AA instrument manual.

17.2 Leeman Hydra AA II instrument manual.

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Lab Manager Nancy Cole

QA Manager Gregory Tomkowski for Mark Worby

Effective Date: 9/12/11

TITLE: DIGESTION OF NON-POTABLE WATERS FOR ICP OR ICP-MS ANALYSIS.

REFERENCES: SW846 3010A

Revised Sections: ***8.5, 10.3.5***

1.0 SCOPE & APPLICATION

1.1 This method is applicable for the digestion of aqueous samples, TCLP extracts, and wastes that contain small amounts of suspended solids. After digestion, the samples can be analyzed by ICP or by ICP-MS. This digestion method is based on SW846 3010A .

2.0 SUMMARY

2.1 Samples for metals analysis are digested on a hot plate or in a digestion block at 90 to 95° C to solubilize the metals before analysis. Nitric and hydrochloric acids are used for digestion.

3.0 REPORTING LIMIT AND METHOD DETECTION LIMIT

3.1 Reporting Limit. See determinative method.

3.2 Method Detection Limit. MDLs must be established using a solution spiked at approximately 3 to 5 times the estimated detection limit. To determine the MDL values, take seven replicate aliquots of the spiked sample and process through the entire analytical method. The MDL is calculated by multiplying the standard deviation of three replicate analyses by 3.14, which is the student's t value for a 99% confidence level. MDLs must be determined approximately once per year for frequently analyzed parameters.

4.0 DEFINITIONS

BATCH: A group of samples which behave similarly with respect to the sampling or the testing procedures being employed and which are processed as a batch. For QC purposes, if the number of samples in a group is greater than 20, then each group of 20 samples or less will all be handled as a separate batch.

SPIKE BLANK OR LAB CONTROL SAMPLE. Digest and analyze a laboratory control sample or spike blank with each set of samples. A minimum of one lab control sample or spike blank is required for every 20 samples. Assess laboratory performance against the control limits specified in the SOP. In house limits should also be generated once sufficient external check standard data is available to generate limits (usually a minimum of 20 to 30 analyses). If the lab control is outside of the control limits for a parameter, all samples must be redigested or redistilled and reanalyzed for that parameter. The exception is if the lab control recovery is high and the results of the samples to be reported are less than the reporting limit. In that case, the sample results can be reported with no flag. Note: If control limits are not specified in the SOP, then default limits of 80 to 120 percent should be used.

MATRIX: The component or substrate (e.g., water, soil) which contains the analyte of interest.

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MATRIX DUPLICATE: A duplicate sample is digested at a minimum of 1 in 20 samples. The relative percent difference (RPD) between the duplicate and the sample must be assessed. The duplicate RPD is calculated as shown below. Assess laboratory performance against the control limits that are specified in the SOP. In house limits are generated once sufficient duplicate data is available to generate limits (usually a minimum of 20 to 30 analyses). If a duplicate is out of control, flag the results with the appropriate footnote. If the sample and the duplicate are less than 5 times the reporting limits and are within a range of ± the reporting limit, then the duplicate is considered to be in control. Note: If control limits are not specified in the SOP, use default limits of ± 20% RPD.

$$\frac{(|\text{Sample Result} - \text{Duplicate Result}|) \times 100}{(\text{Sample Result} + \text{Duplicate Result})/2} = \text{Duplicate RPD}$$

MATRIX SPIKE: The laboratory must add a known amount of each analyte to a minimum of 1 in 20 samples. The matrix spike recovery is calculated as shown below. Assess laboratory performance against the control limits that are specified in the SOP. In house limits are generated once sufficient matrix spike data is available to generate limits (usually a minimum of 20 to 30 analyses). If a matrix spike is out of control, then the results must be flagged with the appropriate footnote. If the matrix spike amount is less than one fourth of the sample amount, then the sample cannot be assessed against the control limits and must be footnoted to that effect. Note: If control limits are not specified in the SOP, then default limits of 75 to 125 percent should be used.

$$\frac{(\text{Spiked Sample Result} - \text{Sample Result})}{(\text{Amount Spiked})} \times 100 = \text{Matrix Spike Recovery}$$

MATRIX SPIKE DUPLICATES: Intralaboratory split samples spiked with identical concentrations of target analyte(s). The spiking occurs prior to sample preparation and analysis. They are used to document the precision and bias of a method in a given sample matrix.

$$\frac{(|\text{MS Result} - \text{MSD Result}|) \times 100}{(\text{MS Result} + \text{MSD Result})/2} = \text{MSD RPD}$$

METHOD BLANK. The laboratory must digest and analyze a method blank with each set of samples. A minimum of one method blank is required for every 20 samples. For a running batch, a new method blank is required for each different digestion day. If no digestion step is required, then the method blank is equivalent to the reagent blank. The method blank must contain the parameter of interest at levels of less that the reporting limit for that parameter. If the method blank contains levels over the reporting limits, the samples must be redigested or redistilled and reanalyzed. The exception to this rule is when the samples to be reported contain greater than 10 times the method blank level. In addition, if all the samples are less than a client required limit and the method blank is also less than that limit, then the results can be reported as less than that limit.

METHOD DETECTION LIMITS (MDLS). The minimum concentration of a substance 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. MDLs are determined approximately once per year for frequently analyzed parameters.

REAGENT BLANK: The reagent blank is a blank that has the same matrix as the samples, i.e., all added reagents, but did not go through sample preparation procedures. The reagent blank is an indicator for contamination introduced during the analytical procedure. (Note: for methods requiring no preparation step, the reagent blank is equivalent to the method blank.) Either a reagent blank or a method blank must be analyzed with each batch of 20 samples or less. The concentration of the analyte of interest in the reagent blank must be less than the reporting limit for that analyte. If the reagent blank contains levels over

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the reporting limits, the samples must be reanalyzed. The exception to this rule is when the samples to be reported contain greater than 10 times the reagent blank level. In addition, if all the samples are less than a client required limit and the reagent blank is also less than that limit, then the results can be reported as less than that limit.

REAGENT GRADE: Analytical reagent (AR) grade, ACS reagent grade, and reagent grade are synonymous terms for reagents which conform to the current specifications of the Committee on Analytical Reagents of the American Chemical Society.

REAGENT WATER: Water that has been generated by any method which would achieve the performance specifications for ASTM Type II water. For organic analyses, see the definition of organic-free reagent water.

REFERENCE MATERIAL: A material containing known quantities of target analytes in solution or in a homogeneous matrix. It is used to document the bias of the analytical process.

5.0 HEALTH & SAFETY

5.1 The analyst must follow normal safety procedures as outlined in the Accutest Laboratory Safety Manual which includes the use of safety glasses and lab coats. All digestions must be done in a hood. In addition, all acids are corrosive and must be handled with care. Flush spills with plenty of water. If acids contact any part of the body, flush with water and contact the supervisor.

5.2 The toxicity or carcinogenicity of each reagent used in this method has not been precisely determined; however, each chemical must be treated as a potential health hazard. Expose to these reagents must be reduced to the lowest possible level. The laboratory is responsible for maintaining a current awareness file of OSHA regulations regarding the safe handling of the chemical specified in this method. A reference file of date handling sheets must be made available to all personnel involved in these analyses.

6.0 COLLECTION, PRESERVATION, & HOLDING TIMES

6.1 All samples must be preserved with nitric acid at the time of collection to a pH of < 2.

6.1.1 Samples received without preservation must be preserved following the specifications in the Accutest QSM.

6.2 All samples must be digested and analyzed within 6 months of the time of collection.

7.0 APPARATUS AND MATERIALS

7.1 The apparatus needed for this digestion procedure are listed below. It should be noted that hot plates and beakers with watch glasses may be used in place of the digestion block and digestion tubes.

7.2 Digestion block. Temperature adjustable and designed to hold sample digestion tubes and capable of maintaining temperatures from 90 to 95°C.

7.3 Thermometers, calibrated with NIST traceable thermometers. To be used to monitor digestion temperatures.

7.4 Sample digestion tubes and ribbed watch glasses.

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7.4.1 If sample digestion tubes are used to measure initial and final volumes, then they must be calibrated following the procedure outlined in EMP203, the digestion tube calibration SOP.

7.5 Automatic pipeter bottles.

7.6 50 ml volumetric flasks or 50 ml TD volumetric cylinders (Class A).

7.6.1 All glassware must be washed with soap and tap water and then soaked in a 10% nitric acid bath for several hours. It must then be rinsed at least 3 times with distilled, deionized water.

7.7 Glass funnels.

7.8 Whatman #41 filter paper or equivalent.

7.9 Volumetric pipets, class A.

7.10 pH paper.

8.0 STANDARDS & REAGENTS

8.1 All chemicals listed below are reagent grade unless otherwise specified. Deionized water must be used whenever water is required.

8.2 Hydrochloric acid. Baker instra-analyzed or equivalent.

8.3 Nitric Acid. Baker instra-analyzed or equivalent.

8.4 Metals Spiking Solutions. All metals spiking solutions must be made up in a solution of 2 % nitric acid following the procedures outlined in the metals standards preparation SOP.

8.5 Hydrogen Peroxide, 30%. (Used only if sulfur is an analyte of interest).

9.0 INTERFERENCES

9.1 Organics in a matrix may cause interferences if the sample is not digested rigorously enough. In addition, high levels of acids in the final digestate may cause interferences in the analysis. Both of these interferences can be avoided by choosing the appropriate digestion method and by bringing the sample to an appropriate final volume. For a discussion of other interferences, refer to specific analytical methods.

10.0 PROCEDURE

10.1 Below is the procedure to be followed for the digestion of aqueous samples prior to ICP or ICP-MS analysis.

10.2 Before starting the analysis, check the initial pH of the sample with pH paper and verify that it is < 2. If it is < 2, then enter a Y in the pH check column on the metals prep logs. If the sample is not < 2, then adjust it to < 2 with nitric acid and record both the initial and final pH on the digestion log.

10.2.1 For highly basic or buffered samples, where more than a few drops of acid are required, adjust an aliquot of the sample rather than the whole amount and record the amount of acid used for the adjustment.

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10.2.2 Samples for TCLP matrix or leachate spikes will be received unpreserved from the TCLP leaching area. These must be aliquoted, spiked, and preserved on receipt in the metals prep area.

10.2.3 For some clients, additional documentation of the pH adjustment is necessary. For all samples from Ohio, the pH adjustment must be noted in the case narrative or conformance summary for the samples.

10.3 Measure out 50 ml of each sample into a labeled digestion tube or into a beaker. The sample may be measured by using a graduated cylinder or by using a calibrated digestion tube. Make sure that the sample identification is accurately recorded with the digestion tube/beaker numbers on the sample digestion log. In addition to the samples, a Spike Blank or a Lab Control and a Method Blank must be set up with each batch of 20 samples or less. A Matrix Spike and a Matrix Spike Duplicate (or Matrix Duplicate) must be set up with each batch of 20 samples. Matrix Spike Duplicates are normally used unless otherwise specified by client requirements. Check with the metals supervisor for spiking levels to use for the matrix spikes and the spike blank or lab control.

10.3.1 For the method blank, add 50 ml of deionized water to the digestion tube.

10.3.2 For the lab control, add 50 ml of lab control solution to the digestion tube. Refer to the metals spiking solution SOP, EMP202, for information on the preparation of the lab control solution.

10.3.3 For the matrix spike and matrix spike duplicates, add the spiking solution directly to the 50 ml of sample in the designated tubes. Refer to the metals spiking solution SOP, EMP202, for information on the preparation and amounts of spiking solution required.

10.3.4 TCLP blank spikes must be prepared using 50 ml of the appropriate TCLPE extraction fluid.

10.3.5 If the sample is going to be analyzed for sulfur by method 6010, then add 5 ml of peroxide at room temperature to the sample and QC and let them sit for 30 minutes before proceeding. The purpose of this step is to oxidize any sulfide that is present before the digestion.

10.4 Add 1.5 ml of concentrated nitric acid to all quality control and samples.

10.5 Place the labeled tubes into a digestion block and cover with watch glasses. (If using beakers, cover the beakers with watch glasses and place them on a hot plate.) Heat the samples at 90 to 95°C until they come to a gentle reflux and then continue to heat the samples until they are evaporated to near dryness, for example 10 ml or less. After the heating is complete, allow the samples to cool.

10.5.1 Watch glasses may be removed if necessary to allow for faster volume reduction, but should be left on for the maximum time possible to limit contamination.

10.6 Add an additional 1.5 ml of concentrated nitric acid to all quality control and samples. Continue heating the samples at a gentle reflux until the sample is completely digested. (More acid may be added as necessary to complete the digestion.)

10.6.1 Signs of a complete digestion are if the digestate is light in color and/or if the appearance of the sample does not change with continued refluxing.

10.7 Add 5 ml of 1:1 HCl to each sample and reflux for an additional 15 minutes.

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10.8 Wash down the beaker walls and watch glass with DI water. Bring the sample to a final volume of 50 ml with deionized water. The sample is now ready for analysis by ICP.

10.8.1 If the sample contains particulate, it can be filtered through Whatman # 41 filter paper (or equivalent) before analysis. If any samples in a batch are filtered, then all of the associated quality control must also be filtered in the same manner.

10.8.2 For ICP-MS analysis, the digestate is normally further diluted at the instrument before analysis (at least by a factor of 2) and the dilution factor must be added to the instrument file.

11.0 QUALITY ASSURANCE

11.1 A sample batch is defined as a maximum of 20 field samples in a preparation batch over a time period of 24 hours. A matrix spike/matrix spike duplicate, matrix spikes and/or duplicate is required every 20 samples.

11.2 For each digestion batch of 20 samples or less, a lab control (and a spike blank) and a method blank is prepared. Besides a lab control, a spike blank is also digested when analyzing the odd elements, such as B, Si, Sr, Sn and Pd.

11.3 For every 20 samples, digest a matrix spike/matrix spike duplicate pair instead of a matrix spike/ duplicate pair unless otherwise requested by a client.

11.4 Refer to the analytical methods SOPs for additional information on method quality control.

12.0 DOCUMENTATION

12.1 All digestion information must be entered on a digestion log. The information required includes the sample identification, the initial sample volume, the final sample volume, the initial sample pH, the acids used (including both amount and lot number), the spikes used, and the digestion times and temperatures, and the thermometer identification. Both the corrected and uncorrected temperatures must be recorded. If filtration is done, the filter type and lot must also be recorded.

12.2 The analyst must write additional information such as unusual sample characteristics in the Comments section. All spiking solution information must be entered in the metals spiking solution notebook.

13.0 DATA REVIEW & REPORTING

13.1 The prep analyst is responsible for updating the samples to SCH status in the LIMS system and for entering the prep information into the LIMS. This may be done manually or electronically. When the prep information is in the LIMS, the completed paperwork must be turned into the metals supervisor for review.

13.2 The supervisor or a metals analyst reviews the preparation information and approves the data in the LIMS system.

13.3 The original paperwork is submitted to the report generation department for filing.

14.0 POLLUTION PREVENTION & WASTE MANAGEMENT

14.1 Users of this method must perform all procedural steps in a manner that controls the creation and/or escape of wastes or hazardous materials to the environment. The amounts of standards,

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reagents, and solvents must be limited to the amounts specified in this SOP. All safety practices designed to limit the escape of vapors, liquids or solids to the environment must be followed. All method users must be familiar with the waste management practices described in section 14.2.

14.2 Waste Management. Individuals performing this method must follow established waste management procedures as described in the waste management SOP, EHS004. This document describes the proper disposal of all waste materials generated during the testing of samples as follows:

14.2.1 Non hazardous aqueous wastes.

14.2.2 Hazardous aqueous wastes.

14.2.3 Chlorinated organic solvents.

14.2.4 Non-chlorinated organic solvents.

14.2.5 Hazardous solid wastes.

14.2.6 Non-hazardous solid wastes.

15.0 ADDITIONAL REFERENCES

15.1 Refer to the ICP and ICPMS analytical SOP's, the spiking procedure SOP (EMP202), and the digestion tube calibration SOP (EMP203).

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Lab Manager: [signature]

QA Manager: [signature]

Effective Date: October 7, 2009

TEST NAME: **DIGESTION OF SOILS FOR ICP AND ICP-MS ANALYSIS**

REFERENCE: SW846 3050B (Revision 2, December 1996)

Revised Sections, 10.2.3, 10.2.4, 12.1

1.0 SCOPE AND APPLICATION

1.1 This method is applicable for the digestion of sediments, soils, sludges, solid wastes, and wipes. After digestion, the samples can be analyzed by ICAP or by ICP-MS (or by graphite furnace AA for antimony). This digestion method is based upon SW846 method 3050B, Revision 2, 12/96.

2.0 SUMMARY

2.1 For the digestion of samples, a representative 1-2 gram (wet weight) or 1 gram (dry weight) sample is digested with repeated additions of nitric acid (HNO_3) and hydrogen peroxide (H_2O_2). Then hydrochloric acid (HCl) is added to the initial digestate and the sample is refluxed. In an optional step to increase the solubility of some metals, this digestate is filtered and the filter paper and residues are rinsed, first with hot HCl and then hot reagent water. Filter paper and residue are returned to the digestion flask, refluxed with additional HCl and then filtered again. The digestate is then diluted to a final volume of 100 mL.

2.2 In method 3050B, the final HCl addition is not included for ICP-MS digestates as chloride is an interference for a number of elements on ICP-MS. However, the HCl is necessary for good solubility of many elements. HCl interferences at the ICP-MS can normally be addressed with corrections at the ICP-MS. Therefore it is recommended that HCl be added for ICP-MS digestions by this method unless otherwise directed by the lab supervisor or manager.

2.0 REPORTING LIMIT AND METHOD DETECTION LIMIT

3.1 See determinative method.

4.0 DEFINITIONS

BATCH: A group of samples which behave similarly with respect to the sampling or the testing procedures being employed and which are processed as a unit. For QC purposes, if the number of samples in a group is greater than 20, then each group of 20 samples or less will all be handled as a separate batch.

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SPIKE BLANK OR LAB CONTROL SAMPLE. Digest a laboratory control sample or spike blank with each set of samples. A minimum of one lab control sample or spike blank is required for every 20 samples. Assess laboratory performance against the control limits specified in the SOP. In house limits should also be generated once sufficient external check standard data is available to generate limits (usually a minimum of 20 to 30 analyses). If the lab control is outside of the control limits for a parameter, all samples must be redigested or redistilled and reanalyzed for that parameter. The exception is if the lab control recovery is high and the results of the samples to be reported are less than the reporting limit. In that case, the sample results can be reported with no flag. Note: If control limits are not specified in the SOP, then default limits of 80 to 120 percent should be used.

MATRIX: The component or substrate (e.g., water, soil) which contains the analyte of interest.

MATRIX DUPLICATE: A duplicate sample is digested at a minimum of 1 in 20 samples. The relative percent difference (RPD) between the duplicate and the sample should be assessed. The duplicate RPD is calculated as shown below. Assess laboratory performance against the control limits that are specified in the SOP. In house limits are generated once sufficient duplicate data is available to generate limits (usually a minimum of 20 to 30 analyses). If a duplicate is out of control, flag the results with the appropriate footnote. If the sample and the duplicate are less than 5 times the reporting limits and are within a range of $\pm$ the reporting limit, then the duplicate is considered to be in control. Note: If control limits are not specified in the SOP, use default limits of $\pm$ 20% RPD.

$$\frac{(|\text{Sample Result} - \text{Duplicate Result}|) \times 100}{(\text{Sample Result} + \text{Duplicate Result})/2} = \text{Duplicate RPD}$$

MATRIX SPIKE: The laboratory must add a known amount of each analyte to a minimum of 1 in 20 samples. The matrix spike recovery is calculated as shown below. Assess laboratory performance against the control limits that are specified in the SOP. In house limits are generated once sufficient matrix spike data is available to generate limits (usually a minimum of 20 to 30 analyses). If a matrix spike is out of control, then the results should be flagged with the appropriate footnote. If the matrix spike amount is less than one fourth of the sample amount, then the sample cannot be assessed against the control limits and should be footnoted to that effect. Note: If control limits are not specified in the SOP, then default limits of 75 to 125 percent should be used.

$$\frac{(\text{Spiked Sample Result} - \text{Sample Result})}{(\text{Amount Spiked})} \times 100 = \text{Matrix Spike Recovery}$$

MATRIX SPIKE DUPLICATES: Intralaboratory split samples spiked with identical concentrations of target analyte(s). The spiking occurs prior to sample preparation and analysis. They are used to document the precision and bias of a method in a given sample matrix.

$$\frac{(|\text{MS Result} - \text{MSD Result}|) \times 100}{(\text{MS Result} + \text{MSD Result})/2} = \text{MSD RPD}$$

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METHOD BLANK. The laboratory must digest and analyze a method blank with each set of samples. A minimum of one method blank is required for every 20 samples. For a running batch, a new method blank is required for each different digestion day. If no digestion step is required, then the method blank is equivalent to the reagent blank. The method blank must contain the parameter of interest at levels of less that the reporting limit for that parameter. If the method blank contains levels over the reporting limits, the samples must be redigested or redistilled and reanalyzed. The exception to this rule is when the samples to be reported contain greater than 10 times the method blank level. In addition, if all the samples are less than a client required limit and the method blank is also less than that limit, then the results can be reported as less than that limit.

METHOD DETECTION LIMITS (MDLS). The minimum concentration of a substance 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. MDLs should be determined approximately once per year for frequently analyzed parameters.

REAGENT BLANK. The reagent blank is a blank that has the same matrix as the samples, i.e., all added reagents, but did not go through sample preparation procedures. The reagent blank is an indicator for contamination introduced during the analytical procedure. (Note: for methods requiring no preparation step, the reagent blank is equivalent to the method blank.) Either a reagent blank or a method blank must be analyzed with each batch of 20 samples or less. The concentration of the analyte of interest in the reagent blank must be less than the reporting limit for that analyte. If the reagent blank contains levels over the reporting limits, the samples must be reanalyzed. The exception to this rule is when the samples to be reported contain greater than 10 times the reagent blank level. In addition, if all the samples are less than a client required limit and the reagent blank is also less than that limit, then the results can be reported as less than that limit.

REAGENT GRADE. Analytical reagent (AR) grade, ACS reagent grade, and reagent grade are synonymous terms for reagents which conform to the current specifications of the Committee on Analytical Reagents of the American Chemical Society.

REAGENT WATER. Water that has been generated by any method which would achieve the performance specifications for ASTM Type II water. For organic analyses, see the definition of organic-free reagent water.

5.0 HEALTH & SAFETY

5.1 The analyst must follow normal safety procedures as outlined in the Accutest Health and Safety Plan and Personal Protection Policy, which include the use of safety glasses and lab coats. In addition, all acids are corrosive and mustd be handled with care. Flush spills with plenty of water. If acids contact any part of the body, flush with water and contact the supervisor.

5.2 The toxicity or carcinogenicity of each reagent used in this method has not been precisely determined; however, each chemical must be treated as a potential health hazard. Exposure to these reagents should be reduced to the lowest possible level. The laboratory is responsible for maintaining a current awareness file of OSHA regulations regarding the safe

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handling of the chemicals specified in this method. A reference file of data handling sheets must be made available to all personnel involved in these analyses.

6.0 PRESERVATION & HOLDING TIME

6.1 Non-aqueous samples should be refrigerated at the time of receipt.

6.2 All samples should be digested and analyzed within 6 months of the time of collection.

7.0 INTERFERENCES

7.1 Sludge and soil samples can contain diverse matrix types, which may contain a variety of interferences. Spiked samples can be used to determine if these interferences are adequately treated in the digestion process. For a discussion of other interferences, refer to specific analytical methods.

8.0 APPARATUS

8.1 The apparatus needed for this digestion procedure are listed below. It should be noted that hot plates and beakers with watch glasses might be used in place of the digestion block and digestion tubes.

8.2 Digestion block. Temperature adjustable and designed to hold sample digestion tubes and capable of maintaining temperatures from 90 to 95°C.

8.3 Thermometers, calibrated with NIST traceable thermometers. To be used to monitor digestion temperatures.

8.4 Sample digestion tubes and ribbed watch glasses.

8.5 Automatic pipeter bottles.

8.6 100 ml volumetric flasks.

8.7 Glass funnels.

8.8 Whatman #41 filter paper.

8.9 Top loader balance.

8.10 Volumetric Pipets, class A.

8.11 Disposable Wood Spatulas

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8.12 Ceramic Mixing Bowl.

9.0 REAGENTS

9.1 All chemicals listed below are reagent grade unless otherwise specified. Deionized water should be used whenever water is required.

9.2 Hydrochloric acid. Baker instra-analyzed or equivalent.

9.3 Nitric Acid. Baker instra-analyzed or equivalent.

9.4 Hydrogen Peroxide, 30 %.

9.5 Metals Spiking Solutions. All metals spiking solutions should be made up in a solution of 2 % nitric acid as described in Table 1. Use volumetric glassware and pipets or autopipets. Check with the metals supervisor for additional information. Different levels of spiking solutions may be used as specified by the area supervisor.

9.5.1 The expiration date for the spiking solution is defined as the earliest date of any element or compound in that solution.

9.6 Teflon Chips

10.0 PROCEDURE

10.1 Weigh out an amount of wet sample equivalent to 1 g of dry sample into a numbered digestion tube. The sample should be weighed out using a top loader balance and the weights should be recorded to two places past the decimal. Make sure that the sample identification is accurately recorded with the digestion tube numbers on the sample digestion log.

10.1.1 Make sure that the sample has been thoroughly mixed before weighing out the representative sample. Discard rocks, sticks, etc. from the sample. (Refer to the SOP EQA042 for proper sample aliquoting procedures). All homogenization and sample handling should be done with wooden spatulas and ceramic (or other non-metal) bowls.

10.1.2 If the sample has a low percent solids, a larger sample size may be used to obtain a weight approximately equivalent to 1 g of dry sample. Check with the metals supervisor for additional direction with sampled with low percent solids or unusual matrices.

10.1.3 If the sample is a wipe, weighing is not necessary. Transfer the entire wipe into the labeled digestion tube and proceed with the digestion following steps 10.2 through 10.10. Extra wipes must be supplied by the client for the matrix spike or duplicate.

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10.2 In addition to the samples, a spike blank or a lab control and a method blank must be set up with each batch of 20 samples or less. A matrix spike, a matrix spike duplicate or a duplicate should be set up with each batch of 20 samples. Matrix spike duplicates are normally used unless otherwise specified by client requirements. Refer to Table 1 for spiking levels to use for each MS and Spike Blank.

10.2.1 For the method blank and spike blank, instead of weighing out soil add approximately 1 g of Teflong chips to the digestion tube. Add the spiking solution to the blank spike after the chips are in the tube.

10.2.2 For some clients, a solid lab control is required rather than a blank spike. In that case, the solid lab control must be weighed out in the same manner as a sample.

10.2.3 For the matrix spike and matrix spike duplicate, refer to the metals spiking SOP, EMP202, for information on the preparation and amount of spiking solution require to be added to the sample in the digestion tube.

10.2.4 For the matrix spike and matrix spike duplicate, refer to the metals spiking SOP, EMP 202, for information on the preparation and amount of “odd metals spike” is to be added to the sample in the digest tube when necessary.

10.2.5 For additional details on spiking solutions and preparation, refer to the metals spiking sop, EMP202.

10.3 Add 10 ml of 1:1 nitric acid to all Quality Control and samples.

10.4 Place the numbered tubes into a digestion block and cover with watch glasses. (If using beakers, cover the beakers with watch glasses and place them on a hot plate.) Heat the samples at 90 to 95°C until they come to a gentle reflux and then continue to heat the samples for an additional 10 to 15 minutes. Do not allow the samples to boil. After the heating is complete, allow the samples to cool.

10.5 Add an additional 5ml of concentrated nitric acid to all quality control and samples. Heat the samples at a gentle reflux for an additional 30 minutes. Do not allow the volume to be reduced to below 5 ml. Cool.

10.5.1 If brown fumes are generated during this digestion, add an additional 5ml aliquot of concentrated nitric acid and heat for 30 more minutes. Repeat this process until no more brown fumes are generated.

10.6 Continue the digestion at 90 to 95ºC until the volume is reduced to 5 ml or for a period of 2 hours. Do not let the samples boil at any point during the digestion process.

10.7 Add 2 ml of water and 3 ml of 30 % hydrogen peroxide to each sample and reflux until the effervescence subsides. Cool.

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10.7.1 The 30% hydrogen peroxide may be added in smaller or larger initial aliquots depending on the sample characteristics. If sample effervescence is suspected to be a problem, smaller aliquots should be used.

10.8 Continue to add 30 % hydrogen peroxide in 1ml aliquots with warming until the effervescence is minimal or until the general sample appearance is unchanged. NOTE: Do not add more than a total of 10 ml of 30 % hydrogen peroxide. Continue the digestion at 90 to 95ºC until the volume is reduced to 5 ml or for a period of 2 hours.

10.9 Add 10 ml of concentrated HCl and reflux for an additional 15 minutes.

10.9.1 HCl may be omitted for some ICP-MS digestions for limited elements (As, Be, Cd, Cr, Co, Fe, Pb, Mo, Se, and Tl) at the discretion of the area supervisor or manager. However, in normal circumstances it should be added. Refer to section 2.2.

10.10 Filter the digestate through Whatman #41 filter paper (or equivalent) into 100 ml volumetric flasks. Make sure to rinse the digestion tubes and the filter paper well with deionized water. Dilute to volume with deionized water. The sample is now ready for analysis.

10.10.1 For ICP-MS analysis, the digestate should be further diluted at the instrument before analysis (normally at least by a factor of 2 to 5) and the dilution factor should be added to the instrument file.

11.0 QUALITY ASSURANCE

11.1 For each digestion batch of 20 samples or less, a lab control or a spike blank and a method blank should be prepared. Besides a lab control, a spike blank is also digested when analyzing the odd elements, such as B, Si, Sr, Sn and Pd.

11.1.1 Solid lab controls are required for some clients. Check with the metals supervisor for additional information.

11.2 For every 20 samples, a matrix spike, a matrix spike duplicate or a duplicate should be prepared. Matrix spike duplicates are normally used unless otherwise specified by the client requirements.

11.3 If a batch is a running batch, samples can be added to the batch (along with a method blank and spike blank or lab control) up to a maximum of 2 weeks.

11.3.1 Running batches are not allowed for all clients. Check with the metals supervisor for additional information.

11.4 Refer to the analytical methods SOPs for additional information on method quality control.

12.0 DOCUMENTATION

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12.1 All digestion information should be entered on a digestion log. The information required includes the sample identification, the initial sample weight, the final sample volume, the acids used (including both amount and lot number), the spikes used, and the digestion times, temperatures, and the thermometer identification. Both the corrected and uncorrected temperature must be recorded.

12.2 The analyst should write additional information such as unusual sample characteristics in the Comments section. All spiking solution information should be entered in the metals spiking solution notebook.

12.3 Any corrections to laboratory data must be done using a single line through the error. The initials of the person and date of correction must appear next to the correction.

12.4 Certificates of analysis for all primary stocks must be kept on file. If a certificate is received in the lab, give the original to the area supervisor for submission for filing with the QA department.

13.0 DATA REVIEW & REPORTING

13.1 The prep analyst is responsible for updating the samples to SCH status in the LIMS system and for entering the prep information into the LIMS. This may be done manually or electronically. When the prep information is in the LIMS, the completed paperwork should be turned into the metals supervisor for review.

13.2 The supervisor or a metals analyst reviews the preparation information and approves the data in the LIMS system.

13.3 The original paperwork is submitted to the report generation department for filing.

13.4 Supervisory (or peer) personnel will review and sign all reagent documentation a minimum of once per month.

14.0 POLLUTION PREVENTION & WASTE MANAGEMENT

14.1 Users of this method must perform all procedural steps in a manner that controls the creation and/or escape of wastes or hazardous materials to the environment. The amounts of standards, reagents, and solvents must be limited to the amounts specified in this SOP. All safety practices designed to limit the escape of vapors, liquids or solids to the environment must be followed. All method users must be familiar with the waste management practices described in section 14.2.

14.2 Waste Management. Individuals performing this method must follow established waste management procedures as described in the waste management SOP, EHS004. This document describes the proper disposal of all waste materials generated during the testing of samples as follows:

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14.2.2 Non hazardous aqueous wastes.

14.2.3 Hazardous aqueous wastes.

14.2.4 Chlorinated organic solvents.

14.2.5 Non-chlorinated organic solvents.

14.2.6 Hazardous solid wastes.

14.2.7 Non-hazardous solid wastes.

15.0 ADDITIONAL REFERENCES

15.1 Refer to the ICP and ICPMS analytical SOP's and the spiking procedure SOP (EMP202).

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TABLE 1: SOIL SPIKING SOLUTION FOR 6010B (1.0 g sample)

Spiking Solution	Element	Stock Conc. in mg/l	Vol. of Stock in ml	Final Vol. of Spiking Solution in ml	Spiking Solution Conc. in mg/l	Amt of spike added in ml	Final Digestate Vol. in ml	Final Conc. at the instrument in mg/l
Mixed ICP Metals	Al	200.00	NA	NA	200.00	2.00	100.00	4.00 +
	Sb	50.00			50.00			1.00
	As	200.00			200.00			4.00
	Ba	200.00			200.00			4.00
	Be	5.00			5.00			0.10
	Cd	5.00			5.00			0.10
	Cr	20.00			20.00			0.40
	Co	50.00			50.00			1.00
	Cu	25.00			25.00			0.50
	Fe	100.00			100.00			2.00 +
	Pb	50.00			50.00			1.00
	Mn	50.00			50.00			1.00
	Ni	50.00			50.00			1.00
	Se	200.00			200.00			4.00
	Ag	5.00			5.00			0.10
	Tl	200.00			200.00			4.00
	V	50.00			50.00			1.00
	Zn	50.00			50.00			1.00
Soil Mineral Mix	Al	10000.00	50.00	200.00	2500.00	2.00	100.00	50.00 +
	Fe	10000.00	50.00	200.00	2500.00			50.00 +
	Ca	10000.00	12.50	200.00	625.00			12.50
	Mg	10000.00	12.50	200.00	625.00			12.50
	K	10000.00	12.50	200.00	625.00			12.50
	Na	10000.00	12.50	200.00	625.00			12.50
Odd Metals	B	1000.00	20.00	200.00	100.00	1.00	100.00	1.00
	Mo	1000.00	20.00	200.00	100.00			1.00
	Sn	1000.00	20.00	200.00	100.00			1.00
	Sr	1000.00	20.00	200.00	100.00			1.00
	Ti	1000.00	20.00	200.00	100.00			1.00
	Pd	1000.00	20.00	200.00	100.00			1.00
	Si	1000.00	40.00	200.00	200.00			2.00
	W	1000.00						

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Lab Manager _____

QA Manager _____

Effective Date: July 1, 2011

TEST NAME: METHOD 8270D, SEMIVOLATILE ORGANIC COMPOUNDS BY GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)

REFERENCE: SW846 8270D (Revision 4, February 2007)

Revised Sections: ***2.1, 9.5.1, 10.1.1, 11.11.2, 12.6.2, 12.6.3, 12.8.3, Tables 7C, 9, 10***
Added Section 12.11

SCOPE AND APPLICATION

1.1 The following method describes the analytical procedure that is utilized by Accutest to analyze semivolatile organic compounds in extracts prepared from all types of solid waste matrices, soils, and water samples. Options are incorporated for the analysis of sixteen (16) polyaromatic hydrocarbons (PAH) and other compounds listed in table 8A by selected ion monitoring GC/MS (GC/MS-SIM).

1.2 Table 1 lists the neutral, acidic, and basic organic compounds that can be determined by this method. The applicable concentration range of this method is compound and instrument dependent. Some compounds may require special treatment due to the limitations caused by sample preparation and/or chromatographic problems.

2.0 SUMMARY OF METHOD

2.1 This method is performed in accordance with the following extraction methodologies in SW846: 3510, 3520, 3545, 3550 and 3580.

2.2 The resultant methylene chloride extract is injected into a tuned and calibrated GC/MS system equipped with a fused silica capillary column. The GC column is temperature-programmed to separate the analytes, which are then detected with a mass spectrometer (MS) connected to the gas chromatograph.

2.3 The peaks detected are qualitated by comparison to characteristic ions and retention times specific to the known target list of compounds.

2.4 Once identified, the compound is quantitated by internal standard techniques with an average response factor generated from the calibration curve.

2.5 Additional unknown peaks with a response greater than 10 % of the closest internal standard may be processed through a library search with comparison to a NIST98 database. An estimated concentration is quantitated by assuming a response factor of 1.

2.6 This method includes analytical options for PAHs and other selected compounds by GC/MS-SIM. The extract is fortified with an additional SIM specific internal standard mix and analyzed using selected ions that are characteristic of the compounds of interest following the analysis of lower concentration

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calibration standards analyzed under the same MS scan conditions. Qualitative and quantitative identification is conducted using the procedures employed for full scan analysis.

3.0 REPORTING LIMIT & METHOD DETECTION LIMIT

3.1 Reporting Limit. The reporting limit for this method is established at either method detection limit or the lowest concentration standard in the calibration curve, depending on the requirements of different regulatory programs. Detected concentrations below this concentration cannot be reported without qualification. See table 9.

3.1.1 Compounds detected at concentrations between the reporting limit and MDL are quantitated and qualified as "J", estimated value. Program or project specifications may dictate that "J" qualified compounds are not to be reported.

3.2 Method Detection Limit. Experimentally determine MDLs using the procedure specified in 40 CFR, Part 136, Appendix B. This value represents the lowest reportable concentration of an individual compound that meets the method qualitative identification criteria.

3.2.1 Experimental MDLs must be determined annually for this method.

3.2.2 Process all raw data for the replicate analysis in each MDL study. Forward the processed data to the QA group for archiving.

4.0 DEFINITIONS

BATCH - a group of samples which behave similarly with respect to the sampling or the testing procedures being employed and which are processed as a unit. For QC purposes, if the number of samples in a group is greater than 20, then each group of 20 samples or less will all be handled as a separate batch.

BLANK - an analytical sample designed to assess specific sources of laboratory contamination.

CONTINUING CALIBRATION - a mid-range calibration check standard run every 12 hours to verify the initial calibration of the system.

EXTRACTED ION CURRENT PROFILE (EICP) - a plot of ion abundance versus time (or scan number) for ion(s) of specified mass (Es).

INITIAL CALIBRATION - analysis of analytical standards for a series of different specified concentrations which cover the working range of the instrument; used to define the linearity and dynamic range of the response of the mass spectrometer to the target compounds.

INTERNAL STANDARDS - compounds added to every standard, blank, matrix spike, matrix spike duplicate, and sample extract at a known concentration, prior to analysis. Internal standards are used as the basis for quantitation of the target compounds and must be analytes that are not sample components.

MATRIX - the predominant material of which the sample to be analyzed is composed.

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MATRIX SPIKE - aliquot of a matrix (water 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.

MATRIX SPIKE DUPLICATE - a second aliquot of the same matrix as the matrix spike (above) that is spiked in order to determine the precision of the method.

METHOD BLANK - an analytical control consisting of all reagents, internal standards and surrogate standards, is carried throughout the entire preparatory and analytical procedure. The method blank is used to define the level of laboratory, background and reagent contamination.

METHOD DETECTION LIMITS (MDLs) - The minimum concentration of a substance 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. MDLs should be determined approximately once per year for frequently analyzed parameters.

PERCENT DIFFERENCE (%D) - As used to compare two values, the percent difference indicates both the direction and the magnitude of the comparison, i.e., the percent difference may be either negative, positive, or zero. (In contrast, see relative percent difference.)

PRIMARY QUANTITATION ION - a contract specified ion used to quantitate a target analyte.

REAGENT WATER - water in which no interferant is observed at or above the minimum detection limit of the parameters of interest.

RECONSTRUCTED ION CHROMATOGRAM (RIC) - a mass spectral graphical representation of the separation achieved by a gas chromatograph; a plot of total ion current versus retention time.

RELATIVE PERCENT DIFFERENCE (RPD) - As used to compare two values, 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. (In contrast, see percent difference.)

RELATIVE RESPONSE FACTOR (RRF) - a measure of the relative mass spectral response of an analyte compared to its internal standard. Relative Response Factors are determined by analysis of standards and are used in the calculation of concentrations of analytes in samples.

RELATIVE RETENTION TIME (RRT) - the ratio of the retention time of a compound to that of a standard (such as an internal standard).

RESOLUTION - also termed separation or percent resolution, the separation between peaks on a chromatogram, calculated by dividing the depth of the valley between the peaks by the peak height of the smaller peak being resolved, multiplied by 100.

INITIAL CALIBRATUION VERIFICATION (SECOND SOURCE CALIBRATION STANDARD) - a standard from a separate source than the calibration curve that is used to verify the accuracy of the calibration standards. An external check must be run whenever an initial calibration is performed.

SURROGATES - pure analytes added to every blank, sample, matrix spike, matrix spike duplicate, and standard in known amounts before extraction or other processing; used to evaluate analytical efficiency

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by measuring recovery. Surrogates are brominated, fluorinated, or isotopically labeled compounds not expected to be detected in environmental media.

5.0 HEALTH & SAFETY

5.1 The analyst must follow normal safety procedures as outlined in the Accutest Health and Safety Plan and Personal Protection Policy, which include the use of safety glasses and lab coats. In addition, all acids are corrosive and must be handled with care. Flush spills with plenty of water. If acids contact any part of the body, flush with water and contact the supervisor.

5.2 The toxicity or carcinogenicity of each reagent used in this method has not been precisely determined; however, each chemical must be treated as a potential health hazard. Exposure to these reagents must be reduced to the lowest possible level. The laboratory is responsible for maintaining a current awareness file of OSHA regulations regarding the safe handling of the chemicals specified in this method. A reference file of data handling sheets is made available to all personnel involved in these analyses.

5.3 The following analytes covered by this method have been tentatively classified as known or suspected human or mammalian carcinogens: benzo(a)anthracene, benzidine, 3,3'-dichlorobenzidine, benzo(a)pyrene, dibenzo(a,h)anthracene, N-nitrosodimethylamine, and 4,4'-DDT. Prepare primary standards of these toxic compounds in a hood. A NIOSH/Mass approved toxic gas respirator must be worn when the analyst handles high concentrations of these toxic compounds.

6.0 INTERFERENCES

6.1 The data from all blanks, samples, and spikes must be evaluated for interferences.

6.2 Method interferences may be caused by contaminants in solvents, reagents, glassware, and other stages of sample processing. Refer to "The Preparation of Glassware for Extraction of organic contaminants" SOP for practices utilized in the extraction department.

6.3 Matrix interferences may be caused by contaminants that are co-extracted from the sample. The extent of matrix interferences will vary considerably from source to source, depending upon the nature and diversity of the industrial complex or municipality being sampled.

6.4 To reduce carryover when high-concentration samples are sequentially analyzed, the syringe must be rinsed out between samples with solvent. Whenever an unusually concentrated sample is encountered, it should be followed by the analysis of solvent to check for cross contamination.

7.0 SAMPLE COLLECTION, PRESERVATION, & HOLDING TIMES

7.1 Water samples may be collected in 1-liter glass bottles with Teflon insert in caps. Soil samples may be collected in 250-ml wide-mouth amber glass bottles.

7.1.1 Sample should be taken with care so as to prevent any portion of the collected sample coming in contact with the sampler's gloves, thus avoiding possible phthalate contamination.

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7.2 Test all aqueous samples for residual chlorine using test paper for free and total chlorine. If the sample tests positive for residual chlorine, add 80 mg of sodium thiosulfate to each liter of sample.

7.3 The samples must be protected from light and refrigerated at $\leq$ 6° C from the time of receipt until extraction and analysis.

7.4 Store the sample extracts at -10 °C in amber vials (protected from light), in sealed vials equipped with unpierced PTFE-lined septa.

7.5 HOLDING TIME

7.5.1 Aqueous samples must be extracted within 7 days of sampling.

7.5.2 Soil, sediments and concentrated waste samples must be extracted within 14 days of sampling.

7.5.3 Extracts must be analyzed within 40 days following extraction.

8.0 APPARATUS & MATERIALS

8.1 GAS CHROMATOGRAPH/MASS SPECTROMETER SYSTEM

8.1.1 Gas Chromatograph. HP-5890, HP-6890, or Agilent 6890-N which includes an analytical system that is complete with a temperature programmable gas chromatograph and all required accessories including syringes, capillary chromatographic columns, and gases.

8.1.1.1 The injection port is designed for splitless injection with capillary columns.

8.1.1.2 The capillary column is directly coupled to the source.

8.1.2 Column.

8.1.2.1 30 m x 0.25 mm fused silica (0.25 μm film thickness) DB-5MS or equivalent capillary column. Condition the column as per manufacture's directions.

8.1.3 Mass Spectrometer (HP-5972, HP-5973 or Agilent 5975).

8.1.3.1 Full Scan Mode -Capable of scanning from 35-500 amu every 1 second or less utilizing 70 volt (nominal) electron energy in the electron impact ionization mode.

8.1.3.2 SIM Mode- Capable of selective ion grouping at specified retention times for increased compound sensitivity (table 2a).

8.1.3.3 Capable of producing a mass spectrum which meets all the EPA performance criteria in Table 3 when injecting 50 ng of Decafluorotriphenyl phosphine (DFTPP).

8.2 DATA SYSTEM

8.2.1 Acquisition and Instrument Control: HP Chemstation. A computer system is interfaced to the mass spectrometer that allows the continuous acquisition and storage on machine readable

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media (disc) of all mass spectra obtained throughout the duration of the chromatographic program.

8.2.2 Data Processing: HP Enviroquant. The software accommodates searching of GC/MS data files for analytes which display specific fragmentation patterns. The software also allows integrating the abundance of an EICP between specified time or scan number limits. The data system includes the NIST98 spectra library for qualitative searches of non-target compounds present in the chromatogram. It flags all data files that have been edited manually by laboratory personnel.

8.2.3 Offline Magnetic Tape Storage Device (Lagato Networker) - the magnetic tape storage device copies data for long term, offline storage.

