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ADDENDUM TO
REMEDIAL ACTION WORK PLAN
ASH ROAD PROPERTIES
221 SYCAMORE ROAD
TOWN OF VESTAL, NEW YORK
NYSDEC BCP SITE #C704032

Prepared For:

WEST COVINA ROYALE, LP
AND
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Prepared By:

GEOLOGIC NY, INC.
P.O. BOX 350
HOMER, NEW YORK

May 2015

Project No. 209183

GeoLogic

5/26/15

Kenneth J. Teter, P.E. Date

I Forrest C. Earl certify that I am currently a Qualified Environmental Professional as defined in 6 NYCRR Part 375, and that this Addendum to the Remedial Action Plan was prepared in accordance with DER Technical Guidance for Site Investigation and Remediation (DER-10).

5-26-15

Forrest C. Earl Date
Principal Hydrogeologist
GeoLogic NY, Inc.

I Susan Cummins certify that I am currently a Qualified Environmental Professional as defined in 6 NYCRR Part 375, and that this Addendum to the Remedial Action Plan was prepared in accordance with DER Technical Guidance for Site Investigation and Remediation (DER-10).

5-26-15

Susan M. Cummins Date
Project Manager
GeoLogic NY, Inc.

For:

ADDENDUM TO THE REMEDIAL ACTION WORK PLAN
Ash Road Properties
221 Sycamore Road
Town of Vestal, New York
NYSDEC Site #C704032
May 2015

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APPENDICES

1 INTRODUCTION

1.1 General

This Remedial Action Work Plan (RAWP) for Ash Road Properties located at 221 Sycamore Road in the Town of Vestal, Broome County, New York was prepared by GeoLogic NY, Inc. (GeoLogic) on behalf of West Covina Royale, LP and conditionally approved by New York State Department of Environmental Conservation (NYSDEC) on April 29, 2015 (See Appendix F).

This addendum is a supplement to the March 2015 RAWP that provides the additional information and documents requested in the NYSDEC April 29, 2015 letter.

2 INJECTION SCOPE

A pre-injection evaluation of groundwater was conducted on February 11, 2015 for the following parameters: Field Measurements for pH, dissolved oxygen (DO), oxidation-reduction potential (ORP), and nitrate; Laboratory Measurements for methane, manganese, sulfate and total organic carbon (Laboratory Report, Appendix C). The results of this data assisted in identifying and selecting CAP 18®, an anaerobic biostimulation emulsified oil product developed by Carus Corporation. A Fact Sheet for CAP 18 is in Appendix B

2.1 Injection Scheme

The planned injection area encompasses approximately 2,880 square feet with injection spacing of generally 6-feet, and a distribution thickness of 3 feet (capillary fringe and top of saturated zone). The injection point termination depths will be approximately 12 feet below ground surface (bgs) and the application of the CAP 18 will be between the 9 and 12 foot depth bgs with the following exception. Of the approximate one hundred three injection locations, twenty-six injection locations will be advanced in the south end of the interim remedial measure excavation (see Appendix A, Drawing). This section of the excavation extended to a depth of approximately 10 feet bgs; therefore, the distribution thickness will be 2 feet in that area (between the 10 and 12 feet bgs).

A theoretical minimum of approximately 100 pounds of CAP 18 was recommended using the Carus Estimation Spreadsheet. This value is based on various site-specific parameters that include contaminant concentrations, soil characteristics, and background demands for oxygen, nitrate, manganese, iron, sulfate and water hardness. The following input parameters were used for the Estimation Spreadsheet.

Parameter	Value
Soil Characteristics	Silt
Bulk Density	1.5 tons per cubic yard
Hydraulic Gradient (Field Measurement)	0.01 ft/ft
Dissolved Contamination Demand	
Tetrachloroethene	3 mg/L
Trichloroethene	2 mg/L
cis-1,2-Dichloroethene	5 mg/L
Vinyl chloride	1 mg/L
Koc (Published Data)	
Tetrachloroethene	155 L/kg
Trichloroethene	165 L/kg
cis-1,2-Dichloroethene	35 L/kg
Vinyl chloride	60 L/kg
Background Demand	
Oxygen (Field Measurement)	1.0 mg/L
Nitrate (Field Measurement)	0.1 mg/L
Manganese (Laboratory)	8.6 mg/L
Iron (Published Data)	0.05 mg/L
Sulfate (Laboratory Measurement)	2.5 mg/L
Water Hardness (Published Data)	100 mg/L

An Estimation Spreadsheet template in enclosed in Appendix B.

The Carus Estimation Spreadsheet also calculates a recommended amount of 849 pounds of CAP 18. This recommended amount is based on Carus' field experiences and equates to a distribution of approximately 3 pounds per lineal foot.

2.2 Pre-Injection Sampling

Monitoring wells MW-01, MW-02S/D, MW-09S/D and MW-10S/D are located within or just beyond the general limits of the on-site contaminant plume with wells MW-02D, MW-09D and MW-10D being deeper piezometer wells. Groundwater samples collected from these wells have reported low contaminant concentrations to no contaminants detected.

Seven sampling events over a two-year period have reported little to no variation in contaminant concentrations at these deeper wells. These wells will not be part of the sampling scheme for pre-injection and post-injection monitoring.

Prior to the injection of CAP 18, groundwater samples from monitoring wells MW-01, MW-02S, MW-09S and MW-10S will be collected and analyzed for volatile organic compounds on the Target Compounds List (TCL) by EPA Method 8260 in accordance with the Sampling and Analysis Plan, attached (Appendix D). Pre-injection groundwater monitoring will also include DO, ORP, pH, temperature, and conductivity field measurements at all four monitoring wells. Groundwater samples from wells MW-02S and MW-09S will also be analyzed for biological oxygen demand (BOD), nitrate, nitrite, sulfate, chloride, dissolved iron and methane to evaluate trends in biological activity (See Appendix B, Analytical Matrix, Table No. 1).

The laboratory that will be providing analytical services for this work is Pace Analytical. Pace's Quality Assurance/Quality Control Manual is also enclosed in Appendix C. Also included is the Sampling & Analysis Plan for this work (Appendix D).

2.3 Injection of Biostimulants

CAP 18 will be transported to the site in two 55-gallon drums, totaling 850 pounds of liquid biostimulant. There is no mixing or diluting of the biostimulant, and there are little to no health and safety risks associated with CAP 18. The MSDS will be included in the HASP. A copy of the MSDS is also in Appendix B.

The application of the biostimulant(s) into the subsurface will be through pressure injection using direct-push equipment and a Geoprobe® Grout Pump, an injection machine that features a variable-speed control valve and pulsating fluid delivery. It is anticipated that the 103 injection locations will be in a grid-pattern within the general proximity of the interim remedial investigation excavation encompassing the area south of the excavation (a likely on-going source of contamination) and north of the excavation encompassing the contaminant plume with concentrations over 500 parts per billion (ppb). The direct-push rods will be advanced to a depth of approximately 12 feet bgs. The injection will commence in a bottom up fashion, starting at approximately two feet

below the saturated zone, extending up to approximately 1 foot above the water table, with the exception of the 26 injection locations within the south end of the interim remedial measure excavation. After completing the injection, the boring will be allowed to collapse in on itself as the rods are removed. The remaining open borehole will be sealed with a granular bentonite.

Field adjustments to the locations of the injection points and/or spacing of the injection locations may be required based on surface features (ex. curbing) and underground utilities.

2.4 Post-Injection Monitoring and Sampling

The anticipated post-injection monitoring of groundwater will be conducted over a three-month period (see Analytical Matrix Table in Appendix B).

Post-injection groundwater monitoring will include DO, ORP, pH, temperature, and conductivity field measurements on a weekly basis for the first month and then monthly for the following two months. Analysis of biological oxygen demand (BOD), nitrate, nitrite, sulfate, chloride, dissolved iron and methane will be conducted at wells MW-02S and MW-09S on a monthly basis for three months. Groundwater samples from MW-01, MW-02S, MW-09S and MW-10S will be analyzed for TCL volatile compounds one and three months post-injection.