8.3 SYRINGE

8.3.1 10 μl graduated, auto sampler (Hamilton or equiv.).

8.3.2 Micro liter syringes, various sizes

9.0 REAGENTS AND STANDARDS

9.1 Solvents - Ultra pure, chromatography grade methylene chloride and acetone.

9.2 Stock Standard Solutions.

9.2.1 Certified, commercially prepared standards, from two separate sources are used.

9.2.1.1 Base Neutrals.

- Base/Neutrals Mix #1 (Absolute: Semivolatile Organics Standard Mix # 1).
- Base/Neutrals Mix #2 (Absolute: Semivolatile Organics Standard Mix # 2).
- PAH Mix (Absolute: Semivolatile Organics Standard Mix # 7).
- PAH Mixture #2 (Ultra).
- PAH Selected Ion Monitoring Mixture
- Benzidines Mix (Absolute: Semivolatile Organics Standard Mix # 6).
- Toxic Substances #2 (Absolute: Semivolatile Organics Standard Mix # 5).
- Pyridines Mixture (Ultra).
- Additonal requested compound(s) mix (Absolute).
- Base Neutral Mixture (2nd Source).

Acids.

- Phenols Mix (Absolute: Semivolatile Organics Standard Mix # 8).
- Toxic Substances #1(Absolute: Semivolatile Organics Standard Mix # 4).
- Acid Mixture (2nd Source).Internal Standard Mixtures.

9.2.2 Internal Standard Mixtures

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9.2.2.1 Ultra (or equivalent) at a concentration of 4,000 μg/ml for each of the following compounds.

Full Scan

- 1,4-Dichlorobenzene-d4
- Naphthalene-d8
- Acenaphthene-d10
- Phenanthrene-d10
- Chrysene-d12
- Perylene-d12

SIM

- 1,2-Dichlorobenzene-d4
- 1-Methylnaphthalene-d10
- Fluorene-d10
- Fluoranthene-d10
- Benzo(a)pyrene-d12

9.2.2.2 The internal standards should permit most of the components of interest in a chromatogram to have retention times of 0.8 - 1.20 relative to one of the internal standards.

9.2.2.3 Each 1 ml sample extract, and standard undergoing analysis should be spiked with 10 μl of the internal standard mixtures, resulting in a concentration of 40 μg/ml of each internal standard for full scan analysis and 4 ug/ml for SIM analysis.

9.2.3 Surrogate Standard Mixture.

9.2.3.1 B/N Surrogate Standard Mix: RESTEK (or equivalent) at a concentration of 5,000 μg/ml each surrogate compound.

- Nitrobenzene-d5.
- 2-Fluorobiphenyl.
- p-Terphenyl-d14.

9.2.3.2 Acid Surrogate Standard Mix: RESTEK (or equivalent) at a concentration of 7,500 μg/ml each surrogate compound.

- Phenol-d5.
- 2-Fluorophenol.
- 2,4,6-Tribromophenol.

9.2.4 DFTPP Tune Stock.

9.2.4.1 Protocol (or equivalent) at a concentration of 2,500 μg/ml for the following compounds.

- Decafluorotriphenylphosphine.
- 4,4'-DDT.

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- Benzidine.
- Pentachlorophenol.

9.2.5 Store at -10 ^{o}C or less when not in use or according to the manufacturer's documented holding time and storage temperature recommendations. Stock standard solutions must be replaced after 1 year or sooner if manufacture's expiration date comes first or comparison with quality control check samples indicates degradation.

9.3 Surrogate Spiking Solutions.

9.3.1 Two surrogate spiking solutions, base/neutral surrogate solution and acid surrogate solution, at a concentration of 100 μg/ml are prepared in Extraction. Spike each sample, and blank with 0.5 ml of each solution, prior to extraction, for a final concentration of 50 μg/l of each surrogate compound in the extract.

9.3.2 A calibration range must be constructed for the surrogate compounds. Accordingly, appropriate amounts of surrogates are mixed with each calibration solution to define a range similar to the target compounds.

9.3.3 Store at -10 °C or less or according to the manufacturer's documented storage temperature recommendations. Prepare fresh surrogate spiking solutions every year, or sooner, if the manufacturer's expiration dates come first or if the solution has degraded or evaporated.

9.4 Intermediate Calibration Standard Solution.

9.4.1 The calibration stock solution is prepared by adding an appropriate amount of each stock and surrogate compounds into a 10 ml volumetric flask. Dilute the solution to the volume with methylene chloride and mix thoroughly. Refer to Table 7A for details.

9.5 Calibration Standards.

9.5.1 Initial Calibration Standards.

9.5.1.1 Calibration standards containing the surrogate compounds should be made by quantitative dilutions of the above intermediate solution. The calibration standards are prepared at a minimum of five concentrations to cover the range of 1 - 100 μg/ml for full scan and 0.02 – 5ug/ml for SIM, depending upon project specific requirements. Suggested levels and preparations are shown in Table 7A and 7B.

9.5.2 Continuing Calibration Verification.

9.5.2.1 The concentration of the mid range standard used for continuing calibration verification is alternated between 25 and 50 μg/ml for full scan and 2.5 and 1.0 for SIM.

9.5.3 Store the calibration standards in a refrigerator at $\leq$ 6 °C and prepare every 6 months or before the manufacturer's expiration date, whichever is sooner. Standards must be replaced immediately if the analysis of check standards indicates degradation.

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9.6 Initial Calibration verification (ICV) -Second source calibration check standard.

9.6.1 The ICV standard is prepared per Table 7E, using the intermediate solutions prepared in Extraction.

9.6.2 The ICV is analyzed after each initial calibration.

9.7 Daily GC/MS Performance Checks.

9.7.1 The solution is prepared at 50 μg/ml by making a 1:50 dilution of DFTPP stock solution (Section 9.2.4) in methylene chloride.

9.8 Matrix Spike Solutions.

9.8.1 The matrix spike solutions for both Base/Neutral and Acid are prepared in Acetone at a concentration of 100 μg/ml for each compound. Prepare the matrix spike, matrix spike duplicate and blank spike by spiking the selected sample and the blank with 0.5 ml of these solutions for a final concentration of 50 μg/l of each compound.

9.9 All organic new standard solutions are analyzed prior to use to verify the accuracy of the prepared concentration.

9.9.1 The prepared standard solution is analyzed using the determinative (instrumental) technique for the method.

9.9.2 The solution is analyzed following the completion of instrument calibration or a calibration check.

9.9.3 The concentration of the standard solution is determined using the software routines used in determining the acceptability of calibration verification.

9.9.4 The data is evaluated and the percent difference determined. The standard solution is approved for use if all designated compounds are present in the solution and the percent difference is less than the established criteria (±20%).

10.0 CALIBRATION

10.1 Initial Calibration.

10.1.1 The calibration range covered for routine analysis under RCRA employs standards of 1, 2, 5, 10, 25, 50, 80, 100 μg/ml for full scan and 0.02, 0.05, 0.10, 0.20, 1.0, 2.5, 5.0 ug/ml for SIM. A minimum of five standards must be run sequentially. The reporting limit is established by the concentration of the lowest standard analyzed during the initial calibration. Lower concentration standard may be needed to meet the reporting limit requirements of state specific regulatory program. The linear range covered by this calibration is the highest concentration standard.

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10.1.2 A calibration range must be constructed for each surrogate compound. Accordingly, add appropriate amounts of surrogate spiking solutions to the calibration solution to define a range similar to the target compounds.

10.1.3 Aliquot 1 ml of each calibration standard into a 2 ml crimp top vial.

10.1.4 Prior to analysis, add 10 μl of the applicable (Full scan and/or SIM) internal standard solution (Section 9.2.2) to each standard. This results in a concentration of 40 μg/ml (Full scan) and 4ug/ml (SIM) for each internal standard.

10.1.5 Analyze the standard solutions using the conditions established in Section 11.0. Each analyte is quantitatively determined by internal standard technique using the closest eluting internal standard and the corresponding area of the major ion. See Table 6.

10.1.6 The Response Factor (RF) is defined in Section 13.1. Calculate the mean RF for each target analyte, using minimum of five RF values calculated from the initial calibration curve.

10.1.7 For the initial calibration to be valid, the following criteria must be met.

10.1.7.1 The percent relative standard deviation (% RSD) (see Section 13.2) of all target analytes must be less than or equal to 20%.

10.1.7.2 If the %RSD of any individual compound is $\geq$20%, employ an alternative calibration linearity model. Specifically, linear regression using a least squares approach may be employed.

10.1.7.2.1 If a linear regression is employed, select the linear regression calibration option of the mass spectrometer data system. Do not force the regression line through the origin and do not employ 0,0 as a sixth calibration standard.

10.1.7.2.2 The correlation coefficient (r value) must be $\geq$0.99 for each compound to be acceptable.

10.1.7.2.2.1 When calculating the calibration curves using the linear regression model, a minimum quantitation check on the viability of the lowest calibration point should be performed by re-fitting the response from the low concentration calibration standard back into the curve.

10.1.7.2.2.2 The recalculated concentration of the low calibration point should be within $\pm$ 30% of the standard's true concentration.

10.1.7.2.3 If more than 10% of the compounds included with the initial calibration exceed the 20% RSD limit and do not meet the minimum correlation coefficient for the linear calibration option, then the chromatographic system is considered too reactive for the analysis to begin. Perform

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corrective action and recalibrate if the calibration criteria cannot be achieved.

10.1.7.3 It is recommended that the minimum response factor for the most common target analytes in the following table should be demonstrated for each individual calibration level as a means to ensure that these compounds are behaving as expected.

Minimum Response Factor Table

Semivolatile Compounds	Minimum Response Factor (RF)
Benzaldehyde	0.010
Phenol	0.800
Bis (2-chloroethyl) ether	0.700
2-Chlorophenol	0.800
2-Methylphenol	0.700
2,2'-Oxybis-(1-chloropropane)	0.010
Acetophenone	0.010
4-Methylphenol	0.600
N-Nitroso-di-n-propylamine	0.500
Hexachloroethane	0.300
Nitrobenzene	0.200
Isophorone	0.400
2-Nitrophenol	0.100
2,4-Dimethylphenol	0.200
Bis(2-chloroethoxyl)methane	0.300
2,4-Dichlorophenol	0.200
Naphthalene	0.700
4-Chloroaniline	0.010
Hexachlorobutadiene	0.010
Caprolactam	0.010
4-Chloro-3-methylphenol	0.200
2-Methylnaphthalene	0.400
Hexachlorocyclopentadiene	0.050
2,4,6-Trichlorophenol	0.200
2,4,5-Trichlorophenol	0.200
1,1'-Biphenyl	0.010
2-Chloronaphthalene	0.800
2-Nitroaniline	0.010
Dimethyl phthalate	0.010
2,6-Dinitrotoluene	0.200
Acenaphthylene	0.900
3-Nitroaniline	0.010
Acenaphthene	0.900
2,4-Dinitrophenol	0.010
4-Nitrophenol	0.010
Dibenzofuran	0.800
2,4-Dinitrobenzene	0.200

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Diethyl phthalate	0.010
1,2,4,5-Tetrachlorobenzene	0.010
4-Chlorophenyl-phenyl ether	0.400
Fluorene	0.900
4-Nitroaniline	0.010
4,6-Dinitro-2-methylphenol	0.010
4-Bromophenyl-phenyl ether	0.100
N-Nitrosodiphenylamine	0.010
Hexachlorobenzene	0.100
Atrazine	0.010
Pentachlorophenol	0.050
Phenanthrene	0.700
Anthracene	0.700
Carbazole	0.010
Di-n-butyl phthalate	0.010
Fluoranthene	0.600
Pyrene	0.600
Butyl benzyl phthalate	0.010
3,3'-Dichlorobenzidine	0.010
Benzo(a)anthracene	0.800
Chrysene	0.700
Bis-(2-ethylhexyl)phthalate	0.010
Di-n-octyl phthalate	0.010
Benzo(b)fluoranthene	0.700
Benzo(k)fluoranthene	0.700
Benzo(a)pyrene	0.700
Indeno(1,2,3-cd)pyrene	0.500
Dibenz(a,h)anthracene	0.400
Benzo(g,h,i)perylene	0.500
2,3,4,6-Tetrachlorophenol	0.010

10.1.7.3.1 Due to the large number of compounds, some compounds will fail to meet the minimum response factor criteria. They may be used as qualified data or estimated values for screening purposes. Non-detects may be reported if adequate sensitivity has been demonstrated at the applicable lower quantitation limit.

10.1.7.4 The initial calibration criteria for this method applies to all additional compounds of concern specified by the client.

10.1.7.5 The relative retention times of each target analyte in each calibration standard should agree within 0.06 relative retention time units.

10.2 Initial Calibration Verification (ICV) - Source Calibration Check Standard.

10.2.1 The calibration is verified with a calibration check standard at 50 μg/ml (Full scan) or 1ug/ml (SIM) from an external source (Section 9.6). It must be analyzed immediately following the initial calibration.

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10.2.2 The percent difference (% D) (Section 13.3) for this standard must meet the criteria of 30% for all the target compounds.

10.2.2.1 If % D is greater than 30%, reanalyze the second source check. If the criteria cannot be met upon re-injection, re-prepare the second source solution using a fresh ampoule and repeat the process.

10.2.2.2 If the %D criteria cannot be achieved after re-preparation of the second source, prepare a third source and repeat the process. Make fresh calibration standards using one of the two standard sources that match each other.

10.3 Continuing Calibration Verification Standard - CCV

10.3.1 A calibration verification standard at close mid-level concentration of the initial calibration range at alternating 25 and 50ug/ml for full scan and 2.5ug/ml and 1ug/ml for SIM must be acquired every 12 hrs.

10.3.1.1 The calibration verification standard selected must be near concentration of the midpoint calibration standard or near the action level for the project specified.

10.3.2 For the continuing calibration to be valid, all of the following specified criteria must be met.

10.3.2.1 Each of the most common target analytes in the calibration verification standard should meet the minimum response factors as noted in the Minimum Response Factor Table in section 10.1.7.3.

10.3.2.2 All target compounds of interest must be evaluated using a 20% D criteria. If the percent difference or percent drift for a compound is less than or equal to 20%, then the initial calibration for that compound is assumed to be valid.

10.3.2.3 Due to the large numbers of compounds that may be analyzed by this method, it is expected that some compounds will fail to meet the 20% D criterion. If the criterion is not met (i.e., greater than 20% difference or drift) for more than 20% of the compounds included in the initial calibration, then corrective action must be taken prior to the analysis of samples.

10.3.2.4 In cases where compounds fail, they may still be reported as non-detects if it can be demonstrated that there was adequate sensitivity to the compound at the applicable quantitation limits. For situation when the failed compound is present, the concentrations must be reported as estimated.

10.3.3 If the first continuing calibration verification does not meet criteria, a second standard may be injected after notifying the team leader/manager and checking the system for defects.

10.3.3.1 A continuing calibration check is allowed to be repeated only once; if the second trial fails, a new initial calibration must be performed or refer to section 10.3.2.4. In situations where the first check fails to meet the criteria, the instrument logbook should have clear documented notations as to what the problem was and what corrective action was implemented to enable the second check to pass.

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10.3.4 If the verification criteria cannot be achieved, a new initial calibration must be performed or refer to section 10.3.2.4.

10.3.5 If any of the internal standard areas change by a factor of two (- 50% to + 100%) or the retention time changes by more than 30 seconds from the midpoint standard of the last initial calibration, the mass spectrometer must be inspected for malfunctions and corrections must be made, as appropriate.

10.3.5.1 Reanalyze the continuing calibration standard. New initial calibration is required if reanalyzed standard continues to fail the internal standard requirements.

10.3.5.2 All samples analyzed while the system was out of control must be reanalyzed following corrective action.

11.0 PROCEDURE

11.1 Instrument Conditions.

11.1.1 Recommended instrument conditions are listed in Table 2 and 2a (SIM only). Modifications of parameters specified with an asterisk are allowed as long as criteria of calibration are met. Any modification should be approved by team leader/manger.

11.2 Daily GC/MS Performance Checks.

11.2.1 Mass Spectrometer Tuning. Every 12-hour, inject 1 μl of 50 ng/μl or 2 μl of 25 ng/μl DFTPP solution directly on to the column.

11.2.2 The GC/MS system must be checked to verify that acceptable performance criteria are achieved (see Table 3).

11.2.3 This performance test must be passed before any sample extracts, blanks or standards are analyzed. Evaluate the tune spectrum using three mass scans from the chromatographic peak and a subtraction of instrument background.

11.2.3.1 Select the scans at the peak apex and one to each side of the apex.

11.2.3.2 Calculate an average of the mass abundances from the three scans.

11.2.3.3 Background subtraction is required. Select a single scan in the chromatogram that is absent of any interfering compound peak and acquired within no more than 20 scans to the elution of DFTPP. The background subtraction should be designed only to eliminate column bleed or instrument background ions. Do not subtract part of the tuning compound peak.

11.2.4 If all the criteria are not achieved, the analyst must retune the mass spectrometer with team leader/manager and repeat the test until all criteria are met.

11.2.4.1 Alternatively, an additional scan on each side of the peak apex may be selected and included in the averaging of the mass scans. This will provide a mass spectrum of

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five averaged scans centered on the peak apex. NOTE: The selection of additional mass scans for tuning may only be performed with supervisory approval on a case by case basis.

11.2.5 The injection time of the acceptable tune analysis is considered the start of the 12-hour clock.

11.2.6 In order to assess GC column performance and injection port inertness, the DFTPP tune standard also contains appropriate amount of 4,4'-DDT, benzidine and pentachlorophenol.

11.2.6.1 Injection Port Inertness Check.

11.2.6.1.1 The injection port inertness of the GC portion of the GC/MS is evaluated by the percent breakdown of 4,4'-DDT. DDT is easily degraded in the injection port. Breakdown occurs when the injection port liner is contaminated by high boiling residue from sample injection or when the injector contains metal fittings. Check for degradation problems by injecting a GC/MS tune standard containing 4,4'-DDT every 12 hour, regardless of whether DDT is a target analyte. The degradation of DDT to DDE and DDD should not exceed 20%, in order to proceed with calibration procedures. Refer to Section 13.7 for calculation. Print the check and keep it on file.

11.2.6.2 Column Performance Check.

11.2.6.2.1 The condition of the GC column is evaluated by the tailing of benzidine and pentachlorophenol every 12 hour. Benzidine and pentachlorophenol should be present at their normal responses, with no visible peak tailing, as demonstrated by the peak tailing factors. The tailing factor criteria for benzidine (base-neutral fraction) must be $\leq$ 2 and for pentachlorophenol (acid fraction) must be $\leq$ 2. Print the check daily and keep on file:

11.2.6.3 If degradation is excessive and/or poor chromatography is observed, the injector port may require cleaning. It may also be necessary to break off the first 6-12 in. of the capillary column.

11.3 Initial Calibration

11.3.1 Refer to Section 10.1.

11.4 Initial calibration Verification (ICV) - Second Source Calibration Check

11.4.1 This standard must at least be analyzed when initial calibration provided. Refer to Section 10.2.

11.5 Continuing Calibration Checks

11.5.1 Refer to Section 10.3.

11.6 Sample Analysis.

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11.6.1 Allow the sample extract to warm to room temperature. Spike 10 μl of the appropriate internal standard mix (4,000 μg/ml for full scan and 400ug/ml for SIM) into 1 ml sample extract, just prior to analysis. This is equivalent to a concentration of 40 μg/ml (full scan) and 4ug/ml (SIM) of each internal standard.

11.6.2 Inject 1 μl aliquot of the sample extract into the GC/MS system. A splitless injection technology is used.

11.6.3 If the response for any ion of interest exceeds the working range of the GC/MS system, dilute a stored extract if available and reanalyze.

11.6.4 When the extracts are not being used for the analyses, store them at -10°C, protected from light, in sealed vials equipped with unpierced PTFE-lined septa.

11.7 Sample Dilution

11.7.1 Establish dilution of sample in order to fall within calibration range or to minimize the matrix interference.

- Utilize screen data (specific project only).
- Utilize acquired sample data.
- Utilize the history program or approval from client/project.
- Sample characteristics (appearance, odor).

11.7.2 If no lower dilution has been reported, the dilution factor chosen should keep the response of the largest peak for a target analyte in the upper half of the initial calibration range of the instrument.

11.7.3 Preparing Dilutions.

11.7.3.1 Prepare sample dilutions quantitatively. Dilute the sample extract with methylene chloride using logical volume to volume ratios, i.e., 1:5, 1:10, 1:50, etc. Large dilutions may require serial dilutions or the use of a Class A 10 ml volumetric flask.

11.7.3.2 Syringe dilutions. – Calibrated syringes are used to prepare dilutions. Add the appropriate amount of methylene chloride to a clean autosampler vial. Add the proper amount of sample using a calibrated syringe of the appropriate volume for the dilution. Add sufficient internal standard to maintain a concentration of 40ug/ml. Cap the vial and gently shake to disperse the sample through the solvent.

11.7.3.3 Volumetric Flask Dilutions – Large dilutions may require the use of a 10 ml Class A Volumetric flask.

11.8 Establishing Search Criteria for target compounds. Search criteria for each compound listed in the method must be entered into the method quantitation/identification file in the Enviroquant software package. This activity must be performed before attempting qualitative and quantitative analysis on any acquired data file. The search criteria are based on compound retention time and the characteristic ions from the reference mass spectrum. Characteristic ions are defined as the three

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ions of greatest relative intensity, or any ions over 30% relative intensity, if less than three such ions occur in the reference spectrum. The number of secondary ions displayed for each compound search varies between compounds.

11.8.1 Select the primary ion for the target compound from the characteristic ions in Table 6. If multiple characteristic ions are listed, the first ion is the major (primary) ion. Enter this ion as the search ion. Enter the relative abundance of this ion (100% for base peak ions) and set the relative abundance window at ± 30%.

11.8.1.2 Alternate primary ions may be selected when interferences exist from ion abundance contribution from close eluting compounds.

11.8.2 Enter the remaining ions as secondary ions. Secondary ions are not be used to locate peaks within the search window, but are be used to support the qualitative identification of selected peaks. The number of secondary ions displayed for each compound search varies between compounds depending on the number of ions in the spectra >30% relative abundance.

11.8.3 Set the relative abundance windows for the secondary ions at ± 30%.

11.8.4 Establish the relative retention window for each compound. Because it is a relative retention window the same width window applies to all compounds on the quantitation list. The window must be established at a minimum of 0.06 relative retention time units.

11.9 Data Interpretation.

11.9.1 Executing Qualitative Searches. The target compounds shall be identified by analyst with competent knowledge in the interpretation of mass spectra by comparison of the sample mass spectrum to the mass spectrum of a standard of the suspected compound.

11.9.1.1 The search procedure will identify peaks within the search window using the primary ion only. Secondary ions and the relative retention are used to determine “the best match”. If the best match contains secondary ions outside the relative abundance window, they will be flagged with a # sign.

11.9.2 Qualitative Identification. The qualitative identification of compounds determined by this method is based on retention time and on comparison of the sample mass spectrum, after background correction, with characteristic ions in a reference mass spectrum. Compounds are identified when the following criteria are met.

11.9.2.1 The intensities of the characteristic ions of a compound must maximize in the same scan or within one scan of each other.

11.9.2.2 The sample component must elute at the same relative retention time (RRT) as the daily standard. Criterion is the RRT of sample component must be within ± 0.06 RRT units of the standard.

11.9.2.3 The relative intensities of the characteristic ions agree within 30% of the relative intensities of these ions in the reference spectrum. (Example: For an ion with an

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abundance of 50% in the reference spectrum, the corresponding abundance in a sample spectrum can range between 20% and 80%).

11.9.2.3.1 If a chromatographic peak exhibits a spectrum containing an ion with relative abundance outside the relative abundance window is selected for reporting, the analyst must annotate the spectra that the compound qualified based on his/her best judgement. This circumstance will most often occur from coeluting compounds with similar ions or background matrix interferences.

11.9.3 Quantitative Analysis.

11.9.3.1 Once a target compound has been identified, its concentration (Section 13.4) will be based on the integrated area of the quantitation ion, normally the base peak (Table 6). The compound is quantitated by internal standard technique with an average response factor generated from the initial calibration curve.

11.9.3.2 If the sample produces interference for the primary ion, use a secondary ion to quantitate. This may be characterized by an excessive background signal of the same ion, which distorts the peak shape beyond a definitive integration. Also interference could severely inhibit the response of the internal standard ion. The secondary ion must be used to generate a new response factor.

11.10 Library Search for Tentatively Identified Compounds.

11.10.1 If a library search is requested, the analyst should perform a forward library search of the NIST98 mass spectral library to tentatively identify 10 to 15 non-reported compounds (15 for base, 10 for acid, 25 for base/acid fraction).

11.10.2 Guidelines for making tentative identification are listed below.

11.10.2.1 These compounds should have a response greater than 10% of the nearest internal standard. The response is obtained from the integration for peak area of the Total Ion Chromatogram (TIC).

11.10.2.2 The search is to include a spectral printout of the 3 best library matches for a particular substance. The results are to be interpreted by analyst.

11.10.2.3 Molecular ions present in the reference spectrum should be present in the sample spectrum.

11.10.2.4 Relative intensities of major ions in the reference spectrum (ions > 10 % of the most abundant ion) should be present in the sample spectrum.

11.10.2.5 The relative intensities of the major ions should agree within ± 20 %. (Example: For an ion with an abundance of 50% in the standard spectrum, the corresponding sample ion abundance must between 30 and 70%).

11.10.2.6 Ions present in the sample spectrum but not in the reference spectrum should be reviewed for possible background contamination or presence of coeluting compounds.

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11.10.2.7 Ions present in the reference spectrum but not in the sample spectrum should be verified by performing further manual background subtraction to eliminate the interference created by coeluting peaks and/or matrix interference.

11.10.3 Quantitation of the tentatively identified compounds is obtained from the total ion chromatogram based on a response factor of 1 and is to be tabulated on the library search summary data sheet.

11.10.4 The resulting concentration should be reported indicating: (1) that the value is estimate, and (2) which internal standard was used to determine concentration. Quantitation is performed on the nearest internal standard.

11.10.5 Peaks that are suspected to be aldol-condensation reaction products (i.e., 4-methyl-4-hydroxy-2-pentanone and 4-methyl-3-pentene-2-one) shall be searched and reported but not counted towards the total TIC count.

11.10.6 Any peak naming as “System artifact” (from the column bleedings) or “Internal Standard” (added by lab for other test, like SIM analysis) shall be searched and reported but not counted towards the total TIC count.

11.11 Selected Ion Monitoring (SIM) Option

NOTE: The use of SIM is not allowed by the SCDHEC for samples from South Carolina.

11.11.1 Instrument Set-Up: Modify the method for SIM analysis and define ion groups with retention times, ions and dwell times to include base peak ion for the target compounds of interest, surrogates, and internal standards (Table 2a, Table 8a) Select a mass dwell time of 50 milliseconds for all compounds.

11.11.2 Calibration: Calibrate the mass spectrometer in the selected ion monitoring mode using 7 calibration standards of 0.02, 0.05, 0.10, 0.20, 1.0, 2.5, 5.0 ug/ml. Spike each standard with the SIM specific internal standard solution at 4ug/ml. Calculate individual response factors and response factor RSDs using the procedures and criteria described in Section 10.1.6, 10.1.7.3 and 10.1.7.4.

11.11.3 Initial Calibration Verification. Verify the initial calibration after its completion using a 1.0 ug/ml calibration standard purchased or prepared from a second standards reference materials source. The initial calibration verification must meet the criteria of Section 10.2.2.

11.11.4 Continuing Calibration Verification. Verify the initial calibration every 12 hours using a 1.0 or 2.5 ug/ml calibration. The continuing calibration verification must meet the criteria of Section 10.3.

11.11.5 Sample Extract Analysis: Each extract has been previously spike with the SIM internal standard at 4 ug/ml. Analyze the sample extracts for the compounds of interest using the SIM scan parameters employed for the calibration standards.

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11.11.6 Surrogate Standard Calculation.. Report surrogate spike accuracy for the surrogates spiked for the full scan GC/MS analysis at 50 ug/ml.

12.0 QUALITY CONTROL

12.1 QC Requirements Summary.

Daily GC/MS Performance Checks	Beginning of the analytical shift and every 12 hours
Initial Calibration	Whenever needed.
Second Source Calibration Check	Following initial calibration
Continuing Calibration Verification	Every 12 hours.
Method Blank	One per extraction batch*.
Blank Spike	One per extraction batch*.
Matrix Spike	One per extraction batch*.
Matrix Spike Duplicate	One per extraction batch*.
Surrogate	Every sample extract and standard.
Internal Standard	Every sample extract and standard.

*The maximum number of samples per batch is twenty or per project specification.

12.2 Daily GC/MS Performance Checks.

12.2.1 Refer to Section 11.2.

12.3 Initial Calibration.

12.3.1 Refer to Section 10.1.

12.4 Initial Calibration Verification (ICV) - Source Calibration Check.

12.4.1 Refer to Section 10.2.

12.5 Continuing Calibration Verification.

12.5.1 Refer to section 10.3.

12.6 Method blank.

12.6.1 The method blank is either reagent water or anhydrous sodium sulfate (depending on the sample matrix) which must be extracted with each set of 20 or less samples. For a running

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batch, a new method blank is required for each different extraction day. The method blank is then extracted and carried through all stages of the sample preparation and measurement.

12.6.2 If the method blank contains a target analyte above its MDL , the entire batch must be re-extracted and re-analyzed.

12.6.3 Surrogate compounds are added to the method blank prior to extraction. If the surrogate accuracy in the method blank does not meet in house criteria , it must be reanalyzed. If the reanalysis confirms the original data, the entire batch should be re-extracted.

12.7 Blank Spike

12.7.1 A blank spike must be extracted with each set of 20 or less samples. For a running batch, a new blank spike is required for each different extraction day. The blank spike consists of an aliquot of a clean (control) matrix similar to the sample matrix and of the same volume. It is spiked with the same analytes at the same concentrations as the matrix spike/matrix spike duplicate.

12.7.2 The blank spike recoveries should be assessed using laboratory in house limits.

12.7.3 If a blank spike is out of control, the following corrective actions must be taken and all the associated samples must be re-extracted and reanalyzed. The exception is if the blank spike recovery is high and no hits reported in associated samples and QC batch. In that case, the sample results can be reported with footnote (remark) and no further action is required.

12.7.3.1 Check to be sure that there are no errors in the calculations, or spike solutions. If errors are found, recalculate the data accordingly.

12.7.3.2 Check instrument performance. If an instrument performance problem is identified, correct the problem and reanalyze the sample batch.

12.7.3.3 If no problem is found, re-extract and reanalyze the sample batch.

12.8 Matrix Spike(MS) / Matrix Spike Duplicate(MSD)

12.8.1 One sample is randomly selected from each extraction batch and spiked in duplicate to assess the performance of the method as applied to a particular matrix and to provide information on the homogeneity of the matrix. Both the MS and MSD are carried through the complete sample preparation, and determinative procedures.

12.8.2 Matrix spikes are prepared by spiking an actual sample at a concentration of 50 μg/l for both base/neutral and acids.

12.8.3 Assess the matrix spike recoveries (% R) (Section 13.5) and relative percent difference (RPD) (Section 13.6) against the in house control limits.

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12.8.4 If the matrix spike accuracy of any individual compound is out of control, the accuracy for the compound in the blank spike must be within control. In such case, matrix interference is assumed and the data is reported with footnote (e.g., spike recovery indicates possible matrix interference). No further corrective action is required.

12.9 Surrogates

12.9.1 All standards, blanks, sample extracts, and matrix spikes contain surrogate compounds which are used to monitor the performance of the extraction and analytical system.

12.9.2 The recoveries (Section 13.5) of the surrogates must be evaluated to determine whether or not they fall within surrogate control limits developed by the laboratory annually.

12.9.3 If the recovery of any surrogate compound does not meet the control limits, the calculation must be checked for possible error. The surrogate solution should be checked for degradation. Contamination and instrument performance should also be reviewed.

12.9.3.1 Reanalyze the extract if no calculation errors are detected. If the surrogate recoveries for the reanalyzed extract are in control, report the data from the reanalysis only.

12.9.3.2 If the data from the reanalysis is also out of control, re-extract and reanalyze the sample.

12.9.3.3 If, upon reanalysis, the surrogate recoveries are acceptable, report the reanalysis data. If the holding time has expired prior to the reanalysis, report both the original and reanalysis results and note the holding time problem.

12.9.3.4 If the recovery is again not within limits, the problem is considered to be matrix interference. Submit both data sets with the original analysis being reported.

12.9.4 If the sample exhibits matrix interference, defined as excessive signal where target or non-target responses are greater than the response of the internal standards. In this case, reanalysis may not be required following team leader/manager approval; the surrogates will be qualified as outside the limits due to matrix interference. Alternatively, sample may be reanalyzed on dilution, if the reanalysis is again not within the limit, the sample should be reported with a footnote indicating that there were possible matrix interference.

12.10 Internal Standards.

12.10.1 Retention time for all internal standards must be within ± 30 seconds of the corresponding internal standard in the latest continuing calibration or 50 μg/ml standard of initial calibration.

12.10.2 The area (Extracted Ion Current Profile) of the internal standard in all analyses must be within 50 to 200 % of the corresponding area of the latest calibration standard (12 hr. time period).

12.10.3 If the area of internal standard does not meet control limits, the calculations must be checked. If a problem is not discovered, the sample must be reanalyzed.

12.10.4 If the areas are acceptable upon reanalysis, the reanalysis data is reported.

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12.10.5 If the areas are unacceptable upon reanalysis, then both sets of data are submitted with the original analysis reported.

12.11 Refer to Project Specific Bench Notes(MS8270) for additional program or client specific QC requirements

13.0 CALCULATION

13.1 Response Factor (RF).

$$RF = \frac{A_s \times C_{is}}{A_{is} \times C_s}$$

where:

A_s = Area of the characteristic ion for the compound being measured.
A_{is} = Area of the characteristic ion for the specific internal standard.
C_s = Concentration of the compound being measured (μg/ml).
C_{is} = Concentration of the specific internal standard (μg/ml).

13.2 Percent Relative Standard Deviation (%RSD).

$$\%RSD = \frac{SD}{RF_{av}} \times 100$$

where:

SD = Standard Deviation.
RF_{av} = Average response factor from initial calibration.

13.3 Percent Difference (%D).

$$\%\ D = \frac{|\ RF_{av} - RF_{cv}\ |}{RF_{av}} \times 100$$

where: RF_{cv} = Response factor from Calibration Verification Standard.

13.4 Concentration (Conc.).

13.4.1 <u>for water:</u>

$$\text{Conc. } (\mu g/l) = \frac{A_s \times C_{is} \times V_f \times D \times 1000}{A_{is} \times RF_{av} \times V_i}$$

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13.4.2 for soil/sediment (on a dry weight basis):

$$\text{Conc. } (\mu g/kg) = \frac{A_s \times C_{is} \times V_f \times D \times 1000}{A_{is} \times RF_{av} \times W_s \times S}$$

where:

V_f = Final Volume of total extract (ml).
D = Secondary dilution factor.
V_i = Initial volume of water extracted (ml).
W_s = Weight of sample extracted (g).
S = (100 - % moisture in sample) / 100.

13.5 Percent Recovery (%R).

$$\%\ R = \frac{\text{Concentration found}}{\text{Concentration spiked}} \times 100$$

13.6 Relative Percent Difference (RPD).

$$RPD = \frac{|MSC - MSDC|}{(1/2)(MSC+MSDC)} \times 100$$

where:

MSC = Matrix Spike Concentration.
MSDC = Matrix Spike Duplicate Concentration.

13.7 Percent Breakdown.

$$\%\ \text{Breakdown for DDT} = \frac{\text{Total DDT degradation peak area}}{\text{Total DDT peak area}} \times 100$$

where:

Total DDT degradation peak area = DDE + DDD
Total DDT peak area = DDT + DDE + DDD.

13.8 Linear regression by the internal standard technique.

$$C_s = \left(\frac{\frac{A_s}{A_{is}} - b}{a} \right) \times C_{is}$$

Where:
Cs = concentration of target analyte
As = Area of target analyte
Cis = concentration of the internal standard

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b = Intercept
a = slope of the line

$$a = \frac{N \Sigma xy - \Sigma x \Sigma y}{N \Sigma x^2 - (\Sigma x)^2}$$

$$b = \frac{\Sigma y - a \Sigma x}{N}$$

N = number of points
x = amount of analyte
y = response of instrument

13.9 Correlation Coefficient

$$r = \frac{\Sigma(x - \bar{x})(y - \bar{y})}{\sqrt{\Sigma(x - \bar{x})^2 \Sigma(y - \bar{y})^2}}$$

Where r = correlation coefficient
x = amount of analyte
y = response of instrument

$\bar{x}$ = average of x values

$\bar{y}$ = average of y values

14.0 DOCUMENTATION

14.1 The Analytical Logbook is a record of the analysis sequence; the logbook must be completed daily. Each instrument will have a separate logbook.

14.1.1 If samples require reanalysis, a brief explanation of the reason must be documented in this log.

14.2 The Standard Preparation Logbook must be completed for all standard preparations. All information requested must be completed, the page must be signed and dated by the respective person.

14.2.1 The Accutest Lot Number must be cross-referenced on the standard vial.

14.3 The Instrument Maintenance Logbook must be completed when any type of maintenance is performed on the instrument. Each instrument has a separate log.

14.4 Any corrections to laboratory data must be done using a single line through the error. The initials of the person and date of correction must appear next to the correction.

14.5 Unused blocks of any form must be X'ed and Z'ed by the analyst before submitting the data for review.

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14.6 Supervisory (or peer) personnel must routinely review (at least once per month) all laboratory logbooks to ensure that information is being recorded properly. Additionally, the maintenance of the logbooks and the accuracy of the recorded information should also be verified during this review.

15.0 DATA REVIEW AND REPORTING

15.1 Initial and continuing calibration check. Verify that all calibration and continuing calibration criteria have been achieved. If the criteria had not been achieved, corrective action must be performed to bring the system in control before analyzing any samples.

15.1.1 If samples had been analyzed under non-compliant calibration criteria, all sample extracts must be re-analyzed once the system is brought into control.

15.2 Quality Control Data Review. Review all QC data. If QC criteria were not achieved, perform corrective action before proceeding with analysis.

15.2.1 In some situation, corrective action may demand that the entire sample batch be re-extracted and re-analyzed before processing data.

15.3 Chromatogram Review. The chromatogram of each sample is evaluated for target analytes.

15.3.1 Each sample may require the reporting of different target analytes. Review the login to assure that the correct target compounds are identified.

15.3.2 Manual integration of chromatographic peaks must be identified by the analysts. Upon review, the supervisor will initial and date the changes made to the report.

15.4 Transfer to LIMS. Following the initial screen review, transfer the processed data to the LIMS.

15.4.1 Compare the printed values to the original values to verify transfer accuracy.

15.4.2 If transfer errors occurred, the errors must be corrected before the data is re-submitted.

16.0 POLLUTION PREVENTION & WASTE MANAGEMENT

16.1 Users of this method must perform all procedural steps in a manner that controls the creation and/or escape of wastes or hazardous materials to the environment. The amounts of standards, reagents, and solvents must be limited to the amounts specified in this SOP. All safety practices designed to limit the escape of vapors, liquids or solids to the environment must be followed. All method users must be familiar with the waste management practices described in section 16.2.

16.2 Waste Management. Individuals performing this method must follow established waste management procedures as described in the waste management SOP, EHS004. This document describes the proper disposal of all waste materials generated during the testing of samples as follows:

16.2.1 Non hazardous aqueous wastes.

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16.2.2 Hazardous aqueous wastes
16.2.3 Chlorinated organic solvents
16.2.4 Non-chlorinated organic solvents
16.2.5 Hazardous solid wastes
16.2.6 Non-hazardous solid wastes

Table 1 – Target Compounds by SW846 8270C			
Benzenethiol (1)	4-Bromophenyl phenyl ether	Di-n-octyl phthalate	5-Nitro-o-toluidine (1)
Benzoic Acid	Butyl benzyl phthalate	Diethyl phthalate	Naphthalene
2-Chlorophenol	Benzyl Alcohol	Dimethyl phthalate	Nitrobenzene
4-Chloro-3-methyl phenol	1,1'-Biphenyl (1)	2,3-Dichloroaniline (1)	n-Nitrosodimethylamine
2,4-Dichlorophenol	Butyl Stearate (1)	Decane	4-Nitroquinoline 1-Oxide (1)
2,4-Dimethylphenol	2-Chloronaphthalene	Octadecane (1)	N-Nitroso-di-n-propylamine
2,4-Dinitrophenol	4-Chloroaniline	bis(2-Ethylhexyl)phthalate	N-Nitrosodi-n-butylamine
2,6-Dichlorophenol	Carbazole	Ethyl methanesulfonate	N-Nitrosodiethylamine
4,6-Dinitro-2-methylphenol	Caprolactam (1)	Famphur	N-Nitrosodiphenylamine
Dinoseb	Chlorobenzilate	Fluoranthene	N-Nitrosomethylethylamine
2-Methylphenol	Chrysene	Fluorene	N-Nitrosomorpholine
3&4-Methylphenol	Cumene (1)	Hexachlorobenzene	N-Nitrosopiperidine
2-Nitrophenol	bis(2-Chloroethoxy)methane	Hexachlorobutadiene	N-Nitrosopyrrolidine
4-Nitrophenol	bis(2-Chloroethyl)ether	Hexachlorocyclopentadiene	O,O,O-Triethyl phosphorothioat
Pentachlorophenol	bis(2-Chloroisopropyl)ether	Hexachloroethane	2-Picoline
Phenol	4-Chlorophenyl phenyl ether	Hexachlorophene	Parathion
2,3,4,6-Tetrachlorophenol	1,2-Dichlorobenzene	Hexachloropropene	Pentachloroethane (1)
2,4,5-Trichlorophenol	1,2-Diphenylhydrazine	Indene (1)	Pentachlorobenzene
2,4,6-Trichlorophenol	1,3-Dichlorobenzene	Indeno(1,2,3-cd)pyrene	Pentachloronitrobenzene
2-Acetylaminofluorene	1,4-Dichlorobenzene	Isodrin	Phenacetin
4-Aminobiphenyl	2,4-Dinitrotoluene	Isophorone	Phenanthrene
Acenaphthene	2,6-Dinitrotoluene	Isosafrole	Phorate
Acenaphthylene	3,3'-Dichlorobenzidine	Kepone	Pronamide
Acetophenone	3,3'-Dimethylbenzidine	1-Methylnaphthalene	Pyrene
Aniline	1,4-Dioxane (1)	2-Methylnaphthalene	Pyridine
Anthracene	7,12-Dimethylbenz(a)anthracene	3-Methylcholanthrene	p-Phenylenediamine
Aramite	Dimethylnaphthalenes (total) (1)	4,4'-Methylenebis(2-chloroaniline)	Quinoline (1)
Atrazine (1)	Diallate	Methapyrilene	Safrole
alpha-Terpineol	Dibenz(a,h)acridine	Methyl methanesulfonate	1,2,4,5-Tetrachlorobenzene
A,A-Dimethylphenethylamine	Dibenzo(a,h)anthracene	Methyl parathion (1)	1,2,4-Trichlorobenzene
Benzidine	Dibenzofuran	6-Methyl Chrysene (1)	1,2,3-Trichlorobenzene (1)
Benzaldehyde (1)	Dimethoate	1,4-Naphthoquinone	1,3,5-Trichlorobenzene (1)
Benzo(a)anthracene	Diphenylamine	1-Naphthylamine	Thionazin (1)

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Benzo(a)pyrene	Disulfoton	2-Naphthylamine	o-Toluidine
Benzo(b)fluoranthene	m-Dinitrobenzene	2-Nitroaniline	sym-Trinitrobenzene (1)
Benzo(g,h,i)perylene	p-(Dimethylamine) azobenzene (1)	3-Nitroaniline	Tetraethyl dithiopyrophosphate (1)
Benzo(k)fluoranthene	Di-n-butyl phthalate	4-Nitroaniline	

(1) NELAC Accreditation is not offered for this compound.