After completing the three-month post-injection monitoring period, the data will be evaluated to determine the scope of further post-injection monitoring and the on-going viability of the biostimulant. A post-injection monitoring report summarizing the injection process and post-injection findings will be submitted to NYSDEC for review.

3 SCHEDULE

A schedule outlining the major milestones for the remaining work is enclosed in Appendix E. The Environmental Easement package with an addendum to the Brownfield Cleanup Agreement was submitted to NYSDEC on April 29, 2015. NYSDEC milestones for achieving a 2015 Certificate of Completion include a submittal date of August 1, 2015 for the Draft Site Management Plan; and the submittal date is September 15, 2015 for the Draft Final Engineering Report.

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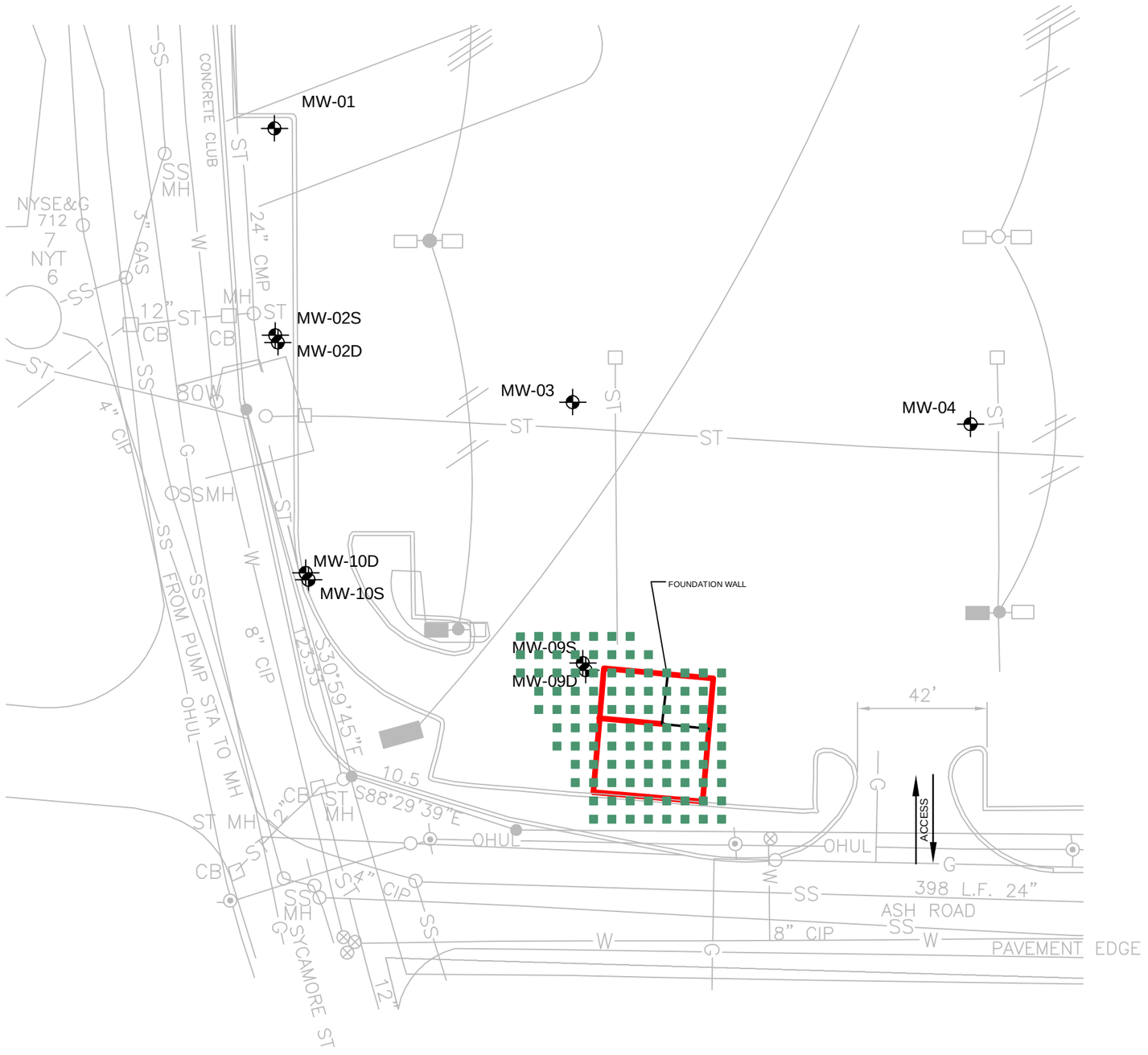
APPENDIX A

DRAWING



LEGEND

DECORATIVE WOOD FENCE	
CHAIN LINK FENCE	
GUIDE RAIL	
SANITARY SEWER	SS
STORM SEWER	ST
WATER LINE	W
OVERHEAD UTILITY LINES	OHUL
UNDERGROUND ELECTRIC	UE
UNDERGROUND TELEPHONE	UT
GAS LINE	G
UNDERGROUND SITE ELECTRIC	
FIRE HYDRANT	
MANHOLE	
CATCH BASIN	
LIGHT POLE	
UTILITY POLE	
CONCRETE SLAB OR SIDEWALK	
CONCRETE CURB	
TITLE LINES	
OUTSIDE PROPERTY BOUNDARY	
NUMBER OF PARKING SPACES	(33)
CAPPED 5/8"REBAR SET	
LIBER AND PAGE OF RECORD	1864/872
MONITORING WELL LOCATION	
LIMITS OF EXCAVATION	
INJECTION LOCATION	

N

NOTE: THIS DRAWING BASED ON BOUNDARY, BUILDING & UTILITIES LOCATION SURVEY BY WHISTLE, PREPARED BY GARY W. WHISTLE, DATED 11-15-06.

THIS MAP DOES NOT CONSTITUTE A SURVEY AND IS INTENDED TO CONVEY APPROXIMATE SAMPLE LOCATIONS AND SITE FEATURES.

APPROXIMATE SCALE:

0' 10' 40' 80'

GeoLogic

GeoLogic NY, Inc., Homer, New York

INJECTION LOCATION PLAN
ASH ROAD PROPERTIES
TOWN OF VESTAL, NEW YORK
BCP SITE #C704032

DRAWN BY:	SCALE:	PROJECT NO.:
SMC/SDW	AS SHOWN	209183
REVIEWED BY:	DATE: MAY 2015	DRAWING NO.: 1

\..\209183\TECH\DRAWING\Injection Location Plan 05-08-15.dwg

APPENDIX B

ANALYTICAL MATRIX TABLE & CAP 18 INFORMATION/SPREADSHEET

TABLE NO. 1

ANALYTICAL MATRIX
Pre-Injection and Post-Injection

Ash Road Properties
Town of Vestal, New York

Task	Location	Matrix	Field Screening[1]	Analytical Parameters			
				TCL 8260	BOD[3]	Nitrate/Nitrite/ Sulfate/Chloride/ Dissolved Iron	Methane
Pre-Injection	MW-01	Groundwater	DO-ORP- T-C-pH	X			
(One Event)	MW-02S	Groundwater	DO-ORP- T-C-pH	X	X	X	X
	MW-09S	Groundwater	DO-ORP- T-C-pH	X	X	X	X
	MW-10S	Groundwater	DO-ORP- T-C-pH	X			
	Field Duplicate	Groundwater		X			
Post-Injection	MW-01	Groundwater	DO-ORP- T-C-pH				
(Three Weekly Events)	MW-02S	Groundwater	DO-ORP- T-C-pH				
	MW-09S	Groundwater	DO-ORP- T-C-pH				
	MW-10S	Groundwater	DO-ORP- T-C-pH				
Post-Injection	MW-01	Groundwater	DO-ORP- T-C-pH	X[2]			
(Three Monthly Events)	MW-02S	Groundwater	DO-ORP- T-C-pH	X[2]	X	X	X
	MW-09S	Groundwater	DO-ORP- T-C-pH	X[2]	X	X	X
	MW-10S	Groundwater	DO-ORP- T-C-pH	X[2]			
	Field Duplicate	Groundwater		X[2]			