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Table 2 – RECOMMENDED OPERATING CONDITIONS: Gas Chromatograph/ Mass Spectrometer	
Injection Type	Splitless
Carrier Gas (linear velocity)	Helium at 30 cm/sec*
Mass range	35-500 AMU
Electron Energy	70 volts (nominal)
Scan time	not to exceed 1 sec. per scan
Injection port temperature	200-300 °C
Source temperature	220-270 °C
Transfer line temperature	250-300 °C
Analyzer temperature	220-250 °C
Gas Chromatograph Temperature Program*	
Initial temperature	40-50 °C*
Time 1	2-4 minutes*
Column temperature rate	8-25 degrees/min*
Final temperature	290-320 °C according to column type*
Total run time	*20-40 minutes*

***** Parameter modification allowed for performance optimization as long as QC criteria are achieved.

Table 2a – SIM Group Parameters		
Group No.	**Retention Time (minutes)**	**Ions**
1	0 – 7.8	150, 64, 93, 82, 152, 99, 63, 128, 112, 42, 95
2	7.8 – 11	150, 128, 225, 142, 172, 152, 129, 223, 141, 171, 122, 127, 227, 115, 170
3	11 – 13.8	172, 152, 166, 182, 334, 266, 176, 153, 165, 330, 284, 264, 174, 154, 77, 332, 286, 268
4	13.8 – 18	266, 179, 202, 122, 268, 212, 203, 284, 178, 213, 244, 286
5	18 – 22	244, 229, 167, 122, 226, 202, 228, 149, 203
6	22 – 34.7	264, 149, 253, 278, 263, 150, 250, 139, 265, 252, 276, 138

Table 3 - DFTPP KEY IONS AND ION ABUNDANCE CRITERIA	
Mass	**Ion Abundance Criteria**
51	30-60 of mass 198
68	<2 % of mass 69
70	<2 % of mass 69
127	40-60 % of mass 198
197	<1 % of mass 198
198	Base peak, 100 % relative abundance
199	5-9 % of mass 198
275	10-30 % of mass 198
365	>1 % of mass 198
441	Present but less than mass 443
442	>40 % of mass 198
443	17-23 % of mass 442

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Table 4 – INTERNAL STANDARDS	
Internal Standard (Full Scan)	**Prim/Sec. ions**
1,4-Dichlorobenzene-d4	152 / 150, 115
Naphthalene-d8	136 / 68
Acenaphthene-d10	164 / 162, 160
Phenanthrene-d10	188 / 94, 80
Chrysene-d12	240 / 120, 236
Perylene-d12	264 / 260, 265
Internal Standard (SIM)	**Prim/Sec. ions**
1,2-Dichlorobenzene-d4	152/ 150
1-Methylnaphthalene-d10	150/ 152, 122
Fluorene-d10	174/ 176
Fluoranthene-d10	212/ 213
Benzo(a)pyrene- d12	264/ 263, 265

Table 6 – Full Scan Semivolatile Internal Standards with Corresponding Analytes Assigned for Quantitation			
1,4-Dichlorobenzene-d4	**Ions**	**Acenaphthene-d10**	**Ions**
Aniline	(93/66,65)	Acenaphthene	(154/153,152)
Benzaldehyde	(105)	Acenaphthylene	(152/151,153)
Benzenethiol	(110)	1-Chloronaphthalene	(162/127,164)
Benzyl alcohol	(108/79,77)	2-Chloronaphthalene	(162/127,164)
Bis(2-chloroethyl)ether	(93/63,95)	4-Chlorophenylphenyl ether	(204/206,141)
Bis (2-chloroisopropyl)ether	121	Dibenzofuran	(168/139)
2-Chlorophenol	(128/64,130)	Diethyl phthalate	(149/177,150)
Cumene	(105,120)	Dimethyl phthalate	(163/149,164)
Decane	(43)	m-Dinitrobenzene	(168)
1,3-Dichlorobenzene	(146/148,111)	2,4-Dinitrophenol	(184/63,154)
1,4-Dichlorobenzene	(146/148,111)	2,4-Dinitrotoluene	(165/63,89)
1,2-Dichlorobenzene	(146/148,111)	2,6-Dinitrotoluene	(165/63,89)
1,4 Dioxane	(88)	Fluorene	(166/165,167)
Ethyl methanesulfonate	(79/109,97)	Hexachlorocyclopentadiene	(295/237,142)
2-Fluorophenol (SURR.)	(112)	1,4 – Naphthoquinone	(158)
Hexachloroethane	(117/201,199)	1- Naphthylamine	(143/115,116)
Indene	(116)	2- Naphthylamine	(143/115,116)
Methyl methanesulfonate	(80/79,64)	2-Nitroaniline	(65/92,138)
2-Methylphenol	(108/107,79)	3-Nitroaniline	(138/108,92)
4-Methylphenol	(108/107,79)	4-Nitroaniline	(138/108,92)
N-Nitrosodiethylamine	(102)	4-Nitrophenol	(139/109,65)
N-Nitrosodimethylamine	(74/42)	5 Nitro-o-toluidine	(152)
N-Nitroso-di-n-propylamine	(70/101,130)	Pentachlorobenzene	(250/252,248)
N-Nitrosomethyethylamine	(42)	Pentachloronitrobenzene	(237/235,272)
N-Nitrosomorpholine	(56)	Phenacetin	(108/109,179)
N-Nitrosoptrrolidine	(41)	Phorate	(75)
O-Toluidine	(106)	Pronamide	(173/175,145)
Petachloroethane	(167)	1,2,4,5-Tetrachlorobenzene	(216/214,218)
Phenol	(94)	2,3,4,6-Tetrachlorphenol	(232/230,131)
Phenol-d5 (SURR.)	(99)	Tetraethyldithiopyrophosphate	(322)
2-Picoline	(93/66,92)	Thioazin	(143)
Pyridine	(79)	2,4,6-Trichlorophenol	(196/198,200)
		2,4,5-Trichlorophenol	(196/198,200)

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Table 6 (cont'd) – Full Scan Semivolatile Internal Standards with Corresponding Analytes Assigned for Quantitation			
Naphthalene-d8	**Ions**	**Phenanthrene-d10**	**Ions**
A,A-Dimethylphenethylamine	(58)	4-Aminobiphenyl	(169/168,170)
Acetophenone	(105/77,51)	Anthracene	(178/176,179)
Benzoic acid	(184/92,185)	Atrazine	(58)
Bis(2-chloroethoxy)methane	(93/95,123)	4-Bromophenyl phenyl ether	(248/250,141)
Caprolactam	(55)	Carbazole	(167)
4-Chloroaniline	(127)	Diallate	(86)
4-Chloro-methylphenol	(107/144)	Dimethoate	(87)
2,3 Dichloroaniline	(161)	Di-n-Butyl phthalate	(149/150)
2,4-Dichlorophenol	(162/164,98)	4,6-Dinitro-2-methylphenol	(198/51,105)
2,6-Dichlorophenol	(162/164,98)	Dinoseb	(211)
Dimethylnaphthalene	(156)	Diphenylamine	(169/168,167)
2,4-Dimethylphenol	(122/107)	1,2-Diphenylhydrazine	(77/105)
a,a-Dimethyl-phenethylamine	(58/91,42)	Disulfoton	(88)
Hexachlorobutadiene	(225/223,227)	Fluoranthene	(202/101,203)
Hexachloroprene	(213)	2-Fluorobiphenyl (SURR)	(172)
Isophorone	(82/95,138)	Hexachlorobenzene	(284/142,249)
Isosafrole	(127)	Isodrin	(193)
1-Methylnaphthalene	(142)	Methapyriline	(58)
2-Methylnaphthalene	(142/141)	Methyl Parathion	(125)
Naphthalene	(128/129,127)	N-Nitrosodiphenylamine	(169/168,167)
Nitrobenzene	(77/123,65)	4-Nitroquinoline 1-oxide	(190)
Nitrobenzene-d5 (SURR.)	(82)	Octadecane	(57)
N-Nitroso-di-n-butylamine	(84/57/41)	Parathion	(109)
2-Nitrophenol	(139/109,65)	Pentachlorophenol	(266/264,268)
Quinoline	(129)	Phenanthrene	(178/179,176)
N-Nitrosopiperidine	(42/114,55)	Pronamide	(173)
p-Phenylenediamine	(108)	sym- Trinitrobenzene	(213)
O,O,O-Triethylphosphorthioat	(198)	2,4,6 Tribromophenol (SURR)	(330)
Safrole	(162)		
alpha –Terpineol	(128)	**Perylene-d12**	**Ions**
1,2,3-Trichlorobenzene	(180/182,145)	Benzo(b)fluoranthene	(252/125)
1,2,4-Trichlorobenzene	(180/182,145)	Benzo(k)fluoranthene	(252/125)
1,3,5-Trichlorobenzene	(180/182,145)	Benzo(g.h.i)perylene	(276/138,277)
		Benzo(a)pyrene	(252/253,125)
Chrysene-d12	**Ions**	Dibenz(a,j)acridine	(279/280)
2 –Acetylaminofluorene	(181)	Dibenz(a,h)anthracene	(278/139,279)
Aramite	(194)	7,12-Dimethylbenz(a)anthracene	(256/241,257)
Benzidine	(184)	Di-n-Octyl Phthalate	(149)
Benzo(a)anthracene	(228/229/226)	Hexachlorophene	(196)
Bis(2-ethylhexyl)phthalate	(149/167,279)	Indeno(1,2,3-d)pyrene	(276)
Butylbenzyl phthalate	(149/91)	3-Methylchloanthrene	(268/253)
Chlorobenzilate	(251)		
Chrysene	(228/226,229)		
3,3'-Dichlorobenzidine	(252/254,126)		
p-Dimethylaminoazobenzene	(120/225,77)		
3,3 Dimethylbenzidine	(212)		
Famphur	(218)		
Kepone	(272)		
Methyl Chrysene	(242)		

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Pyrene	(202/200,203)		
Terphenyl-d14 (SURR.)	(244)		
Table 6a – SIM Semivolatile Internal Standards with Corresponding Analytes Assigned for Quantitation			
1,4-Dichlorobenzene-d4	**Ions**	**Fluoranthene-d10**	**Ions**
2-Fluorophenol (Surr)	(112)	Fluoranthene	202, 101, 203
Phenol-d5 (Surr)	(99)	Pyrene	202, 203
Bis-(2-chloro-ethyl)ether	93, 63, 95	Terphenyl-d14 (Surr)	(244)
Nitrobenzene-d5 (Surr)	(82)	Benzo(a)anthracene	228, 229, 226
		Chrysene	228, 226, 229
1-Methylnaphthalene-d10	**Ions**	Bis(2-ethylhexylphthalate	149, 167, 279
Naphthalene	128, 129, 127		
Hexachlorobutadiene	225, 223, 227	**Benzo(a) pyrene-d12**	**Ions**
2-Methyl Naphthalene	142, 141, 115	Di-n-octyl phthalate	149, 150, 43
2-Fluorobiphenyl (Surr)	(172)	Benzo(b)fluoranthene	252, 253
		Benzo(k)fluoranthene	252, 125
Fluorene-d10	**Ions**	Benzo(a)pyrene	252, 253, 125
Acenaphthylene	152, 151, 153	Indeno(1,2,3-cd)pyrene	276, 277, 138
Acenaphthene	153, 152, 154	Dibenzo(a,h)anthracene	278, 139, 279
Fluorene	166, 165, 167	Benzo(g,h,i)perylene	276, 138, 277
1,2-Diphenylhydrazine	77, 105, 182		
2,4,6-Tribromophenol (Surr)	(330)		
Hexachlorobenzene	284, 286		
Pentachlorophenol	266, 264		
Phenanthrene	178, 179, 176		
Anthracene	178, 176, 179		

Table 7. STANDARD PREPARATION

Table 7A – Intermediate Calibration Standard Solution				
Stock Solution	**Stock Conc., µg/ml**	**Volume Added, µl**	**Final Vol. in $MeCl_2$, ml**	**Final Conc. µg/ml**
Semivolatile Standard Mix # 1	2,000	500	10	100
Semivolatile Standard Mix # 2	2,000	500	10	100
Semivolatile Standard Mix # 4	2,000	500	10	100
Semivolatile Standard Mix # 5	2,000	500	10	100
Semivolatile Standard Mix # 6	2,000	500	10	100
Semivolatile Standard Mix # 7	2,000	500	10	100
PAH Mixture #2	2,000	500	10	100
Semivolatile Standard Mix # 8	2,000	500	10	100
Additional Requested Compound(s) Mix	2,000	500	10	100
Pyridines Mixture	2,000	500	10	100
1,2,3-Trichlorobenzene	1,000	1,000	10	100
1,3,5-Trichlorobenzene	1,000	1,000	10	100
Butyl Stearate	10,000	200	10	200
Pentachlorophenol	1,000	1,000	10	100
B/N Surrogate Standard Mix	5,000	200	10	100
Acid Surrogate Standard Mix	7,500	134	10	100.5

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Table 7B – Intermediate Calibration Standard Solution -SIM				
Stock Solution	**Stock Conc., µg/ml**	**Volume Added, µl**	**Final Vol. in $MeCl_2$, ml**	**Final Conc. µg/ml**
Semivolatile Standard Mix # 1	2,000	50	10	10
Semivolatile Standard Mix # 2	2,000	50	10	10
Toxic #2	2,000	50	10	10
PAH Mixture #2	2,000	50	10	10
Semivolatile Standard Mix # 8 (Acids)	2,000	250	10	50
1-Methynaphthalene	1,000	100	10	10
B/N Surrogate Standard Mix	5,000	100	10	50
Acid Surrogate Standard Mix (Full Scan)	7500	67	10	50

Table 7C – Initial Calibration Standards Prep Scheme

Standard Solution	Intermediate Conc., µg/ml	Intermediate added, µl Full Scan	Final Volume in $MeCl_2$, ml	Final Conc., µg/ml – Full Scan
STD 1	100	1,000	1	100
STD 2	100	800	1	80
STD 3	100	500	1	50
STD 4	100	250	1	25
STD 5	100/10 (SIM)	100	1	10
STD 6	100	50	1	5
STD 7	100	20	1	2
STD8	100	10	1	1

Table 7D Initial Preparation Standards Prep Scheme - SIM

Standard Solution	Intermediate Conc., µg/ml	Intermediate added, µl SIM	Final Volume in $MeCl_2$, ml	Final Conc., µg/ml – SIM Scan
STD 1	10/50	500	1	5 BN / 25 Acids
STD 2	10/50	250	1	2.5 BN / 12.5 Ac
STD 3	10/50	100	1	1 BN / 5 Acids
STD 4	1	200	1	0.2 BN / 1 Acids
STD 5	1	100	1	0.1 BN / 0.5 Acids
STD7	0.1	500	1	0.05 BN / 0.25 AC
STD 6	0.1	200	1	0.02 BN / 0.1 AC

Table 7E– ICV -Second Source Calibration Check Standard				
Intermediate	**Intermediate Conc., µg/ml**	**Volume Used, µl (Full/SIM)**	**Final Volume in Acetone, ml**	**Final Conc., µg/ml (Full/SIM)**
Base Neutrals Mixture	100	500/ 50	1	50/ 5
Acid Mixture	100	500/ 50	1	50/ 5

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Table 8a –Selected Ion Monitoring: Masses and Dwell Times		
Compound	**Mass Ion (m/z)**	**Dwell Time (ms)**
Acenaphthene	153, 152, 154	50
Acenaphthylene	152, 151, 153	50
Anthracene	178, 176, 179	50
Benzo(a)anthracene	228, 229, 226	50
Benzo(a)pyrene	252, 253, 125	50
Benzo(b)fluoranthene	252, 253	50
Benzo(g,h,i)perylene	276, 138, 277	50
Benzo(k)fluoranthene	252, 125	50
Chrysene	228, 226, 229	50
Dibenzo(a,h)anthracene	278, 139, 279	50
Fluoranthene	202, 101, 203	50
Fluorene	166, 165, 167	50
Indeno(1,2,3-cd)pyrene	276, 277, 138	50
Naphthalene	128, 129, 127	50
Phenanthrene	178, 179, 176	50
Pyrene	202, 203	50
2-Methyl Naphthalene	142, 141, 115	50
Bis-(2-chloro-ethyl)ether	93, 63, 95	50
Pentachlorophenol	266, 264	50
Hexachlorobutadiene	225, 223, 227	50
1,2-Diphenylhydrazine	77, 105, 182	50
Bis(2-ethylhexylphthalate	149, 167, 279	50
Di-n-octyl phthalate	149, 150, 43	50
Hexachlorobenzene	284, 286	50
2-Fluorophenol	112, 64, 63	50
Phenol-d5	99, 42	50
Nitrobenzene-d5	82, 128	50
2-Fluorobiphenyl	172, 171, 170	50
2,4,6-Tribromophenol	330, 332, 334	50
Terphenyl-d14	244, 122	50

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Table 9. REPORTING LIMITS

Compound	Water	Soil	Compound	Water	Soil
	µg/l	µg/kg		µg/l	µg/kg
Benzoic Acid	20	667	Chlorobenzilate	5	167
2-Chlorophenol	5	167	Chrysene	1	33
4-Chloro-3-methylphenol	5	167	bis(2-Chloroethoxy)methane	2	67
2,4-Dichlorophenol	5	167	bis(2-Chloroethyl)ether	2	67
2,4-Dimethlyphenol	5	167	Bis(2-Chloroisopropyl)ether	2	67
2,4-Dinitrophenol	20	667	4-Chlorophenyl phenyl ether	2	67
4,6-Dinitro-o-cresol	20	667	1,2-Dichlorobenzene	2	67
Dinoseb	5	167	1,3-Dichlorobenzene	2	67
2-Methylphenol	2	67	1,4-Dichlorobenzene	2	67
4-Methylphenol	2	67	2,4-Dinitrotoluene	2	67
2-Nitrophenol	5	167	2,6-Dinitrotoluene	2	67
4-Nitrophenol	10	333	3,3'-Dichlorobenzidine	5	167
Pentachlorophenol	10	333	3,3'-Dimethylbenzidine	5	167
Phenol	2	67	7,12-Dimethylbenz(a)anthracene	5	167
2,3,4,6-Tetrachlorophenol	5	167	Diallate	5	167
2,4,5-Trichlorophenol	5	167	Dibenzo(a,h)anthracene	1	33
2,4,6-Trichlorophenol	5	167	Dibenzofuran	2	67
2-Acetylaminofluorene	5	167	Dimethoate	5	167
4-Aminobiphenyl	5	167	Diphenylamine	5	167
Acenaphthene	1	33	Disulfuton	5	167
Acenaphthylene	1	33	m-Dinitrobenzene	5	167
Acetophenone	5	167	p-(Dimethylamine)azobenzene	5	167
Aniline	2	67	Di-n-butyl phthalate	2	67
Anthracene	1	33	Di-n-octyl phthalate	2	67
Aramite	5	167	Diethyl phthalate	2	67
A,A-Dimethylphenethylamine	5	167	Dimethyl phthalate	2	67
Benzo(a)anthracene	1	33	bis(2-Ethylhexyl)phthalate	2	67
Benzo(a)pyrene	1	33	Ethyl methansulfonate	5	167
Benzo(b)fluoranthene	1	33	Famphur	30	1000
Benzo(g,h,i)perylene	1	33	Fluoranthene	1	33
Benzo (k)fluoranthene	1	33	Fluorene	1	33
4-Bromophenyl phenyl ether	2	67	Hexachlorobenzene	2	67
Butyl benzyl phthalate	2	67	Hexachlorobutadiene	1	33
Benzyl Alcohol	2	67	Hexachlorocyclopentadiene	20	667
2-Chloronaphthalene	2	67	Hexachloroethane	5	167
4-Chloroaniline	5	167	Hexachlorophene	50	1700
Carbazole	1	67	Hexachloropropene	5	167

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Table 9 (Cont'd)

Compound	Water	Soil	Compound	Water	Soil
	µg/l	µg/kg		µg/l	µg/kg
Indeno(1,2,3-cd)pyrene	1	33	N-Nitrosomethylethylamine	5	167
Isodrin	5	167	N-Nitrosomorpholine	5	167
Isophorone	2	67	N-Nitrosopiperidine	5	167
Isosafrole	5	167	N-Nitrosopyrrolidine	5	167
Kepone	30	1000	O,O,O Triethylphosphorothioat	5	167
2-Methylnaphthalene	2	667	2-Picoline	5	167
3-Methylcholanthene	5	167	Parathion	5	167
Methapyrilene	5	167	Pentachlorobenzene	5	167
Methyl Methanesulfonate	5	167	Pentachloroethane	5	167
Methyl Parathion	5	167	Pentachloronitrobenzene	5	167
1,4 Naphthoquinone	5	167	Phenacetin	5	167
1-Naphthylamine	5	167	Phenanthrene	1	33
2-Naphthylamine	5	167	Phorate	5	167
2-Nitroaniline	5	167	Pronamide	5	167
3-Nitroaniline	5	167	Pyrene	1	33
4-Nitroaniline	5	167	Pyridine	2	67
5-Nitro-o-toluidine	5	167	p-Phenylenediamine	5	167
Naphthalene	1	33	Safrole	5	167
Nitrobenzene	2	67	1,2,4,5 Tetrachlorobenzene	5	167
n-Nitrosodimethylamine	2	67	1,2,4-Trichlorobenzene	2	67
4-Nitroquinoline-1-Oxide	10	333	Thionazin	5	167
N-Nitroso-di-n-propylamine	2	67	o-Toluidine	5	167
N-Nitrosodi-n-butylamine	5	167	sym-Trinitrobenzene	5	167
N-Nitrosodiethylamine	5	167	Tetraethyl dithiopyrophosphate	5	167
N-Nitrosodiphenylamine	5	167			

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Table 10. Selected Ion Monitoring Reporting Limits

Compound	Water	Soil	Compound	Water	Soil
	µg/l	µg/kg		µg/l	µg/kg
Pentachlorophenol	0.3	17	Fluoranthene	0.1	3.3
Acenaphthene	0.1	3.3	Fluorene	0.1	3.3
Acenaphthylene	0.1	3.3	Hexachlorobenzene	0.02	3.3
Anthracene	0.1	3.3	Hexachlorobutadiene	0.1	3.3
Benzo(a)anthracene	0.1	3.3	Indeno(1,2,3-cd)pyrene	0.1	3.3
Benzo(a)pyrene	0.1	3.3	2-Methylnaphthalene	0.1	3.3
Benzo(b)fluoranthene	0.1	3.3	Naphthalene	0.1	3.3
Benzo(g,h,i)perylene	0.1	3.3	Phenanthrene	0.1	3.3
Benzo (k)fluoranthene	0.1	3.3	Pyrene	0.1	3.3
Chrysene	0.1	3.3	bis(2-Chloroethyl)ether	0.2	6.6
Dibenzo(a,h)anthracene	0.1	3.3	Bis (2-ethylhexyl) phthalate	0.2	6.6
1,2-Diphenylhydrazine	0.2	6.6	Di-n-octyl phthalate	0.2	6.6

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Lab Manager: _____

QA Manager: _____

Effective Date: 11/3/09

TITLE: **PREPARATION OF SEMI-VOLATILE EXTRACTABLES IN AQUEOUS SAMPLES**

METHOD REFERENCE: SW-846 3510C

Revised Sections: ***10.18.2***
Added Sections: ***7.3, 7.7, 7.8***

1.0 SCOPE AND APPLICATION

1.1 This method describes the extraction procedure of semi-volatile organic compounds in various water sources for analysis by gas chromatography, gas chromatography/mass spectrometry (GC/MS) or High Performance Liquid Chromatography.

2.0 Summary

2.1 Extract a measured volume of sample, usually 1 liter, with an immiscible organic solvent (methylene chloride or hexane) using a separatory funnel. Serial extractions are performed at specified pHs. The extract is concentrated by evaporation/distillation by a factor of 100 – 1,000 prior to analysis to increase the apparent concentration of target analytes and improve the sensitivity of the instrumental technique. This method is applicable for EPA methods 608, 610, 625, and SW846 8081, 8082, 8100, 8270, 8015B and 8310

3.0 Reporting Limit and Method Detection Limit

3.1 See determinative method.

4.0 DEFINITIONS

BLANK - an analytical sample designed to assess specific sources of laboratory contamination. See individual types of Blanks: Method Blank, Instrument Blank, Storage Blank, and Leachate Blank.

CLASS A GLASSWARE - Volumetric laboratory glass that has been manufactured, calibrated and certified to established ASTM volume standards. Class A Glassware does not require volume calibration or verification.

CONTINUOUS LIQUID-LIQUID EXTRACTION - used herein synonymously with the terms continuous extraction, continuous liquid extraction, and liquid extraction. This extraction technique involves boiling the extraction solvent in a flask and condensing the solvent above the aqueous sample. The condensed solvent drips through the sample, extracting the compounds of interest from the aqueous phase.

DETECTOR – An electronic device used in conjunction with a gas chromatograph that indicates the presence of an analyte. Detectors are designed to respond to the presence of specific chemical entities based on elemental constituents, structure and functional groups.

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EXTRACTION – The process of removing a desired compound from a matrix using chemical or mechanical procedures. The process is used to isolate and concentrate targeted constituents for instrumental analysis

GAS LIQUID CHROMATOGRAPHY (GC) - An instrumental procedure used to separate mixtures of organic compounds based on polarity or boiling point. The technique employs long capillary columns containing a high molecular weight organic polymer to effect the separation.

KUDERNA DANISH – A three-stage glass solvent concentration device consisting of a large volume receiving flask (250 or 500ml), a small volume concentrator tube and a three-ball air cooled condenser. This device is used to evaporate large volumes of solvent used for organic extractions to increase the concentration of the analyte in the solvent.

MATRIX - the predominant material of which a sample is composed. For the purpose of this method, a sample matrix is either water or soil/sediment. Matrix is not synonymous with phase (liquid or solid).

MATRIX SPIKE - aliquot of a field sample (water or soil) fortified (spiked) with known quantities of specific compounds and subjected to the entire analytical procedure in order to indicate the effectiveness of the method for a specific matrix by measuring spike accuracy.

MATRIX SPIKE DUPLICATE - a second aliquot of the same matrix as the matrix spike (above) that is spiked in order to determine the precision of the method.

METHOD BLANK - an analytical control consisting of all reagents, internal standards, and surrogate standards that is carried throughout the entire analytical procedure. The method blank is used to define the level of laboratory, background, and reagent contamination.

REAGENT WATER - water in which an interferant is not observed at or above the minimum reporting limit of the parameters of interest.

SEPARATORY FUNNEL – A large volume (500, 1000 or 2000ml) closed funnel used for separating immiscible liquids from each other. The device is used for shaking samples with solvent to extract organic constituents. One of the phases of the mixture is removed through the stopcock opening in the base to effect the separation.

TURBOVAP CONCENTRATOR. A computerized sample concentration device that automatically reduces sample extracts to preset volumes operating unattended.

5.0 HEALTH & SAFETY

5.1 The analyst must follow normal safety procedures as outlined in the Accutest Laboratory Safety Manual and Accutest Safety Policy, which includes the use of safety glasses and lab coats. Handle all acids, which are corrosive with care. Flush spills with plenty of water. If acids contact any part of the body, flush with water and contact the supervisor

5.2 The toxicity or carcinogenicity of each reagent used in this method has not been precisely determined; however, treat each chemical as a potential health hazard. Reduce exposure to these reagents to the lowest possible level. The laboratory is responsible for maintaining a current file of OSHA regulations regarding the safe handling of the chemicals specified in this method. A reference file of data handling sheets is available to all personnel involved in these analyses.

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6.0 INTERFERENCES

6.1 Solvents, reagents, glassware, and other sample processing hardware may yield artifacts and/or interferences to sample analysis. Demonstrate that these materials are free from interferences under the conditions of the analysis by analyzing method blanks.

6.2 Interferences co-extracted from the samples will vary considerably from source to source. If interferences prevent the analysis of an extracted sample, further cleanup of the sample extract may be necessary. Refer to SW-846 Method 3600 for guidance on cleanup procedures.

6.3 Phthalate esters contaminate many products commonly used in the laboratory. Avoid plastics in particular because they contain phthalates, used as plasticizers, which can leach from these materials. Practice sound, consistent materials control to avoid phthalate contamination, which may occur at any time. Soap residue (e.g. sodium dodecyl sulfate), which results in a basic pH on glassware surfaces, may cause degradation of certain analytes. Specifically, Aldrin, Heptachlor, and most organophosphorus pesticides will degrade in this situation. This occurs in glassware that is difficult to rinse (e.g., 500-mL K-D flask). Carefully hand-rinse these items to avoid this problem.

7.0 Collection, Preservation and Holding Times

7.1 Collect samples in 1 liter glass amber bottles without preservatives.

7.2 A liter of an unpreserved sample is required for extraction. Additional sample volume is necessary for any samples used for matrix duplicates and matrix spikes. Therefore, submit 3 liters of at least one sample in every group of 20 field samples for analysis to accommodate all quality control requirements.

7.3 The samples must be protected from light and refrigerated at <6° C from the time of receipt until extraction and analysis.

7.4 Test all samples for residual chlorine using test paper for free and total chlorine. If the sample tests positive for residual chlorine, add 80 mg of sodium thiosulfate to each liter of sample.

7.5 For methods EPA 610,625; SW-846 8081, 8082, 8100, 8270 8015B, & 8310 Extract samples within 7 days of sampling and analyze within 40 days of the extraction.

7.6 For method 608, check the sample pH and adjust to 5-9 if necessary. Extract samples within 7 days of sampling and analyze within 40 days of the extraction. If the sample pH cannot be adjusted between 5-9, the sample must be extracted within 72 hours.

7.7 For Methods 625 and 8270 store the sample extracts at < -10° C in amber vials (protected from light), in sealed vials equipped with unpierced PTFE-lined septa.

7.8 For all other extracts store at < 6°C in amber vials(protected from light), in sealed vials equipped with unpierced PTFE-lined septa.

8.0 Apparatus & Materials

8.1 Separatory funnels - 2 liter with Teflon stopcocks.

8.2 Drying column – (glass funnel containing pre-washed filter paper and sodium sulfate)

8.3 Kuderna-Danish Evaporator

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8.3.1 500 and 250ml Receiving Flasks

8.3.2 Three-ball Snyder column

8.3.3 Ten (10) ml graduated concentrator tube (calibrated at 10ml and 1ml).

8.3.4 Class A volumetric vessels: 1ml, 5ml & 10ml

8.4 Turbovap concentrator tubes – 200ml

8.5 250 ml and 500 ml beakers and Erlenmeyer flasks.

8.6 One (1) ml volumetric pipettes or pre-calibrated 1ml syringes

8.7 2-ml crimp vials.

8.8 1 liter Graduated cylinder.

8.9 Glass wool.

8.10 Porous Boiling Chips or Glass Beads.

8.11 Class A Volumetric Flasks: 1ml, 5ml , 10ml volumes

8.12 Evaporating steambaths capable of temperatures from 55 – 90^{o}C ±5^{o}C.

8.13 Nitrogen blowdown apparatus with waterbath, capable of maintaing a temperature of 35^{o}C±3^{o}C.

8.14 Zymark Turbovap Model II. Computerized, large volume solvent concentrator capable of automated extract volume sensing with automated water bath temperature and gas flow control.

8.15 Glas_Col 4 position Automatic Separatory Funnel Shaker

9.0 Reagents

9.1 Reagent water - deionized and carbon filtered water prepared to ASTM Type II specifications.

9.2 Sodium hydroxide solution (10N) - dissolve 40 g of NaOH in reagent water and dilute to 100 ml. Ten normal (10N) sodium hydroxide may be purchased as a commercially prepared solution.

9.3 Sulfuric acid (1:1) prepare a 50% solution of concentrated sulfuric acid.

9.4 Solvents - reagent grade for trace organic analysis.

9.4.1 Methylene chloride

9.4.2 Hexane

9.4.3 Cyclohexane

9.4.4 Acetone

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9.4.5 Each solvent lot must be checked for interferences prior to use. Refer to SOP EOP013 for the procedure regarding solvent lot approval.

9.5 Sodium sulfate - granular anhydrous, prepared by baking at 400^{o}C for a minimum of 4 hours.

9.6 Nitrogen Gas – High Purity Grade.

9.7 Whatman 41 filter paper (or equivalent)

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9.8 Surrogate and Matrix Spiking Solutions. See SOP for target compound specifications.

Method	Surrogate Conc.	Vol Spike ml	Target CMPD Spike Conc.	Vol Spike ml	SOP
EPA 608 Pest	400 ng/ml	1.0	250 ng/ml	1.0	EGC608
EPA 608 PCB	400 ng/ml	1.0	2 ug/ml	1.0	EGC608
SW 846-8081	400 ng/ml	1.0	250 ng/ml	1.0	EGC8081
SW 846 8081 Tox	400 ng/ml	1.0	5μg/ml	1.0	EGC8081
SW 846 8081 Chl	400 ng/ml	1.0	4μg/ml	1.0	EGC8081
SW 846-8082	400 ng/ml	1.0	2 ug/ml	1.0	EGC8082
EPA 610	100 ug/ml	1.0	10 ug/ml	1.0	EGC610
SW 846-8100	100 ug/ml	1.0	10 ug/ml	1.0	EGC8100
EPA 625 BN	100 ug/ml	0.5	100 ug/ml	0.5	EMS625
SW 846-8270 BN	100 ug/ml	0.5	100 ug/ml	0.5	EMS8270
EPA 625 Ac	100 ug/ml	0.5	100 ug/ml	0.5	EMS625
SW 846-8270 Ac	100 ug/ml	0.5	100 ug/ml	0.5	EMS8270
SW 846 8015B	50μg/ml	1.0	1000μg/ml	1.0	EGC8015B
SW 846 8310	10 μg/ml	1.0	10μg/ml	1.0	ELC8310

9.8.1 Pesticide Surrogate: EPA 608, SW 846-8081.

9.8.1.1 Prepare surrogate from a 200 ug/ml solution of decachlorobiphenyl / Tetrachloro-m-Xylene (TCMX) obtained from commercial sources.

9.8.1.2 Dilute the commercial stock 1:500 in acetone. The final solution concentration is 400 ng/ml.

9.8.2 Pesticide Target Compound: EPA 608, SW 846-8081.

9.8.2.1 Prepare target compound spike from a 10 ug/ml stock solution of the target organochlorine pesticides obtained from commercial sources.

9.8.2.2 Dilute the commercial stock 1:40 in acetone. The final solution concentration is 250 ng/ml.

9.8.2.3 Prepare a Toxaphene spike if required from a 100 μg/ml stock solution obtained from commercial sources. Dilute the commercial stock 1:20 in acetone. The final solution concentration is 5 μg/ml.

9.8.2.4 Prepare a Chlordane spike if required from a 100 μg/ml stock solution obtained from commercial sources. Dilute the commercial stock 1:25 in acetone. The final solution concentration is 4 μg/ml.

9.8.3 PCB Surrogate: EPA 608, SW 846-8082. See 9.8.1

9.8.4 PCB Target Compound: EPA 608, SW 846-8082.

9.8.4.1 Prepare target compound spike from a 1000 ug/ml solution of Aroclor 1016 and Aroclor 1260 obtained from commercial sources.

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9.8.4.2 Dilute the commercial stock 1:500 in acetone. The final solution concentration is 2.0 ug/ml.

9.8.5 PAH Surrogate: EPA 610, SW-846-8100. See 9.8.7.

9.8.6 PAH Target Compound: EPA 610, SW-846-8100

9.8.6.1 Prepare target compound spike from a 2000 ug/ml solution of PAH target compounds obtained from commercial sources.

9.8.6.2 Dilute the commercial stock 1:200 in acetone. The final solution concentration is 10.0 ug/ml.

9.8.7 BN Surrogate: EPA 625, SW-846-8270

9.8.7.1 Prepare surrogate from a 5000 ug/ml stock solution of base neutral surrogate compounds obtained from commercial sources.

9.8.7.2 Dilute the commercial stock 1:50 in acetone. The final solution concentration is 100 ug/ml.

9.8.8 BN Target Compound: EPA 625, SW-846-8270

9.8.8.1 Prepare a single target compound spike solution from five (5) stock solutions of base neutral target compound compounds obtained from commercial sources. Dilute the commercial stocks in acetone combining the final solution in one 50 ml volumetric flask as follows:

Solution Name	Stock Conc. ug/ml	Volume Used ml/50ml	Dilution Factor	Final Conc. ug/ml
Semi-Volatile Mix	1000	5.0	10	100
Base Neutral Mix	1000	5.0	10	100
Benzidines	2000	2.5	20	100
Methylnapthalenes	2000	2.5	20	100
Cumene	5000	1.0	50	100

9.8.9 Ac Surrogate: EPA 625, SW-846-8270

9.8.9.1 Prepare surrogate from a 10,000 ug/ml solution of acid surrogates obtained from commercial sources.

9.8.9.2 Dilute the commercial stock 1:100 in acetone. The final solution concentration is 100 ug/ml.

9.8.10 Ac Target Compound: EPA 625, SW-846-8270

9.8.10.1 Prepare target compound spikes from a 1000 ug/ml solution of acid target compounds obtained from commercial sources.

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9.8.10.2 Dilute the commercial stock 1:10 in acetone. The final solution concentration is 100 ug/ml.

9.8.11 DRO Surrogate SW-846-8015B

9.8.11.1 Prepare Surrogate from a 1000 μg/ml solution of stock surrogate obtained from commercial sources.

9.8.11.2 Dilute the commercial stock 1:20 in acetone. The final solution concentration is 50 μg/ml

9.8.12 DRO Target Compound SW-846-8015B

9.8.12.1 Prepare target compound spike from a 50000 μg/ml solution of DRO spiking solution obtained from commercial sources.

9.8.12.2 Dilute the commercial stock 1:50 in acetone. The final solution concentration is 1000 μg/ml

9.8.13 PAH Surrogate SW-846-8310

9.8.13.1 Prepare PAH surrogate from a 1000 ug/ml solution of stock surrogates obtained from commercial sources. Each surrogate is in a separate solution (p-Terphenyl & o-Terphenyl).

9.8.13.2 Dilute each commercial stock 1:100 in acetone. The final solution concentration is 10 μg/ml

9.8.14 PAH Target Compound SW-846-8310

9.8.14.1 Prepare target compound spike from a 500 μg/ml stock PAH mix and 1000 μg/ml stock solutions of 1 & 2 methylnaphthalene obtained from commercial sources.

9.8.14.2 Dilute the PAH mix 1:50 in acetone, and the 1 & 2 methylnaphthalene 1:100 in acetone. The final solution concentration is 10 μg/ml.

9.9 Unopened stock solutions must be stored according to the manufacturers documented holding time and storage temperature recommendations.

9.10 After opened, stock standards must be replaced after 6 months or sooner if manufacturer's expiration date comes first or comparison with quality control check samples indicated degragation.

9.11 pH indicator paper – wide range, minimum of pH 2 – pH 11.

9.12Wide range residual and total chlorine test paper.

10 Procedure

10.1 Obtain custody for the samples selected for analysis and group them into a sample batch. A batch consists of 20 samples a method blank and a spiked blank per extraction day. A matrix spike (sample) and matrix spike duplicate (sample) is required for every 20 samples extracted.

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Generate the method blank and spiked blank in the laboratory using 1 liter of reagent water for each sample.

10.1.1 TCLP samples require extraction of a leachate spike for each matrix type. Conduct leachate spiking on the duplicate leachate of a sample leached using SW1311.

10.1.2 Clients are requested to provide a total of 3 liters of a selected sample for each job to be used as matrix spike/matrix spike duplicates. If an additional liter of sample is not provided, the duplicate sample is shaken and split into two equal volumes that are handled as duplicates and used for the matrix spike pair.

10.1.3 Samples that consist of organic matrices or contain visible, high level contamination must be sub-sampled before surrogate or sample spikes may be added.

10.1.3.1 Mix the sample thoroughly and remove an appropriate sub-sample from the original sample bottle using a graduated cylinder. Record the volume on the extraction log.

10.1.3.2 Add the appropriate surrogate spike using a calibrated 1ml syringe or 1 ml volumetric pipette following the specifications detailed in Steps 10.3, 10.4, 10.5 or 10.6.

10.1.3.3 Transfer the spiked sample to a 2-liter separatory funnel. Adjust the pH if necessary following the steps detailed in Steps 10.3, 10.4, 10.5 or 10.6.

10.2 Mark the level of the sample on the outside of the sample container.

10.3 EPA Method 608, SW846 Method 8081, SW846 Method 8082.

10.3.1 Measure two 1-liter aliquots of deionized water for a method blank and spiked blank into separate 2-liter separatory funnels.

10.3.2 Mix the sample thoroughly by shaking.

Note: Verify that the sample pH is between 5 and 9 before adding the spike. If the sample pH is outside of this range, extraction must take place within 72 hours of collection.

10.3.3 After mixing the sample, pour the entire contents into a 2L separatory funnel.

10.3.4 Add 1ml of the pesticide/ PCB surrogate solution using a calibrated 1ml syringe or 1 ml volumetric pipette to all samples, blanks, and spikes.

Note: Check the expiration date for all spiking materials to verify that the solution is valid. Do not use expired solutions for spiking.

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10.3.5 Add 1 ml of the pesticide or PCB target compound spike to the samples selected for matrix spikes. The blank target compound spikes are added to the separatory funnel.

Note: Check the expiration date for all spiking materials to verify that the solution is valid. Do not use expired solutions for spiking.

10.3.6 Rinse the sample bottle with 60 ml of methylene chloride.

10.3.7 Transfer the 60 ml methylene chloride rinse from the sample container into the separatory funnel containing the sample. Proceed with section10.8.

10.4 EPA Method 610, SW-846 Method 8100, SW846 Method 8310

10.4.1 Measure two 1-liter aliquots of deionized water for a method blank and spiked blank into separate 2-liter separatory funnels.

10.4.2 Mix the sample thoroughly by shaking.

10.4.3 Mark the level of the sample on the outside of the sample container. After mixing the sample, pour the entire content into it into a 2 L separatory funnel.

10.4.4 Add 1ml of the BN surrogate solution for Method 8100 or 1ml of the PAH Surrogate solution for method 8310 using a calibrated 1ml syringe or 1 ml volumetric pipette to all samples, blanks, and spikes.

Note: Check the expiration date for all spiking materials to verify that the solution is valid. Do not use expired solutions for spiking.

10.4.5 Add 1 ml of the appropriate polynuclear aromatic hydrocarbon target compound spike to the sample selected for the matrix spike. The blank target compound spikes are added to the separatory funnel.

Note: Check the expiration date for all spiking materials to verify that the solution is valid. Do not use expired solutions for spiking.

10.4.6 Rinse the sample bottle with 60 ml of methylene chloride.

10.4.7 Transfer the 60 ml methylene chloride rinse from the sample container into the separatory funnel containing the sample. Proceed with section10.8.

10.5 EPA Method 625

10.5.1 Measure two 1-liter aliquots of deionized water for a method blank and spiked blank into separate 2-liter separatory funnels. Mix the sample thoroughly by shaking.

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10.5.2 Mark the level of the sample on the outside of the sample container. After mixing the sample, pour the entire content into it into a 2 L separatory funnel.

10.5.3 Add 0.5 ml of the base neutral surrogate and/or 0.5 ml of the acid surrogate using a calibrated 1ml syringe to all samples, blanks, and spikes. Field samples surrogates spikes are added directly to the original sample container.

Note: Check the expiration date for all spiking materials to verify that the solution is valid. Do not use expired solutions for spiking.

10.5.4 Add 0.5 ml of the base neutral target compound spike and/or 0.5 ml of the acid target compound spike to the samples selected for matrix spikes to the sample in its original container. The target compound spikes are added to the spike blank in the separatory funnel.

Note: Check the expiration date for all spiking materials to verify that the solution is valid. Do not use expired solutions for spiking.

10.5.5 Rinse the sample bottle with 60 ml of methylene chloride.

10.5.6 If the sample is to be analyzed for acid extractable and base-neutral extractables, adjust the pH of the same aqueous aliquot to <2 using the 50% sulfuric acid solution. If the sample is to be analyzed for base-neutral extractable compounds only, check the pH of the sample with pH paper and adjust the pH to >11 with the 10N sodium hydroxide solution. Check the pH of the sample with pH test paper to verify the correct pH.

10.5.7 Transfer the 60 ml methylene chloride rinse from the sample container into the separatory funnel containing the sample.

10.5.8 Extract the sample by shaking the funnel vigorously for approximately 2 minutes either using the automatic shaker or by hand. Release excess pressure by occasionally venting the funnel under the hood by opening and closing the Teflon stopcock. Allow the aqueous solvent layers to separate for about 10 minutes while preparing the sodium sulfate drying columns.

10.5.9 Transfer the methylene chloride extract by draining the solvent into a 500ml beaker or erlenmeyer flask.

10.5.10 Add a second 60-ml volume of methylene chloride to the separatory funnel. Seal and shake the separatory funnel and repeat the extraction procedure described in Section 10.5.9. Perform a third extraction in the same manner.

10.5.11 Prepare a drying funnel by adding approximately 30g of baked sodium sulfate into a funnel lined with filter paper. Rinse with 30 ml of methylene chloride and collect in a waste beaker and discard in chlorinated solvent waste bottle.

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10.5.12 Centrifuge the solvent layer to break emulsions. Place the drying column on top of Turbovap concentrator tube to collect the "dried" extract. Label all apparatus with the correct sample identification. Pour the solvent from the 500-ml beaker or erlenmeyer flask through the sodium sulfate drying column into the concentrator tube. Collect the extract in the concentrator tube until the solvent layer reaches the top of the sodium sulfate layer. **Important:** Do not allow the sodium sulfate to become dry between solvent extracts.
Procede to section 10.17

10.5.13 Alternatively. place the drying column on top of a Kuderna Danish receiving flask and Class A volumetric vessel to collect the "dried" extract. Label all apparatus with the correct sample identification. Pour the solvent from the 500-ml beaker or erlenmeyer flask through the sodium sulfate drying column into the K-D flask. Collect the extract in the Kuderna Danish until the solvent layer reaches the top of the sodium sulfate layer.

10.5.13.1 A concentrator tube may be used in place of the Class A volumetric vessel. However in that case the extract must be transferred to a class A vessel/flask to obtain the final volume. (See 10.22)

Note: The Turbo Vap procedure is generally used for waters and the K-D procedure is used for soils.

Procede to Section 10.15

10.5.14 If the sample is to be analyzed for base-neutral extractable compounds also, adjust the pH to >11 with the 10N sodium hydroxide solution, check the pH of the sample with pH test paper to verify the correct pH. Repeat the extraction technique described in Sections 10.5.8 – 10.5.12.

10.6 SW-846 Method 8270

10.6.1 Measure two 1-liter aliquots of deionized water for a method blank and spiked blank into separate 2-liter separatory funnels.

10.6.2 Mix the sample thoroughly by shaking.

10.6.3 Mark the level of the sample on the outside of the sample container. After mixing the sample, pour the entire content into it into a 2 L separatory funnel.

10.6.4 Add 0.5 ml of the base neutral surrogate and/or 0.5 ml of the acid surrogate using a calibrated 1ml syringe or 1 ml volumetric pipette to all samples, blanks, and spikes.

Note: Check the expiration date for all spiking materials to verify that the solution is valid. Do not use expired solutions for spiking.

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10.6.5 Add 0.5 ml of the base neutral target compound spike and/or 0.5 ml of the acid target compound spike to the samples selected for matrix spikes and leachates spikes (if applicable) to the sample.

Note: Check the expiration date for all spiking materials to verify that the solution is valid. Do not use expired solutions for spiking.