Notes:
1 - DO-ORP- T-C-pH: Dissolved Oxygen (DO), Redox Potential (ORP), Temperature (T), Conductivity (C), and pH.
2 - Analyses 1 and 3 months post-injection
3 - BOD, Biological Oxygen Demand

CARUS
REMEDIATION



CAS Registry No. 8001-22-7
EINECS No. 232-274-4

CAP 18® Anaerobic Bioremediation Product

FACT SHEET

CAP 18® anaerobic bioremediation product has been specifically manufactured for environmental applications such as remediation of soils and associated groundwater. This product can be used to degrade a variety of contaminants including chlorinated solvents, nitrates, sulfates, perchlorate, explosives, and other compounds found as contaminants in groundwater.

REMEDIATION GRADE

CAP 18 is a proprietary blend of food-grade, long-chain fatty acids refined from natural vegetable oils and designed to be used in remediation projects.

CHEMICAL/PHYSICAL DATA

Food Grade - Derived from natural vegetable oils
GRAS -Generally Recognized as Safe
Form Liquid
Specific Gravity
Neat Solution 0.931g/mL by weight, 10° C/ 50° F
Neat Solution
Not Emulsified

SHIPPING CONTAINERS

55-gallon drum (208-L) with 425 lb (193 kg) net weight. Drum made of high-density polyethylene (HDPE). The drums stand approximately 34.4 in (87.1 cm) high and has an outside diameter of 23 in (58.4 cm). (Domestic and international)

275-gallon IBC (Intermediate Bulk Container) (1040-L) with 2100 lb (952 kg) net weight. IBC made of HDPE. The IBC dimensions are 47.4 in (120.3 cm) high, 39.4 in (100.1 cm) long, and 40.5 in (102.8 cm) wide. (Domestic)

1000-liter IBC (Intermedate Bulk Container) with 920-kg net weight. IBC made of HDPE. The IBC dimensions are 1200 mm long, 1000 mm wide, and 1170 mm high. (International)

Special packages will be considered upon request.

Packaging meets UN performance-oriented packaging requirements.

SHIPPING

CAP 18 is not regulated by US DOT, Canada TDG, UN, IMDG, or IATA regulations.

HANDLING, STORAGE, AND INCOMPATIBILITY

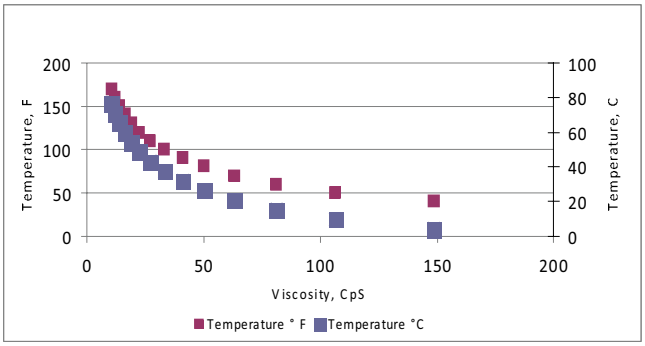
CAP 18 is stable and is typically produced on an as-needed basis for specific projects. To clean up spills and leaks, follow the steps recommended in the MSDS or eSDS.

Proper personal protective equipment includes safety glasses or goggles. Wear rubber gloves or neoprene gloves and footwear, and otherwise normal working clothing. A respirator is normally NOT needed, but if mists are present, use a NIOSH-approved respirator for organic vapors.

Store in accordance with NFPA 30 requirements in the United States or the European Fire Protection Association in Europe for Class IIIB combustible liquids. Protect containers from physical damage. Store in a cool, dry area in closed containers. Keep away from heat and flames. Do not store near strong oxidizing agents.