10.6.6 Rinse the sample bottle with 60 ml of methylene chloride.

10.6.7 If the sample is to be analyzed for acid extractable and base-neutral extractables, adjust the pH of the same aqueous aliquot to <2 using the 50% sulfuric acid solution. If the sample is to be analyzed for base-neutral extractable compounds only, check the pH of the sample with pH paper and adjust the pH to >11 with the 10N sodium hydroxide solution. Check the pH of the sample with pH test paper to verify the correct pH.

10.7 Transfer the 60 ml methylene chloride rinse from the sample container into the separatory funnel containing the sample.

10.8 Extract the sample by shaking the funnel vigorously for approximately 2 minutes either using the automatic shaker or by hand. Release excess pressure by occasionally venting the funnel under the hood by opening and closing the Teflon stopcock. Allow the aqueous solvent layers to separate for about 10 minutes while preparing the sodium sulfate drying columns.

10.9 Transfer the methylene chloride extract by draining the solvent into a 500ml beaker or erlenmeyer flask.

10.10 Add a second 60-ml volume of methylene chloride to the separatory funnel. Seal and shake the separatory funnel and repeat the extraction procedure described in Section 10.7. Repeat the procedures described in section 10.8. Perform a third extraction in the same manner.

10.11 Prepare a drying funnel by adding approximately 30g of baked sodium sulfate into a funnel lined with filter paper. Rinse with 30 ml of methylene chloride and collect in a waste beaker and discard in chlorinated solvent waste bottle.

10.12 Centrifuge the solvent layer to break emulsions. Place the drying column on top of Turbovap concentrator tube to collect the "dried" extract. Label all apparatus with the correct sample identification. Pour the solvent from the 500-ml beaker or erlenmeyer flask through the sodium sulfate drying column into the concentrator tube. Collect the extract in the concentrator tube until the solvent layer reaches the top of the sodium sulfate layer **Important:** Do not allow the sodium sulfate to become dry between solvent extracts. Procede to Section 10.17

10.13 Alternatively place the drying column on top of a Kuderna Danish receiving flask and Class A volumetric vessel to collect the "dried" extract. Label all apparatus with the correct

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sample identification. Pour the solvent from the 500-ml beaker or erlenmeyer flask through the sodium sulfate drying column into the K-D flask. Collect the extract in the Kuderna Danish until the solvent layer reaches the top of the sodium sulfate layer. . Prodece to Section 10.15

10.13.1 A concentrator tube may be used in place of the Class A volumetric vessel. However, in that case the extract must be transferred to a Class A vessel/flask to obtain the final volume.(See 10.22)

10.14 If the sample is to be analyzed for base-neutral extractable compounds also, adjust the pH to >11 with the 10N sodium hydroxide solution, check the pH of the sample with pH test paper to verify the correct pH. Repeat the extraction technique described in Sections 10.7 – 10.10.

10.15 After the final extract has passed through the sodium sulfate funnel, rinse down the inside of the funnel with 30 ml of solvent. Add a glass-boiling bead to the K-D flask and attach a three-ball Snyder column. Prime the Snyder column by adding 1 ml of methylene chloride to the top.

10.16 Position the K-D concentrator setup on a hot water bath maintained at 60 $\pm 5^{o}$C for methylene chloride extracts and with only the 10-ml concentrator tube submersed in water. Reduce the solvent to an apparent volume of 1-ml, not allowing it to go to dryness.

10.17 TurboVap Solvent Concentration. Position concentrator tube on TurboVap workstation. Immersing the tube nipple into the waterbath. Set the bath temperature for the solvent system in the concentrator tube. Methylene chloride: 40-45^{o}C, methylene chloride/acetone: 55-60^{o}C. Select volume setpoint for 1ml and initiate the volume reduction procedure. Proceed to step 10.22

10.18 Solvent Exchange – Kuderna Danish.

10.18.1 If a solvent exchange is required (methods 608, 8081, 8082 require exchange to hexane, method 8310 requires acetonitrile), momentarily remove the Snyder column, add 50 ml of the exchange solvent, a new boiling chip, and reattach the Snyder column. Alternatively, pour the exchange solvent into the top of the Snyder column while the concentrator remains on the water bath. Concentrate the extract, as described in Sec. 10.13, raising the temperature of the water (85 $\pm 5^{o}$C for hexane) bath to maintain proper distillation.

10.18.2 Remove the Snyder column and rinse the flask and its lower joints into the concentrator tube with 1 - 2 ml of hexane. If sulfur crystals are a problem, proceed to EOP011 for cleanup. The extract may be further concentrated by using the technique outlined in Sec. 10.20 or adjusted to 10.0 ml in a Class A 10 ml volumetric vessel with the solvent last used.

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10.19 Solvent Exchange – TurboVap Concentrator. If a solvent exchange is required (methods 608, 8081, 8082 require exchange to hexane, method 8310 requires acetonitrile), pour 25 ml of the exchange solvent into the concentrator tube after the initial concentration to 10ml. Concentrate the extract, as described in Sec. 10.17, raising the temperature of the water bath to 60 $\pm 5^{o}$C for hexane. Proceed to step 10.22.

10.20 Remove the K-D apparatus from the bath and allow the solvent condensed in the Snyder column to drip back down into the concentrator tube. Allow the solvent to cool for approximately 10 minutes, then remove the Snyder column and K-D flask while rinsing each connector joint with 1 ml of methylene chloride.

10.21 Since the volume is now greater than 1 ml, concentrate using an N-Evap nitrogen concentrator. Immerse the concentrator tube into the water bath of the N-Evap, which is maintained at 35^{o}C. Direct a gentle stream of nitrogen gas over the extract surface and evaporate the solvent until the desired volume is reached. Occasionally rinse the side- walls of the concentrator tubes with methylene chloride during the final evaporation step.

10.22 Final volume adjustments.

10.22.1 If a K-D apparatus with a Class A collection vessel was used to concentrate the sample, adjust the volume to 1-ml directly in the vessel with the solvent last used. Transfer the extract to a 2-ml crimp vial using a Pastuer pipette. Label the vial with sample number and batch number. Protect the extracts from light and store them in the extract freezer at –10^{o}C.

10.22.2 If a K-D apparatus with a concentrator tube (not Class A) was used to concentrate the sample, transfer the extract to a 1ml Class A volumetric vessel or flask with a Pastuer pipette. Adjust the volume to 1ml with the solvent last used. Label a 2-ml crimp vial with the sample number and batch number. Transfer the extract to the 2- ml crimp vial with a new Pastuer pipette. Label the vial with sample number and batch number. Protect the extracts from light and store them in the extract freezer at –10^{o}C.

10.22.3 If the TurboVap apparatus was used, transfer the extract to a 1ml Class A volumetric vessel or flask with a Pastuer pipette. Adjust the volume to 1ml with the solvent last used. Label a 2-ml crimp vial with the sample number and batch number. Transfer the extract to the 2- ml crimp vial with a new Pastuer pipette. Label the vial with sample number and batch number. Protect the extracts from light and store them in the extract freezer at –10^{o}C.

10.23 Fill the empty sample jar with tap water to the mark on the jar from step 10.2. Pour the contents of the jar into a graduated cylinder and measure the volume. This is the sample volume that is recorded on the extraction log. If the jar was full assume a volume of 1 liter.

11 Calculations

11.1 Not applicable.

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12 Quality Assurance

12.1 Extract a method blank and blank spike at a rate of one per day or every twenty (20) samples, whichever is more frequent.

12.2 A matrix spike / matrix spike duplicate (MS/MSD)is required per every 20 samples. Client specific requirements may specify an MS/MSD per day.

12.3 Perform solvent checks for each new solvent lot to verify the absence of interferences. See SOP EOP013.

12.4 Verify the accuracy of prepared solutions prior to use.

13 Documentation

13.1 All sample preparation activities and related information must be documented in the sample preparation log. The extraction log form, OP001 is attached in Appendix 1.

15.2.1 Complete all information required for the extraction summary logbook. All blocks must either be completed or "X'ed" out.

15.2.1.1 Errors must be stricken with a single line, initialed and dated. The correct information must be written adjacent to the erroneous information.

15.2.2 The individual with custody responsibility must sign the extraction log.

15.2.3 Document all standards used in the appropriate blocks of the preparation log.

14.0 POLLUTION PREVENTION & WASTE MANAGEMENT.

14.1 Users of this method must perform all procedural steps in a manner that controls the creation and/or escape of wastes or hazardous materials to the environment. The amounts of standards, reagents, and solvents must be limited to the amounts specified in this SOP. Follow all safety practices that limit the escape of vapors, liquids, or solids to the environment. All method users must be familiar with the waste management practices described in section 14.2.

14.2 Waste Management. Individuals performing this method must follow established waste management procedures as described in the waste management SOP, EHS004. This document describes the proper disposal of all waste materials generated during the testing of samples as follows:

14.2.1 Non hazardous aqueous wastes.

14.2.2 Hazardous aqueous wastes

14.2.3 Chlorinated organic solvents

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14.2.4 Non-chlorinated organic solvents

14.2.5 Hazardous solid wastes

14.2.6 Non-hazardous solid wastes

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Appendix I

Organic Prep Form OP001

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Lab. Manager:_____

QA Manager:_____

Effective Date:_____

Title: EXTRACTION OF SEMIVOLATILE ORGANICS FROM SOLIDS BY SONICATION (Base, Neutral, Acid Organics; Pesticides, Polychlorinated Biphenyls, Diesel Range Organics)

METHOD REFERENCE: SW-846, Method 3550C (Rev 3. February 2007)

Applicable Matrices: Soils, Sediments, Wipes and Sludges

Deleted Sections 10.10, 13.4

1.0 Scope and Application.

1.1 This method describes the extraction procedure of semi-volatile organic compounds (Base, Neutral, Acid Organics; Pesticides, Polychlorinated Biphenyls) in soil, sludge, wipes and other solid matrices for analysis by gas chromatograph/mass spectrometer (GC/MS), gas chromatography/ electron capture detector (GC/ECD), gas chromatography/ flame ionization detector (GC/FID), or high performance liquid chromatography (HPLC).

1.1.1 This method is used primarily for Method 8270 , Base Neutral and Acid extractables, 8100, and 8310, PAH's. Pesticides, PCB's and other soil extracts are generally prepared using Accelerated Solvent Extraction, EOP040A. The procedures for all methods are included in this SOP Herbicide extraction for soils is described in EGC8151.

2.0 Summary

2.1 A 30-gram aliquot of sample is mixed with anhydrous sodium sulfate. Wipe samples are extracted in their entirety, without weighing. The mixture is extracted with methylene chloride/acetone 3 times using ultrasonic extraction. The extract is decanted and concentrated for analysis using instrumental techniques using SW-846 Methods 8081B, 8082A, 8100, 8270D, 8015B and 8310. Where necessary, solvent exchange from methylene chloride to hexane is performed prior to analysis to accommodate instrument detectors. Alternatively, a 2-gram sample is extracted once with 10ml of with methylene chloride/acetone. The extract is filtered and adjusted to the desired volume for analysis using instrumental techniques using SW-846 Methods 8081B, 8082A, 8100, 8270D 8015B and 8310.

3.0 Reporting Limit and Method Detection Limit

3.1 See determinative method.

4.0 Definitions

BLANK - an analytical sample designed to assess specific sources of laboratory contamination. See individual types of Blanks: Method Blank, Instrument Blank, Storage Blank, and Sulfur Blank.

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CLASS A GLASSWARE – Volumetric laboratory glass that has been manufactured, calibrated and certified to established ASTM volume standards. Class A glassware does not require volume calibration or verification.

KUDERNA DANISH – A three-stage glass solvent concentration device consisting of a large volume receiving flask (250 or 500ml), a small volume concentrator tube and a three-ball air cooled condenser. Use this device to evaporate large volumes of solvent used for organic extractions to increase the concentration of the analyte in the solvent.

MATRIX - the predominant material of which the sample to be analyzed is composed. For the purpose of this SOW, a sample matrix is either water or soil/sediment. Matrix is not synonymous with phase (liquid or solid).

MATRIX SPIKE - aliquot of a matrix (water 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.

MATRIX SPIKE DUPLICATE - a second aliquot of the same matrix as the matrix spike (above) that is spiked in order to determine the precision of the method.

METHOD BLANK - an analytical control consisting of all reagents, internal standards, and surrogate standards that is carried throughout the entire analytical procedure. The method blank is used to define the level of laboratory, background, and reagent contamination.

PERCENT DIFFERENCE (%D) - As used in this SOW and elsewhere to compare two values, the percent difference indicates both the direction and the magnitude of the comparison, i.e., the percent difference may be either negative, positive, or zero. (In contrast, see relative percent difference.)

PERCENT MOISTURE - an approximation of the amount of water in a soil/sediment sample made by drying an aliquot of the sample at 105^{o}C. The percent moisture determined in this manner also includes contributions from all compounds that may volatilize at or below 105 ^{o}C, including water. Percent moisture may be determined from decanted samples and from samples that are not decanted.

REAGENT WATER - water in which an interferant is not observed at or above the minimum quantitation limit of the parameters of interest.

SEPARATORY FUNNEL – A large volume (500, 1000 or 2000ml) closed funnel used for separating immiscible liquids from each other. The device is used for shaking samples with solvent to extract organic constituents. One of the phases of the mixture is removed through the stopcock opening in the base to effect the separation.

TURBOVAP CONCENTRATOR – An automated device for the concentration of organic solvent extracts concentration. The apparatus is capable of accepting whole volume extracts and automatically evaporating and concentrating solvent extracts to a pre-designated volume using a water bath heated to a specified temperature combined with a nitrogen blow-down system.

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ULTRASONIC – High frequency sound waves that increase molecular vibration of molecules absorbed to surfaces of solid materials. The process can readily mobilize adsorbed organics from solids into organic solvents.

WIPE – An inert fabric of known area used to swab the surface of a contaminated area for the purpose of removing the contamination from the surface for chemical analysis.

5.0 Health and Safety

5.1 The analyst must follow normal safety procedures as outlined in the Accutest Laboratory Safety Manual which includes the use of safety glasses and lab coats. In addition, all acids are corrosive and must be handled with care. Flush spills with plenty of water. If acids contact any part of the body, flush with water and contact the supervisor.

5.2 The toxicity or carcinogenicity of each reagent used in this method has not been precisely determined; however, each chemical must be treated as a potential health hazard. Exposure to these reagents must be reduced to the lowest possible level. The laboratory maintains a current awareness file of OSHA regulations regarding the safe handling of the chemicals specified in this method. A reference file of data handling sheets is available to all personnel involved in these analyses.

5.3 Primary standards of toxic compounds must be prepared in a hood. A NIOSH/Mass approved toxic gas respirator should be worn when the analyst handles high concentrations of toxic compounds.

6.0 Interferences

6.1 Solvents, reagents, glassware, and other sample processing hardware may yield artifacts and/or interferences to sample analysis. Blanks must be analyzed to demonstrate that these materials are free from interferences under the conditions of the analysis.

6.2 Interferences co-extracted from the samples will vary considerably from source to source. If interferences prevent the analysis of an extracted sample, further cleanup of the sample extract may be employed if necessary. Refer to SW-846 Method 3600 for cleanup procedures.

6.3 Phthalate esters contaminate many types of products commonly found in the laboratory. Avoid plastics in particular because they contain phthalates, used as plasticizers, which can leach from these materials. Practice sound, consistent materials control to avoid phthalate contamination, which may occur at any time. Soap residue (e.g. sodium dodecyl sulfate), which results in a basic pH on glassware surfaces, may cause degradation of certain analytes. Specifically, Aldrin, Heptachlor, and most organophosphorus pesticides will degrade in this situation. This occurs in glassware that is difficult to rinse (e.g., 500-mL K-D flask). Carefully hand-rinse these items to avoid this problem.

7.0 Collection, Preservation and Holding Times

7.1 Collect samples in 250-mL widemouth glass amber bottles.

7.2 Collect wipe samples in 150-mL widemouth glass amber bottles.

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7.3 Cool samples to ≤6°C and store at ≤6°C until extraction.

7.4 Thirty (30) grams of solid samples are required for an extraction. Additional sample volume may be necessary for any samples used for matrix duplicates and matrix spikes.

7.5 Extract samples within 14 days of sampling and analyze the extract within 40 days of the extraction.

7.6 Store the base, neutral, & acid sample extracts at –10°C in amber vials (protected from light) sealed with PTFE-lined septa. Store pesticide & PCB extracts at 4°C in the same type vial.

8.0 Apparatus and Materials

8.1 Beakers - 250 ml or 250 ml Erlenmyer flasks.

8.2 Sonicator/sonic disrupter, 300 watt output minimum, with soundproof casing.

8.2.1 The sonicator must be tuned to manufacturer's specifications prior to each use. Document tuning activities in the tuning logbook.

8.2.2 A ¾-horn for the low concentration method procedure and a 1/8-inch tapered microtip attached to a ½-inch horn for the medium/high concentration procedure.

8.3 Drying column – glass funnel containing pre-washed filter paper and sodium sulfate.

8.4 Kuderna-Danish (K-D) Evaporator

8.4.1 500 & 250 ml receiving flasks
8.4.2 three ball Snyder column
8.4.3 10ml graduated concentrator tubes
8.4.4 Class A volumetric vessels: 1ml, 5ml and 10ml

8.5 TurboVap concentrator Apparatus(Zymark or equivalent)

8.6 TurboVap concentrator tubes – 200ml

8.7 1ml volumetric pipettes or pre-calibrated 1ml syringe

8.8 2ml crimp vials

8.9 Glass Wool

8.10 Porous Boiling Chips or Glass beads, solvent extracted

8.11 Evaporating steam baths capable of temperatures from 55 - 90°C .

8.11.1 Record the operating temperature daily with use.

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8.12 Nitrogen blow down apparatus with waterbath, capable of maintaining a temperature of 35°C+/-3°C.

8.12.1 Record the operating temperature daily with use.

8.13 Top Loading balance, capable of weighing to 0.01g.

8.14 Cotton fabric cloth wipe 5cm^2, pre washed with hexane.

8.15 Class A volumetric flasks: 1ml, 5ml, 10ml.

8.16 Disposable wood spatulas

9.0 Reagents

9.1 Hexane – reagent grade for pesticide residue analysis.

9.2 Acetone – reagent grade for trace organic analysis.

9.3 Methylene Chloride– reagent grade for trace organic analysis.

9.4 Methylene Chloride/Acetone. 1:1 - reagent grade for trace organic analysis – mix equal parts of each solvent.

9.5 Sodium sulfate - granular anhydrous, prepared by baking at 400°C for a minimum of 4 hours.

9.6 Nitrogen Gas – High Purity Grade.

9.7 Whatman 41 filter paper (or equivalent)

9.8 Surrogate and Matrix Spiking Solutions. See SOP for target compound specifications.

Method	Surrogate Conc.	Vol Spike ml	Target CMPD Spike Conc.	Vol Spike ml	SOP
SW 846-8081B	400 ng/ml	1.0	250 ng/ml	1.0	EGC8081B
SW 846-8081B Tox	400 ng/ml	1.0	5 µg/ml	1.0	EGC8081B
SW 846-8081B Chl	400 ng/ml	1.0	4 µg/ml	1.0	EGC8081B
SW 846-8082A	400 ng/ml	1.0	2 ug/ml	1.0	EGC8082A
SW 846-8100	100 ug/ml	1.0	10 ug/ml	1.0	EGC8100
SW 846-8270D BN	100 ug/ml	0.5	100 ug/ml	0.5	EMS8270D
SW 846-8270D Ac	100 ug/ml	0.5	100 ug/ml	0.5	EMS8270D
SW 846-8015B	50 µg/ml	1.0	1000 µg/ml	1.0	EGC8015B
SW 846-8310	10 µg/ml	1.0	10 µg/ml	1.0	EGC8310

9.8.1 Pesticide Surrogate: SW 846-8081B.

9.8.1.1 Prepare surrogate from a 200 ug/ml solution of decachlorobiphenyl / Tetrachloro-m-Xylene obtained from commercial sources.

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9.8.1.2 Dilute the commercial stock 1:500 in acetone. The final solution concentration is 400 ng/ml.

9.8.2 Pesticide Target Compound: SW 846-8081B.

9.8.2.1 Prepare target compound spike from a 10 ug/ml stock solution of the target organochlorine pesticides obtained from commercial sources.

9.8.2.2 Dilute the commercial stock 1:40 in acetone. The final solution concentration is 250 ng/ml.

9.8.2.3 Prepare a Toxaphene spike if required from a 100 μg/ml stock solution obtained from commercial sources. Dilute the commercial stock 1:20 in acetone. The final solution concentration is 5 μg/ml.

9.8. 2.4 Prepare a Chlordane spike if required from a 100 μg/ml stock solution obtained from commercial sources. Dilute the commercial stock 1:25 in acetone. The final solution concentration is 4 μg/ml.

9.8.3 PCB Surrogate: SW 846-8082A. See 9.8.1

9.8.4 PCB Target Compound: SW 846-8082A.

9.8.4.1 Prepare target compound spike from a 1000 ug/ml solution of Aroclor 1016 and Aroclor 1260 obtained from commercial sources.

9.8.4.2 Dilute the commercial stock 1:500 in acetone. The final solution concentration is 2.0 ug/ml.

9.8.5 PAH Surrogate: SW-846-8100. See 9.8.7.

9.8.6 PAH Target Compound: SW-846-8100

9.8.6.1 Prepare target compound spike from a 2000 ug/ml solution of PAH target compounds obtained from commercial sources.

9.8.6.2 Dilute the commercial stock 1:200 in acetone. The final solution concentration is 10.0 ug/ml.

9.8.7 BN Surrogate: SW-846-8270D

9.8.7.1 Prepare surrogate from a 5000 ug/ml stock solution of base neutral surrogate compounds obtained from commercial sources.

9.8.7.2 Dilute the commercial stock 1:50 in acetone. The final solution concentration is 100 ug/ml.

9.8.8 BN Target Compound: SW-846-8270D

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9.8.8.1 Prepare single target compound spike solutions from five (5) base neutral stock solutions obtained from commercial sources. Dilute the stocks in acetone combining the final solution into a 50 ml volumetric flask as follows:

Solution Name	Stock Conc. ug/ml	Volume Used ml/50ml	Dilution Factor	Final Conc. Ug/ml
Semi-Volatile Mix	1000	5.0	10	100
Base Neutral Mix	1000	5.0	10	100
Benzidines	2000	2.5	20	100
Methylnaphthalenes	2000	2.5	20	100
Cumene	5000	1.0	50	

9.8.9 Ac Surrogate: SW-846-8270D

9.8.9.1 Prepare surrogate from a 10,000 ug/ml solution of acid surrogates obtained from commercial sources.

9.8.9.2 Dilute the commercial stock 1:100 in acetone. The final solution concentration is 100 ug/ml.

9.8.10 Ac Target Compound: SW-846-8270D

9.8.10.1 Prepare target compound spikes from a 1000 ug/ml solution of acid target compounds obtained from commercial sources.

9.8.10.2 Dilute the commercial stock 1:10 in acetone. The final solution concentration is 100 ug/ml.

9.8.11 DRO Surrogate SW-846-8015B

9.8.11.1 Prepare Surrogate from a 1000 μg/ml solution of stock surrogate obtained from commercial sources.

9.8.11.2 Dilute the commercial stock 1:20 in acetone. The final solution concentration is 50 μg/ml

9.8.12 DRO Target Compound SW-846-8015B

9.8.12.1 Prepare target compound spike from a 50000 μg/ml solution of DRO spiking solution obtained from commercial sources.

9.8.12.2 Dilute the commercial stock 1:50 in acetone. The final solution Concentration is 1000 μg/ml

9.8.13 PAH Surrogate SW-846-8310

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9.8.13.1 Prepare PAH surrogate from a 1000 ug/ml solution of stock surrogates obtained from commercial sources. Each surrogate is in a separate solution (p-Terphenyl & o-Terphenyl).

9.8.13.2 Dilute each commercial stock 1:100 in acetone. The final solution concentration is 10 μg/ml

9.8.14 PAH Target Compound SW-846-8310

9.8.14.1 Prepare target compound spike from a 500 μg/ml stock PAH mix and 1000 μg/ml stock solutions of 1 & 2 methylnaphthalene obtained from commercial sources.

9.8.14.2 Dilute the PAH mix 1:50 in acetone, and the 1 & 2 methylnaphthalene 1:100 in acetone. The final solution concentration is 10 μg/ml.

9.9 Unopened stock solutions must be stored according to the manufacturers documented holding time and storage temperature recommendations.

9.10 After opened, stock standards must be replaced after 6 months or sooner if manufacturer's expiration date comes first or comparison with quality control check samples indicated degradation.

9.11 Copper Powder Mesh: Aldrich powder, 150 mesh or equivalent

9.11.1 Add copper to a 50ml volumetric flask.
9.11.2 Add 5% Nitric Acid , slurry for 15-20 seconds
9.11.3 Rinse 3-4 times with deionized water.
9.11.4 Rinse with Acetone
9.11.5 Dry with Nitrogen
9.11.6 The copper should be pink and shiny.
9.11.7 Store in an amber vial covered with hexane.

10.0 Procedure

10.1 Obtain custody for the samples selected for analysis and group them into a sample batch. A batch consists of 20 samples, a method blank and a spiked blank extracted on the same day. A matrix spike (sample) and a matrix spike duplicate (sample) are prepared for every 20 sample extracted. Generate the method blank and spiked blank in the laboratory using 30 grams of sodium sulfate for each sample.

10.2 Sediment/soil samples - Decant and discard any water layer on the sediment. Mix samples thoroughly, especially composited samples. Discard any foreign objects such as sticks, leaves, and rocks. See SOP EQA042 for additional sample homogenization detail.

10.3 Dry waste samples amenable to grinding - Grind or otherwise subdivide the waste so that it either passes through a 1-mm sieve or can be extruded through a 1-mm hole. Introduce sufficient sample into the grinding apparatus to yield at least 10 g after grinding.

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10.4 Gummy, fibrous or oily materials not amenable to grinding should be cut, shredded, or otherwise reduced in size to allow mixing and maximum exposure of the sample surfaces for the extraction. The addition of anhydrous sodium sulfate to the sample (1:1) may make the mixture amenable to grinding.

10.5 Wipes – Transfer the entire wipe and any remaining solvent into the extraction vessel. Weighing is unnecessary.

10.6 Percent Dry Weight Determination - Dry weight determination is performed by another department and incorporated into the final result calculation after sample extraction has been performed.

10.7 **Low level concentration of organics (<= 20 mg/kg) expected:**

10.7.1 Weigh out approximately 30 g of wet weight soil into a tarred 250 ml beaker and record the weight to the nearest 0.1 g. Samples that do not have a free flowing texture (sandy) are mixed with approximately 60-g anhydrous sodium sulfate to form a free flowing mixture. A sample should be weighed in triplicate for the batch matrix spike and matrix spike duplicate.

10.7.2 Weigh out 30 grams of anhydrous sodium sulfate into each of two, clean 150ml beakers to be used as the method blank and spiked blank. An empty beaker is used as a method blank and spiked blank and should be treated as a sample starting with 10.9.

10.7.3 Wipe samples are transferred to the extraction beaker. Weighing and drying is not necessary.

10.7.4 Perform the following steps rapidly to avoid loss of the more volatile compounds.

10.7.5 Add the appropriate surrogate standard solution as per table 9.8 to all samples, spiked samples, QC samples, and blanks.

10.7.6 For the quality control samples in each batch selected for spiking (Spiked blanks, matrix spikes), add the appropriate matrix spiking solution as per Table 9.8.

10.8 **High level concentration of organics (> 20 mg/kg) expected:**

10.8.1 Weigh out approximately 2 g of wet weight soil into a tarred 150-ml beaker and record the weight to the nearest 0.1-g. Samples that do not have a free flowing texture (sandy) are mixed with approximately 4-g anhydrous sodium sulfate to form a free flowing mixture. Select a sample to be weighed in triplicate for the batch matrix spike and matrix spike duplicate.

10.8.2 Weigh out 2 grams of anhydrous sodium sulfate into each of two, clean 150ml beakers to be used as the method blank and spiked blank. An empty beaker is used as a method blank and spiked blank and should be treated as a sample starting with 10.9.

10.8.3 Wipe samples are transferred to the extraction beaker. Weighing and drying is not necessary.

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10.8.4 Add the appropriate surrogate standard solution as per table 9.8 to all samples, spiked samples, QC samples, and blanks.

10.8.5 For the sample in each batch selected for spiking, add the appropriate matrix spiking solution as per table 9.8.

10.8.6 Immediately add sufficient volume of methylene chloride/acetone to bring the volume to 10.0 ml considering the volume added of surrogates and spiking solution.

10.8.7 Sonicate with the 1/8 inch microtip ultrasonic probe for 2 min at an output of 5 and 50% duty cycle.

10.8.8 Filter the sample through 2-3 cm of glass wool in a pasteur pipette. If the sample does not require further concentration collect the entire sample and seal the container, or proceed to perform clean up procedures as appropriate.

10.8.9 If the sample requires further concentration, collect a known amount of extract, i.e. 5 ml and concentrate to a final volume of 0.5 ml using the nitrogen blowdown technique in section 10.15.

10.9 Add 100 ml of methylene chloride/acetone to each beaker under the hood.

10.10 The extractor horns for the low concentration and high concentration protocols are not interchangeable.

10.10.1 For low level place the tip of a ¾-inch disruptor horn about ½-inch below the solvent surface but above the sample. Sonicate each sample for three minutes at 50% duty cycle and an output of 10. Check with your supervisor on how to make adjustments.

10.10.2 For medium/high level place the tip of a 1/8-inch tapered microtip.about ½-inch below the solvent surface but above the sample. Sonicate each sample for two minutes at 50% duty cycle and an output of 5. Check with your supervisor on how to make adjustments.

10.11 Prepare a drying funnel by adding approximately 30-g of baked sodium sulfate into a funnel. Place a prepared Kuderna Danish apparatus under the column to collect the sample extract. Take the sample extract contained in the 250-ml beaker and pour it into the top of the drying funnel through a funnel containing filter paper and sodium sulfate. Make sure all apparatus is labeled accordingly.

10.11.1 The K-D apparatus can be set up with a concentrator tube or a Class A volumetric vessel.

10.12 Add a second 100-ml volume of methylene chloride/acetone to beakers and sonicate a second time. Decant the extract into the same drying column and combine the extracts in the K-D flask. Perform a third extraction in the same manner.

10.13 After the final extract has passed through the sodium sulfate column, rinse down the funnel and inside of the column with an excess of 30-ml of solvent. Add a glass boiling bead to the K-D flask

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and attach a three-ball Snyder column, prime the Snyder column by adding 1 ml of methylene chloride to the top.

10.14 SW8270D & SW8100: Position the K-D concentrator setup on the hot water bath with only the 10-ml concentrator tube submersed in the water. Evaporate the extract to about 1-ml not allowing it to go to dryness. Remove the K-D apparatus from the bath and allow the solvents condensed in the Snyder column to drip back down into the concentrator tube. Allow the solvent to cool for approximately 10 minutes, then remove the Snyder column and K-D flask while rinsing the connector joints with 1 ml of methylene chloride. Since the volume is now greater than 1 ml, concentrate by directing a gentle stream of nitrogen gas over the extract surface to under 1-ml.

10.15 ALTERNATE CONCENTRATION PROCEDURE. SW8270D & SW8100: TurboVap Solvent Concentration. Place the sodium sulfate column onto the top of a TurboVap concentrator tube. Take the sample extract contained in the 150-ml beaker and pour it into the top of the drying funnel through a funnel containing filter paper and sodium sulfate following steps 10.12 – 10.15. Position the concentrator tube on TurboVap workstation. Immersing the tube nipple into the waterbath. Set the bath temperature for the solvent system in the concentrator tube. Methylene chloride: 40-45^{o}C, methylene chloride/acetone: 55-60^{o}C. Select volume setpoint for 1ml and initiate the volume reduction procedure. Proceed to step 10.19.

Note: This procedure is not normally used for soils, but may be employed in case of equipment malfunctions, or overload.

10.16 Solvent Exchange – Kuderna Danish (SW8081B, SW8082A & SW 8310)

10.16.1 If a solvent exchange is required (methods 8081B, 8082A require exchange to hexane, method 8310 requires acetonitrile), momentarily remove the Snyder column, add 50 ml of the exchange solvent, a new boiling chip, and reattach the Snyder column. Alternatively, pour the exchange solvent into the top of the Snyder column while the concentrator remains on the water bath. Concentrate the extract, as described in Sec. 10.15, raising the temperature of the water (85 $\pm$ 5^{o}C for hexane) bath to maintain proper distillation.

10.16.2 Remove the Snyder column and rinse the flask and its lower joints into the concentrator tube with 1 - 2 ml of hexane. If sulfur crystals are a problem, proceed to EOP011 for cleanup. The extract may be further concentrated by using the technique outlined in Sec. 10.18 or adjusted to 10.0 ml with the solvent last used. Proceed to step 10.24.

10.17 Solvent Exchange – TurboVap Concentrator (SW8081B,SW8082A & SW8310). If a solvent exchange is required (methods 8081, 8082 require exchange to hexane, Method 8310 requires acetonitrile), pour 50 ml of the exchange solvent into the concentrator tube after the initial concentration to 1ml. Concentrate the extract, as described in Sec. 11.16, raising the temperature of the water bath to 60 $\pm$ 5^{o}C for hexane. Take TurboVap concentrator tube out after it reaches 1 ml and add 9 ml of Hexane to adjust to the final volume of 10 ml. Proceed to step 10.23 for SW8082A or step 10.24 for SW8081B.

10.18 Employ steps 10.20 through 10.22 for SW8100 and SW8270D.

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10.19 Remove the K-D apparatus from the bath and allow the solvent condensed in the Snyder column to drip back down into the concentrator tube. Allow the solvent to cool for approximately 10 minutes, then remove the Snyder column and K-D flask while rinsing each connector joint with 1 ml of methylene chloride or hexane

10.20 Since the volume is now greater than 1 ml, concentrate using an N-Evap nitrogen concentrator. Immerse the concentrator tube into the water bath of the N-Evap, which is maintained at 35^{o}C. Direct a gentle stream of nitrogen gas over the extract surface and evaporate the solvent until the desired volume is reached. Occasionally rinse the side- walls of the concentrator tubes with methylene chloride during the final evaporation step.

10.21 Final Volume Adjustments.

10.21.1 If a K-D apparatus with a Class A collection vessel was used to concentrate the sample, adjust the volume to 1-ml directly in the vessel with the solvent last used. Transfer the extract to a 2-ml crimp vial using a Pastuer pipette. Label the vial with sample number and batch number. Protect the extracts from light and store them in the extract freezer at –10^{o}C.

10.21.2 If a K-D apparatus with a concentrator tube (not Class A) was used to concentrate the sample, transfer the extract to a 1ml Class A volumetric vessel or flask with a Pastuer pipette. Adjust the volume to 1ml with the solvent last used. Label a 2-ml crimp vial with the sample number and batch number. Transfer the extract to the 2- ml crimp vial with a new Pastuer pipette. Label the vial with sample number and batch number. Protect the extracts from light and store them in the extract freezer at –10^{o}C.

10.21.3 If the TurboVap apparatus was used, transfer the extract to a 1ml Class A volumetric vessel or flask with a Pastuer pipette. Adjust the volume to 1ml with the solvent last used. Label a 2-ml crimp vial with the sample number and batch number. Transfer the extract to the 2- ml crimp vial with a new Pastuer pipette. Label the vial with sample number and batch number. Protect the extracts from light and store them in the extract freezer at –10^{o}C.

10.22 Sulfuric Acid Cleanup (Required for PCB analysis using SW8082A)

10.22.1 Transfer 2-ml of the extract to a Teflon screw cap 4-ml vial, which contains 2-ml of pure sulfuric acid. Shake vigorously for 1 minute using a touch mixer. The Method Blank and Spike Blank must also undergo this cleanup

10.22.2 Proceed to 10.24.

10.23 Copper Clean-Up

10.23.1 Transfer the extract to a 2-ml Teflon lined crimp vial that contains activated copper. Shake vigorously for 2 minutes and allow settling for 5 minutes. The copper cleanup is performed to remove sulfur contamination and can be repeated to further cleanup the extract. A black precipitate indicates that sulfur is present in the sample. The Method Blank and Spike Blank must also undergo this cleanup.

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10.24 Store the vials by batch in the refrigerator located in the extraction laboratory. Protect the extracts from light and refrigerate them at 4°C.

11.0 Calculations

11.1 Not applicable.

12.0 QC Requirements

12.1 A method blank and blank spike is required on each day of extraction or every 20 samples, whichever is more frequent.

12.2 A matrix spike/ matrix spike duplicate is required per 20 samples.

12.3 A separate BSP and MS/MSD set are needed if the sample requires PCBs, Toxaphene and/or chlordane. Therefore, if a sample is to be extracted for pesticides and PCBs, 2 sets of MS/MSDs and BSP are needed.

12.4 Refer to Project Specific Bench Notes(GC8081, GC8082, MS8270) for additional program or client specific QC requirements.

13.0 Documentation

13.1 All the information required by the extraction logbooks must be completed.

13.2 All standards preparation must be documented in the standards preparation logbook.

13.3 Equipment maintenance logs must be maintained.

14.0 Data Review And Reporting

14.1 The sample prep supervisor reviews all extraction log information for completeness and accuracy prior to the release of sample extracts for analysis,

14.2 The supervisor updates the sample status in the LIMS upon completion of the extraction.

15.0 Pollution Prevention & Waste Management

15.1 Users of this method must perform all procedural steps in a manner that controls the creation and/or escape of wastes or hazardous materials to the environment. The amounts of standards, reagents, and solvents must be limited to the amounts specified in this SOP. All safety practices designed to limit the escape of vapors, liquids or solids to the environment must be followed. All method users must be familiar with the waste management practices described in section 15.2.

15.2 Waste Management. Individuals performing this method must follow established waste management procedures as described in the waste management SOP, EHS004. This

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document describes the proper disposal of all waste materials generated during the testing of samples as follows:

15.2.1 Non hazardous aqueous wastes
15.2.2 Hazardous aqueous wastes
15.2.3 Chlorinated organic solvents
15.2.4 Non-chlorinated organic solvents
15.2.5 Hazardous solid wastes
15.2.6 Non-hazardous solid waste

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Lab Manager: _____

QA Manager: _____

Effective Date: 12/15/2010

TEST NAME: **PRESSURIZED FLUID EXTRACTION (ASE)**

METHOD REFERENCE: **SW 846 3545A, Revision 1, February 2007**

Revised Sections: ***1.1, 1.2, Table 1, Added Section 10.7***

1.0 SCOPE AND APPLICATION

1.1 Method 3545A is used for extracting water insoluble or slightly water soluble semivolatile organic compounds from soils, clays, sediments, sludges, waste solids, and biota. It is applicable to the extraction of base, neutral, and acid semivolatile organic compounds, PAH's organophosphorus pesticides, organochlorine pesticides, chlorinated herbicides, and PCBS. The method uses elevated temperature (100^{0}C) and pressure (1500 psi) to achieve analyte recoveries equivalent to those from Soxhlet extraction, using less solvent and taking significantly less time than the Soxhlet procedure. Method 3545A is applicable to solid samples only, and is most effective on dry materials with small particle sizes.

1.2 This method is primarily used with methods 8015B, 8081, 8082. Methods 8270, 8100, 8310 and 8151 use sonication (EOP003).

2.0 SUMMARY

2.1 Samples are prepared for extraction either by mixing the sample with pelletized diatomaceous earth. The sample is then ground to a 100 - 200 mesh powder (150 um to 75 um) and loaded into the extraction cell. The extraction cell containing the sample is heated to the extraction temperature, pressurized with the appropriate solvent system, and extracted for a fixed time period. The solvent systems employed are based on the appropriate solvents used for the analytes of interest and the matrix being extracted.

2.2 The solvent is collected from the heated extraction vessel and allowed to cool. The extract is concentrated, if necessary, and prepared for analysis based on the requirements of the determinative analytical finish being employed.

3.0 REPORTING LIMIT AND METHOD DETECTION LIMIT

3.1 See determinative method.

4.0 DEFINITIONS

BLANK - an analytical sample designed to assess specific sources of laboratory contamination. See individual types of Blanks: Method Blank; Instrument Blank, Storage Blank, and Sulfur Blank.

CLASS A GLASSWARE – Volumetric laboratory glassware that has been manufactured, calibrated and certified to established ASTM volume standards. Class A Glassware does not require volume calibration or verification.

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CONTINUOUS LIQUID-LIQUID EXTRACTION - used herein synonymously with the terms continuous extraction, continuous liquid extraction, and liquid extraction. This extraction technique involves boiling the extraction solvent in a flask and condensing the solvent above the aqueous sample. The condensed solvent drips through the sample, extracting the compounds of interest from the aqueous phase.

INTERNAL STANDARDS - compounds added to every standard, blank, matrix spike, matrix spike duplicate, sample (for volatiles), and sample extract (for semivolatiles) at a known concentration, prior to analysis. Internal standards are used as the basis for quantitation of the target compounds.

MATRIX - the predominant material of which the sample to be analyzed is composed. For the purpose of this SOW, a sample matrix is either water or soil/sediment. Matrix is not synonymous with phase (liquid or solid).

MATRIX SPIKE - aliquot of a matrix (water 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.

MATRIX SPIKE DUPLICATE - a second aliquot of the same matrix as the matrix spike (above) that is spiked in order to determine the precision of the method.

METHOD BLANK - an analytical control consisting of all reagents, internal standards and surrogate standards (or SMCs for VOA), that is carried throughout the entire analytical procedure. The method blank is used to define the level of laboratory, background and reagent contamination.

PERCENT DIFFERENCE (%D) - As used in this SOW and elsewhere to compare two values, the percent difference indicates both the direction and the magnitude of the comparison, i.e., the percent difference may be either negative, positive, or zero. (In contrast, see relative percent difference.)

PERCENT MOISTURE - an approximation of the amount of water in a soil/sediment sample made by drying an aliquot of the sample at 105°C. The percent moisture determined in this manner also includes contributions from all compounds that may volatilize at or below 105 °C, including water. Percent moisture may be determined from decanted samples and from samples that are not decanted.

REAGENT WATER - water in which an interferant is not observed at or above the minimum quantitation limit of the parameters of interest.

RECONSTRUCTED ION CHROMATOGRAM (RIC) - a mass spectral graphical representation of the separation achieved by a gas chromatograph; a plot of total ion current versus retention time.

5.0 HEALTH & SAFETY

5.1 The analyst must follow normal safety procedures as outlined in the Accutest Laboratory Safety Manual which includes the use of safety glasses and lab coats. In addition, all acids are corrosive and should be handled with care. Flush spills with plenty of water. If acids contact any part of the body, flush with water and contact the supervisor

5.2 The toxicity or carcinogenicity of each reagent used in this method has not been precisely determined; however, each chemical should be treated as a potential health hazard. Exposure to these reagents should be reduced to the lowest possible level. The laboratory is responsible for maintaining a current awareness file of OSHA regulations regarding the safe handling of the chemicals specified in this method. A reference file of data handling sheets should be made available to all personnel involved in these analyses.

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5.3 The following analytes covered by this method have been tentatively classified as known or suspected, human or mammalian carcinogens: benzene, carbon tetrachloride, chloroform, and vinyl chloride. Primary standards of these toxic compounds should be prepared in a hood. A NIOSH/Mass approved toxic gas respirator should be worn when the analyst handles high concentrations of these toxic compounds.

6.0 INTERFERENCES

6.1 Solvents, reagents, glassware, stainless steel extraction cell and other sample processing hardware may yield artifacts and/or interferences to sample analysis. All these materials must be demonstrated to be free from interferences under the conditions of the analysis by analyzing method blanks. Specific selection of reagents and purification of solvents by distillation in all-glass systems may be necessary. Refer to each method for specific guidance on quality control procedures and to Chapter Four for guidance on the cleaning of glassware.

6.2 Interferences coextracted from the samples will vary considerably from source to source. If analysis of an extracted sample is prevented due to interferences, further cleanup of the sample extract may be necessary. Refer to Method SW 846 3600 for guidance on cleanup procedures.

6.3 Phthalate esters contaminate many types of products commonly found in the laboratory. Plastics, in particular, must be avoided because phthalates are commonly used as plasticizers and are easily extracted from plastic materials. Serious phthalate contamination may result at any time if consistent quality control is not practiced. Soap residue (e.g. sodium dodecyl sulfate), which results in a basic pH on glassware surfaces, may cause degradation of certain analytes.

7.0 REAGENTS

7.1 Organic free reagent water prepared to the specifications of SW846 Chapter One.

7.2 Drying Agents

7.2.1 Pelletized diatomaceous earth.

7.2.2 Optional: Sodium sulfate (granular anhydrous)

7.2.3 Drying agents must be pre-cleaned or by Soxhlet extraction using the solvent system employed for samples followed by heating at 400°C for 4 hours in a shallow tray.

7.3 Sand, 10% HCl and deionized water washed, fired and or muffled at 600°C prior to use.

7.4 Solvents.

7.4.1 Organochlorine pesticides Analysis: Pesticide Grade, acetone/hexane (1:1, v/v) or acetone/methylene chloride (1: l,v/v)

7.4.2 Semivolatile organics Analysis: Pesticide Grade, acetone/hexane (1:1, v/v) or acetone/methylene chloride (1: l,v/v)

7.4.3 PCBs Analysis: Pesticide Grade, acetone/hexane (1:1, v/v) or acetone/methylene chloride (1: l,v/v)

7.4.4 Organophosphorus pesticides Analysis: Pesticide Grade methylene chloride, or acetone/methylene chloride (1: 1, v/v)

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7.4.5 Chlorinated herbicides Analysis: Pesticide Grade acetone/methylene chloride/phosphoric acid solution (250:125:15, v/v/v), or acetone/methylene chloride/trifluoroacetic acid solution (250:125:1, v/v/v),. (if trifluoroacetic acid solution is used, prepare by mixing 1% trifluoroacetic acid in acetonitrile.) Make fresh solutions before each batch of extractions. Phosphoric acid solution Prepare a 1:1 (v/v) solution of 85% phosphoric acid in organic-free reagent water.

7.4.6 CAUTION: For best results with very wet samples (e.g., ≥30% moisture), reduce or eliminate the quantity of hydrophilic solvent used.

7.5 Nitrogen, high-purity.

7.6 Surrogate Standard Solutions

7.6.1 Pesticide / PCB Surrogates: 400ppm solution in Acetone (Tetrachloro-meta-xylene, Decachlorobiphenyl).

7.6.2 BN Surrogates: 100ppm solution in acetone(2-Fluorobiphenyl, Nitrobenzene-d_5, Terphenyl-d_{14}).

7.6.3 Acid Surrogates: 100ppm solution in acetone (Phenol-d_5, 2-Fluorophenol, 2,4,6 Tribromophenol).

7.6.4 DRO Surrogates: 50 ppm solution in acetone (o-Terphenyl, Tetracosane-d50, 5α Androstane)

7.6.5 PAH Surrogates Method 8100: 100ppm solution in acetone(2-Fluorobiphenyl, Nitrobenzene-d_5, Terphenyl-d_{14}).

7.6.6 PAH Surrogates Method 8310:10 ppm solution in acetone (p-Terphenyl and o-Terphenyl)

7.7 Target Compound Spiking Solutions.

7.7.1 Pesticide Target Compounds: 250ppb solution (Priority pollutants & Target compound list). Toxaphene 5 ppm and Chlordane 4 ppm if required

7.7.2 PCBs target Compounds: 2ppm solution in acetone (Aroclors 1016, 1260)

7.7.3 BN Target Compounds: Full list - 100 ppm in acetone (Priority pollutants & Target compound list).

7.7.4 Acid Target Compounds:, Full list - 100 ppm in acetone (Priority pollutants & Target compound list).

7.7.5 DRO Target Compounds 1000 ppm in acetone (DRO Spiking Solutions)

7.7.6 PAH Target Compounds Method 8100: 10 ppm in acetone (PAH Target Compounds)

7.7.7 PAH Target Compounds Method 8310: 10 ppm in acetone (PAH Target Compounds + 1&2 Methylnaphthalene)

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8.0 APPARATUS

8.1 Dionex pressurized fluid extraction device (Accelerated Solvent Extractor) with 11ml, 22ml, and 33ml stainless steel extraction cells to accommodate 10-g, 20-g and 30-g samples respectively.

8.1.1 Extraction cells must be cleaned following each use. Dis-assemble the cell and discard the extracted sample in an environmentally conscious manner. Rinse the cell caps with deionized water. Also rinse the cell body with deionized water while removing any residual solids with a tube brush. Rinse the entire apparatus, first with acetone, then with methylene chloride. Thoroughly dry the device prior to loading the sample.

8.2 Mortar and pestle, capable of reducing dried sample particle size to <1mm.

8.3 Analytical balance - capable to weighing to 0.01 g.

8.4 40-mL and 60-mL, pre-cleaned, extract collection vials (IChem) with open top, screw-cap and PTFE-lined silicone septum.

8.5 Whatman glass fiber filter disk - 1.91 cm, (PN-18219356).

8.6 Dionex PEEK seal cell cap disks (PN-49454,49455).

8.7 Sieves, # 10 mesh and #1 mesh.

8.8 Class A volumetric flasks 1ml and 10 ml

9.0 PROCEDURE

9.1 Sample preparation

9.1.1 Sediment/soil samples - Decant and discard any water layer on a sediment sample. Mix the sample thoroughly, especially composited samples. Discard any foreign objects such as sticks, leaves, and rocks. Mix the sample with pre-extracted diatomaceous earth (DE) according to the following proportions:

Sample Weight	Weight DE
10 gram - Dry	2 grams
10 gram - Wet	3 grams
15 gram - Dry	3 grams
15 gram - Wet	4 grams

9.1.2 Mix until a free-flowing powder is obtained. Do not use the sodium sulfate option with polar solvents. Sodium sulfate will dissolve in pressurized, heated, polar solvents and re-crystallize in the transfer lines of the apparatus.

9.1.3 Spike the sample with the appropriate surrogate solutions, and, if necessary, target compound solutions.

9.1.3.1 Pesticide / PCB Surrogates: 1ml of the 400ppb solution.

9.1.3.2 Pesticide Target Compounds: 1ml of the 250ppb solution. 1ml of 5 ppm Toxaphene or 1ml of 4 ppm Chlordane if required

9.1.3.3 PCBs: 1ml of the 2ppm Aroclor solution

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9.1.3.4 BN Surrogates: 0.5ml of the 100ppm surrogate solution.

9.1.3.5 Acid Surrogates: 0.5ml of the 100ppm surrogate solution.

9.1.3.6 BN Target Compounds: 0.5ml of the 100ppm solution.

9.1.3.7 Acid Target Compounds: 0.5ml of the 100ppm solution.

9.1.3.8 DRO Surrogates: 1.0 ml of the 50ug/ml surrogate solution.

9.1.3.9 DRO Target Compounds 1.0 ml of the 1000 ppm solution.

9.1.3.10 PAH Method 8100 Surrogates: 1.0 ml of the 100 ppm solution.

9.1.3.11 PAH Method 8100 Target Compounds: 1.0 ml of the 10 ppm solution.

9.1.3.12 PAH Method 8310 Surrogates: 1.0 ml of the 10 ug/ml solution.

9.1.3.13 PAH Method 8310 Target Compounds: 1.0 ml of the 10 ppm solution.

9.1.4 Grind or otherwise reduce the particle size of the waste so that it either passes through a 1-mm sieve or can be extruded through a 1-mm hole using a mortar and pestle. The grinding apparatus must be decontaminated between each sample with soap and water, followed by acetone and hexane rinses.

9.2 NOTE: The note in Sec. 9. 1.1 also applies to the grinding process.

9.3 Grind a sufficient weight of the dried sample from Sec. 9.1 to yield the sample weight needed for the determinative method (usually 10 - 15 g). Grind the sample until it passes through a 10 mesh sieve.

9.4 Transfer the ground sample to an extraction cell of the appropriate size for the aliquot. Use an 11-mL cell for 10g aliquots, a 22-mL cell for 20g aliquots, and a 33-mL cell for 30g aliquots. The weight of a specific sample that a cell will contain depends on the bulk density of the sample and the amount of drying agent that must be added to the sample in order to make it suitable for extraction. Analysts should ensure that the sample aliquot extracted is large enough to provide the necessary sensitivity and choose the extraction cell size accordingly.

9.5 Place a Whatman GF/B, 1.91 cm glass fiber filter in the cell outlets. Fill any extraction cell volume voids with clean sand.

9.6 Place the extraction cell into the instrument or auto-sampler carrousel.

9.7 Place a pre-cleaned 60ml IChem collection vial into the collection vial carousel for each sample extracted. The collection vessel carousel number corresponds to the carousel number of the extraction cell. The total volume of the collected extract will depend on the extraction procedure employed and may range from 0.5 to 1.4 times the volume of the extraction cell. Ensure that the collection vessel is sufficiently large to hold the extract.

9.8 Extraction Parameters. Select the appropriate extraction parameters from Table 1, dependent upon the parameters of interest and enter them into the method screen of the instrument micro-computer. Save the operating parameters under an assigned method

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number and employ these operating parameters when sample matrices of this type are extracted for the target parameters of interest.

Table 1.
Accelerated Solids Extraction
Operating Parameters for Selected Analysis

BNAs

Solvent:	Methylene Chloride : Acetone
Temperature:	100°C.
Pressure:	1500 PSI
Static Time:	5 Min
Flush Volume:	60%
Purge Time:	60 seconds
Static Cycles:	1
Oven Heatup	5 Min

PAH's

Solvent:	Methylene Chloride : Acetone
Temperature:	100°C.
Pressure:	1500 PSI
Static Time:	5 Min
Flush Volume:	60%
Purge Time:	60 seconds
Static Cycles:	1
Oven Heatup:	5 Min

Chlorinated Pesticides

Solvent:	Methylene Chloride : Acetone
Temperature:	100°C.
Pressure:	1500 PSI
Static Time:	5 Min
Flush Volume:	60%
Purge Time:	60 seconds
Static Cycles:	1
Oven Heatup	5 Min

PCB's

Solvent:	Methylene Chloride : Acetone
Temperature:	100°C.
Pressure:	1500 PSI
Static Time:	5 Min
Flush Volume:	60%
Purge Time:	60 seconds
Static Cycles:	1
Oven Heatup	5 Min

DRO

Solvent:	Methylene Chloride : Acetone
Temperature:	100°C.
Pressure:	1500 PSI
Static Time:	5 Min
Flush Volume:	60%
Purge Time:	60 seconds
Static Cycles:	1
Oven Heatup	5 Min

Chlorinated Herbicides

Solvent:	Methylene Chloride : Acetone
Temperature:	100°C.
Pressure:	1500 PSI
Static Time:	5 Min
Flush Volume:	60%
Purge Time:	60 seconds
Static Cycles:	1
Oven Heatup	5 Min

Table 1 (cont'd)

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PCBs in Fish tissue

Solvent:	Methylene Chloride : Acetone
Temperature:	100^{0}C.
Pressure:	1500 PSI
Static Time:	5 Min
Flush Volume:	60%
Purge Time:	60 seconds
Static Cycles:	1
Oven Heatup	5 Min

9.9 Initiate the extraction cycle by first loading the method and extraction schedule from the load method screen and pushing the enter key. When this step has been completed, push the start key to initiate the extraction sequence.

9.10 Collect each extract in a clean vial (see Sec. 9.6). Allow the extracts to cool after the extractions are complete.

9.11 Residual Water Removal. Prepare a sodium sulfate column in a small glass funnel. Pre-rinse the sodium sulfate with methylene chloride. pass the sample extract through the sodium sulfate, removing the co-extracted water. Collect the extract in an in-line Kuderna-Danish equipped with a jacketed concentrator tube.

9.12 The extract is now ready for concentration, cleanup, or analysis, depending on the extent of interferants and the determinative analytical finish to be employed. Excess water present in extracts may be removed by filtering the extract through a bed of anhydrous sodium sulfate. Refer to EOP 002 for detailed procedures.

9.13 If the phosphoric acid solution is used for the extraction of chlorinated herbicides, then the extractor should be rinsed by pumping acetone through all the lines of the system. The use of other solvents for these analytes may not require this rinse step.

10.0 QUALITY CONTROL

10.1 Reagents. All reagents used in the extraction process are carefully controlled by maintaining accurate records of purchase dates, opening dates, and shelf life. Any reagent that either contains interfering compounds or becomes contaminated with interfering compounds must be immediately discard and replaced with a lot which satisfies the interference free criteria.

10.2 Method Blank. Each extraction batch must contain a method blank that demonstrates that all parts of the equipment in contact with the sample and reagents are interference-free. This is accomplished through the analysis of a solid matrix method blank (e.g., clean sand). Each time samples are extracted, and when there is a change in reagents, a method blank needs to be extracted and analyzed for the compounds of interest. The method blank is processed through the extraction and analytical finish steps.

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10.3 If the equipment or reagents contains interferences or target parameters which affect the analysts ability to report reliable data, the analysis must be immediately stopped and the source of contamination identified and eliminated before continuing with sample extraction.

10.4 A laboratory control spike (LCS) is extracted and analyzed with each batch of samples. LCS accuracy is used to determine if out of control performance on matrix spike/matrix spike duplicate samples is attributed to matrix effects. If the MS/MSD is out of control and the LCS is in control, matrix effects are attributed to the poor MS/MSD accuracy. If the LCS is out of control, then the laboratory is out of control and all sample analysis must be repeated.

10.5 A matrix spike or matrix spike/matrix spike duplicate (MS/MSD) samples must be extracted and analyzed with each batch of samples prepared by this procedure. The accuracy values for each compound are compared to the control limit values. If the results indicate an out of control situation, the performance of each individual compound in the MS/MSD is compared to the individual accuracy in the laboratory control spike. If the laboratory control spike accuracy is within control, the out of control MS/MSD performance is attributed to matrix related issues and the client is given the option of requesting repeat analysis.

10.6 Surrogate standards are added to all samples and quality control samples. Surrogate accuracy is monitored to determine if the analysis is in control. If surrogate accuracy falls outside the control limits, and attempts to determine the reasons for the out of control event are unsuccessful, the extraction must be repeated to verify either matrix affects or extraction error.

10.7 Refer to Project Specific Bench Notes(GC8081, GC8082, MS8270) for additional program or client specific QC requirements.

11.0 DOCUMENTATION

11.1 All the information required in the extraction logbooks must completed.

11.2 All standards preparation must be documented in the standards preparation logbook.

11.3 Equipment maintenance logs must be maintained.

12.0 DATA REVIEW & REPORTING

Not applicable.

13.0 POLLUTION PREVENTION & WASTE MANAGEMENT

13.1 Users of this method must perform all procedural steps in a manner that controls the creation and/or escape of wastes or hazardous materials to the environment. The amounts of standards, reagents, and solvents must be limited to the amounts specified in this SOP. All safety practices designed to limit the escape of vapors, liquids or solids to the environment must be followed.

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13.2 Waste Management. Individuals performing this method must follow established waste management procedures as described in the waste management SOP, EHS004. This document describes the proper disposal of all waste materials generated during the testing of samples as follows:

13.2.1 Non hazardous aqueous wastes.

13.2.2 Hazardous aqueous wastes

13.2.3 Chlorinated organic solvents

13.2.4 Non-chlorinated organic solvents

13.2.5 Hazardous solid wastes

13.2.6 Non-hazardous solid wastes

14.0 REFERENCES

14.1 B. Richter, Ezzell, J., and Felix, D., "Single Laboratory Method Validation Report. Extraction of TCL/PPL (Target Compound List/Priority Pollutant List) BNAs and Pesticides using Accelerated Solvent Extraction (ASE) with Analytical Validation by GC/MS and GC/ECD"; Document 116064.A, Dionex Corporation, June 16, 1994.

14.2 B Richter, Ezzell, J., and Felix, D., "Single Laboratory Method Validation Report. Extraction of TCL/PPL (Target Compound List/Priority Pollutant List) OPPS, Chlorinated Herbicides and PCBs using Accelerated Solvent Extraction (ASE)". Document 101 124, Dionex Corporation, December 2, 1994).

14.3 United States Environmental Protection Agency, "Method 3545A: Pressurized Fluid Extraction", Test Methods for Evaluating Solid Wastes, SW846 Final Update IV: Laboratory Manual, Physical/Chemical Methods, Revision 1, February 2007.

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Lab Manager: _____

QA Manager: _____

Effective Date: 9-21-12

Title: **MICROWAVE EXTRACTION PROCEDURE**

References: **SW846 3546**

Revised Sections: 1.1, 2.2, Renumbered section 10 (10.1 Pest/PCB procedure, 10.2 (B8015 DRO procedure)
Added Section: 9.8, 10.2

1. Scope and Application

1.1. This procedure is applicable to solid samples submitted for Pesticide and/or PCB analysis by GC/ECD methods, including SW-846 8081B and SW-846 8082A and DRO (Diesel Range Organics) by SW-846 8015.

2. Summary

2.1. Solid samples are extracted with hexane and acetone using a microwave extractor, concentrated by TurboVap or PowerVap, and stored in glass vials with Teflon lined screw caps.

2.2. This procedure is adapted from SW-846 methods 3500C and 3546, and utilized "Microwave Extraction". The method outlined in this SOP is designed for low concentration samples (concentration of the individual organic components is expected to be less than 5000ug/kg).

3. Reporting Limit and Method Detection Limit

3.1. Not Applicable. See determinative method.

4. Definitions

Batch: A group of samples which are similar with respect to matrix and the testing procedures being employed and which are processed as a unit. A sample batch is limited to a maximum of 20 samples.

Blank Spike (BS): An analyte-free matrix spiked with a known amount of analyte(s), processed simultaneously with the samples through all the steps of the analytical procedure. Blank Spike Recoveries are used to document laboratory performance for a given method. This may also be called a Laboratory Control Sample (LCS).

Holding Time: The maximum times that samples may be held prior to preparation and/or analysis and still are considered valid.

Matrix Spike (MS): A sample aliquot spiked with a known amount of analyte(s), processed simultaneously with the samples through all the steps of the analytical procedure. The matrix spike recoveries are used to document the bias of a method in a given sample matrix.

Matrix Spike Duplicate (MSD): A replicate sample aliquot spiked with a known amount of analyte(s), processed simultaneously with the samples through all the steps of the analytical procedure. The matrix spike duplicate recoveries are used to document the precision and bias of a method in a given sample matrix.

Method Blank (MB): An analyte-free matrix to which all reagents are added in the same volumes or proportions as used in sample processing. The method blank is processed simultaneously with the samples through all the steps of the analytical procedure. The method blank is used to document contamination resulting from the analytical process.

Sample Duplicate (DUP): A replicate sample which is used to document the precision of a method in a given sample matrix.

Preservation: Refrigeration and/or reagents added at the time of sample collection (or later) to maintain the chemical integrity of the sample.

Surrogate: An organic compound which is similar to the target analyte(s) in chemical composition and behavior, but which is not normally found in environmental samples. Surrogates are used to measure the extraction efficiency.

Blank - an analytical sample designed to assess specific sources of laboratory contamination. See individual types of Blanks: Method Blank, Instrument Blank, Storage Blank, and Leachate Blank.

Class A Glassware - Volumetric laboratory glass that has been manufactured, calibrated and certified to established ASTM volume standards. Class A Glassware does not require volume calibration or verification.

Extraction – The process of removing a desired compound from a matrix using chemical or mechanical procedures. The process is used to isolate and concentrate targeted constituents for instrumental analysis.

Kuderna Danish(K-D) – A three-stage glass solvent concentration device consisting of a large volume receiving flask (250 or 500ml), a small volume concentrator tube and a three-ball air cooled condenser. This device is used to evaporate large volumes of solvent used for organic extractions to increase the concentration of the analyte in the solvent.

Reagent Water - water in which an interferant is not observed at or above the minimum reporting limit of the parameters of interest.

Turbovap Concentrator - A computerized sample concentration device that automatically reduces sample extracts to preset volumes operating unattended.

PowerVap - A computerized sample concentration device that automatically reduces sample extracts.

5. Health and Safety

5.1. The analyst must follow normal safety procedures as outlined in the Accutest Laboratory Safety Manual and Accutest Safety Policy, which includes the use of safety glasses and lab coats. Handle all acids, which are corrosive with care. Flush spills with plenty of water. If acids contact any part of the body, flush with water and contact the supervisor

5.2. The toxicity or carcinogenicity of each reagent used in this method has not been precisely determined; however, treat each chemical as a potential health hazard. Reduce exposure to these reagents to the lowest possible level. The laboratory is responsible for maintaining a current file of OSHA regulations regarding the safe handling of the chemicals specified in this method. A reference file of data handling sheets is available to all personnel involved in these analyses.

6. Interferences

6.1. Solvents, reagents, glassware, and other sample processing hardware may yield artifacts and/or interferences to sample analysis. Demonstrate that these materials are free from interferences under the conditions of the analysis by analyzing method blanks.

6.2. Interferences co-extracted from the samples will vary considerably from source to source. If interferences prevent the analysis of an extracted sample, further cleanup of the sample extract may be necessary.

6.3. Phthalate esters contaminate many products commonly used in the laboratory. Avoid plastics in particular because they contain phthalates, used as plasticizers, which can leach from these materials. Practice sound, consistent materials control to avoid phthalate contamination, which may occur at any time. Soap residue (e.g. sodium dodecyl sulfate), which results in a basic pH on glassware surfaces, may cause degradation of certain analytes. Specifically, Aldrin, Heptachlor, and most organophosphorus pesticides will degrade in this situation. This occurs in glassware that is difficult to rinse (e.g., 500-mL K-D flask). Carefully hand-rinse these items to avoid this problem.

7. Collection, Preservation and Holding Time

7.1. Collect soil samples in 250-mL widemouth glass amber bottles.

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7.2. Collect wipe samples in 150-mL widemouth glass amber bottles.

7.3. Cool and store samples to 0 to ≤6°C until extraction.

7.4. 15 grams of solid samples are required for an extraction. Additional sample volume may be necessary for any samples used for matrix duplicates and matrix spikes.

7.5. Extract samples within 14 days of sampling and analyze the extract within 40 days of the extraction.

7.6. Store extracts at 4°C in amber vials (protected from light) sealed with PTFE-lined septa.

8. Apparatus & Materials

8.1. Beakers - 250 ml or 250 ml Erlenmyer flasks.

8.2. TurboVap concentrator Apparatus(Zymark or equivalent)

8.3. TurboVap concentrator tubes – 200ml

8.4. 2ml crimp vials

8.5. Porous Boiling Chips or Glass beads, solvent extracted.

8.6. Nitrogen blow down apparatus with waterbath, capable of maintaining a temperature of 35°C+/-3°C.(for Florisil Cleanup)

8.7. Top Loading balance, capable of weighing to 0.01g.

8.8. Class A volumetric flasks: 1ml, 5ml, 10ml.

8.9. Disposable wood spatulas

8.10. Glass funnels (large enough to support the filters)

8.11. 1.0ml syringes

8.12. 10ml graduated concentrator tube

8.13. Disposable transfer pipettes

8.14. Fisher P8 filters – or equivalent

8.15. 2ml amber glass vials

8.16. Microwave Extractor - Ethos Ex Microwave Extraction System
- Mars-xpress

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8.17. Microwave extraction vessels – Teflon with pressure cap

9. Reagents

9.1. Hydromatrix – drying agent. Pre-cleaned or heated to 400°C for 4 hours in a shallow tray.

9.2. Reagent grade inorganic chemicals shall be used in all tests. Unless otherwise indicated, it is intended that all inorganic reagents shall conform to the specifications of the Committee on Analytical Reagents of the American Chemical Society, where such specifications are available. Other grades may be used, provided it is first ascertained that the reagent is of sufficiently high purity to permit its use without lessening the accuracy of the determination.

9.3. Organic-free reagent water - All references to water in this method refer to organic-free reagent water, as defined in Chapter One.

9.4. Sulfuric acid, H_2SO_4, (1:1 v/v in water) - Slowly add 50 mL H_2SO_4 to 50 mL of organic-free reagent water.

9.5. Sodium sulfate (granular, anhydrous), Na_2SO_4 - Purify by heating at 400°C for 4 hours in a shallow tray, or by pre-cleaning the sodium sulfate with methylene chloride. If the sodium sulfate is pre-cleaned with methylene chloride, a method blank must be analyzed, demonstrating that there is no interference from the sodium sulfate.

9.6. Solvents

9.6.1. Hexane, $CH_3(CH_2)_4CH_3$ - Pesticide quality or equivalent.
9.6.2. Acetone, CH_3COCH_3 - Pesticide quality or equivalent.
9.6.3. Methanol, CH_3OH - Pesticide quality or equivalent.
9.6.4. Methylene Chloride CH2Cl2 – Pesticide quality or equivalent

9.7. Pesticide & PCB Samples

9.7.1. Surrogate and Matrix Spiking Solutions. See analytical SOP for target compound specifications.

9.7.2. Pesticide Surrogate: SW 846-8081B & 8082A (Ultra ISM-320-1 or equivalent)

9.7.2.1. Prepare surrogate from a 200 ug/ml solution of decachlorobiphenyl / Tetrachloro-m-Xylene obtained from commercial sources. Dilute the commercial stock 1:500 in acetone. The final solution concentration is 400 ng/ml.

9.7.3. Pesticide Matrix Spike Target Compound: SW 846-8081B(Ultra PPM-808C-1 or equivalent)

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9.7.3.1. Prepare target compound spike from a 1000 ppm stock solution of the target organochlorine pesticides obtained from commercial sources.

9.7.3.2. Dilute the commercial stock 1:40 in acetone. The final solution concentration is 250 ng/ml.

9.7.3.3. Prepare a Toxaphene spike if required from a 100 µg/ml stock solution obtained from commercial sources. Dilute the commercial stock 1:20 in acetone. The final solution concentration is 5 µg/ml. (Ultra PP-271 or equivalent)

9.7.4. Prepare a Chlordane spike if required from a 100 µg/ml stock solution obtained from commercial sources. Dilute the commercial stock 1:25 in acetone. The final solution concentration is 4 µg/ml.(Ultra PP-151 or equivalent)

9.7.5. PCB Target Compound: SW 846-8082A(Ultra PPM-8082-1 or equivalent)

9.7.5.1. Prepare target compound spike from a 1000 ug/ml solution of Aroclor 1016 and Aroclor 1260 obtained from commercial sources.

9.7.5.2. Dilute the commercial stock 1:500 in acetone. The final solution concentration is 2.0 ug/ml.

9.8. DRO Spike and Surrogate Solutions

9.8.1. DRO Surrogates: 50 ppm solution in acetone (o-terphenyl, tetracosane-d50, 5αAndrostane)

9.8.2. DRO spike is prepared with DRO Target Compound Solution (Diesel Fuel #2) 1000ppm in acetone.

10. Procedure

10.1. Procedure for Pest/PCB extraction

10.1.1. The extraction of all samples must be documented in the extraction logbook. The log will include such items as: sample ID, bottle number, initial amount, final volume, solvent lot numbers, spike and surrogate lot numbers, batch numbers, and dates. The extraction technician is responsible for filling out all the required information on the prep sheet. A copy of the prep sheet will be submitted to the GC analyst with the extracts.

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10.1.2. Decant any free liquid from the solid sample. Remove any foreign objects such as twigs or rocks. Thoroughly mix the sample with a disposable wooden spatula. Samples that are tightly packed or contain obvious layers may need to be transferred to a larger container for proper mixing.

10.1.3. On a top loading balance weigh out approximately 15 grams of sample into a glass jar, record the weight to the nearest 0.1 gram in the Prep Logbook. Add between 3-5 grams of Hydromatrix to dry the sample. Additional Hydromatrix may be added depending on the sample. Mix the sample and the Hydromatrix so that it is free flowing, not clumpy. Appropriately label microwave extraction vessels and transfer the sample to the vessel. Use a clean spatula for each sample.

10.1.3.1. If using sodium sulfate as the drying agent, use about 15 grams for each sample. Additional sodium sulfate may be used as needed. The sample should be free flowing, not clumpy.

10.1.4. QC Samples. This includes the method blank (MB), blank spike (BS), matrix spike (MS), and matrix spike duplicate (MSD). Use 15 grams of hydromatrix and/or clean sand for the MB and BS. Use additional 15 gram aliquots of a sample for the MS and MSD. Mix with 3-5 grams of Hydromatrix. If there is insufficient sample amount, a lesser amount may be used. Record the weight to the nearest 0.1g. Record the sample ID, bottle number, and weight on the prep sheet.

10.1.5. Using a syringe add 1ml of surrogate solution to each of the samples including the QC samples.

10.1.5.1. Two spiking solutions are used for Pest/PCB samples. If the samples are to be analyzed for "pesticides" only, use the **Pesticide** spiking solution. If the samples are to be analyzed for "PCBs" only, use the **PCB** spiking solution. If the samples are to be analyzed for both "pesticides" and "PCBs" two separate sets of QC (BS, MS, and MSD) must be prepared, one using the **Pesticide** spiking solution and one using the **PCB** spiking solution.

10.1.6. Using a syringe add 1ml of the appropriate spike solutions to the BS, MS, and MSD. Record the spike lot number on the prep sheet.

10.1.7. Immediately add 20ml of hexane and 10ml of acetone to each of the microwave extraction vessels. Alternately, prepare a large volume of 2:1 hexane/acetone solution and add 30ml.

10.1.8. Attach the pressure cap and tighten using the cap tool.

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10.1.9. Invert each capped extraction vessel to mix.

10.1.10. Place all of the extraction vessels for the batch into the carousel. Load the carousel into the Microwave extractor.

10.1.11. Load the PPCB8082 method into the microwave. Method is named PPCB8082.The microwave extractor will monitor the temperature of each vessel and adjust the power as needed.

10.1.12. Open the microwave and remove the carousel. Allow the extraction vessels to cool to room temperature.

10.1.13. Label the TurboVap/PowerVap tubes and place them in the metal support racks. Place a glass filter funnel containing filter paper and sodium sulfate on the top of each tube.

10.1.14. After the extraction vessels have cooled, shake them to mix the solvent and sample. Remove each cap and pour the entire sample and solvent mix into the appropriate funnels.

10.1.15. Rinse each tube with hexane and transfer that to the appropriate funnel.

10.1.16. Allow the solvent to drain through the sample.

10.1.17. Remove the filter funnel and swirl the extract.

10.1.18. Concentrating Pest/PCB samples. Samples may be concentrated by use of a TurboVap or PowerVap.

10.1.18.1. TurboVAp: The sample can be concentrated using a TurboVap. Set the water bath temperature for the TurboVap to 55 °C to a maximum temperature of 60°C. Place the tube in the TurboVap. If the bath is too hot, the more volatile compounds may be lost during this step. Concentrate the extract to approximately 1ml. (Note: If the extract will not concentrate to 1ml, choose the next appropriate final volume. Be sure to record the final volume in the extraction logbook.

10.1.18.2. Remove the TurboVap tube and place it in the metal support rack to allow it to cool.

10.1.18.3. Transfer the extract to a clean Class A, 10ml graduated cylinder. Adjust the final volume to 10ml. Use a transfer pipet to thoroughly mix the extract.

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10.1.18.4. PowerVap procedure. Turn on the heating switch and all positions of the Powervap to " manual." Place hexane in a receiver and place it in one of the cells of the unit. Let the unit run for approximately 15 minutes, then record the temperature by placing a thermometer in a tube filled with hexane. The temperature of the hexane should be 60°C.

10.1.18.5. Pour the extract into the glass receiver and place in the unit. Monitor the process and concentrate the extract to approximately 1ml.

10.1.18.6. Remove the concentrated extract, let it cool and using a Class A graduated cylinder, bring the final volume to 10 ml. Use a transfer pipet to mix the sample thoroughly.

10.1.19. Transfer the extract into two 2-ml screw cap vials. One to be used for the cleanup process and one as a spare.

10.1.20. Extract Cleanup Methods for Pest/PCB extracts.

10.1.20.1. Acid Cleanup Procedure used for all PCB extracts only.

10.1.20.1.1. Each vial should contain about 2ml of extract.

10.1.20.1.2. Add 2ml of concentrated H_2SO_4 to each of the vials. Cap the vial and shake for one minute.

10.1.20.1.3. Allow the extracts to stand for 10 minutes. Transfer the hexane layer (top) to an appropriately labeled 2.0ml screw cap vial.

10.1.20.1.4. Store the extracts in the "extract refrigerator" until they are needed for analysis.

10.1.20.2. Sulfur Cleaning Procedure (Copper option) used for all Pesticide and PCB extracts.

10.1.20.2.1. Each 2ml vial should contain about 1 - 1.5ml of extract.

10.1.20.2.2. Add copper and allow the extracts to stand for at least 1 hour prior to analysis. Extracts may be stored in contact with the copper.

10.1.20.2.3. Store the extracts in the "extract refrigerator" until they are needed for analysis.

10.1.20.3. If additional cleanup methods are required, see the Extraction Supervisor.

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10.2. Procedure for Diesel Range Organics(DRO) Extraction

10.2.1. The extraction of all samples must be documented in the extraction logbook. The log will include such items as: sample ID, bottle number, initial amount, final volume, solvent lot numbers, spike and surrogate lot numbers, batch numbers, and dates. The extraction technician is responsible for filling out all the required information on the prep sheet. A copy of the prep sheet will be submitted to the GC analyst with the extracts.

10.2.2. Decant any free liquid from the solid sample. Remove any foreign objects such as twigs or rocks. Thoroughly mix the sample with a disposable wooden spatula. Samples that are tightly packed or contain obvious layers may need to be transferred to a larger container for proper mixing.

10.2.3. Using a top loading balance weigh out approximately 105 grams of sample into a glass jar, record the weight to the nearest 0.1 gram in the Prep Logbook. Add between 3-5 grams of Hydromatrix to dry the sample. Additional Hydromatrix may be added depending on the sample. Mix the sample and the Hydromatrix so that it is free flowing, not clumpy. Appropriately label microwave extraction vessels and transfer the sample to the vessel. Use a clean spatula for each sample.

10.2.3.1. If using sodium sulfate as the drying agent, use about 15 grams for each sample. Additional sodium sulfate may be used as needed. The sample should be free flowing, not clumpy.

10.2.4. QC Samples. This includes the method blank (MB), blank spike (BS), matrix spike (MS), and matrix spike duplicate (MSD). Use 15 grams of hydromatrix and/or clean sand for the MB and BS. Use additional 10 gram aliquots of a sample for the MS and MSD. Mix with 3-5 grams of Hydromatrix. If there is insufficient sample amount, a lesser amount may be used. Record the weight to the nearest 0.1g. Record the sample ID, bottle number, and weight on the prep sheet.

10.2.5. Using a syringe add 1ml of surrogate solution to each of the samples including the QC samples.

10.2.6. Using a syringe add 1ml of the appropriate spike solutions to the BS, MS, and MSD. Record the spike lot number on the prep sheet.

10.2.7. Immediately add 15ml of methylene Chloride and 15 ml of acetone to each of the microwave extraction vessels. Alternately, prepare a large volume of 1:1 methylene chloride/acetone solution and add 30ml.

10.2.8. Attach the pressure cap and tighten using the cap tool.

10.2.9. Invert each capped extraction vessel to mix.

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10.2.10. Place all of the extraction vessels for the batch into the carousel. Load the carousel into the Microwave extractor.

10.2.11. Load the PPCB8082 method into the microwave. The same program is used for Pesticide, PCB and DRO extraction. The microwave extractor will monitor the temperature of each vessel and adjust the power as needed.

10.2.12. Open the microwave and remove the carousel. Allow the extraction vessels to cool to room temperature.

10.2.13. Label the TurboVap/PowerVap tubes and place them in the metal support racks. Place a glass filter funnel containing filter paper and sodium sulfate on the top of each tube.

10.2.14. After the extraction vessels have cooled, shake them to mix the solvent and sample. Remove each cap and pour the entire sample and solvent mix into the appropriate funnels.

10.2.15. Rinse each tube with hexane and transfer that to the appropriate funnel.

10.2.16. Allow the solvent to drain through the samples.

10.2.17. Remove the filter and swirl the extract.

10.2.18. Concentrating DRO samples samples by Turbo-vap or Power-vap.

10.2.18.1. TurboVAp: The sample can be concentrated using a TurboVap. Set the water bath temperature for the TurboVap to 40 °C to a maximum temperature of 60°C. Place the tube in the TurboVap. If the bath is too hot, the more volatile compounds may be lost during this step. Concentrate the extract to approximately 1ml. (Note: If the extract will not concentrate to 1ml, choose the next appropriate final volume. Be sure to record the final volume in the extraction logbook.

10.2.18.1.1. Remove the TurboVap tube and place it in the metal support rack to allow it to cool.

10.2.18.1.2. Transfer the extract to a clean Class A, 1ml volumetric flask. Adjust the final volume to 1ml. Use a transfer pipet to transfer it into a vial.

10.2.18.2. PowerVap option. Turn on the heating switch and all positions of the Powervap to " manual." Place hexane in a receiver and place it in one of the cells of the unit. Let the unit run for approximately 15 minutes, then record the temperature by placing a thermometer in a tube filled with hexane. The temperature of the unit should be set to 40°C.

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10.2.18.2.1. Pour the extract into the glass receiver and place in the unit. Monitor the process and concentrate the extract to approximately 1ml.

10.2.18.2.2. Remove the concentrated extract, let it cool and using a Class A volumetric flask, bring the final volume to 1 ml. Use a transfer pipet to mix the sample thoroughly.

10.2.18.2.3. Transfer the extract into a vial.

10.2.19. Store the extracts in the assigned refrigerator until they are needed for analysis.

11. Calculations

11.1. Not applicable.

12. Quality Assurance

12.1. A method blank and blank spike is required on each day of extraction or every 20 samples, whichever is more frequent.

12.2. A matrix spike/ matrix spike duplicate is required per 20 samples.

12.2.1. For pest/PCBs a separate BSP and MS/MSD set are needed if the sample requires PCBs, Toxaphene and/or chlordane. Therefore, if a sample is to be extracted for pesticides and PCBs, 2 sets of MS/MSDs and BSP are needed.

12.3. Surrogates must be added to all samples and QC samples.

13. Documentation

13.1. All the information required by the extraction logbooks must be completed.

13.2. All standards preparation must be documented in the standards preparation logbook.

13.3. Equipment maintenance logs must be maintained.

14. Data Review & Reporting

14.1. The Organic Prep supervisor reviews all extraction log information for completeness and accuracy prior to the release of sample extracts for analysis,

14.2. The supervisor updates the sample status in the LIMS upon completion of the extraction.

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15. Pollution Prevention & Waste Management

15.1. Users of this method must perform all procedural steps in a manner that controls the creation and/or escape of wastes or hazardous materials to the environment. The amounts of standards, reagents, and solvents must be limited to the amounts specified in this SOP. All safety practices designed to limit the escape of vapors, liquids or solids to the environment must be followed. All method users must be familiar with the waste management practices described in section 16.2.

15.2. Waste Management. Individuals performing this method must follow established waste management procedures as described in the waste management SOP, EHS004. This document describes the proper disposal of all waste materials generated during the testing of samples as follows:

15.2.1. Non-hazardous aqueous waste

15.2.2. Hazardous aqueous wastes

15.2.3. Chlorinated organic solvents

15.2.4. Non-chlorinated organic solvents

15.2.5. Hazardous solid wastes

15.2.6. Non-hazardous solid waste

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Lab Manager _____

QA Manager _____ for Phil Worley

Effective Date 6-8-12

TEST NAME: METHOD 8260B, VOLATILE ORGANIC COMPOUNDS BY GAS CHROMATOGRAPHY/ MASS SPECTROMETRY (GC/MS)

METHOD REFERENCE: SW846 8260B (Revision 2, December 1996)

Revised Sections: 7.1.1.5(temp 0-<6°C), 7.2.1.1(pH),10.4.3(CCV requirements-entire section)
Deleted Section 10.4.4(info placed in 10.4.3), 10.4.5 renumber as 10.4.4
Added Section: 10.4.3.2.1, 10.4.3.2.2

1.0 SCOPE AND APPLICATION

1.1 This SOP describes the analytical procedures, which are utilized by Accutest to acquire samples for analysis of volatile organic compounds by gas chromatographic/mass spectrometric (GC/MS) following purge and trap utilizing the internal standard technique. The compounds in Table 1 may be determined by this method. An option has been included for the analysis of 1,4-Dioxane by selected ion monitoring GC/MS (GC/SIM-SIM).

1.2 This analytical method is designed for nearly all types of samples, regardless of water content, including ground water, aqueous sludges, liquors, waste solvents, oily wastes, tars, filter cakes, sediments and soils.

1.3 The applicable concentration range of this method is compound, matrix, and instrument dependent. Volatile water-soluble compounds can be included in this analytical technique. However, for some low-molecular weight halogenated hydrocarbons, aromatics, ketones, nitriles, acetates, acrylates, ethers, and sulfides, quantitation limits are approximately ten times higher because of poor purging efficiency. Determination of some structural isomers (i.e. xylenes) may also be hampered by coelution.

2.0 SUMMARY OF METHOD

2.1 Volatile compounds are introduced into the gas chromatograph by purge-and-trap (Method 5030/5035). Method 5030 may be used directly on ground water samples. Method 5035 is used for low-concentration and medium-concentration soils, sediments, and wastes. Medium concentration samples are preserved and stored in methanol prior to purge-and-trap analysis.

2.2 An inert gas is bubbled through a 5 ml sample contained in a specifically designed purging chamber at ambient temperature. The purgeables are efficiently transferred from the aqueous phase to the vapor phase. The vapor is swept through a sorbent column where the purgeables are trapped. After purging is completed, the sorbent column is heated and backflushed with the inert gas to desorb the purgeables onto a gas chromatographic (GC) column.

2.3 The volatile compounds are separated by the temperature programmed GC column and detected using a mass spectrometer, which is used to provide both qualitative and quantitative information.

2.4 The peaks detected are qualitated by comparison to characteristic ions and retention times specific to the known target list of compounds.

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2.5 Once identified the compound is quantitated by comparing the response of major (quantitation) ion relative to an internal standard technique with an average response factor generated from a calibration curve.

2.6 Additional unknown peaks with a response > 10 % of the closest internal standard may be processed through a library search with comparison to a database of approximately 75,000 spectra. An estimated concentration is quantitated by assuming a response factor of 1.

2.7 Water soluble volatile organic and other poor purging compounds maybe analyzed using this methodology, however this method is not the method of choice for these compounds and the laboratory's ability to achieve all calibration and quality control criteria for this method cannot be guaranteed. These compounds are noted as (pp) in Table 7.

2.8 The method includes an analytical option for the analysis of 1,4-Dioxane by GC/MS-SIM. The selected ions that are characteristic of the analytes of interest are analyzed using lower concentrations of calibration standards under the same MS conditions. SIM analysis is performed upon client request and is documented in the report.

3.0 REPORTING LIMIT AND METHOD DETECTION LIMIT

3.1 Reporting Limit. The reporting limit for this method is established at the lowest concentration standard in the calibration curve and may vary depending on matrix interferences, sample volume or weight and percent moisture. Detected concentrations below this concentration cannot be reported without qualification. See Table 10.

3.1.1 Compounds detected at concentrations between the reporting limit and MDL are quantitated and qualified as "J", estimated value. Program or project specifications may dictate that "J" qualified compounds are not to be reported.

3.2 Method Detection Limit. Experimentally determine MDLs using the procedure specified in 40 CFR, Part 136, Appendix B. This value represents the lowest reportable concentration of an individual compound that meets the method qualitative identification criteria.

3.2.1 Experimental MDLs must be determined annually for this method.

3.2.2 Process all raw data for the replicate analysis in each MDL study. Forward the processed data to the QA group for archiving.

4.0 DEFINITIONS

BLANK - an analytical sample designed to assess specific sources of laboratory contamination. See individual types of Blanks: Method Blank, Instrument Blank, Storage Blank, Cleanup Blank and Sulfur Blank.

4-BROMOFLUOROBENZENE (BFB) - the compound chosen to establish mass spectral instrument performance for volatile (VOA) analyses.

CALIBRATION FACTOR (CF) - a measure of the gas chromatographic response of a target analyte to the mass injected. The calibration factor is analogous to the Relative Response Factor (RRF) used in the Volatile and Semivolatile fractions.

CONTINUING CALIBRATION - analytical standard run every 12 hours to verify the initial calibration of the system.

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CONTINUOUS LIQUID-LIQUID EXTRACTION - used herein synonymously with the terms continuous extraction, continuous liquid extraction, and liquid extraction. This extraction technique involves boiling the extraction solvent in a flask and condensing the solvent above the aqueous sample. The condensed solvent drips through the sample, extracting the compounds of interest from the aqueous phase.

EXTRACTED ION CURRENT PROFILE (EICP) - a plot of ion abundance versus time (or scan number) for ion(s) of specified mass (Es).

INITIAL CALIBRATION - analysis of analytical standards for a series of different specified concentrations; used to define the linearity and dynamic range of the response of the mass spectrometer to the target compounds.

INTERNAL STANDARDS - compounds added to every standard, blank, matrix spike, matrix spike duplicate, sample (for volatiles), and sample extract (for semivolatiles) at a known concentration, prior to analysis. Internal standards are used as the basis for quantitation of the target compounds.

MATRIX - the predominant material of which the sample to be analyzed is composed. For the purpose of this SOP, a sample matrix is either water or soil/sediment. Matrix is not synonymous with phase (liquid or solid).

MATRIX SPIKE - aliquot of a matrix (water 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.

MATRIX SPIKE DUPLICATE - a second aliquot of the same matrix as the matrix spike (above) that is spiked in order to determine the precision of the method.

METHOD BLANK - an analytical control consisting of all reagents, internal standards and surrogate standards that is carried throughout the entire analytical procedure. The method blank is used to define the level of laboratory, background and reagent contamination.

METHOD DETECTION LIMITS (MDLs) - The minimum concentration of a substance 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. MDLs should be determined approximately once per year for frequently analyzed parameters.

PERCENT DIFFERENCE (%D) - As used in this SOP and elsewhere to compare two values, the percent difference indicates both the direction and the magnitude of the comparison, i.e., the percent difference may be either negative, positive, or zero. (In contrast, see relative percent difference.)

PERCENT MOISTURE - an approximation of the amount of water in a soil/sediment sample made by drying an aliquot of the sample at 105°C. The percent moisture determined in this manner also includes contributions from all compounds that may volatilize at or below 105 °C, including water. Percent moisture may be determined from decanted samples and from samples that are not decanted.

PRIMARY QUANTITATION ION - a contract specified ion used to quantitate a target analyte.

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REAGENT WATER - water in which an interferant is not observed at or above the minimum detection limit of the parameters of interest.

RECONSTRUCTED ION CHROMATOGRAM (RIC) - a mass spectral graphical representation of the separation achieved by a gas chromatograph: a plot of total ion current versus retention time.

RELATIVE PERCENT DIFFERENCE (RPD) - As used in this SOP and elsewhere to compare two values, 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. (In contrast, see percent difference.)

RELATIVE RESPONSE FACTOR (RRF) - a measure of the relative mass spectral response of an analyte compared to its internal standard. Relative Response Factors are determined by analysis of standards and are used in the calculation of concentrations of analytes in samples.

RELATIVE RETENTION TIME (RRT) - the ratio of the retention time of a compound to that of a standard (such as an internal standard).

INSTRUMENT BLANK – a system evaluation sample containing lab reagent grade water with internal standards and surrogate standards added. An instrument blank is used to remove and/or evaluate residual carryover from high level standards, spike samples and field samples.

5.0 HEALTH & SAFETY

5.1 The analyst must follow normal safety procedures as outlined in the Accutest Health and Safety Plan and Personal Protection Policy, which include the use of safety glasses and lab coats. In addition, all acids are corrosive and must be handled with care. Flush spills with plenty of water. If acids contact any part of the body, flush with water and contact the supervisor.