Fires may be controlled and extinguished by using dry chemical, waterfog, carbon dioxide (CO_2), foam, or Type K fire extinguishers. Refer to the MSDS or eSDS for more information.

VISCOSITY AS A NEAT SOLUTION



CORPORATE HEADQUARTERS | 315 Fifth Street, Peru IL 61354 | Tel + 1.815.223.1500 / 1-800-435-6856 | Fax + 1.815.224.6697 | Web: www.caruschem.com | E-Mail: salesmkt@caruschem.com
CARUS EUROPE | Parque Empresarial de ASIPO | C/Secundino Roces 3, Planta 1, Oficina 13-14 | 33428 Cayes, Llanera Spain | Tel +34.985.78.55.13 / Fax +34.985.78.55.10
CARUS WATER, JINING | Jiangmiao Village, Ershilipu Town, Rencheng District, Jining City, | Shandong Province, China. 272000 | Tel +86.053.7279.1228 / Fax +86.053.7279.1339

RESPONSIBLE CARE® OUR COMMITMENT TO SUSTAINABILITY

CARUS®

CAP 18® Anaerobic Bioremediation Product

EC- SAFETY DATA SHEET according to EC directive 2001/58/E

MATERIAL SAFETY DATA SHEET

SECTION 1: CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: CAP 18® Anaerobic Bioremediation Product
SYNONYMS AND ALTERNATE TRADE NAMES: None.
USE OF SUNSTANCE: Groundwater remediation.

COMPANY NAME (US): CARUS CORPORATION	**COMPANY ADDRESS:**	315 Fifth Street Peru, IL 61354, USA
	INFORMATION:	(815) 223-1500 (815) 224-6816 (FAX) www.caruscorporation.com (Web) salesmkt@carusorporation.com (Email)
	EMERGENCY TELEPHONE:	(800) 435 –6856 (USA) (815) 223-1500 (Other countries) (800) 424-9300 (Chemtrec, USA) (703) 527-3887 (Chemtrec, Other countries)
COMPANY NAME (Europe): CARUS EUROPE	**COMPANY ADDRESS:**	C/SECUNDINO ROCES, 3-Planta 1ª-Oficina 14, 33428 Cayes – Llanera, Asturias - Spain
	INFORMATION:	(34) 985-785-513
	EMERGENCY TELEPHONE:	(34) 985-785-513

SECTION 2 HAZARDS IDENTIFICATION

Hazardous Materials Identification System (HMIS) Ratings:
Health: 1 - Slight
Flammability: 1 - Slight
Reactivity: 1 - Slight
Personnel Protective Equipment: C : goggles, , apron, and proper gloves.

ACUTE HEALTH EFFECTS
All components are Generally Recognized As Safe under USDA guidelines.

EYES: This product may cause slight eye irritation.
SKIN CONTACT: This product may cause slight skin irritation.
INHALATION: High vapor or aerosol concentrations may be irritating to nose, throat, and upper respiratory tract.
INGESTION: Ingestion of large amounts may produce gastrointestinal disturbances including irritation, nausea, and diarrhea.

CHRONIC HEALTH EFFECTS
This material does not contain any chemical listed as a carcinogen or potential carcinogen by OSHA.

SECTION 3. HAZARDOUS INGREDIENTS

INGREDIENTS	CAS NUMBER	EC NUMBER	PERCENT
Mixed triacylglycerides, soybean oil	8001-22-7	232-274-4	100%

HAZARD SYMBOLS: None
RISK PHRASES: None
SAFETY PHRASES: None

SECTION 4 FIRST AID MEASURES

Eyes:
Immediately flush eyes with large amounts of water for at least 15 minutes holding lids apart to ensure flushing of the entire surface.
Skin:
Immediately wash contaminated areas with water. Remove contaminated clothing and footwear. Wash clothing and decontaminate footwear before reuse.
Inhalation:
Remove person from contaminated area to fresh air.
Ingestion:
Never give anything by mouth to an unconscious or convulsing person. If person is conscious, give large quantities of water or milk. Seek medical attention immediately.