5.2 The toxicity or carcinogenicity of each reagent used in this method has not been precisely determined; however, each chemical must be treated as a potential health hazard. Exposure to these reagents must be reduced to the lowest possible level. The laboratory is responsible for maintaining a current awareness file of OSHA regulations regarding the safe handling of the chemicals specified in this method. A reference file of data handling sheets must be made available to all personnel involved in these analyses.

5.3 The following analytes covered by this method have been tentatively classified as known or suspected, human or mammalian carcinogens: benzene, carbon tetrachloride, 1,4-dichlorobenzene, 1,2-dichlorethane, hexachlorobutadiene, 1,1,2,2-tetrachloroethane, 1,1,2-trichloroethane, chloroform, 1,2-dibromoethane, tetrachloroethene, trichloroethene, and vinyl chloride. Primary standards of these toxic compounds must be prepared in a hood. A NIOSH/Mass approved toxic gas respirator should be worn when the analyst handles high concentrations of these toxic compounds.

6.0 INTERFERENCES

6.1 The data from all blanks, samples, and spikes must be evaluated for interferences.

6.2 Impurities in the purge gas, organic compounds out-gassing from the plumbing ahead of the trap, and solvent vapors in the laboratory account for the majority of contamination problems. The analytical system must be demonstrated to be free from contamination under the conditions of the analysis by running laboratory reagent blanks. The use of non-TFE tubing, non-TFE thread sealants, or flow controllers with rubber components in the purging device should be avoided.

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6.3 Samples can be contaminated by diffusion of volatile organics (particularly methylene chloride and fluorocarbons) through the septum seal into the sample during shipment and storage. A trip blank prepared from reagent water and carried through the sampling and handling protocol can serve as a check on such contamination.

6.4 Contamination by carry-over can occur whenever high level and low-level samples are sequentially analyzed.

6.4.1 Whenever an unusually concentrated sample is encountered, it should be followed by an analysis of an instrument blank to check for cross contamination. Refer to Table 11 for compounds that may cause carryover for this method.

6.4.2 It may be necessary to wash the purging device with methanol, rinse it with organic-free water, and then dry the purging device in an oven at 105^0 C. Follow the instrument manual for instructions on cleaning. Document the occurrence in the maintenance log and notify the manager/supervisor.

6.4.2.1 Clean and bake purging tube.

6.4.2.2 Clean or replace purge needle.

6.4.2.3 Clean and bake sample filter or sparge filter.

6.4.2.4 Clean and bake sample loop.

6.4.2.5 Replace trap if necessary.

6.4.2.6 Replace water management module if necessary.

6.4.2.7 Rinse transfer line with methanol. Caution: disconnect the trap before rinsing.

6.4.3 In extreme situations, the entire purge-and trap device may require dismantling and cleaning. Follow the instrument's manual for instructions on disassembly. Document the occurrence in the maintenance log and notify the manager/supervisor. Screening of the samples prior to purge-and-trap GC/MS analysis is highly recommended to prevent contamination of the system. This is especially true for soil and waste samples.

6.4.4 If the contamination has been transferred to gas chromatograph, any of the following approaches may be used to cleanup the instrument.

6.4.4.1 Baking out the column between analyses.

6.4.4.2 Change the injector liner to reduce the potential for cross-contamination.

6.4.4.3 Remove a portion of the analytical column in the case of extreme contamination.

6.4.5 The oven temperature program must include a post-analysis bake out period to ensure that semivolatile hydrocarbons are stripped from the chromatographic column.

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6.4 Special precautions must be taken during the analysis to avoid contamination from methylene chloride and other common laboratory solvents.

6.5.1 The sample storage and analytical area should be isolated from all atmospheric sources of methylene chloride or other common solvents.

6.5.2 Laboratory clothing worn by the analyst should be clean and used in designated areas only. Clothing previously exposed to solvent vapors in the organics sample preparation laboratory can contribute to sample contamination.

7.0 SAMPLE HANDLING AND PRESERVATION AND HOLDING TIME

7.1 HANDLING and PRESERVATION

7.1.1 Water samples

7.1.1.1 Container - 40 ml glass screw-cap VOA vial with Teflon-faced silicone septum. The 40-ml glass VOA vials are pre-cleaned and certified.

7.1.1.2 Collect all samples in duplicate. Test all samples for residual chlorine using test paper for free and total chlorine. If samples contain residual chlorine, three milligrams of sodium thiosulfate should be added for each 40 ml of water sample.

7.1.1.3 Fill sample bottles to overflowing, but do not flush out the dechlorinating agent. Sample should be taken with care so **as** to prevent any air or bubbles entering vials creating headspace.

7.1.1.4 Adjust the pH of all samples to ≤ 2 at the time of collection, but after dechlorination, by carefully adding two drops of 1:1 HCl for each 40 ml of sample. Seal the sample bottles, Teflon face down, and mix for one minute. Or VOA vials containing the preservative(HCL) may be used.

Note: Do not mix the sodium thiosulfate with the HCl in the sample bottle prior to sampling.

7.1.1.5 The samples must be protected from light and refrigerated at 0 - ≤ 6 °C from the time of receipt until analysis.

7.1.2 Soil Samples

7.1.2.1 Refer to the SOP for SW846 Method 5035 for preservation requirement of non-aqueous solids. For Ohio VAP freezing is not allowed; samples must be preserved with sodium bisulfate.

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7.2 HOLDING TIME

7.2.1 Water Samples.

7.2.1.1 All samples are to be analyzed within 14 days of sampling (HCl preserved for aqueous sample) unless otherwise specified by the contract. The sample preservation deficiency is noted in the analytical run logbook when the analyst checks the pH at the bench. If the pH is not <2, the analyst notifies the supervisor, who then notifies Client Service Dept. A comment is added to the result page and Non-Conformance Summary.

7.2.2 Soil Samples

7.2.2.1 Refer to the SOP for SW846 Method 5035 for holding time requirement of non-aqueous solids.

7.2.2.2 All samples are analyzed within 14 days of sampling unless otherwise specified.

8.0 APPARATUS AND MATERIALS

8.1 SYRINGE

8.1.1 10, 25, 50, 100, 500 and 5000 µl graduated syringes, manually held (Hamilton/equiv.).

8.1.2 5 ml and 50 ml glass gas tight syringes with Luerlok end, if appropriate for the purging device.

8.2 BALANCE

8.2.1 Analytical balance capable of weighing 0.0001 gram.

8.2.2 Top loading balance capable of weighing 0.1 gram.

8.3 PURGE AND TRAP DEVICES

8.3.1 The autosampler models are used for purging, trapping and desorbing the sample into GC column.

- O.I. Model 4560 sample concentrator with 4551 vial multi-sampler
- O.I. Model 4560 sample concentrator with 4552 Water/Soil multi-sampler

8.3.2 The sample purge vial must be designed to accept 5 ml samples with a water column at least 3 cm deep.

8.3.3 The auto-sampler is equipped with a heater capable of maintaining the purge chamber at 40 °C to improve purging efficiency. The heater is to be used for low level soil/sediment analysis, but not for water or medium level soil/sediment analysis.

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8.3.4 The OI #10 trap is 42 cm with an inside diameter of 0.105 inches. The trap must be packed to contain the following absorbents (3-ring) and should be conditioned at 180 °C for 30 minutes by backflushing with a Helium gas flow at least 20 ml/min before initial use.

- Tenax (2,6-Diphenylene oxide polymer).
- Silica gel.
- Carbon Molecule Sieve (CMS).

8.3.5 The desorber should be capable of rapidly heating the trap to 190^0 C for desorption. Do not exceed 210 ^{0}C during bake-out mode. Alternatively, follow manufacturer's instructions.

8.3.6 The response of chloromethane and bromonethane can be tracked for thermal decomposition products formed. If levels over the calibration requirement, the trap must be replaced and the system re-calibrated after the manager/supervisor been notified.

8.4 GAS CHROMATOGRAPH/MASS SPECTROMETER SYSTEM

8.4.1 Gas Chromatograph.

8.4.1.1 An analytical system complete with a temperature programmable gas chromatograph and all required accessories including syringes, analytical columns, and gases.

8.4.1.2 The injection port should be suitable for split or splitless with appropriate interface.

8.4.1.3 The narrow bore capillary column is directly coupled to the source for HP-6890 model.

8.4.1.4 The wide bore capillary column is interfaced through a jet separator to the source for HP-5890 model.

8.4.2 Column.

- 75 m x 0.53mm ID x 3 µm film thickness capillary column coated with DB-624 (J&W Scientific), or equivalent. Condition as per manufactures directions.
- 105 m x 0.53mm ID x 3 µm film thickness capillary column coated with HP-VOA, or equivalent. Condition as per manufactures directions.
- 60 m x 0.25mm ID x 1.4 µm film thickness capillary column coated with DB-624 (J&W Scientific), or equivalent. Condition as per manufactures directions.
- 60 m x 0.45mm ID x 1.7 µm film thickness capillary column coated with DB-VRX (J&W Scientific), or equivalent. Condition as per manufactures directions.

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8.4.3 Mass Spectrometer.

8.4.3.1 HP5973 or HP5970 is capable of scanning from 35 to 300 amu every 2 seconds or less, utilizing a 70 volt (nominal) electron energy in the electron impact ionization mode.

8.4.3.2 The mass spectrometer must be capable of producing a mass spectrum which meets all the criteria in Table 3 when injecting or purging 50 ng of the GC/MS tuning standard - Bromofluorobenzene (BFB).

8.4.3.3 SIM Mode – Capable of selective ion grouping at specified retention times for increased compound sensitivity (Table 2a).

8.5 DATA SYSTEM

8.5.1 Data Acquisition and Instrument Control (HP Chemstation) - A computer system is interfaced to the mass spectrometer, which allows the continuous acquisition and storage on a machine-readable media (disc) of all mass spectra obtained throughout the duration of the chromatographic program.

8.5.2 Data Processing (HP Enviroquant) - The software accommodates searching of GC/MS data file for target analytes which display specific fragmentation patterns. The software also allows integrating the abundance of an EICP between specified time or scan number limits. The data system includes the recent version of the EPA/NBS or NIST98 mass spectral library for qualitative searches of non-target compounds present in the chromatogram. The data system flags all data files that have been edited manually by laboratory personnel.

8.5.3 Off line Magnetic Tape Storage Device (Lagato Networker) - The magnetic tape storage device copies data for long-term, off-line storage.

9.0 REAGENTS AND STANDARDS

9.1 Solvent

9.1.1 Methanol: purge-and-trap grade quality or equivalent. Store separately, away from the other solvents.

9.2 Reagent Water

9.2.1 Reagent water is defined as water in which an interferant is not observed at the method detection limit of the parameters of interest.

9.2.2 Reagent water is generated by either passing tap water through a bed of approximately one pound of activated carbon or by using the water purification system at Accutest that is a series of deionizers and carbon cartridges.

9.3 Stock Standard Solutions

9.3.1 Commercially prepared standards used.

9.3.1.1 EPA Method 524.2 Volatiles (78 components): Absolute (or equivalent) at 200 µg/ml or 2,000 µg/ml concentration.

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9.3.1.2 Custom Volatiles Mix A: Restek (or equivalent) at 2,000 µg/ml concentration.

9.3.1.3 Custom Volatiles Mix B: Restek (or equivalent) at 2,000 - 100,000 µg/ml concentration.

9.3.1.4 VOC Gas Mixture: Ultra (or equivalent) contains 200 µg/ml or 2,000 µg/ml of the following compounds in methanol.

- Bromomethane
- Chloroethane
- Chloromethane
- Dichlorodifluoromethane
- Trichlorofluoromethane
- Vinyl Chloride

9.3.1.5 Multiple neat compounds.

9.3.1.6 Surrogate standard mixture: Ultra (or equivalent) at a concentration of 2,500 µg/ml each surrogate compound.

- 1,2-Dichloroethane-d_4
- Dibromofluoromethane
- Toluene-d_8
- 4-Bromofluorobenzene

9.3.1.7 Internal standard mixture: Ultra (or equivalent) at a concentration of 2,000 µg/ml for all the compounds except Tert Butyl Alcohol-d_9, which is from Absolute (or equivalent) at a concentration of 50,000 µg/ml. The following five internal standards are used that exhibit similar analytical behavior to the compounds of interest.

- 1,4-Dichlorobenzene-d_4
- 1,4-Difluorobenzene
- Chlorobenzene-d_5
- Pentafluorobenzene
- Tert Butyl Alcohol-d_9

9.3.1.8 1,4-Dioxane Solution for SIMS : Ultra (or equivalent) at 100 µg/ml in methanol

9.3.2 Unopened stock standard (ampoules) must be stored according to manufacturer's documented holding time and storage temperature recommendations (usually placed on the ampoule).

9.3.3 After opened, stock standards, internal standards, and surrogate solutions must be replaced after 6 months (one month for purgeable gases standard) or sooner if manufacture expiration date come first or comparison with quality control check samples indicates degradation.

9.3.4 Store all stock standards in vials with minimal headspace and Teflon lid liners after open, protect from light, and refrigerate to –10°C or colder or as recommended by the standard manufacturer.

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9.3.5 Return the standards to the freezer as soon as the analyst has completed mixing or diluting the standards to prevent the evaporation of volatile target compounds.

9.4 Internal Standard and Surrogate Solution

9.4.1 Five internal standard and surrogate spiking solutions are prepared in methanol per Table 8.A.

9.4.1.1 25 µg /ml internal standard and surrogate mixture.

9.4.1.2 250 µg /ml internal standard and surrogate mixture.

9.4.1.3 100 µg/ml surrogate mixture.

9.4.1.4 25 µg /ml internal standard mixture.

9.4.1.5 250 µg /ml internal standard mixture.

9.4.2 A calibration range must be constructed for the surrogate compounds. Accordingly, appropriate amounts of surrogates are mixed with each calibration solution to define a range similar to the target compounds.

9.4.3 Each 5 ml sample, QC sample, and blank undergoing analysis should be spiked with any one of the above spiking solutions (depending upon the type of standards addition modules used), resulting in a concentration of 50 µg/l of each compound.

9.4.4 Prepare fresh internal standard and surrogate spiking solutions every six months, or sooner, if manufacturer's expiration dates come first or if the solution has degraded or evaporated.

9.5 Secondary Dilution Standards

9.5.1 Using stock standard solutions, prepare secondary dilution standards in methanol containing the compounds of interest, either singly or mixed together.

9.5.1.1 100 µg /ml V8260 mixture: prepared from 2,000 µg /ml stock solution. (see Table 8-C)

9.5.1.2 100 µg /ml V8260 custom mixture: prepared from 2,000 µg /ml stock solution. (see Table 8-C)

9.5.1.3 100 µg /ml Gas mixture: prepared from 2,000 µg /ml stock solution. (see Table 8-C)

9.5.2 Replace after one month for non-gas mixtures (one week for gas mixtures) or sooner if manufacture expiration date come first or comparison with quality control check samples indicates degradation.

9.5.3 Store all secondary dilution standards in vials with no headspace and Teflon lid liners, protect from light, and refrigerate to – 10°C or colder or according to manufacturer's storage temperature recommendation.

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9.5.4 Return the standards to the freezer as soon as preparation is finished to prevent the evaporation of volatile compounds.

9.6 Aqueous Calibration Standard Solutions

9.6.1 Initial Calibration Standards

9.6.1.1 Prepare a minimum of five aqueous calibration standard solutions containing the surrogate compounds as Table 8-D.1 or 8-D.2.

9.6.1.2 To prepare a calibration standard, add a measured volume of secondary dilution standard solutions and the surrogate spiking solution to an aliquot of reagent water in the flask. Use a micro-syringe and rapidly inject the methanol standard into the expanded area of the filled volumetric flask. Remove the needle as quickly as possible after injection. Bring to volume. Mix by inverting the flask three times only. Discard the contents contained in the neck of the flask.

9.6.1.2.1 1,4-Dioxane for SIMS analysis is prepared from primary stock standard (100ppm).

9.6.2 Continuing Calibration Standard

9.6.2.1 A continuing calibration standard at a concentration of 50 µg/l is prepared as the scheme outlined in Table 8-E.

9.6.3 Aqueous standards are not stable and may be stored up to 24 hours if held in Teflon sealed screw-cap vials with zero headspace at 4^0C ($\pm 2^0$C). Protect the standards from light. If not so stored, they must be discarded after use, unless they are set up to be purged by an autosampler.

9.6.4 When using an autosampler, standards may be retained up to 12 hours if they are in purge tubes connected via the autosampler to the purge and trap device.

9.7 Second Source Calibration Check Standard (ICV)

9.7.1 Prepare the second source calibration check standards from separate sources of stock standards from the calibration curve following the procedures in Section 9.6. At a minimum, an ICV should be analyzed with every initial calibration.

9.7.2 For 1,4-Dioxane via SIMS: Prepare the second source calibration check standard using 2.5 µl of a 1000ppm (Absolute or equivalent) to 50 mL of reagent water which yields a 50 ppb standard.

9.8 4-Bromofluorobenzene (BFB) Standard

9.8.1 Two BFB solutions are prepared in methanol per Table 8-B.

9.8.1.1 25 µg /ml solution for direct injection.

9.8.1.2 250 µg /ml solution for purging.

9.8.2 The solution must be replaced after 6 months or sooner if mass spectrum indicates degradation or if manufacture expiration date comes first.

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10.0 CALIBRATION

10.1 Daily Maintenance. Routine Daily maintenance must be performed before any tuning, calibration or sample analysis activities are initiated. These include checks of the following items:

Purge and Trap Device:

Clean & bake purge tube
Bake trap and transfer lines
Check or refill internal/surrogate spike solution on SIM/SAM vials
Clean/replace syringe (if necessary)
Change and refill rinse bottle
Empty and rinse waste bottle

GC Oven: (if necessary)

Change septum
Change liner
Clip column, indicated by carbon build-up

10.2 Initial Calibration

10.2.1 The calibration range covered for routine analysis under RCRA, and SIM, employs standards of 1(specified compounds only), (2)*, 5, 10, 20, 50, 100, 200,(300 or 400)* µg/l. (*instrument dependent). A minimum of five standards must be run sequentially. The low calibration standard defines the reporting limit. Lower concentration standards (1.0 or 2.0 µg/l) may be needed to meet the reporting limit requirements of state specific regulatory programs. Refer to Table 8-D-1 and 8-D-2 for calibration standard preparation.

10.2.2 A calibration range must be constructed for each surrogate compound. Accordingly, add appropriate amounts of each surrogate compound to the calibration solution to define a range similar to the target compounds.

10.2.2.1 For most samples and spikes both the internal standard and the surrogate are added automatically. When doing an initial calibration surrogates are added manually. In order to compensate for the difference between the automatic and manual surrogate additions a correction factor must be applied to the amount of surrogate added in Table 8-D. To determine the correction factor divide the surrogate concentration from an automatic injection by the surrogate concentration from a manual injection for each of the surrogates. Average the result for each of the surrogates to determine the correction factor. Finally multiply the correction factor by the appropriate amount of surrogate from Table 8-D and add this amount to the standard.

10.2.3 For water and medium-level soil calibration: Transfer and fill up (no air space) each standard to labeled 40 ml vial and cap with Teflon septum, then place the vial into O.I. sample tray.

10.2.4 For low-level soil calibration: Transfer 5 ml of each standard to labeled 40 ml vial and cap with Teflon septum, then place the vial into O.I. sample tray.

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10.2.4.1 When calibrating for Method 5035 low-level samples, if the sodium bisulfate option was used, add 1g of sodium bisulfate to the 40-ml vial before aliquot 5 ml of each standard into vial otherwise do not add sodium bisulfate. This is equivalent to the amount of sodium bisulfate added to the samples and will maintain a consistent purging efficiency of the compounds. Cap the vial with Teflon septum and place it into O.I sample tray.

10.2.5 The linear range covered by this calibration is the highest concentration standard.

10.2.6 Program the autosampler to add internal standard mixture to each standard. This results in a concentration of 50 µg/l for each internal standard.

10.2.6.1 For O.I. SIM spiker: Automatically adds 10 µl of 25 µg/ml internal standard solution (Section 9.4.1.4) to each standard.

10.2.6.2 For O.I. SAM spiker: Automatically adds 1 µl of 250 µg/ml internal standard solution (Section 9.4.1.5) to each standard.

10.2.7 Analyze the standard solutions using the conditions established in Section 11.0. Whenever the highest concentration standard is analyzed, it is usually followed by the analyses of two reagent water blanks. Further analysis may not proceed until the blank analysis is demonstrated to be free of interferences.

10.2.8 Each analyte is quantitatively determined by internal standard technique using the closest eluting internal standard and the corresponding area of the major ion. See Table 7.

10.2.9 The Response Factor (RF) is defined in Section 13.1. Calculate the mean RF for each target analyte using minimum of five RF values calculated from the initial calibration curve.

10.2.10 For the initial calibration to be valid, the following criteria must be met.

10.2.10.1 Five compounds (System Performance Check Compounds, SPCCs) are checked for a minimum average response factor. The minimum mean response factors are listed in Table 6. If the initial calibration criteria for SPCCs are not achieved, perform corrective action before completing the calibration

10.2.10.2 The % RSD for each individual Calibration Check Compound (CCC) must be less than 30 %. This check is used to identify gross instrument operating problems. If the initial calibration criteria for CCCs are not achieved, perform corrective action before completing the calibration.

10.2.10.3 The percent relative standard deviation (% RSD) (see Section 13.2) of all target analytes must be less than 15 %.

10.2.10.4 If the average response factor criteria cannot be achieved, and if the problem is associated with one or more of the standards, reanalyze the standards and recalculate the RSD. The instrument logbook should have clear documentation as to what the suspected problem was.

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10.2.10.4.1 A calibration standard is allowed to be repeated only once; if the second trial fails, a new initial calibration must be performed. Notify the team leader/manager. Document this occurrence in the instrument log.

10.2.10.5 Alternately, if the average response factor criteria cannot be achieved, the calibration range can be narrowed by dropping the low or high point of the curve.

10.2.10.5.1 The changes to the upper end of the calibration range will affect the need to dilute samples above the range, while changes to the lower end will affect the overall sensitivity of the method. Consider the regulatory limits or action levels associated with the target analytes when adjusting the lower end.

10.2.10.6 If the average response factor criteria still cannot be achieved, employ an alternative calibration linearity model. Specifically, linear regression using a least squares approach may be employed.

10.2.10.6.1 If Linear regression is employed select the linear regression calibration option of the mass spectrometer data system. Do not force the regression line through the origin and do not employ 0,0 as a sixth calibration standard.

10.2.10.6.2 The correlation coefficient (r value) must be ≥0.99 for each compound to be acceptable.

10.2.10.6.3 Perform corrective action and recalibrate if the calibration criteria cannot be achieved.

10.2.10.7 The initial calibration criteria for this method applies to all additional compounds of concern specified by the client.

10.2.10.8 The relative retention times of each target analyte in each calibration standard should agree within 0.06 relative retention time units.

10.3 Initial Calibration Verification (ICV) - Second Source Calibration Check Standard

10.3.1 The calibration is verified with a calibration check standard at 50 µg/l from an external source (Section 9.7). It must be analyzed immediately following the initial calibration.

10.3.2 The percent difference (% D) (Section 13.3) for this standard must meet the criteria of 20% for all the target compounds.

10.3.2.1 If % D is greater than 20%, reanalyze the second source check. If the criteria cannot be met upon re-injection, re-prepare the second source solution using a fresh ampoule and repeat the process.

10.3.2.2 If the %D criteria cannot be achieved after re-preparation of the second source, prepare a third source and repeat the process. Make fresh calibration standards using one of the two standard sources that matches each other and repeat the initial calibration.

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10.4 Continuing Calibration Verification Standard(CCV)

10.4.1 A continuing calibration verification standard at a concentration near mid-level of the initial calibration range (50 µg/l) must be acquired every 12 hrs or at the beginning of each analytical batch.

10.4.1.1 For water and medium level soil analysis: Transfer and fill up (no air space) the calibration verification standard to labeled 40 ml vial and cap with Teflon septum, then place the vial into O.I. sample tray. Analyze as per Section 11.7.

10.4.1.1.1 Vary the concentration of the continuing calibration verification standard on alternate verifications (i.e. every other calibration verification) using an alternative concentration standard. The standard selected must be lower than the midpoint calibration standard.

10.4.1.2 For low-level soil analysis: Transfer 5 ml of the calibration verification standard to labeled 40 ml vial and cap with Teflon septum, then place the vial into O.I. sample tray. Analyze as per Section 11.7.

10.4.1.2.1 When calibrating for Method 5035 low-level samples, if the sodium bisulfate option was used add 1g of sodium bisulfate to the 40-ml vial before aliquot 5 ml of the calibration verification standard into vial, otherwise do not use sodium bisulfate. This is equivalent to the amount of sodium bisulfate added to the samples and will maintain a consistent purging efficiency of the compounds. Analyze as per Section 11.7.

10.4.1.3 A continuing calibration standard is analyzed whenever the analyst suspects that the analytical system is out of calibration. If the calibration cannot be verified, corrective action is performed to bring the system into control. Analysis may not continue until the system is under control.

10.4.2 For the continuing calibration to be valid, all of the following specified criteria must be met.

10.4.2.1 The minimum RF for SPCC compound is shown on Table 6. Each SPCC compound in the calibration verification standard must meet its minimum response factor.

10.4.2.2 The percent difference (% D, see Section 13.3) for CCC must be less than 20%.

10.4.2.2.1 If the CCCs and SPCCs are not required analytes, such as the shortlist analysis for BTEX only, then all required project analytes must meet the 20 %D.

10.4.3 If the first continuing calibration verification(CCV) does not meet criteria, a second consecutive standard can be analyzed immediately. If the second CCV fails to meet criteria then corrective actions shall be performed. Such as: auto-tuning, routine system cleaning and routine system maintenance. Notify the team leader/manager.

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10.4.3.1 If the second CCV trial fails, the lab must demonstrate acceptable performance after corrective action with two consecutive passing calibration verifications(CCVs) OR a new initial calibration. The Instrument Logbook and Maintenance Logbook must have clear documented notations as to what the problem was and what corrective action was implemented.

10.4.3.1.1 If the lab has not verified calibration, samples cannot be analyzed.

10.4.3.1.2 However, in the case where samples are analyzed on the system where the CCV does not meet the criteria the data must be flagged.

10.4.3.1.2.1 The data may be usable if the response for the verification exceed high(high bias) and the associated samples are non-detects.

10.4.3.1.2.2 .If the criteria for the CCV is low (low bias), those sample results may be reported only if they exceed a maximum regulatory limit/decision level.

10.4.3.2 If the calibration verification is being performed using an auto sampler for night batch, two (2) vials of standard solution are placed in the device for analysis. The second standard must meet continuing calibration criteria and is used for calibration verification. The second check may be discarded only if there is a purge failure or incorrect spike concentration provided the first calibration standard meets the requirement. In this case, the first calibration standard is used as calibration verification following team leader/manager approval. Document this occurrence on instrument log.

10.4.3.2.1 Both CCVs must be evaluated. If vial 1 fails and vial 2 passes this meets the criteria of 10.4.3 of consecutive and immediate passing CCV.

10.4.3.2.2 If CCV number 2 fails, the analysis cannot continue unless it was determined that there was an isolated mechanical failure.

10.4.4 If any of the internal standard areas change by a factor of two (- 50% to + 100%) or the retention time changes by more than 30 seconds from the midpoint standard of the last initial calibration, the mass spectrometer must be inspected for malfunctions and corrections must be made, as appropriate.

10.4.5.1 Reanalyze the continuing calibration standard. New initial calibration is required if reanalyzed standard continues to fail the internal standard requirements.

10.4.5.2 All samples analyzed while the system was out of control must be reanalyzed following corrective action.

10.5 Corrective Action Maintenance For Failed Tuning and Calibration Procedures

10.5.1 Inability to achieve criteria for instrument tuning or calibration may indicate the need for instrument maintenance. Maintenance may include routine system cleaning and replacement of worn expendables or the need for outside service if the scope of the repair exceeds the capability of the staff.

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10.5.2 If maintenance is performed on an instrument, return to control must be demonstrated before analysis can continue. Return to control is demonstrated as follows:

10.5.2.1 Successful instrument tune using PFTBA.

10.5.2.2 Successful tune verification by the analysis of 4-bromofluorobenzene.

10.5.2.3 Successful initial calibration or continuing calibration.

11.0 PROCEDURE

11.1 Instrument conditions.

11.1.1 Recommended instrument conditions are listed in Table 2 and 2a (SIM only). Modifications of parameters specified with an asterisk are allowed as long as criteria of calibration are met. Any modification should be approved by team leader/manger.

11.1.2 Optimize GC conditions for analyte separation and sensitivity. Once optimized, use the same GC conditions for the analysis of all standards, blanks, samples, and QC samples.

11.2 Purge and Trap Device conditions.

11.2.1 See Table 2.

11.2.2 Daily Maintenance. Routine Daily maintenance must be performed before any tuning, calibration or sample analysis activities are initiated. These include checks of the following items:

Purge and Trap Device:

- Clean & bake purge tube.
- Bake trap and transfer lines.
- Check or refill internal/surrogate spike solution on SIM/SAM vials.
- Clean/replace syringe (if necessary).
- Change and refill rinse bottle.
- Empty and rinse waste bottle.

11.3 Step 1: Daily GC/MS performance check.

11.3.1 Every 12 hours, either

- Inject 2 µl (50 ng) of BFB solution directly on column or
- Purge 10 µg/l of 5ml (50ng) to GC column.

11.3.2 The GC/MS system must be checked to verify acceptable performance criteria are achieved (see Table 3).

11.3.3 This performance test must be passed before any samples, blanks or standards are analyzed. Evaluate the tune spectrum using three mass scans from the chromatographic peak and a subtraction of instrument background.

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11.3.3.1 Select the scans at the peak apex and one to each side of the apex.

11.3.3.2 Calculate an average of the mass abundances from the three scans.

11.3.3.3 Background subtraction is required. Select a single scan in the chromatogram that is absent of any interfering compound peaks and no more than 20 scans prior to the elution of BFB. The background subtraction should be designed only to eliminate column bleed or instrument background ions. Do not subtract part of the tuning compound peak.

11.3.4 If all the criteria are not achieved, the analyst must retune the mass spectrometer with team leader/manager and repeat the test until all criteria are met.

11.3.4.5 Alternatively, an additional scan on each side of the peak apex may be selected and included in the averaging of the mass scans. This will provide a mass spectrum of five averaged scans centered on the peak apex. NOTE: The selection of additional mass scans for tuning may only be performed with supervisory approval on a case by case basis.

11.3.5 The injection time of the acceptable tune analysis is considered the start of the 12-hour clock.

11.3.6 Until performance check is acceptable, then calibration check (step 2) can be analyzed.

11.4 Step 2 : Daily calibration check

11.4.1 Initial calibration

11.4.1.1 Refer to Section 10.2.

11.4.1.2 An initial calibration must be established (or reestablished) on each instrument:

- Prior to any sample analyses;
- Whenever a new column is installed;
- Whenever instrument adjustments that affect sensitivity are made; and
- Whenever a continuing calibration standard fails to meet the specified acceptance criteria, on the second trial.

11.4.2 Initial Calibration Verification - Second Source Calibration Check Standard

11.4.2.1 This standard is only analyzed when initial calibration provided. Refer to Section 10.3.

11.4.3 Continuing Calibration verification standard

11.4.3.1 Refer to Section 10.4.

11.4.4 The method blank (step 3) cannot be analyzed until the continuing calibration verification meets the criteria.

11.5 Step 3 : Method blank

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11.5.1 The acceptable method blank must be analyzed for every 12-hour time period or sooner.

11.5.1.1 Water and medium-level soil samples - Place a 40 ml vial, filled with DI water onto the autosampler.

11.5.1.2 Low-level soil samples without sodium bisulfate - Transfer 5 ml of DI water to a 40 ml vial and cap with Teflon septum, then place the vial into O.I. sample tray.

11.5.1.2.1 Low-level soil samples with sodium bisulfate (Method 5035) - Add 1g of sodium bisulfate to a 40 ml vial before aliquot 5 ml of DI water into the vial and cap with Teflon septum, then place the vial onto the autosampler.

11.5.2 Program the autosampler to add internal standard and surrogate solution to the method blank for a concentration of 50 µg/l for each internal standard and surrogate.

11.5.2.1 For O.I. SIM spiker: Automatically adds 10 µl of 25 µg/ml internal standard and surrogate solution (Section 9.4.1.1) to the method blank.

11.5.2.2 For O.I. SAM spiker: Automatically adds 1 µl of 250 µg/ml internal standard and surrogate solution (Section 9.4.1.2) to the method blank.

11.5.3 No compound can be present above the laboratory's MDL. If common laboratory solvents (i.e. methylene chloride, acetone) are present in the sample between the MDL and RL, the analyst must determine if the contamination will negatively impact data quality. If the contamination impacts data quality, all affected samples must be re-analyzed.

11.5.4 Surrogates must meet recovery criteria specified in house limits.

11.5.5 If the method blank does not meet surrogate criteria or contains target analytes above the MDL, then

11.5.5.1 All samples analyzed following an out of control method blank must be reanalyzed.

11.5.5.2 Check for the potential of contamination interference from the following areas. Make sure all items are free contamination.

- the analytical system,
- dust and vapor in the air,
- glassware and
- Reagents.

11.5.5.3 Re-analyze the method blank following the system evaluation. In this situation, the instrument logbook should have clear documented notations as to what the problem was and what corrective action was implemented to enable the second blank to pass.

11.5.5.4 If re-analyzed method blank remains out of control, notify team leader or manager.

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11.5.6 If two consecutive method blanks are analyzed during unattended operations, the second analysis must meet criteria for the subsequent sample analysis to be valid. Always report the second method blank. The second analysis can only be discarded because of a purge failure provided that the first blank meets the requirement. In this case, the first blank is reported following team leader/manager approval. Document this occurrence on the instrument log.

11.5.7 The blank spike (BS) (step 4) cannot be analyzed until the method blank meets criteria.

11.6 Step 4: Blank spike (BS)

11.6.1 An acceptable blank spike must be analyzed with every analytical batch. The maximum number of samples per analytical batch is twenty.

11.6.2 Spike 50 ml of reagent water with appropriate amount of the standards to prepare a blank spike containing 50 µg/L of each analyte. In situations where lower detection limits are required, a blank spike at 20 µg/L may be prepared. The stock solution for the BS must be from a different source than the initial calibration solution. Refer to Table 8-F for the preparations of the blank spikes.

11.6.2.1 Water and medium-level soil samples - Place a 40 ml vial, filled with DI water onto the autosampler.

11.6.2.2 Low-level soil samples without sodium bisulfate - Aliquot 5 ml of the blank spike into vial and cap with Teflon septum, then place the vial into O.I. sample tray.

11.6.2.2.1 Low-level soil samples with sodium bisulfate for Method 5035 - Add 1g of sodium bisulfate to labeled 40 ml vial before aliquot 5 ml of the blank spike into vial and cap with Teflon septum, then place the vial into O.I. sample tray.

11.6.3 Initiate auto addition of internal standard and surrogate into the syringe per 11.5.2.

11.6.4 Compare the percent recoveries (% R) (see Section 13.5) to the in house limits acceptance criteria. If a blank spike is out of control, all the associated samples must be reanalyzed. The exception is if the blank spike recovery is high and no hits reported in associated samples and QC batch. In that case, the sample results can be reported with footnote (remark) and no further action is required. Or if the blank spike recovery is low and the hits in the samples are above regulatory levels.

11.6.5 Do not analyze samples and MS/MSD (step 5) unless the BS meets acceptance criteria.

11.7 Step 5: Samples /MS/MSD analysis

11.7.1 All samples and standard solutions must be allowed to warm to ambient temperature before analysis.

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11.7.2 Select the sample dilution factor to assure the highest concentration analyte is above the calibration range midpoint, but below the upper limit of the range depend on project requirements. See Table 9 for dilution guideline.

- Utilize FID screen data.
- Utilize acquired sample data.
- Utilize the history program.
- Sample characteristics (appearance, odor).

11.7.3 Water samples.

11.7.3.1 Using O.I.Model 4560 sample concentrator with 4551 or 4552 vial multisampler,

- Place the 40 ml vial in the tray, or
- Load 5ml sample into purge tube if sample volume limited.

11.7.4 Sediment/ soil sample

11.7.4.1 Low-level soil method

11.7.4.1.1 Collect the sample using the procedures detailed in the SOP for SW846 Method 5035 low - level soil samples.

11.7.4.1.2 Weigh out 5 g of each sample into a labeled vial. Add 5 ml of reagent water and cap the vial quickly. Transfer the 40ml vial to the autosampler tray. Stir and heat the sample at the time of analysis.

11.7.4.2 Medium-level soil method

11.7.4.2.1 Collect the sample using the procedures detailed in the SOP for SW846 Method 5035 medium - level soil samples.

11.7.4.2.2 Select a methanol aliquot of appropriate volume (see Table 9) determined via screening and transfer to 40 ml of reagent water.

11.7.5 Program the autosampler to inject the internal standard and surrogate solution into the robotic syringe used to withdraw sample from the 40 ml vial. This addition to 5 ml of sample is equivalent to a concentration of 50 µg/L of each internal standard and surrogate.

11.7.5.1 For O.I. SIM spiker: Automatically adds 10 µl of 25 µg/ml internal standard and surrogate solution (Section 9.4.1.1) to each sample.

11.7.5.2 For O.I. SAM spiker: Automatically adds 1 µl of 250 µg/ml internal standard and surrogate solution (Section 9.4.1.2) to each sample.

11.7.6 Purge the sample for 11 minutes with Helium.

11.7.6.1 Low-level soil sample must be performed at 40 °C while the sample is being agitated with the magnetic stirring bar or other mechanical means.

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11.7.6.2 To improve the purging efficiency of water-soluble compounds, aqueous samples may also be purged at 40 °C as long as all calibration standards, samples and QC samples are purged at the same temperature and acceptable method performance is demonstrated.

11.7.7 One sample is randomly selected from each analytical batch of similar matrix types and spiked in duplicate to determine whether the sample matrix contributes bias to the analytical results. A matrix spike and matrix spike duplicate are performed by spiking the sample for a concentration of 50 µg/l or 50 µg/kg based on 5 g dry weight. In situations where lower detection limits are required, a blank spike at lower concentration may be prepared.

11.7.8 Desorb the sample for 4 minutes by rapidly heating the trap to 190 °C while backflushing with Helium. Desorb time may require performance optimum between 2.0 and 4.0 minutes as dictated by trap manufacturers specifications or instrument characteristics.

11.7.9 Program the purge and trap system to automatically rinse purge tube at least twice with heated organic-free water (reagent water) between analyses to avoid carryover of target compounds. For samples containing large amounts of water-soluble materials, suspended solids, high-boiling compounds, or high purgeable levels, it may be necessary to wash out the purging device with methanol solution between analyses, rinse it with distilled water.

11.7.10 Bake the trap at least 10 minutes at 210 °C to remove any residual purgeable compounds.

11.7.11 If the initial analysis of the sample or a dilution of the sample has a response for any ion of interest that exceeds the working range of the GC/MS system, the sample must be reanalyzed at a higher dilution.

11.7.11.1 When ions from a compound in the sample saturate the detector, this analysis must be followed by the analysis of reagent water blank. If the blank analysis is not free of interferences, then the system must be decontaminated. Sample analysis may not resume until the blank analysis is demonstrated to be free of interferences.

11.8 Sample dilutions

11.8.1 Using Screening Data to Determine Dilution Factors

11.8.1.1 Dilution for High Concentration Analytes Exceeding The Calibration Range

11.8.1.1.1 The highest concentration target compound detected in the screen data is compared to the highest concentration calibration standard used for determinative volatile organics analysis.

11.8.1.1.1.1 Divide the calibration concentration of the highest concentration calibration standard by the screen concentration.

11.8.1.1.1.2 If the result is >1, sample dilution is considered.

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11.8.1.1.2 The result from step 11.8.1.1.1 determines the dilution factor. The dilution factor is targeted to assure that the highest concentration diluted analyte is at the mid-range concentration of the calibration curve for the determinative analysis.

11.8.1.1.3 In all cases a conservative approach to dilution is applied to minimize the increase of detection and reporting limits

11.8.1.2 Dilution for High Concentration Matrix Interferences

11.8.1.2.1 The peak height of the background is compared to the peak height of the later eluting calibration standards from the screening analysis.

11.8.1.2.1.1 A rough estimate of background concentration is calculated by dividing the background peak height by the peak height of the selected screening standard and multiplying by its concentration.

11.8.1.2.2 If the result is >1, sample dilution is considered.

11.8.1.2.3 The result from step 11.8.1.2.1 determines the dilution factor. The dilution factor is targeted to avoid Carry-over contamination between samples and facilitate qualitative and quantitative analysis of target compounds present in the sample.

11.8.1.2.4 In all cases a conservative approach to dilution is applied to minimize the increase of detection and reporting limits

11.8.2 If the concentration of any target compound in any sample exceeds the initial calibration range, a new aliquot of that sample must be diluted and re-analyzed. Until the diluted sample is in a sealed sample vial, all steps in the dilution procedure must be performed without delay.

11.8.3 Water Samples.

11.8.3.1 Prepare all dilutions of water samples in volumetric flasks (10 ml to 100 ml). Intermediate dilutions may be necessary for extremely large dilutions.

11.8.3.2 Calculate the approximate volume of reagent water, which will be added to the volumetric flask, and add slightly less than this quantity to the flask. Refer to Table 9 for dilution guideline.

11.8.3.3 Inject the proper sample aliquot from a syringe into the volumetric flask. Dilute the flask to the volume mark with reagent water. Cap the flask and invert the flask three times.

11.8.3.4 Fill a 40 ml sample vial and seal with a Teflon baked silicon septa, load the diluted sample into the autosampler and analyze according to Section 11.7.

11.8.3 Low-level Soil Samples.

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11.8.3.1 The screening data are used to determine which is the appropriate sample preparation procedure for the particular sample, the low-level soil method or the medium-level soil method.

11.8.3.2 If any target compound exceeds the initial calibration range from the analysis of 5 g sample, a smaller sample size must be analyzed. However, the smallest sample size permitted is 0.5 g. If smaller than 0.5 g sample size is needed to prevent any target compounds from exceeding the initial calibration range, the medium level method must be used.

11.9 Data interpretation

11.9.1 Qualitative identification.

11.9.1.1 The targeted compounds shall be identified by analyst with competent knowledge in the interpretation of mass spectra by comparison of the sample mass spectrum to the mass spectrum of a standard of the suspected compound.

11.9.1.2 The characteristic ions for target compounds that can be determined are listed in Table 7. Table 4 and Table 5 list the characteristic ions for internal standards and surrogate compounds respectively.

11.9.1.3 The criteria required for a positive identification are listed below.

11.9.1.3.1 The sample component must elute at the same relative retention time (RRT) as the daily standard. Criteria are the RRT of sample component must be within ± 0.06 RRT units of the standard component.

11.9.1.3.2 The relative intensities of these ions must agree within ± 30 % between the daily standard and sample spectra. (Example: For an ion with an abundance of 50 % in the standard spectra, the corresponding sample abundance must be between 20 and 80 %.)

11.9.1.3.2.1 Compounds can have secondary ions outside criteria from co-eluting compounds and/or matrix effect that can contribute to ion abundances. The interference on ion ratios can't always be subtracted out by software programs resulting in qualified compound identification.

11.9.1.3.2.2 Quantitation reports display compounds that have secondary ions outside the ratio criteria with a "#" flag.

11.9.1.3.2.3 Any quant reports with compounds that are deemed to be reportable despite the "#" flag, will be initialed in the "#" column by the analyst. Further review to the reporting of qualified compounds will be done by a supervisor or team leader and initialed on the quantitation.

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11.9.1.3.3 Structural isomers that produce very similar mass specrtra should be identified as individual isomers if they have sufficiently different GC retention times. Sufficient GC resolution is achieved if the height of the valley between two isomer peaks is less than 25 % of sum of the two peak heights. Otherwise, structural isomers are identified as isomeric pairs.

11.9.2 Quantitative analysis

11.9.2.1 Once a target compound has been identified, its concentration (Section 13.4) will be based on the integrated area of the quantitation ion, normally the base peak (Table 7). The compound is quantitated by internal standard technique with an average response factor generated from the initial calibration curve.

11.9.2.2 If the sample produces interference for the primary ion, use a secondary ion to quantitate (see Table 7). This is characterized by an excessive background signal of the same ion, which distorts the peak shape beyond a definitive integration. Also interference could severely inhibit the response of the internal standard ion. This secondary ion must also be used to generate new calibration response factors.

11.10 Library search for tentatively identified compounds.

11.10.1 If a library search is requested, the analyst should perform a forward library search of NBS or NIST98 mass spectral library to tentatively identify 15 non-reported compounds.

11.10.2 Guidelines for making tentative identification are listed below.

11.10.2.1 These compounds should have a response greater than 10 % of the nearest internal standard. The response is obtained from the integration for peak area of the Total Ion Chromatogram (TIC).

11.10.2.2 The search is to include a spectral printout of the 3 best library matches for a particular substance. The results are to be interpreted by analyst.

11.10.2.3 Molecular ions present in the reference spectrum should be present in the sample spectrum.

11.10.2.4 Relative intensities of major ions in the reference spectrum (ions > 10 % of the most abundant ion) should be present in the sample spectrum.

11.10.2.5 The relative intensities of the major ions should agree within ± 20 %. (Example: For an ion with an abundance of 50% in the standard spectrum, the corresponding sample ion abundance must between 30 and 70%).

11.10.2.6 Ions present in the sample spectrum but not in the reference spectrum should be reviewed for possible background contamination or presence of coeluting compounds.

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11.10.2.7 Ions present in the reference spectrum but not in the sample spectrum should be verified by performing further manual background subtraction to eliminate the interference created by coeluting peaks and/or matrix interference.

11.10.2.8 Quantitation of the tentatively identified compounds is obtained from the total ion chromatogram based on a response factor of 1 and is to be tabulated on the library search summary data sheet.

11.10.2.9 The resulting concentration should be reported indicating: (1) that the value is estimate, and (2) which internal standard was used to determine concentration. Quantitation is performed on the nearest internal standard.

11.11 An instrument blank is a system evaluation sample containing lab reagent grade water with internal standards and surrogates. An instrument blank is used to remove and or evaluate residual carryover from high level standards, spike samples and field samples. Since target compound lists have expanded to overlap some volatile and semi-volatile compounds, instrument blanks are necessary to remove carryover contamination.

11.11.1 The compounds that may exhibit carryover for this method are listed in Table 11.

11.11.2 If instrument blanks following a standard or spike sample exhibits carrry-over effect, then any samples that show the same carryover profile, after a comparable concentration must be considered suspect and rerun for confirmation. For example, if an instrument blank has 1ppb detected after a 200ppb standard, then any sample following a sample containing 200ppb or above of the same compound must be confirmed for possible carryover.

11.11.3 If an Instrument Blank(s) was run following suspect high concentration samples and it exhibits the same carryover profile after a comparable concentration must be considered suspect and rerun for confirmation.

11.11.4 In some cases, several instrument blanks may have to be run to eliminate contamination from over loaded samples.

11.11.5 The analytical system is considered free of carryover, when no target analytes can be detected above the MDL.

11.12 Selected Ion Monitoring (SIM) Option Selected Ion Monitoring (SIM) Option

11.12.1 Instrument Set-Up: Modify the method for SIM analysis and define ion groups with retention times, ions and dwell times to include base peak ion for the target compounds of interest, surrogates, and internal standards (Table 2a.) Select a mass dwell time of 50 milliseconds for all compounds.

11.12.2 Calibration: Calibrate the mass spectrometer in the selected ion monitoring mode using 6 calibration standards of 5, 10, 20, 50, 100, 200 ug/l. Spike each standard with the SIM specific internal standard solution at 4ug/ml. Calculate individual response factors and response factor RSDs.

11.12.3 Initial Calibration Verification. Verify the initial calibration after its completion using a 50 ug/l calibration standard purchased or prepared from a second standards reference materials source. The initial calibration verification must meet the criteria of Section 10.2.

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11.12.4 Continuing Calibration Verification. Verify the initial calibration every 12 hours using a 50 ug/l calibration. The continuing calibration verification must meet the criteria of Section 10.4.

11.12.5 Surrogate Standard Calculation.. Report surrogate spike accuracy for the surrogates spiked for the full scan GC/MS analysis.

12.0 QUALITY CONTROL

12.1 QC Requirements Summary

BFB	Beginning of the analytical shift and every 12 hours
ICV - Second Source Calibration Check Standard	Following initial calibration
Calibration Verification Standard	Every 12 hours
Method Blank	Every 12 hours
Blank Spike	One per analytical batch*
Matrix Spike	One per analytical batch*
Matrix Spike Duplicate	One per analytical batch*
Surrogate	Every sample and standard
Internal Standard	Every sample and standard

*The maximum number of samples per analytical batch is twenty.

12.2 Daily GC/MS Performance Check - BFB

12.2.1 Refer to Section 11.3.

12.3 Second Source Calibration Check Standard

12.3.1 Refer to Section 10.3.

12.3.2 Calibration Verification Standard

12.3.3 Refer to Section 10.4.

12.5 Method Blank

12.5.1 Refer to Section 11.5.

12.6 Blank Spike

12.6.1 Refer to Section 11.6.

12.7 Matrix Spike (MS)/Matrix Spike Duplicate (MSD)

12.7.1 One sample is selected at random from each analytical batch of similar matrix types and spiked in duplicate to check precision and accuracy.

12.7.2 Assess the matrix spike recoveries (Section 13.5) and relative percent difference (RPD) (Section 13.6) against the control limits..

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12.7.3 If the matrix spike recoveries do not meet the criteria, check the blank spike recovery to verify that the method is in control. If the blank spike did not meet criteria, the method is out of control for the parameter in question and should be reanalyzed or qualified with an estimate of potential bias. Otherwise, matrix interference is assumed and the data is reportable. No further corrective action is required.

12.8 Surrogates

12.8.1 All standards, blanks, samples, and matrix spikes contain surrogate compounds, which are used to monitor method performance. If the recovery of any surrogate compound does not meet the control limits, the result must be flagged and:

12.8.1.1 The calculation must be checked.

12.8.1.2 The sample must be reanalyzed if the recovery of any one surrogate is out of control limit.

12.8.2 If the sample exhibits matrix interference, defined as excessive signal levels from target or non-target interfering peaks. In this case, reanalysis may not be required following team leader/manager approval.

12.8.3 If surrogate recoveries are acceptable upon reanalysis, the data from the reanalysis is reported. If the reanalysis date did not meet the hold time, then both sets of data must be submitted with the reanalysis reported.

12.8.4 If surrogates are still outside control limits upon reanalysis, then both sets of data should be submitted with the first analysis reported.

12.9 Internal Standard

12.9.1 Retention time for all internal standards must be within ± 30 seconds of the corresponding internal standard in the latest continuing calibration or 50 µg/l standard of initial calibration.

12.9.2 The area (Extracted Ion Current Profile) of the internal standard in all analyses must be within 50 to 200 % of the corresponding area in the latest calibration standard (12 hr. time period).

12.9.3 If area of internal standard does not meet control limits, the calculations must be checked. If a problem is not discovered, the sample must be reanalyzed.

12.9.4 If areas are acceptable upon reanalysis, the reanalysis data is reported.

12.9.5 If areas are unacceptable upon reanalysis, then both sets of data are submitted with the original analysis reported.

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13.0 CALCULATION

13.1 Response Factor (RF)

$$RF = \frac{As \times Cis}{Ais \times Cs}$$

where:
As = Area of the characteristic ion for the compound being measured.
Ais = Area of the characteristic ion for the specific internal standard.
Cs = Concentration of the compound being measured (ug/l).
Cis = Concentration of the specific internal standard (ug/l).

13.2 Percent Relative Standard Deviation (% RSD)

$$\%RSD = \frac{SD}{RFav} \times 100$$

where:
SD = Standard Deviation
RFav = Average response factor from initial calibration.

13.3 Percent Difference (%D)

$$\%D = \frac{(RFav - RFcv)}{RFav} \times 100$$

where:
RFcv = Response factor from Calibration Verification standard.
RFav = Average response factor from initial calibration.

13.4 Concentration (Conc.)

For water:

$$\text{Conc. } (\mu g/l) = \frac{Ac \times Cis \times Vp}{Ais \times RF \times Vi}$$

For soil/sediment low level (on a dry weight basis):

$$\text{Conc. } (\mu g/kg) = \frac{Ac \times Cis \times Vp}{Ais \times RF \times Ws \times M}$$

For soil/ sediment medium level (on a dry weight basis)

$$\text{Conc. } (\mu g/kg) = \frac{Ac \times Cis \times Vp \times Vt}{Ais \times RF \times Vme \times Ws \times M}$$

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Where:
Ac = Area of characteristic ion for compound being measured.
Ais = Area of characteristic ion for internal standard.
Cis = Concentration of internal standard
RF = Response factor of compound being measured(from initial calibration)
Vi = Initial volume of water purged (ml)
Vp = 5 ml (Total Purge Volume)
Vme = Volume of Methanol aliquot
Vt = Ml Solvent + ((100-% solid)/100 x Ws)
Ws = Weight of sample extracted (g).
M = (100 - % moisture in sample) / 100 or % solids / 100

13.5 Percent Recovery (% R)

$$\%\ R = \frac{\text{Concentration found}}{\text{Concentration spiked}} \times 100$$

13.6 Relative Percent Difference (RPD)

$$RPD = \frac{|\ MSC - MSDC\ |}{(1/2)\ (MSC+MSDC)} \times 100$$

Where:
MSC = Matrix Spike Concentration
MSDC = Matrix Spike Duplicate Concentration

13.7 Linear regression by the internal standard technique.

$$C_s = \left(\frac{\frac{A_s}{A_{is}} - b}{A} \right) \times C_{is}$$

Where:
Cs = concentration of target analyte
As = Area of target analyte
Cis = concentration of the internal standard
b = Intercept
a = slope of the line

$$a = \frac{N \Sigma xy - \Sigma x \Sigma y}{N \Sigma x^2 - (\Sigma x)^2}$$

$$b = \frac{\Sigma y - a \Sigma x}{N}$$

N = number of points
x = amount of analyte
y = response of instrument

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13.8 Correlation Coefficient

$$r = \frac{\Sigma(x - \bar{x})(y - \bar{y})}{\sqrt{\Sigma(x - \bar{x})^2 \Sigma(y - \bar{y})^2}}$$

Where r = correlation coefficient
x = amount of analyte
y = response of instrument

$\bar{x}$ = average of x values

$\bar{y}$ = average of y values

14.0 DOCUMENTATION

14.1 The Analytical Logbook records the analysis sequence; the logbook must be completed daily. Each instrument will have a separate logbook.

14.1.1 If samples require reanalysis, a brief explanation of the reason must be documented in the Comments section.

14.2 Standards Preparation Logbook must be completed for all standard preparations. All information must be completed; the page must be signed and dated by the appropriate person.

14.2.1 The Accutest lot number must be cross-referenced on the standard vial.

14.3 Instrument Maintenance Logbook must be completed when any type of maintenance is performed on the instrument. Each instrument has a separate log.

14.4 Any corrections to laboratory data must be done using a single line through the error. The initials of the person and date of correction must appear next to the correction.

14.5 Supervisory (or peer) personnel must routinely review (at least once per month) all laboratory logbooks to ensure that information is being recorded properly. Additionally, the maintenance of the logbooks and the accuracy of the recorded information should also be verified during this review.

15.0 POLLUTION PREVENTION & WASTE MANAGEMENT

15.1 Users of this method must perform all procedural steps in a manner that controls the creation and/or escape of wastes or hazardous materials to the environment. The amounts of standards, reagents, and solvents must be limited to the amounts specified in this SOP. All safety practices designed to limit the escape of vapors, liquids or solids to the environment must be followed. All method users must be familiar with the waste management practices described in section 15.2.

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15.2 Waste Management. Individuals performing this method must follow established waste management procedures as described in the waste management SOP, EHS004. This document describes the proper disposal of all waste materials generated during the testing of samples as follows:

15.2.1 Non hazardous aqueous wastes

15.2.2 Hazardous aqueous wastes

15.2.3 Chlorinated organic solvents

15.2.4 Non-chlorinated organic solvents

15.2.5 Hazardous solid wastes

15.2.6 Non-hazardous solid wastes

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Table 1. TARGET COMPOUNDS		
Acetone	1,4-Dichlorobenzene	Methylene Bromide
Acetonitrile	Dichlorodifluoromethane	Methylene Chloride
Acrolein	1,1-Dichloroethane	1-Methylnaphthalene (1)
Acrylonitrile	1,2-Dichloroethane	2-Methylnaphthalene (1)
Allyl Chloride	1,1-Dichloroethene	Naphthalene
Benzene	cis-1,2-Dichloroethene	2-Nitropropane (1)
Benzyl chloride	trans-1,2-Dichloroethene	Pentachloroethane
Bromobenzene	1,2-Dichloropropane	Propionitrile
Bromochloromethane	1,3-Dichloropropane	Propyl Acetate (1)
Bromodichloromethane	2,2-Dichloropropane	n-Propylbenzene
Bromoform	1,1-Dichloropropene	Styrene
Bromomethane	cis-1,3-Dichloropropene	Tert Butyl Alcohol
2-Butanone (MEK)	trans-1,3-Dichloropropene	tert-Amyl Methyl Ether
Butyl Acetate (1)	1,4-Dioxane	tert-Butyl Ethyl Ether
n-Butyl Alcohol (1)	Epichlorohydrin (1)	1,1,1,2-Tetrachloroethane
n-Butylbenzene	Ethyl Acetate	1,1,2,2-Tetrachloroethane
sec-Butylbenzene	Ethyl Ether	Tetrachloroethene
tert-Butylbenzene	Ethyl Methacrylate	Tetrahydrofuran
Carbon Disulfide	Ethylbenzene	Toluene
Carbon Tetrachloride	p-Ethyltoluene (1)	trans-1,4-Dichloro-2-Butene
Chlorobenzene	Freon 113	1,2,3-Trichlorobenzene
Chlorodifluoromethane (1)	Heptane (1)	1,2,4-Trichlorobenzene
Chloroethane	Hexachlorobutadine	1,1,1-Trichloroethane
2-Chloroethyl Vinyl Ether	Hexachloroethane	1,1,2-Trichloroethane
Chloroform	Hexane (1)	Trichloroethene
Chloromethane	2-Hexanone	Trichlorofluoromethane
Chloroprene (2-chloro-1,3-butadiene)	Iodomethane (Methy iodide)	1,2,3-Trichloropropane
o-Chlorotoluene	IsoAmyl Alcohol (1)	1,2,4-Trimethlylbenzene
p-Chlorotoluene	Isobutyl Alcohol	1,3,5-Trimethylbenzene
Cyclohexane (1)	Isopropyl Acetate (1)	2,2,4 Trimethylpentane
Cyclohexanone	Isopropylbenzene	Vinyl Acetate
di-Isobutylene (1)	p-Isopropyltoluene	Vinyl Chloride
di-Isopropyl Ether	Methacrylonitrile	Vinyltoluene (1)
1,2-Dibromo-3-Chloropropane	Methyl Acetate (1)	m,p-Xylene
Dibromochloromethane	3 Methyl-1-Butanol (1)	o-Xylene
1,2-Dibromoethane	Methyl Tert Butyl Ether	Ethanol
Dibromomethane (1)	Methylcyclohexane	Methyl Acrylate
1,2-Dichlorobenzene	Methyl Methacrylate	
1,3-Dichlorobenzene	4-Methyl-2-pentanone (MIBK)	

(1) NELAC Accreditation is not offered for this compound. Results may not be useable for regulatory purposes in States where this accreditation option is not offered.

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Table 2. RECOMMENDED OPERATING CONDITION	
Gas Chromatograph/ Mass Spectrometer	
Carrier Gas (linear velocity)	Helium at *30 cm/sec
Mass range	35 – 300 amu
Electron Energy	70 volts (nominal)
Scan time	not to exceed 2 sec. per scan
Injection port temperature	200 - 225 °C
Source temperature	200 - 250 °C
Transfer line temperature	220 - 280 °C
Analyzer temperature	220 - 250 °C
Gas Chromatograph temperature program*	
Initial temperature	*40 °C
Time 1	*3 minutes
Column temperature rate	*8 degrees/min.
Final temperature	*220 °C.- 240 °C
Total run time	*25 – 50 mins
Purge and Trap Device	
Purge time	9 min. (at 40 °C for low-level soil) SIM – 6 min @ 50 °C
Desorb**	4 min. at 190 °C
Bake	>10 min. at 210 °C
Transfer line	100 - 130 °C
Valve temperature	approx. transfer line temperature

* Parameter modification allowed for performance optimization provided operational and QC criteria is achieved.(must be approved by team leader/manager)

** Desorb time may require performance optimum between 2.0 and 4.0 minutes as dictated by trap manufacturers specifications or instrument characteristics

Table 2a – SIM Group Parameters		
Group No.	**Retention Time (minutes)**	**Ions**
1	0 – 10.8	58, 65, 66, 88
2	10.8 – 16.0	95, 174, 176, 98, 100, 70

Table 3. BFB KEY IONS AND ION ABUNDANCE CRITERIA	
Mass	**Ion Abundance Criteria**
50	15-40% of mass 95
75	30-60% of mass 95
95	Base peak, 100% relative abundance
96	5-9% of mass 95
173	< 2% of mass 174
174	> 50% of mass 95
175	5-9% of mass 174
176	>95% and <101% of mass 174
177	5-9% of mass 176

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Table 4. INTERNAL STANDARD QUANTITION IONS	
Internal Standard	**Primary/Secondary Ions**
1,4-Difluorobenzene	114 / 63,88
Chlorobenzene-d5	117 / 82, 119
Pentafluorobenzene	168
1,4-Dichlorobenzene-d4	152 / 115, 150
Tert Butyl Alcohol-d9	65/66
Internal Standard (SIM)	
Tert Butyl Alcohol-d9	65/66

Table 5. SURROGATE QUANTITION IONS	
Surrogate Compound	**Primary/Secondary Ions**
1,2 Dichloroethane – d_4	102
Dibromofluoromethane	113
Toluene-d8	98
4-Bromofluorobenzene	95 / 174, 176

Table 6. CRITERIA FOR CCC AND SPCC		
Initial Calibration	Maximum % RSD for CCC is 30 %	
Continuing Calibration	Maximum % D for CCC is 20 %	
Calibration check compounds (CCC)	**Volatile Compound**	
	Vinyl chloride 1,1-Dichloroethene Chloroform 1,2-Dichloropropane Toluene Ethylbenzene	
System Performance Check Compounds (SPCC)	**Compound Name**	**Minimum RF**
	Chloromethane	0.1
	1,1-Dichloroethane	0.1
	Bromoform	0.1
	1,1,2,2-Tetrachloroethane	0.3
	Chlorobenzene	0.3

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Table 7. Volatile Internal Standards with Corresponding Analytes Assigned for Quantitation

Analyte	Primary Characteristic Ion	Secondary Characteristic Ion (s)	Analyte	Primary Characteristic Ion	Secondary Characteristic Ion (s)
Tert Butyl Alcohol-d9			Dibromomethane	93	95, 174
Tert Butyl alcohol	59	57	Di-isobutylene	57	
Ethanol	45	46	Epichlorohydrin (pp)	57	57, 49, 62, 51
Pentafluorobenzene			Ethyl methacrylate	69	69, 41, 99, 86, 114
1,1,1-Trichloroethane	97	99, 61	Heptane	57	
1,1-Dichlorethane	63	65, 83	Hexane	56	
1,1-Dichloroethene	96	61, 63	Isopropyl acetate	43	
2,2-Dichloropropane	77	97	Methyl cyclohexane	83	
2-Butanone (pp)	72	43, 72	Methyl methacrylate	69	69, 41, 100, 39
Acetone (pp)	58	43	n-Butanol (pp)	56	41
Acetonitrile (pp)	41	41, 40, 39	Propyl Acetate	43	
Acrolein (pp)	56	55,58	tert Amyl Methyl Ether	73	
Acrylonitrile (pp)	53	52, 51	Toluene	92	91
Allyl Chloride	41		Toluene-d_8	98	
Bromochloromethane	128	49, 130	trans-1,3-Dichloropropene	75	77, 39
Bromomethane	94	96	Trichloroethene	95	97, 130, 132
Carbon disulfide	76	78			
Chlorodifluouromethane	51	86	**Chlorobenzene-d5**	117	82,119
Chloroethane	64	66	1,1,1,2-Tetrachloroethane	131	133, 119
Chloroform	83	85	1,2-Dibromoethane	107	109, 188
Chloromethane	50	52	1,3-Dichloropropane	76	78
Chloroprene	53	53, 88, 90, 51	Bromoform	173	175, 254
cis-1,2-Dichloroethene	96	61, 98	Butyl Acetate	56	
Cyclohexane	84		Chlorobenzene	112	77, 114
Dibromofluoromethane	113		Dibromochloromethane	129	127
Dichlorodifluoromethane	85	87	Ethylbenzene	91	106
Dichloroethane-d_4	102	65	m-Xylene	106	91
Diethyl ether	74	45, 59	o-Xylene	106	91
Diisopropyl ether	45	102	p-Xylene	106	91
Ethyl acetate (pp)	88	43, 45, 61	Styrene	104	78
Ethyl tert Butyl Ether	59		Tetrachloroethene	164	129,131,166
Freon 113	151				
Iodomethane	142	127, 141	**1,4 Dichlorobenzene-d4**	152	115,150
Isobutyl alcohol (pp)	43	43, 41, 42, 74	1,1,2,2-Tetrachloroethane	83	131, 85
Methacrylonitrile (pp)	41	41, 67, 39, 52, 66	1,2,3-Trichlorobenzene	180	182, 145
Methyl Acetate	43	74	1,2,3-Trichloropropane	75	77
Methylene chloride	84	86, 49	1,2,4-Trichlorobenzene	180	182, 145
Methyl-t-butyl ether	73	57	1,2,4-Trimethylbenzene	105	120
Propionitrile (ethyl cyanide)(pp)	54	54, 52, 55, 40	1,2-Dibromo-3-chloropropane(pp)	75	155, 157
Tetrahydrofuran	42		1,2-Dichlorobenzene	146	111,148
trans-1,2-Dichloroethene	96	61, 98	1,3,5-Trimethylbenzene	105	120
Trichlorofluoromethane	151	101, 153	1,3-Dichlorobenzene	146	111, 148
Vinyl acetate	43	86	1,4-Dichlorobenzene	146	111, 148
Vinyl chloride	62	64	2-Chlorotoluene	91	126
Methyl Acrylate	55	85	4-Bromofluorobenzene	95	174, 176
2,2,4 Trimethylpentane	57				
1,4 Difluorobenzene	114	63, 88	4-Chlorotoluene	91	126
1,1,2-Trichloroethane	83	97, 85	Benzyl chloride	91	91, 126, 65, 128
1,1-Dichloropropene	75	110, 77	Bromobenzene	156	77, 158
1,2 Dichloroethane	62	98	Cyclohexanone	55	
1,2 Dichloropropane	63	112	Hexachlorobutadiene	225	223, 227
1,4-Dioxane (pp)	88	88, 58, 43, 57	Hexachloroethane (pp)	201	166, 199, 203
2-Chloroethyl-vinylether (pp)	63	65, 106	Isopropylbenzene	105	120

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Table 7. Volatile Internal Standards with Corresponding Analytes Assigned for Quantitation

Analyte	Primary Characteristic Ion	Secondary Characteristic Ion (s)	Analyte	Primary Characteristic Ion	Secondary Characteristic Ion (s)
2 – Hexanone	43	58,57,100	Naphthalene	128	-
2-Hexanone (pp)	43	58, 57, 100	n-Butylbenzene	91	92, 134
2-Nitropropane	46	-	n-Propylbenzene	91	120
3 Methyl –1 butanol	55		Pentachloroethane (pp)	167	167,130,132,165,169
4-Methyl-2-pentanone (pp)	100	43, 58, 85	p-isopropyltoluene	119	134,91
Benzene	78	-	sec-Butylbenzene	105	134
Bromodichloromethane	83	85, 127	tert-Buytlbenzene	119	91, 134
Carbon tetrachloride	117	119	trans-1,4-Dichloro-2-butene (pp)	53	88, 75
cis-1,3-Dichloropropene	75	77, 39			
Methylcyclohexane	83		(pp) = Poor Purging Efficiency		

Table 7-1 SIM - Volatile Internal Standards with Corresponding Analytes Assigned for Quantitation

Analyte	Primary Characteristic Ion	Secondary Characteristic Ion (s)
Tert Butyl Alcohol-d9		
1,4-Dioxane	88	58
Toluene –d8	98	100
4-BFB	95	174, 176

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Table 8. STANDARDS PREPARATION

A) Internal standard and Surrogate mixtures:

	a) 25/250 µg/ml	b) 250/2,500 µg/ml
Internal Standard Mixture (2,000 µg/ml)	1.25 ml	1 .25 ml
Tert Butyl Alcohol-d_9 (50,000 µg/ml)	0.5 ml	0.5 ml
Surrogate Mixture (2,500 µg/ml)	1 ml	1 ml
Methanol	97.25 ml	7.25 ml
Total	100 ml	10 ml

- 25/250 µg /ml internal standard and surrogate mixture: The mixture is prepared by measuring 1.25ml of 2,000 µg /ml Internal Standard Mixture (Ultra or equivalent), 0.5 ml of 50,000 µg/ml TBA-d_9 (Absolute or equivalent), 1 ml of 2,500 µg /ml Method 8260A Surrogate Standard Mixture (Ultra or equivalent) and bringing to 100 ml with methanol.

- 250/2,500 µg /ml internal standard and surrogate mixture: The mixture is prepared by measuring 1.25 ml of 2,000 µg /ml Internal Standard Mixture (Ultra or equivalent), 0.5 ml of 50,000 µg/ml TBA-d_9 (Absolute or equivalent), 1 ml of 2,500 µg /ml Method 8260A Surrogate Standard Mixture (Ultra or equivalent) and bringing to 10 ml with methanol.

- 100 µg/ml surrogate mixture: The solution is prepared at 100 µg/ml by measuring 0.4 ml of 2,500 µg/ml Method 8260A Surrogate Standard Mixture (Ultra or equivalent) and bringing to 10 ml with methanol.

- 25/250 µg /ml internal standard mixture: The solution is prepared by measuring 1.25 ml of 2,000 µg /ml Internal Standard Mixture (Ultra or equivalent), 0.5 ml of 50,000 µg/ml TBA-d_9 (Absolute or equivalent), and bringing to 100 ml with methanol.

- 250/2,500 µg /ml internal standard mixture: The solution is prepared by measuring 1.25 ml of 2,000 µg /ml Internal Standard Mixture (Ultra or equivalent), 0.5 ml of 50,000 µg/ml TBA-d_9 (Absolute or equivalent), and bringing to 10 ml with methanol.

B) Bromofluorobenzene (BFB):

	a) 25 µg/ml	b)) 250 µg/ml
BFB (25,000 µg/ml)	0.1 ml	0.1 ml
Methanol	99.9 ml	9.9 ml
Total	100 ml	10 ml

- 25 µg /ml solution for direct injection: The BFB is prepared at 25 µg /ml by measuring 0.1 ml of 25,000 µg /ml (Absolute Stock or equivalent) and diluting to 100 ml with methanol.

- 250 µg /ml solution for purging: The BFB is prepared at 250 µg /ml by measuring 0.1 ml of 25,000 µg /ml (Absolute Stock or equivalent) and diluting to 10 ml with methanol.

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Table 8. STANDARD PREPARATION (Continued)

C) Secondary dilution standards:

2nd Dilution Standards	Stock Solution	Concentration (µg/ml)	Volume Added (µl)	Final Volume in Methanol (ml)	Final Concentration (µg/ml)
V8260 Mixture	EPA Method 524.2 Volatiles	2,000	2,500	50	100
	Acrolein	Neat (90%)	66.2		1,000
	Acrylonitrile*	Neat	25		500+
	Propionitrile**	Neat	58.9		1,000++
	Di-iso Butylene	Neat	7.1		100
	Cyclohexane	Neat	6.5		100
	Cyclohexanone	Neat	52.9		1,000
V8260 Custom Mixture	Custom Volatiles Mix A	2,000	2,500	50	100
	Custom Volatiles Mix B	2,000 -100,000	2,500		100 - 5,000
	Epichlorohydrin	Neat	21.4		500
	Iso-Amyl alcohol	Neat	125		2,000
	2-Chloroethyl vinyl ether	Neat	20.1		500
	Ethyl tert-butyl ether	Neat	6.8		100
	Tert-Amyl methyl ether	Neat	6.56		100
	Benzyl chloride	Neat	4.6		100
Gas Mixture	VOC Gas Mixture	2,000	1,000	20	100

- 100 µg /ml V8260 mixture: The mixture is prepared at 100 µg /ml by measuring 2 ml of 2,000 µg /ml EPA Method 524.2 Volatiles stock standard, appropriate amount of some neat compounds, and bringing to 50 ml with methanol.
  * Acrylonitrile = 400 µg /ml (Neat) + 100 µg /ml (EPA Method 524.2 Volatiles)
  ** Propionitrile = 900 µg /ml (Neat) + 100 µg /ml (EPA Method 524.2 Volatiles)

- 100 µg /ml V8260 custom mixture: The mixture is prepared at 100 - 5,000 µg /ml by measuring 2.5ml of 2,000 µg /ml Custom Volatiles Mix A, 2.5 ml of 2,000 - 100,000 µg/ml Custom Volatiles Mix B, appropriate amount of some neat compounds, and bringing to 50 ml with methanol.

- 100 µg /ml gas mixture ***: The mixture is prepared at 100 µg /ml by measuring 1 ml of 2,000 µg /ml stock standard and bring to 20 ml with methanol.
  *** Gas mixture should be prepared weekly.

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Table 8. STANDARD PREPARATION (Continued)

D).1 Initial Calibration Standards: using DI water bring to 50 ml final volume: all mixtures used should be **secondary dilution** standards at **100 ppm**.

Standard and Surrogate Concentration	V8260 Mix (100 ppm)	V8260 Custom Mix (100 ppm)	Gas compound Mix (100 ppm)	Surrogate Mix (100ppm)
1 ppb	0.5 µl	0.5 µl	0.5 µl	0.5 µl#
2 ppb *	1.0 µl	1.0 µl	1.0 µl	1.0 µl#
5 ppb	2.5 µl	2.5 µl	2.5 µl	2.5 µl#
10 ppb *	5 µl	5 µl	5 µl	5 µl#
20 ppb	10 µl	10 µl	10 µl	10 µl#
50 ppb	25 µl	25 µl	25 µl	25 µl#
100 ppb	50 µl	50 µl	50 µl	50 µl#
200 ppb	100 µl	100 µl	100 µl	100 µl#
300 ppb *	150 µl	150 µl	150 µl	150 µl#
400 ppb *	200 µl	200 µl	200 µl	200 µl#

* depending upon the instrument.
\# See Section 10.2.2.1 for correction factor.

- When calibrating for Method 5035 low-level soil samples, add 1g of sodium bisulfate to the 40-ml vial before aliquot 5 ml of each standard into vial. This is equivalent to the amount of sodium bisulfate added to the samples and will maintain a consistent purging efficiency of the compounds.

D).2 Initial Calibration Standards for 1,4-Dioxane using SIMS

Standard and Surrogate Concentration (ppb)	1,4-Dioxane Solution (100ppm)	Surrogate Mix (100ppm)	DI Water – Final Volume (ml)
2	2 µl	1 µl	100
5	5 µl	2 µl	100
25	25 µl	5 µl	100
50	25 µl	2.5 µl	50
100	50 µl	5 µl	50
200	100 µl	10 µl	50
400	200 µl	20 µl	50

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Table 8. STANDARD PREPARATION (Continued)

E) Continuing Calibration Standard: using DI water bring to 50 ml final volume: All mixtures used are secondary dilution standards at 100 ppm.

Concentration	V8260 Mix (100 ppm)	V8260 Custom Mix (100 ppm)	Gas compound Mix (100 ppm)
50 ppb	25 µl	25 µl	25 µl

- When calibrating for Method 5035 low-level soil samples, add 1g of sodium bisulfate to the 40-ml vial before aliquot 5 ml of the continuing calibration standard into vial. This is equivalent to the amount of sodium bisulfate added to the samples and will maintain a consistent purging efficiency of the compounds.

F) Blank Spike (BS): using DI water bring to 50 ml final volume: All mixtures used are 100 ppm secondary dilution standards.

Concentration	V8260 Mix (100 ppm)	V8260 Custom Mix (100 ppm)	Gas compound Mix (100 ppm)
50 ppb	25 ul	25 ul	25 ul

For lower detection level required (test code: V8260LL)

Concentration	V8260 Mix (100 ppm)	V8260 Custom Mix (100 ppm)	Gas compound Mix (100 ppm)
20 ppb	10 ul	10 ul	10 ul

- When calibrating for Method 5035 low-level soil samples, add 1g of sodium bisulfate to the 40-ml vial before aliquot 5 ml of the blank spike into vial. This is equivalent to the amount of sodium bisulfate added to the samples and will maintain a consistent purging efficiency of the compounds.

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Table 9. GUIDELINE FOR DILUTION PREPARATION

Water Sample

Dilution	Sample amount taken	Final volume A (volumetric)	Take from final volume A	Final volume B (volumetric)
1:2	25 ml	50 ml		
1:5	10 ml	50 ml		
1:10	5 ml	50 ml		
1:20	2.5 ml	50 ml		
1: 25	2 ml	50 ml		
1:50	1 ml	50 ml		
1:100	0.5 ml	50 ml		
1:200	250 µl	50 ml		
1:250	200 µl	50 ml		
1:500	100 µl	50 ml		
1:1000	50 µl	50 ml		
1:2000	25 µl	50 ml		
1:2500	20 µl	50 ml		
1:5000	10 µl	50 ml		
1:10000	0.5 ml	50 ml	0.5 ml	50 ml
1:20000	0.5 ml	50 ml	250 µl	50 ml
1:25000	0.5 ml	50 ml	200 µl	50 ml
1:50000	0.5 ml	50 ml	100 µl	50 ml
1:100000	0.5 ml	50 ml	50 µl	50 ml

Soil-Low level (Non-Encore sample)

Dilution	Sample amount taken	Final volume
1:2	2.5 gram	5 ml
1:5	1 gram	5 ml
1:10	0.5 gram	5 ml

Soil-medium level

Additional Dilution	Sample in Methanol amount taken	Final volume (volumetric)
1:1	1 ml	50 ml
1:2	0.5 ml	50 ml
1:5	200 µl	50 ml
1:10	100 µl	50 ml
1:20	50 µl	50 ml
1: 25	40 µl	50 ml
1:50	20 µl	50 ml
1:100	10 µl	50 ml
1:200	5 µl	50 ml
1:250	4 µl	50 ml
1:500	2 µl	50 ml

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Table 10. REPORTING LIMITS

Compound	Water	Soil	Compound	Water	Soil
	µg/l	µg/kg		µg/l	µg/kg
Chlorodifluoromethane	5	5	Chloroform	5	5
Dichlorodifluoromethane	5	5	Freon 113	5	5
Chloromethane	5	5	Methacrylonitrile	10	10
Vinyl chloride	5	5	Butyl Acetate	5	5
Bromomethane	5	5	1,1,1-Trichloroethane	5	5
Chloroethane	5	5	Heptane	5	5
Trichlorofluoromethane	5	5	n-Propyl acetate	5	5
Ethyl ether	5	5	2-Nitropropane	10	10
Acrolein	50	50	Tetrahydrofuran	10	10
1,1-Dichloroethene	2	2	2-Chloroethyl Vinyl Ether	20	20
Tertiary butyl alcohol	50	50	n-Butyl alcohol	250	250
Acetone	5	5	Cyclohexane	5	5
Methyl acetate	5	5	Carbon Tetrachloride	1	1
Allyl chloride	5	5	1,1-Dichloropropene	5	5
Acetonitrile	100	100	Isopropyl Acetate	5	5
Iodomethane	25	25	Benzene	1	1
Iso-butyl alcohol	50	50	1,2-Dichloroethane	2	2
Carbon disulfide	5	5	Trichloroethene	1	1
Methylene chloride	2	2	Methyl methacrylate	10	10
Methyl tert butyl ether	1	1	1,2 Dichloropropane	1	1
Trans-1,2-Dichloroethene	5	5	Di-isobutylene	5	5
Di-isopropyl ether	5	5	Dibromomethane	5	5
2-Butanone	5	5	1,4 Dioxane	125	125
1,1-Dichloroethane	2	2	Bromodichloromethane	1	1
Hexane	5	5	cis-1,3-Dichloropropene	1	1
Chloroprene	5	5	4-Methyl-2-pentanone	5	5
Acrylonitrile	5	5	Toluene	1	1
Vinyl acetate	10	10	trans-1,3-Dichloropropene	1	1
Ethyl acetate	5	5	Ethyl methacrylate	10	10
2,2-Dichloropropane	5	5	1,1,2-Trichloroethane	3	3
Cis-1,2-Dichloroethene	5	5	2-Hexanone	5	5
Bromochloromethane	5	5	Cyclohexanone	5	5

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Table 10. REPORTING LIMITS (Continued)

Compound	Water	Soil	Compound	Water	Soil
	µg/l	µg/kg		µg/l	µg/kg
Tetrachloroethene	1	1	4-Chlorotoluene	5	5
1,3-Dichloropropane	5	5	1,3,5-Trimethylbenzene	5	5
Dibromchloromethane	5	5	tert-Butylbenzene	5	5
1,2-Dibromoethane	2	2	1,2,4 Trimethylbenzene	5	5
Chlorobenzene	2	2	sec-Butylbenzene	5	5
1,1,1,2-Tetrachloroethane	5	5	1,3-Dichlorobenzene	5	5
Ethylbenzene	1	1	p-Isopropyltoluene	5	5
M,p-Xylene	1	1	1,4-Dichlorobenzene	5	5
o-Xylene	1	1	1,2-Dichlorobenzene	5	5
Styrene	5	5	n-Butylbenzene	5	5
Bromoform	4	4	1,2-Dibromo-3-choropropane	10	10
Isopropylbenzene	2	2	1,2,4-Trichlorobenzene	5	5
Bromobenzene	5	5	Hexachlorobutadiene	5	5
1,1,2,2-Tetrachloroethane	2	2	Naphthalene	5	5
Trans-1,4-Dichloro-2-butene	5	5	1,2,3-Trichlorobenzene	5	5
1,2,3-Trichloropropane	5	5	Epichlorohydrin	100	100
n-Proplybenzene	5	5	3-Methyl-1-butanol	5	5
2-Chlorotoluene	5	5	Hexachloroethane	5	5
Ethanol	50	--	Methyl Acrylate	5	--
Benzyl Chloride	1	--	Methylcyclohexane	5	5
2,2,4 Trimethylpentane	5	5			

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Table 11. COMPOUNDS THAT MAY EXHIBIT CARRYOVER

Compound
1,2,4-Trichlorobenzene
Hexachlorobutadiene
Naphthalene
1,2,3-Trichlorobenzene

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Lab Manager: _____

QA Manager: _____

Effective Date: September 27, 2011

Revised Sections: ***10.1.4.12***

TITLE: SAMPLE STORAGE

References: **None**

1.0 Scope and Application

1.1 This procedure describes the laboratory's sample storage system and details the sample retrieval process. The Sample Management Department (SM) has oversight responsibility for sample storage. See SOP EQA018 for detailed information regarding both manual and electronic internal chain of custody procedures.

2.0 Summary

2.1 Samples are assigned an Accutest ID, labeled and placed in their designated storage locations.

2.2 SM assigns each sample bottle a location based on the test and/or matrix. SM is responsible for the placement of the samples to the appropriate location and to maintain the required documentation.

2.3 Samples are retrieved from and replaced to storage by the sample custodian or authorized designee. Each analyst is responsible for the initiation of the request forms, which executes the proper internal custody procedure for tracking intra-laboratory sample transfers.

3.0 Method Detection Limit. Not Applicable

4.0 Definitions

DIGESTATE. A sample that has been chemically processed to free compounds or ions of interest from their matrix or naturally occurring chemical composition, making them available for qualitative and quantitative analysis using instrumental techniques.

EQUIPMENT RINSATE: A sample of analyte-free media which has been used to rinse the sampling equipment. It is collected after completion of decontamination and prior to sampling. This blank is useful in documenting adequate decontamination of sampling equipment.

EXTRACT. An organic solvent concentrate that was employed to remove and isolate an organic compound from its native matrix, making it available for qualitative and quantitative analysis using instrumental techniques.

FIELD BLANK. Reagent water blanks sent into the field to determine if contamination from airborne pollutants from other sources may be occurring during field sampling biasing the sample data.

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INTERNAL CHAIN OF CUSTODY. A document that reflects the transfer of samples within the laboratory facility used to verify that custody integrity was maintained during sample analysis. Sample relinquishment and acceptance is indicated by signatures, dates and times applied by those individuals involved in the sample transfer.

MATRIX: The component or substrate (e.g., surface water, drinking water) which contains the analyte of interest.

ORGANIC-FREE REAGENT WATER: For volatiles, all references to water in the methods refer to water in which an interferant is not observed at the method detection limit of the compounds of interest. Organic-free reagent water can be generated by passing tap water through a carbon filter bed containing about 1 pound of activated carbon. A water purification system may be used to generate organic-free deionized water. Organic-free reagent water may also be prepared by boiling water for 15 minutes and, subsequently, while maintaining the temperature at 90°C, bubbling a contaminant-free inert gas through the water for 1 hour.

For semivolatiles and nonvolatiles, all references to water in the methods refer to water in which an interferant is not observed at the method detection limit of the compounds of interest. Organic-free reagent water can be generated by passing tap water through a carbon filter bed containing about 1 pound of activated carbon. A water purification system may be used to generate organic-free deionized water.

PROJECT: Single or multiple data collection activities that are related through the same planning sequence.

REAGENT WATER: Water that has been generated by any method that would achieve the performance specifications for ASTM Type II water. For organic analyses, see the definition of organic-free reagent water.

SAMPLE CUSTODIAN. The individual assigned responsibility for accepting samples collected by external entities. Assures the continued integrity of external and internal custody and transfers sample custody to analysts and technicians upon written request.

SAMPLE REQUEST FORM. A document that is completed by analysts and technicians for the sample custodian indicating a need for retrieval and transfer of specific samples.

SPLIT SAMPLES: Aliquots of sample taken from the same container and analyzed independently. In cases where aliquots of samples are impossible to obtain, field duplicate samples should be taken for the matrix duplicate analysis. These are usually taken after mixing or compositing and are used to document intra- or inter-laboratory precision.

TRIP BLANK: A sample of analyte-free media taken from the laboratory to the sampling site and returned to the laboratory unopened. A trip blank is used to document contamination attributable to shipping and field handling procedures. This type of blank is useful in documenting contamination of volatile organics samples.

VOLATILE ORGANIC. Samples collected for the analysis of low boiling organic compounds. Volatile organics typically have a propensity for the vapor-state at room temperature.

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5.0 Health and Safety

5.1 The analyst must follow normal safety procedures as outlined in the Accutest Laboratory Safety Manual which includes the use of safety glasses and lab coats.

5.2 Gloves, labcoats and eye protection must be used at all times when handling samples.

5.3 Coolers and samples that have a strong odor are unpacked and labeled under a hood. These samples are stored in a refrigerator dedicated to these types of samples to avoid contamination.

5.4 The toxicity or carcinogenicity of each reagent used in the laboratory has not been precisely determined; however, each chemical must be treated as a potential health hazard. Exposure to these reagents should be reduced to the lowest possible level.

5.5 Analysts must wear safety glasses or a shield for eye protection, protective clothing, and observe proper mixing when working with these reagents.

5.6 Acids are corrosive and must be handled with care. Flush spills with plenty of water. If acids contact any part of the body, flush with water and contact the supervisor. Concentrated sulfuric acid presents some hazards and is moderately toxic and extremely irritating to skin and mucous membranes. This reagent must be used in a fume hood.

5.7 A reference file of material safety data sheets (MSDS) is maintained in the general chemistry lab for analyst use.

6.0 Collection, Preservation and Holding Time

6.1 See procedure section 10.0.

7.0 Apparatus

7.1 Refrigerators

8.0 Standards & Reagents

8.1 None

9.0 Interferences: Not Applicable

10.0 Procedure

10.1 Sample storage procedure.

10.1.1 Once the log-in procedure is complete, samples are placed in their designated refrigerator locations.

10.1.2 The storage of samples is arranged by test and matrix. Each of the shelves in the refrigerators has an identification.

10.1.2.1 Sample storage refrigerators. The shelf numbers are a 3-4 numeric-alpha ID. Refer to Attachment 2 for the Sample Location Forms for specific IDs.

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10.1.2.2 VO refrigerators. Volatile samples are placed in trays. The tray numbers have a 3 - 5 numeric ID. The first digit is the refrigerator number followed by 01 – 99. For example, in refrigerator R4, the first tray is labeled 401. The trays are placed in numeric order in the refrigerators starting in the upper left corner and ending in the lower right corner.

10.1.3 Specific Clients / Projects require trip blanks and field Blanks be stored with the associated soil or solid samples from that sampling event to monitor potential storage contamination of the samples. However trip blanks and field blanks will be stored as aqueous samples if an insufficient number of blanks are provided to the laboratory for multiple +matrix sampling events to establish a 1:1 mapping of trip and field blanks to sample matrices.

10.1.4 A summary of storage locations is listed below. See Attachments for the sample storage sheets specific to each refrigerator. SM may implement temporary modifications, if required.

10.1.4.1 Walk-in #30 is used for Wet Chemistry.

10.1.4.2 Walk-in #31 is used for Extractions.

10.1.4.3 Walk-in #32 is used for % solids samples, PHC and also samples on hold.

10.1.4.4 Walk-in # 1 is used for refrigerated metals, and there is also an ambient metals storage area as well.

10.1.4.5 Walk-in # 2 is used for Special Projects, in house composites, and samples held for disposal.

10.1.4.6 Encore samples are stored in the #28 refrigerator as a temporary reception area with job and sample # label applied. This is set up this way as a flag so any encore pouches in the #28 refrigerator indicate required attention by the encore technician. Inside the foil encore pouches are the permanent storage labels for the #14 refrigerator to be applied to the vials used by the encore technician to put them in final solution. It is important to note that since encores have a 48 hour holding time from the time of sampling that copies of chain of custody must be circulated to 3 mail bins as quickly as possible while keeping the 48 hour rule in mind. Copies are circulated to the Organics Manager, the Organics Scheduler, and the encore technician.

10.1.4.7 Volatile samples are stored in several refrigerators separated by matrix. The vials are stored in labeled racks or in the case of oversized volatile containers on labeled shelves.

10.1.4.8 Volatile soil samples that have been extruded into VOA vials containing organic-free reagent water are physically preserved by placing in a freezer within 48 hours from the time of sample collection in a slanted position and maintained at a temperature between -7 and -20°C.

10.1.4.9 Metal digestates are stored in the metals laboratory, at ambient temperature.

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10.1.4.10 Organic extracts are stored in a refrigerator located in the extraction laboratory.

10.1.4.11 A separate refrigerator # 15 is used for the storage of "product" or strong odor samples. Upon processing in Sample Management all product samples are labeled with a yellow colored sticker for easy identification and proper handling and storage.

10.1.4.12 Walk-in # 48 is used for sample composite staging and subcontract samples from our other Accutest Laboratories, as well as auxiliary extractions or multi-analysis storage. Walk-in #48 also has an ambient storage area within the front part of the room that houses the walk-in for preserved aqueous metals samples.

10.1.5 Determining Available Sample Storage Space

10.1.5.1 The Sample Location Sheets are used to determine available space. As new storage space becomes available, the form is updated to indicate the available locations and the number of samples the shelf or rack can hold. When samples are logged in and assigned a location, the amount is deducted from the total and the remainder is documented for continuous use. A new form is started as needed. The date on the form indicates the date the sample count is taken.

10.2 Sample Retrieval

10.2.1 To obtain the samples for analysis, analysts must complete a Sample Request Form (Attachment 1), or a marked work-list, and submit it to the sample custodian or designee. The Accutest sample ID and storage location must be indicated.

10.2.2 The sample custodian retrieves samples from storage and delivers them to the analyst. The Sample Request Form, or marked work-list, is signed to indicate the transfer.

10.2.3 See SOP EQA018 for specific details regarding the use of either electronic or manual internal chain of custody procedures.

10.2.4 After use, the analyst then returns the samples to the custodian, or to the designated area, along with the signed Sample Request Form or work-list. These forms are filed in the Sample Management Department.

10.2.4.1 Analysts must complete the transfer portion of the Sample Request Form, or a marked work-list. The depletion/ breakage portions of these forms should be completed only when a sample in their custody is depleted or broken. This serves as a notification to SM that these samples are no longer in storage.

10.2.5 Volatile samples are retrieved by the analyst. Personnel performing volatile analyses are authorized custodian designees.

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10.2.5.1 Analysts are assigned a schedule, which list the Accutest sample ID and location. Each analyst retrieves samples from storage and returns them to storage after use.

10.3 Internal Chain of Custody Forms

10.3.1 Internal COCs are originated in the SM Department for specific projects. The electronic procedure for internal custody is used for all other projects. They are completed upon each intra-laboratory sample, extract, leachate, distillate and digestate transfer.

10.3.2 The internal COCs are archived with the original external COC and the Accutest data package.

11.0 Quality Control

11.1 All thermally controlled sample storage areas are checked twice daily to verify that samples are being stored at the proper temperature. Temperature data is recorded in a unit specific logbook. Corrective action is initiated if temperature measurements exceed required control criteria.

11.2 The Sample Request Forms, work-lists and internal COCs must be completed to provide sample traceability. Signatures on custody documents are verified to insure that sample custody integrity is maintained.

12.0 Documentation

12.1 Sample Request Forms. Analysts must complete a Sample Request Form (Attachment 1), or a marked work-list to obtain the samples from storage. The Accutest sample IDs and storage locations are required on the form. This form tracks the in-house transfers of the sample. The form is returned for filing, to the SM Department, when the samples are returned to the custodian for storage.

12.2 Work-Lists. Worklists are generated daily by the department supervisors. Analysts may use these forms in place of the Sample Request Forms when requesting samples from storage. This form also tracks the in-house transfers of the sample. The form is returned for filing, to the SM Department, when the samples are returned to the custodian for storage.

12.3 Sample Location Sheet. The Sample Location Sheets are used to determine available space in the refrigerators. As new storage space becomes available, the form is updated to indicate the available locations and the number of samples the shelf or rack can hold. When samples are logged in and assigned their location, the amount is deducted from the total and the remainder is documented for continuous use. A new form is started as needed. The date on the form indicates the day the sample count is taken.

12.4 Internal COCs. The Internal COCs are originated in the SM Dept. for specific projects and are completed upon each intra-laboratory sample, extract, leachate, distillate and digestate transfer. The internal COCs are archived with the original external COC and the Accutest data package. The electronic procedure for internal custody is used for all other projects.

13.0 Data Reporting. Not Applicable

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14.0 Pollution Prevention & Waste Management

14.1 Waste Management. All staff must follow established waste management procedures as described in the waste management SOP, EHS004. This document describes the proper disposal of all waste materials generated during the testing of samples as follows:

14.1.1 Non hazardous aqueous wastes.

14.1.2 Hazardous aqueous wastes

14.1.3 Chlorinated organic solvents

14.1.4 Non-chlorinated organic solvents

14.1.5 Hazardous solid wastes

14.1.6 Non-hazardous solid wastes

15.0 References: None

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Lab Manager: _____

QA Manager: _____

Effective Date: 10-9-12

TITLE: **CHAIN OF CUSTODY AND LOG IN PROCEDURE**

***Added Section* : 6.6.1.1.2**

1.0 Scope & Application

1.1 This administrative and documentation procedure applies to all samples received from external clients or generated internally. The procedure describes sample receipt, unique sample number assignment, electronic documentation, and chain of custody. Procedures for resolving non-conformances with Company sample acceptance policy are also described.

2.0 Summary

2.1 Samples are delivered to the Accutest laboratory by a company courier, commercial shipper or client self-delivery.

2.2 Custody documentation is signed upon receipt at the laboratory. The sample management technician reviews the chain of custody (COC) received with the samples and verifies that the information on the form corresponds with the delivered samples. The samples are then assigned a unique Accutest sample number and stored at 0 to $\leq 6^{\circ}C$.

2.3 Non-compliant information and discrepancies are documented and relayed to the Accutest project manager. Sample management technicians use the Accutest sample container, volumes, preservatives, and holding times guide (see form –SM50) for review. The project manager contacts the client for a resolution.

2.4 Completed custody documentation is forwarded to the login group for data entry into the LIMS. Transfer of samples and sample data are documented in the LIMS. The initial sample transfer requests between sample management and the analytical departments are manually documented on the sample request. Each subsequent transfer is acknowledged using the LIMS by the individual relinquishing or receiving the sample. See EQA018 for detailed information regarding both manual and electronic internal chain of custody procedures.

3.0 Health and Safety

3.1 The analyst must follow normal safety procedures as outlined in the Accutest Laboratory Safety Manual which includes the use of safety glasses and lab coats. In addition, all acids are corrosive and must be handled with care. Flush spills with plenty of water. If acids contact any part of the body, flush with water and contact the supervisor

3.2 The toxicity or carcinogenicity of each reagent used in this method has not been precisely determined; however, each chemical must be treated as a potential health hazard. Exposure to these reagents must be reduced to the lowest possible level. The laboratory is responsible for

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maintaining a current awareness file of OSHA regulations regarding the safe handling of the chemicals specified in this method. A reference file of data handling sheets must be made available to all personnel involved in these analyses.

3.3 A reference file of material safety data sheets (MSDS) is maintained in the general chemistry lab for analyst use.

3.4 Concentrated sulfuric acid presents some hazards and is moderately toxic and extremely irritating to skin and mucous membranes. This reagent must be used in a fume hood.

3.5 Analysts must wear safety glasses or a shield for eye protection, protective clothing, and observe proper mixing when working with these reagents.

4.0 Definitions

BATCH: A group of samples which behave similarly with respect to the sampling or the testing procedures being employed and which are processed as a unit (see Section 3.4.1 for field samples and Section 4.4.3 for laboratory samples). For QC purposes, if the number of samples in a group is greater than 20, then each group of 20 samples or less will all be handled as a separate batch.

CONTROL SAMPLE: A QC sample introduced into a process to monitor the performance of the system.

EQUIPMENT RINSATE: A sample of analyte-free media which has been used to rinse the sampling equipment. It is collected after completion of decontamination and prior to sampling. This blank is useful in documenting adequate decontamination of sampling equipment.

FIELD DUPLICATES: Independent samples that are collected as close as possible to the same point in space and time. They are two separate samples taken from the same source, stored in separate containers, and analyzed independently. These duplicates are useful in documenting the precision of the sampling process.

MATRIX: The component or substrate (e.g., surface water, drinking water) which contains the analyte of interest.

MATRIX DUPLICATE: An intralaboratory split sample which is used to document the precision of a method in a given sample matrix.

METHOD BLANK: An analyte-free matrix to which all reagents are added in the same volumes or proportions as used in sample processing. The method blank should be carried through the complete sample preparation and analytical procedure. The method blank is used to document contamination resulting from the analytical process. For a method blank to be acceptable for use with the accompanying samples, the concentration in the blank of any analyte of concern should not be higher than the highest of either:

(1)The method detection limit, or
(2)Five percent of the regulatory limit for that analyte, or
(3)Five percent of the measured concentration in the sample.

ORGANIC-FREE REAGENT WATER: For volatiles, all references to water in the methods refer to water in which an interferant is not observed at the method detection limit of the compounds of interest. Organic-free reagent water can be generated by passing tap water through a carbon filter bed containing about 1 pound of activated carbon. A water purification system may be used to generate organic-free deionized

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water. Organic-free reagent water may also be prepared by boiling water for 15 minutes and, subsequently, while maintaining the temperature at 90°C, bubbling a contaminant-free inert gas through the water for 1 hour.

For semivolatiles and nonvolatiles, all references to water in the methods refer to water in which an interferant is not observed at the method detection limit of the compounds of interest. Organic-free reagent water can be generated by passing tap water through a carbon filter bed containing about 1 pound of activated carbon. A water purification system may be used to generate organic-free deionized water.

PROJECT: Single or multiple data collection activities that are related through the same planning sequence.

QUALITY ASSURANCE PROJECT PLAN (QAPjP): An orderly assemblage of detailed procedures designed to produce data of sufficient quality to meet the data quality objectives for a specific data collection activity.

RCRA: The Resource Conservation and Recovery Act.

REAGENT GRADE: Analytical reagent (AR) grade, ACS reagent grade, and reagent grade are synonymous terms for reagents, which conform to the current specifications of the Committee on Analytical Reagents of the American Chemical Society.

REAGENT WATER: Water that has been generated by any method that would achieve the performance specifications for ASTM Type II water. For organic analyses, see the definition of organic-free reagent water.

REFERENCE MATERIAL: A material containing known quantities of target analytes in solution or in a homogeneous matrix. It is used to document the bias of the analytical process.

SPLIT SAMPLES: Aliquots of sample taken from the same container and analyzed independently. In cases where aliquots of samples are impossible to obtain, field duplicate samples should be taken for the matrix duplicate analysis. These are usually taken after mixing or compositing and are used to document intra- or inter-laboratory precision.

TRIP BLANK: A sample of analyte-free media taken from the laboratory to the sampling site and returned to the laboratory unopened. A trip blank is used to document contamination attributable to shipping and field handling procedures. This type of blank is useful in documenting contamination of volatile organics samples.

5.0 Sample Acceptance Policy

5.1 Incoming samples must satisfy Accutest's sample acceptance criteria before being logged into the system.

5.2 Sample acceptance is based on the premise that clients have exercised proper protocols for sample collection. This includes sufficient volume, proper chemical preservation, temperature preservation, sample container sealing and labeling, and appropriate shipping container packing.

5.3 The sample management staff will make every attempt to preserve improperly preserved samples upon arrival. However, if preservation is not possible, the samples may be refused unless the client authorizes analysis.

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5.3.1 No samples will be accepted if holding times have been exceeded or will be exceeded before analysis can take place unless the client authorizes analysis.

5.4 Sample acceptance criteria include proper custody and sample labeling documentation. Proper custody documentation includes an entry for all physical samples delivered to the laboratory with an identification code that matches the sample bottle and a date and signature of the individual who collected the sample and delivered them to the laboratory.

5.4.1 If a Trip Blank is received but is not listed on the COC, the Sample Management technicians must add it to the COC and the sample will be logged in.

5.5 Accutest reserves the right to refuse any sample which in its sole and absolute discretion and judgement is hazardous, toxic and poses or may pose a health, safety or environmental risk during handling or processing

6.0 Procedure

6.1 External Chain of Custody Procedure

6.1.1 Samples are delivered to the lab by an Accutest courier, client self-delivery or commercial carrier.

6.1.2 The sample management technician signs the chain of custody (COC), accepting custody of the samples.

6.1.3 The client may use an Accutest COC or their own chain of custody form.

6.1.3.1 Accutest generates a COC if one is not submitted with the samples. The information is collected from sample labels and the project manager confirms it with the client. Alternately, the project manager will contact the client and request that a COC be forwarded to the lab.

6.1.4 NYSDEC-CLP/ASP-B projects should have the following custody documents: Custody Seals, NYSDEC custody records and Contract Laboratory Sample Information Sheets (CLSIS), sample tags and airbills. The DC-1 form must be completed by the sample management technician upon receipt of NYSDEC-CLP/ASP-B projects.

6.1.5 Non-Compliance issues and discrepancies, on the COC, are documented in a Sample Summary Receipt Summary as a feature in the Sample Receipt Login Program.

6.1.6 Air samples collected in Summa canisters for analysis in accordance with NJDEP Air Contract 03-X-35135 must employ NJDEP custody documents.

6.1.6.1 Chain of custody is initiated by the laboratory after canister preparation is complete. See Accutest SOP ESM012 for details on external chain of custody and shipping for air samples collected in accordance with NJDEP analytical contracts.

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6.2 The bottle set is unpacked from the cooler and placed onto the counter, The samples are visually inspected and compared to the information written on the COC. The following items are checked:

6.2.1 Sample Matrix. Look closely at the sample and the chain of custody and try to determine the matrix by physical appearance of sample and by information on the chain of custody including analyses test codes requested. The Sample Management staff denotes the matrix classification on the upper left hand corner of the COC for the Login Departments use and entry into LIMS, by using the abbreviations listed below.

6.2.1.1 Samples matrices that are <u>not Bi-phasic</u> should be categorized as follows:

6.2.1.1.1 DW - Drinking Water –Potable Water

6.2.1.1.2 GW - Ground Water

6.2.1.1.3 WW - Waste Water

6.2.1.1.4 LIQ - Liquid – Non aqueous free flowing sample that is not an oil.

6.2.1.1.5 SO - Soil – Solids, soils, sludges & Oils

6.2.1.1.6 SLV -Solvent (a subset of SO) *Merck and Spectra samples always classified as SLV*

6.2.1.1.7 Tissue: (BIOA or BIOP)

6.2.1.1.8 FB - Field Blank

6.2.1.1.9 TB - Trip Blank (STB, SSTB, WTB, MTB)

6.2.1.1.9.1 STB – I full VO vial
6.2.1.1.9.2 SSTB – 1,2 VO vial or 1 Methanol/2Vo Vials
6.2.1.1.9.3 WTB – Aqueous TB
6.2.1.1.9.4 MTB – 1 Methanol vial

6.2.1.1.10 Air (Summa cans, Tedlar Bags & Air Filters)

6.2.1.1.11 Wipes

6.2.1.2 Bi-phasic or Multi-phasic samples. The Sample Management staff will determine matrix parts and <u>set up a Problem Note form immediately</u> to determine which phase the client wants analyzed. Pending the Problem Note Resolution, a Phase Separation form may be created.

6.2.1.2.1 Separate phases should be assigned separate LIMS numbers for tracking.

6.2.1.2.1.1 Generally, a water sample with some solids that can be mixed into the sample does not have to go the Problem Note process. The exception is where the solids constitute more than 5% of the sample.

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6.2.1.3 Additional matrix identification. If further clarification is needed, contact the Organic Supervisory staff or Inorganic Supervisory staff, depending on the analysis requested. They will do a visual or physical check to determine matrix and will also determine if the volume submitted is sufficient for the analyses requested. Generally, these samples fall into the Oil, SLV(solvent) or Liq (liquid) classifications.

6.2.1.3.1 Assistance Procedures during regular working hours.

6.2.1.3.1.1 Call or e-mail Organics Management or Inorganics Management requesting matrix identification assistance

6.2.1.3.2 Procedures during non-working hours or when technical assistance is unavailable

6.2.1.3.2.1 Leave messages for Organics Dept. Manager and/or the Inorganics Department Manager requesting matrix identification assistance.

6.2.1.3.2.2 Sequester samples in walk-in cooler until technical assistance is available.

6.2.1.4 Request matrix identification assistance from the operational departments if any of the following conditions exist:

6.2.1.4.1 Waste class samples

6.2.1.4.2 Samples identified as oils, liquids, or sludges,

6.2.1.4.3 Observed discrepancy between Chain of Custody and SM technicians observation

6.2.1.4.3.1 Significant amount of solids present

6.2.1.4.3.1.1 Problem note required

6.2.1.4.4 Disparity between sample bottles contents

6.2.1.4.4.1 Problem notes should be generated when samples of the same point of collection have different appearance with the bottle set, and also if aqueous volatile samples have more then 50% or more silt or solids present in a vial or vials.

6.2.1.4.5 If a sample is heavily contaminated, based on smell or other characteristic, it may be classified as an oil, solvent or liquid.

6.2.1.5 The operations staff will perform the following matrix identification procedures when providing support to the Sample Management Staff:

6.2.1.5.1 Visual Determination

6.2.1.5.1.1 Assign matrix and continue login process

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6.2.1.5.2 Physical Testing

6.2.1.5.2.1 Water dissolution

6.2.1.5.2.2 Solvent dissolution

6.2.1.5.3 Volume Sufficiency Confirmation

6.2.1.5.3.1 Assign matrix, verify sufficient volume available for testing

6.2.1.5.4 Problem note required if matrix category cannot be assigned

6.2.1.6 As stated above, any Bi-phasic samples should be noted on the chain of custody and a problem note issued so the client can dictate which layer is to be analyzed.

6.2.1.7 Sample Matrix for Waste Class parameters can sometimes be determined just by the volume submitted –example- product samples require less volume then an aqueous sample would.

6.2.1.8 If a sample is heavily contaminated, based on smell or other characteristic, it may be classified as an oil, solvent or liquid. Contact the log-in group who will have Client Services call the client for information.

6.2.1.9 In simpler issues such as determining GW from DW matrices generating a problem note is not necessary. This issue is one that can not be determined by lab personnel and is better defined by the client. Just write in the comment section –"Matrix is unclear" and the log-in group will have Client Services call the client for information.

6.2.2 Sample location.

6.2.3 Initials of the person who collected the samples. Date and time of sample collection. The volume and preservation of each bottle.

6.2.4 Signatures of the person relinquishing and accepting the sample(s).

6.2.5 The analysis to be performed.

6.2.6 The client's name, contacts, address, phone number.

6.2.7 Verify samples were transported at the required temperatures.

6.2.8 Any special requirements, such as turnaround, or reporting deliverables.

6.2.9 Verify cooler custody seals, noted seal numbers and condition.

6.2.9.1 The client should note the even number of the custody seal on the chain of custody. Upon receipt of sampling shipping cases at the laboratory, the even numbered seal would be broken and if the number is not noted on the chain of custody it should be documented by Sample Management and also if the seal was intact or not. It should also be documented if a custody seal is present or not.

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6.2.9.2 If the seal on the shipping case is received broken at the laboratory, the client will be contacted and it would be their decision whether or not to proceed with the analyses.

6.3 Assigning Sample Identification Numbers

6.3.1 Sample Job Numbers

6.3.1.1 Each job is assigned a unique alphanumeric ID. The first character of the ID is the alpha-character "JA" for New Jersey. The second portion of the ID is numeric, beginning at the number one and increasing chronologically for each new job received. For example, the first job number would be JA01, the 100th job would be JA100. These numbers are stored in the laboratory information management system (LIMS). When a new job is received, the LIMS provides the next chronological number.

6.3.1.1.1 A job is defined as samples received on the same day, for a specific client pertaining to a specific project. Upon client request a job may consist of samples received over multiple days.

6.3.1.1.2 A CLP job, or sample delivery group (SDG), is defined as a maximum of 20 samples received for a client specific project over a maximum period of 14 calendar days.

6.3.1.1.3 The Massachusetts lab prefixes job numbers with an M. The Florida lab prefixes job numbers with an F. The Texas lab prefixes job numbers with a T. The Northern California lab prefixes job numbers with a C, The Colorado lab prefixes job numbers with a D.

6.3.2 Sample Numbers

6.3.2.1 Sample numbers consist of a job number plus a second series of numbers beginning at one and continuing chronologically for each point of collection. For example, if job JA01 consists of 3 points of collection the sample numbers for that job would be JA01-1, JA01-2 and JA01-3.

6.3.2.1.1 If there are special circumstances regarding a sample, a suffix may be included in the sample ID, for example, JA01-1**R**.

- The suffixes A, B or C are used to designate a subset of original sample. For example, these suffixes are used to separate total metal from TCLP metals or total recoverable metals.
- The suffix X is used to designate tests subcontracted outside Accutest's lab network.
- The suffix Q is used to designate an in-house QC sample.
- The suffix R is assigned by the Login Dept. to designate re-logs for additional test.
- The suffix F is used to designate a filtered sample.

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6.3.2.1.2 The final portion of the sample ID documents the number of bottles received for each sample. For example, if four containers are received for sample JA01-01 they would be labeled as JA01-1.1 Bottle 1, JA01-1.2 Bottle 2,JA01-1.3 Bottle 3 and JA01-1.4 Bottle 4. The location(s) and test(s) pertaining to each bottle are documented in the LIMS.

6.3.2.1.3 Two –part labels are generated by a Lims-based labeling program. The labels are applied to the sample bottles in the following manner:

- Verify that samples are numerically ordered and have not been inadvertently moved before labeling.
- Using the chain of custody as a sample number reference, apply the specific label to the associated bottles. One 1 part of the label is applied to the cap and the 2nd part is applied next to the sample id on the bottle label.
- The customer id and the Accutest sample # assigned must match as it is applied to the bottle.
- It is important to keep the customer's id visible.
- If there are labels missing or there are extra labels at the end of the labeling operation, double-check the chain of custody to determine the discrepancy.
- After verification that all the bottles from that job are correctly numbered and labeled, the sample management technician who performed the labeling will initial and date the bottom right hand corner of the chain of custody.

6.4 The Sample Receipt Log is completed electronically. The information required includes the client, date of receipt, sample numbers, matrix, number of bottles, type of preservation, preservation check finding, volume of each bottle, sample location, temperature of shipping coolers and initials of the sample management technician.

6.5 As previously stated, discrepancies on the COC or non-compliance issues are documented on a Summary Receipt Summary as a feature in the Sample Receipt Login Program. Basically after all the bottle and pH checks information are entered you can create the summary and enter any problems found samples versus chain of custody. You can then choose in the program depending on severity of the problem whether it is just a documented minor issue known as a Login note or if more serious a CSR note. If it is deemed a CSR note then you must also scan the chain of custody so it is available for viewing in a pdf file. They are scanned in and named by the job number only and saved to a folder named pnote coc on the Z drive. When resolved by a C.S. Representative an email is auto generated by the program and then Sample Management would take that job number enter it into our Document Search. We would then pull up both forms the initial problem note and the resolution and attach them to the original coc and send up to the final log-in group. Obviously if the resolution involves relabeling or aliquoting of samples that action is taken as well at that time. Login notes are resolved between the C.S. group and the log-in group or from past history in the LIMS. If those minor issues affect Sample Management then they should be notified of any further action needed. There is a guideline for Sample Management to follow in regards to determining which action group it would be in either CSR or Login, see attached.

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6.5.1 Samples that have discrepancies such as sample bottle ids that don't match the chain of custody ids should not be put away in mainstream sample storage. Specifically in the case where there are multiple ids for one specific test the volumes should be assigned job and sample numbers but stored on the hold shelf or in the case of volatile analyses stored on the bottom of the appropriate volatile refrigerator. If there are any volumes that are correctly matching, those can be put on the normal mainstream shelf location.

6.6 Verification of sample preservation (When Applicable).

6.6.1 The pH is determined for preserved samples.

6.6.1.1 An aliquot of sample is collected into a pipette affixed with a disposable tip.

6.6.1.1.2 The pipet tip may also be used without the pipette attached to transfer the drop.

6.6.1.2 The sample is dispensed onto the pH paper and the color change is observed.

6.6.1.3 If preservatives are correct then the check box next to the "Preserved where applicable" section on the chain of custody will be checked off and initialed by the technician doing the preservative check. If the clients own version of the chain does not have this section we will use our stamp" All samples received preserved as applicable" and it will be initialed by the technician doing the check. A problem note is generated if preservative is found to be out of protocol.

6.6.1.4 Th pH of incoming cyanide samples is performed using pH paper capable of measuring pH greater than 12. This special paper can measure from 12.5 to 14.0 and can be used the same way as other measurements are taken as written above.

6.6.1.5 Aqueous volatile samples should not be opened to check pH in Sample Management as they are checked at the bench in the lab at time of analyses—see SOP EQA051for details.

6.6.2 If preservation or volume is incorrect for the required test, it is documented on the chain of custody and the Problem Notice Form. The form is forwarded to the project manager. The project manager contacts the client to obtain a resolution. All the information is documented on the form and returned to sample management for execution.

6.6.2.1 In some cases, samples that were not properly preserved in the field may be preserved by the laboratory upon receipt. In these cases, the sample management staff executes standard preservation procedures for the test in question. If preservation criterion is unable to be achieved, sample management contacts the appropriate analytical department for instructions regarding "preservation upon arrival". Sample preservation actions performed by the sample management staff are documented on the chain of custody including preservative used, lot number and initials of the technician. The preservative pH value should also be recorded in the Sample Receipt log as well.

6.6.2.2 In the case where HNO3 preservative is needed to be added to metals samples, the adjusted samples but be allowed to equilibrate for a minimum of 24 hours prior to aliquot removal for prep or analyses. There is a checkbox feature on the Sample Management log-in program that can be checked off and that will then automatically

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send an auto-email to the Inorganics Manager and the Supervisor of the Metals laboratory. This will notify them of the adjustment made and the samples #, bottle #, and the date and time of adjustment. Sample Management will also apply a sticker to the bottle adjusted stating that HNO3 was added including the date, time and the initials of who added it.

6.6.3 Other non-compliance issues, such as: head space in VOA vials or TOX bottles, leaking bottles, or broken bottles are also documented on the problem notice form. The form is forwarded to the project manager. The project manager contacts the client to obtain a resolution. All the information is documented on the form and returned to sample management for execution.

6.6.4 If in receipt of a broken sample bottle-always attempt to salvage remaining sample into a new sample bottle. If for some reason the sample cannot be salvaged take a few shots of the breakage with the camera and save to file. This all should be communicated to the client in detail on the sample Problem Notice form.

6.6.5 When soil VOC samples are received from states other than New York as intact jars instead of encores or low level MEOH/DI water kits, they must be placed into low-level solution. This must be done within 48 hours from sampling. If in doubt about the origin of the samples, or the chain of custody does not clearly indicate this information, then proceed with low-level preservation.

6.6.5.1 Login all volumes, and upon label generation create three extra labels: one as MEOH and two as DI Water, each with appropriate VOC locations. The extra labels should be circulated with a copy of the chain of custody to the Voa Prep Lab. The Voa Prep Lab will pull the intact VOC jar from cold storage, and aliquot the appropriate volumes into the three VOC vials in the appropriate solutions needed. The vials will be placed in the rack locations listed on the bar code labels provided by Sample Management.

6.7 Holding-time Verification. A sample analysis that has a 6 - 48 hour hold-time or is in danger of exceeding its hold-time requires an Immediate Analysis Form. The form is completed electronically through use of an Access program at time of electronic log-in and distributed via e-mail to the affected laboratory group and scheduled by a supervisor or manager.

6.8 Special Requests

6.8.1 Fast-track results. Samples that require an accelerated turnaround are handled in the following manner. A copy of the COC is marked in red in the upper right-hand corner to indicate accelerated turnaround is required and forwarded to each laboratory group involved with the samples preparation or analysis. These COCs are distributed as soon as possible (no later than the end of the day.)

6.8.2 Composite Request. If the sample is to be composited, a Composite Request Form is generated electronically and the samples are composited by the General Chemistry Department. The composited sample is returned to the sample custodian for storage.

6.8.2.1 The form is initiated by the sample management technician and delivered electronically to the General Chemistry Supervisor.

6.8.2.2 The samples are placed on the "hold" shelf in refrigerator R32 (Walk-in #32) until the General Chemistry Department performs the composite.

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6.8.2.3 A sample request form is submitted to the sample custodian and the samples are delivered to the analyst.

6.8.2.4 Once the sample is composited, the sample and the composite form are returned to the custodian for storage. The form is filed with the COC.

6.8.3 Phase Separation. If the phases of a sample are to be separated a Phase Separation Form is completed and the sample is separated by phase by the General Chemistry Department. The separated sample is returned to the sample custodian for storage.

6.8.3.1 The form is initiated by the sample management technician and delivered to General Chemistry Supervisor.

6.8.3.2 The samples are placed on the "hold" shelf in refrigerator R32 (Walk-in #32) until the General Chemistry Department performs the phase separation. Note, if the sample or samples are odorous they will be stored in the product refrigerators to avoid the risk of cross-contamination of the samples in walk-in R-32. If additional pre-labeled /.bar-coded bottles are needed, they can be stored on the hold shelf in walk-in R-32.

6.8.3.3 A sample request form is submitted to the sample custodian and the samples are delivered to the analyst.

6.8.3.4 Once the sample is separated, the sample and the form are returned to the custodian for storage. The form is filed with the COC.

6.8.4 Client Thermometers. If a client requests thermometer/instrument calibration, the General Chemistry Department and the QA Department must be notified.

6.8.4.1 A chain of custody must accompany the equipment, an Accutest job number assigned and sent to the Login Department as with all other samples.

6.8.4.2 The thermometers/equipment should be delivered to the General Chemistry Neutral Zone for storage until the calibrations can be performed.

6.8.4.3 Once notified, the QA staff, will enter the thermometers into the Thermometer Database program. Refer to SOP EQA003 for the procedure.

6.8.5 Crush/Homogenize Request. If a client requests sample homogenization or crushing, the Homogenization/Crush for is completed and the sample is homogenized by the lab dependent on the tests required.

6.8.5.1 The form is initiated by the Sample Management technician and emailed to the General Chemistry Dept., Login Dept. and Org Dept(where applicable).

6.8.5.2 The samples are placed on the "crush" shelf in refrigerator R32 (Walk-in #32) until the lab performs the homogenization or crushing.

6.8.5.3 A sample request form is submitted to the sample custodian and the samples are delivered to the analyst.

6.8.5.4 Once the sample is homogenized or crushed, the sample and the form are returned to the custodian for storage. The form is filed with the COC.

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6.8.6 Filtration Request. If the sample s to be filtered at the lab, the Sample Filtration Request Form is completed.

6.8.6.1 The form is initiated by the Sample Management technician and delivered to General Chemistry Supervisor. Note that Low-level mercury samples(LL-HG) must be filtered with 24 hours of receipt and this must be documented on the Filtration Request Form.

6.8.6.2 The samples are placed in cold storage, even metals samples, until the lab can perform the filtration.

6.8.6.3 Once filtered the metals sample bottles are labeled with the date they were filtered.

6.8.6.4 A sample request form is submitted to the sample custodian and the samples are delivered to the analyst.

6.8.7 Immediate Analysis Notification Verification Procedure

6.8.7.1 All incoming samples chains of custody are immediately evaluated by Sample Management to determine if they include short holding time tests.

6.8.7.2 If short hold time tests are requested, the chain of custody is placed into the priority mail bin for immediate receipt attention.

6.8.7.3 The Sample Management staff immediately initiates check in and labeling procedure.

6.8.7.4 An electronic immediate analysis request is prepared and distributed via e-mail to all affected departments. Paper copies are also distributed to the inorganics department manager.

6.8.7.5 The manager of Sample Management initiates a visual examination confirming the initial immediate notification of the immediate request. The manager then would stamp the archived copy of the chain of custody "Verified" and initial the chain of custody verifying the review. This copy would be kept on file in the Sample Management department.

6.8.7.6 In case of absence the day time review would be done by the Technical Supervisor or his designee as a backup.

6.8.7.7 After 3 PM the visual examination would be passed onto the log-in-team and a second person other then the person logging in the job would review the copies of the chain of custody and stamp "Verified" and initial it verifying the review. This copy would be kept on file in Sample Management department.

6.8.8 Rush Turnaround Notification Verification Procedure

6.8.8.1 All incoming sample chains of custody are immediately evaluated to determine if they Include rush turnaround request.

6.8.8.2 If rush turnaround tests are requested, the chain of custody is placed into the priority mail bin or "do me now" bin for immediate receipt attention.

6.8.8.3 The Sample Management staff immediately initiates check in and labeling

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procedures, and places a diagonal strike mark in the right hand corner of the original chain of custody to show that it was circulated.

6.8.8.4 Chain of custody information is immediately delivered to the affected operation departments.

6.8.8.5 Samples requiring rush turnaround of 24 hours or less are immediately delivered to affected departments by the Sample Management staff. Rush samples with turnaround specifications greater than 24 hours are placed into cold storage until requested by the operational departments.

6.8.8.6 Paper copies of all rush turnaround chains of custody are also distributed to the organics and inorganic department managers, supervisors and schedulers as well.

6.8.8.7 The manager of Sample Management initiates a visual examination confirming the initial rush status with strike mark in the right hand corner. This indicates it has been recognized and copies were made for circulation. The archive copy of the chain of custody would then be stamped "Verified" and initialed on the chain of custody verifying the review. This copy would be kept on file in Sample Management.

6.8.8.8 In case of absence the day time review would be done by the Technical Supervisor or his designee as a backup.

6.8.8.9 After 3 PM the visual examination for rushes would be rushes would be passed onto the log-in team and a second person other than the person logging in the job would review the copies of the chain of custody and stamp "Verified" and initial it verifying the review . This copy would be kept on file in Sample Management department.

6.8.9 Secondary Chain of Custody Verification Review

6.8.9.1 A verification review of all chains of custody is conducted following the log-in process. Immediate action is initiated for missed immediate analysis or rush turnaround samples following the procedures detailed in 6.8.7 and 6.8.8. All copies should be stamped as verified and initialed indicating review.

6.9 Labeling and storing samples.

6.9.1 Aqueous and Solid Matrices. Place the Accutest label on all sample bottles. The samples must now be placed in their assigned locations and kept refrigerated at $\leq 6^0$ C, until sample preparation or analysis can be performed.

6.9.2 Air Samples. All air samples are transferred directly to secure storage in the air analysis laboratory.

6.9.2.1 Electronic internal chain of custody is initiated by the sample management staff following the procedures specified in EQA018. Custody is transferred to the analytical staff upon sample transfer.

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6.9.2.2 Manual internal chain of custody for air sample analysis in support of NJDEP methods are initiated using NJDEP Internal Chain of Custody Forms. The procedures detailed in Accutest SOP EQA018 are employed.

6.9.3 The original COC and any additional documentation are submitted to the Login Department. The Login Department enters the sample information, testing requirements and special comments into the LIMS. Upon completion of the LIMS login, the COC is filed in the report generation department until the data package is ready for compilation.

6.10 Sample retrieval requests from individual departments trigger delivery of samples with internal chains of custody (if required) for requested samples. See EQA018 for detailed information regarding both manual and electronic internal chain of custody procedures.

6.10.1 The sample custodian signs and dates the relinquished by column.

6.10.2 Internal chains of custody documents are delivered to designated responsible individuals within departments for custody purposes.

6.10.3 Responsible individuals are as follows:

6.10.3.1 Metals Supervisor

6.10.3.2 Wet Chemistry Supervisor

6.10.3.3 Organic Sample Prep Supervisor

6.10.3.4 Organics Analysis Scheduler

6.11 Electronic Custody Transfers.

6.11.1 Each individual receiving samples must acknowledge the change in custody and status in the LIMS. This step is required to maintain an accurate electronic record of sample status, dates of analytical activity, and custody throughout the laboratory.

6.11.1.1 Log into the LIMS.

6.11.1.1.2 Bring up NetTerm

6.11.1.1.3 Select the appropriate server as follows

- ACCUNJ = Dayton
- ACCUMA = Marlborough
- ACCUFL = Orlando
- ACCUTX = Houston
- ACCUNCA = Northern California
- ACCUCO = Colorado

6.11.1.1.4 Initiate the two level login procedure. Login level one allows access to the LIMS network, level two allows access to the LIMS

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6.11.1.1.4.1 Enter login and password for the Network

6.11.1.1.4.2 Enter Alpha = Acculims

6.11.1.1.4.3 Enter Oracle username and Password to gain LIMS entry. This Procedure automatically captures your unique initials and maps them to any data activity or status update.

6.11.1.1.4.4 Select Update Status on the menu bar.

6.11.1.1.4 Enter Department Number

- 01 = Field data Entry
- 02 = Organic Prep
- 03 = General Chemistry Prep
- 04 = MS Analysis
- 05 = GC Analysis
- 06 = General Chemistry
- 07 = Metals Prep
- 08 = Metals Analysis
- 09 = Microbiology
- 10 = Report Generation
- 11 = Subcontract

6.11.1.1.5 Enter the job and sample numbers that will change status.

6.11.1.1.6 Select the test code whose status will change

6.11.1.1.7 Select the new status from the following

- NEED = The sample, extract, or digestate has not been received as of the current date
- SCH = Scheduled, the test parameter has been scheduled for analysis.
- ASN = Assigned for analysis, Custody manually updated to reflect analysts possession, date of possession is captured.
- AQR = Acquired, system automatically update once data file is transmitted to LIMS, date of analysis is captured
- REDO = Schedule analysis for redo, repeat the cycle
- DONE = Supervisory approval, automatically updated and date stamped for release.
- SUB = Sample subcontracted outside the Accutest network.

6.11.1.1.8 Press the "End" key to commit all manual changes. The date of the sample transfer and/or analytical procedure has now been permanently appended to the electronic custody record.

6.12 Internal Chain of Custody Procedure

6.12.1 Internal chains of custody must be completed each time the sample changes custody for specified programs.

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6.12.2 The need to generate internal chains of custody is identified during sample login. In general manual internal chains are required NJDEP Analytical Services Contracts. Electronic internal custody procedures are used for all other projects. See EQA018 for specific details

6.12.3 Sample management initiates the chain of custody form. Note: Internal Chain of Custody forms generated for samples collected in support of NJDEP analytical services contracts must employ NJDEP forms.

6.12.4 An internal chain of custody form is generated for each analytical test. All information related to the sample must be entered into the appropriate blanks. The form header lists the following items:

6.12.4.1 The name and title of the sample management technician initiating the internal chain of custody. This is the person who has accepted the responsibility for the samples upon receipt of the samples at the laboratory.

6.12.4.2 The field sample seals number and the date and time the seal was broken. In cases of multiple seal numbers, the notation "See CoC" is entered by the technician.

6.12.4.3 The Accutest Job number.

6.12.4.4 The analytical parameter or fraction that the internal chain of custody represents.

6.12.4.5 All sample numbers that the internal chain of custody represents.

6.12.4.6 Each sample being transferred is listed on the form.

6.12.4.7 The responsible individual signs and dates the chain of custody in the received by column.

6.12.5 Individuals performing analysis assume custody for samples without documenting transfer within their department as long as those individuals report to the responsible supervisor of the department.

6.12.5.1 Inter-departmental sample transfers require signature verification of exchange between departments. Record signatures on original internal chain.

6.12.6 The department responsible for analysis assumes responsibility for disposal (consumed during analysis) or returning to sample management control. Responsible individual indicates disposition of sample in their department via signature and date on the chain of custody form.

6.12.7 Responsible individuals retain signed chains in organized fashion at their location. Completed chains are delivered to report Generation upon request.

6.13 Procedure for Off Hour Sample Receipt

6.13.1 Samples delivered to Accutest Laboratories by company courier, commercial shipper or client self- delivery during off hours of operation.

6.13.2 Incoming samples must satisfy Accutest Laboratories sample criteria before being logged into the system.

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6.13.3 Custody documentation (Chain of Custody- COC) is signed upon receipt and the sample management technician will review the COC with the samples and verifies that the information on form corresponds with the delivered samples

6.13.4 The sample cooler(s) or container goes into the Walk-In Refrigerator # 32 whose temperature should be 0° to ≤ 6°.

6.13.5 Procedure

6.13.5.1 Sample acceptance criteria include proper custody and sample labeling documentation. Proper custody documentation includes an entry for all physical samples delivered to the laboratory with an identification code that matches the sample bottle and a date and signature of the individual who collected the sample and delivered them to the laboratory.

6.13.5.2 If a Trip Blank is received but is not listed on the Change of Custody, the Sample Receipt technicians must add it to the Change of Custody and the trip blank sample will be logged in.

6.13.5.3 Access chain of custody from the sealed cooler or client.

6.13.5.4 Check for cooler seal integrity and note that the cooler had seal integrity on the chain of custody. If the cooler(s) is does not have "custody seal", write "none" on the Chain of Custody.

6.13.5.5 If cooler(s) does have custody seal, the custody seal number must be noted on the Chain of Custody.

6.13.5.6 Take temperature of cooler contents: The acceptable temperature is 0° to ≤ 6°. Thermometers are located under the inbound receipt counter.

6.13.5.7 If a temperature blank is present, insert the calibrated thermometer inside the temperature blank and allow a few minutes and then make note of the temperature on the Chain of Custody.

6.13.5.8 If no temperature blank is present use the IR temperature gun, shooting a sample bottle an inch away and avoid bottle caps and labels. Make note of the temperature on the Chain of Custody. Several volumes may have to be checked to get an acceptable receipt of temperature depending how coolers have been ice down.

6.13.5.9 The client or courier signs over the original Change of Custody to the off-hour technician. Make a copy of the original Chain of Custody for the client or courier. Outside couriers do not need a copy of the Chain of Custody. The original Chain of Custody stays with the cooler(s). If an outside courier is used, the off-hour technician signs for shipment receipt. Keep any copy of transport paperwork such as air bills with the chain of custody.

6.13.5.10 Place the cooler(s) in Walk-In Refrigerator # 32 which is the first walk-in outside of Sample Management with the original Chain of Custody. Another copy of the

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Chain of Custody or note of receipt is placed in the Sample Management Login area, usually by the computer awaiting sample login process.

7.0 Documentation Requirements

7.1 Accutest Chain of Custody. The COC is completed by the person collecting the samples and submitted to the laboratory with the samples. The origin and custody of the samples is traced through this document. The signature of the sample technician initiates Accutest's custody of the sample. An original COC is included in each data report; a copy is filed at the laboratory with a copy of the data report.

7.2 Sample Receipt Log (Electronic).The log is used as a manifest to record the client, date of receipt, sample numbers, matrix, number of bottles, type of preservation, volume of each bottle, sample location and initials of the technician. There is also a Sample Receipt Summary as a feature in the Sample Receipt Login Program. Basically after all the bottle and pH checks information are entered you can create the summary and enter any problems found samples versus chain of custody.

7.3 Composite Request Form. This form is completed when the client requests the samples to be composited at the lab. The form is initiated by the sample management technician and delivered electronically to General Chemistry Supervisor. The samples are placed on the "hold" shelf in refrigerator R32 (Walk-in #32) until the General Chemistry Department performs the composite. A sample request form is submitted to the sample custodian and the samples are delivered to the analyst. The composited sample and the form are returned to the sample custodian. The form is filed with the COC.

7.4 Phase Separation Request Form. This form is completed when the client requests that the phases of a sample be separated. The form is initiated by the sample management technician and delivered to General Chemistry Supervisor. The samples are placed on the "hold" shelf in refrigerator R32 (Walk-in #32) until the General Chemistry Department performs the phase separation. Note, if the sample or samples are odorous they will be stored in the product refrigerators, rather than risk cross-contamination of the samples in walk-in R-32. If additional pre-labeled / bar-coded bottles are needed, they can be stored on the hold shelf in walk-in R-32. A sample request form is submitted to the sample custodian and the samples are delivered to the analyst. Once the sample is separated, the sample and the form are returned to the custodian for storage. The form is filed with the COC.

7.5 Immediate Analysis Record. The form is completed electronically at time of log-in for samples with a 6 - 48 hour holding time or a sample in danger of exceeding its hold-time within 6 - 48 hours.

7.6.1 The form is initiated by the sample management technician electronically and distributed to the appropriate laboratory supervisor or manager via e-mail to notify them that the sample is in-house.

7.6.2 The supervisor or manager receives the form via e-mail. A copy is printed and maintained by the manager/supervisor and then assigned to an analyst.

7.6.3 Internal Chain of Custody. The internal chain of custody is initiated by a sample management technician for all NJDEP contract analyses. The form accompanies the sample upon each transfer of custody and is filed with the external COC.

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7.7 Sample Technician Authorized Signatory List. This form is used to document the personnel authorized to retrieve samples in lieu of the absence of the sample technician. It is updated minimally, once a year.

7.8 DC-1 Form. The DC-1 form is completed by the sample technician for all projects that require NYASP B or CLP data packages.

7.9 Internal Sample Tracking Chronicle (Electronic Record of Data Transfer). Select the RP tab on the LIMS startup screen, press enter. Highlight the chronicle tab, select page down. Enter the sample number, press page down. Select the printer, press page down.

7.10 Sample Filtration Request Form. The client can request that samples be filtered at the lab. The form is completed by the sample technician and delivered to the respective department.

7.11 Crush / Homogenize Request Form. The client can request that the samples be crushed or homogenized. The form is completed by the sample technician and is sent to the appropriate supervisor or manager via e-mail.

8.0 Quality Control

8.1 The required documentation described above must be completed and filed appropriately. Changes made to the COC and any attached paperwork must be fully documented in order to maintain sample traceability and to ensure the client's needs are satisfied.

8.2 All chain of custody and login data is reviewed by the project management staff to assure that samples have been properly documented and entered into the LIMS correctly before work is initiated by the laboratory.

8.3 The Sample Container, Volumes, Preservatives and Holding Time Table is included as an attachment in this SOP for reference. Form SM050

9.0 Pollution Prevention & Waste Management

9.1 Waste Management. All staff must follow established waste management procedures as described in the waste management SOP, EHS004. This document describes the proper disposal of all waste materials generated during the testing of samples as follows:

9.1.1 Non hazardous aqueous wastes.

9.1.2 Hazardous aqueous wastes

9.1.3 Chlorinated organic solvents

9.1.4 Non-chlorinated organic solvents

9.1.5 Hazardous solid wastes

9.1.6 Non-hazardous solid wastes

10.0 Additional Documents

10.1 Attachment - Form SM050 Sample Container, Volumes, Preservatives & Holding Times Table

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Attachment

Sample Container, Volumes, Preservatives & Holding Times Table (Accutest Form: SM050)