SECTION 5. FIRE FIGHTING MEASURES

NFPA* HAZARD SIGNS

Health Hazard	1	=	Materials which under fire conditions would give off irritating combustion products. (less than 1 hour exposure) Materials that on the skin could cause irritation.
Flammability Hazard	1	=	Flash point at or above 200 F (93.4 C).Must be preheated for ignition to occur. Will burn in air when exposed at 1500 F (815.5 C) for 5 minutes.
Reactivity Hazard	1	=	Normally stable material, which can become unstable at high temperature and pressure.
Special Hazard			None

***National Fire Protection Association 704 (USA)**

FLAMMABILITY CLASSIFICATION: Combustible liquid – Class IIIB.
FLASH POINT: Greater than 540ºF (PMCC method).
EXTINGUISHING MEDIA: Dry chemical, water fog, carbon dioxide, foam, or Type K fire extinguishers.
FIRE / EXPLOSION HAZARDS: Rags or waste paper soaked with this material may heat and burn spontaneously. Not an explosion hazard.
FIGHTING PROCEDURES: Use of self-contained breathing apparatus is recommended. Apply water fog or mist gently. Avoid heavy application of water as it may cause oil to foam or may spread fire by dispersing oil. Avoid contact with hot oil.
HAZARDOUS DECOMPOSITION PRODUCTS: Oxides of carbon

SECTION 6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS:
Ensure adequate ventilation. Avoid inhalation and contact with eyes and skin. Personnel should wear protective clothing suitable for the task. Remove all ignition sources and incompatible materials before attempting clean up.
ENVIRONMENTAL PRECAUTIONS:
Do not flush into sanitary sewer system or surface water. If accidental release into the environment occurs, inform the responsible authorities. Keep the product away from drains, sewers, surface and ground water and soil.
STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:
Surfaces will be slippery after spillage. Spilled material can be absorbed with earth, sand, vermiculite, cat litter, or other absorbent. Clean area with detergent and water. Large spills can be diked and squeegeed or pumped into a container. All disposals should be in accordance with local, state, and federal agency procedures.

SECTION 7 HANDLING AND STORAGE

WORK/HYGIENIC PRACTICES
Wash hands thoroughly with soap and water after handling the product. Wear proper protective equipment. Remove clothing, if it becomes contaminated.

VENTILATION REQUIREMETNS
Provide sufficient mechanical and/or local exhaust.

CONDITIONS FOR SAFE STORAGE
Store in accordance with NFPA 30 requirements for Class IIIB combustible liquids. Protect containers from physical damage. Store in a cool, dry area in closed containers. Keep away from heat and flames. Do not store near strong acids or oxidizing agents.

Do not keep soiled rags or other absorbent type materials under high temperature and closed conditions in the presence of oxygen.

SECTION 8 EXPOSURE CONTROLS AND PERSONAL PROTECTION

EXPOSURE LIMITS: As an oil mist - 15 mg/m^3 and 5 mg/m^3 respirable (OSHA).

ENGINEERING CONTROLS: Provide mechanical local and/or general ventilation.

PERSONAL PROTECTIVE EQUIPMENT

EYES: Use safety glasses or goggles.

RESPIRATORY: Not normally needed. If mists are present use a NIOSH-approved respirator for organic vapors.

SKIN PROTECTION: Wear rubber or neoprene gloves and footwear, and otherwise normal work clothing.

SECTION 9. CHEMICAL AND PHYSICAL PROPERTIES

Hazardous Decomposition Products:	None
Incompatibility (Keep Away From):	Strong oxidizing agents
Toxic and Hazardous Ingredients:	None
Form: Liquid	**Odor:** Bland
Appearance: Yellow Liquid	**Color:** Light Yellow
Specific Gravity (water = 1):	Less than 1 at 15ºC
Boiling Point: Not available	**Melting Point:** 58ºF
Solubility in water (by weight %)	Not soluble
Volatile (by weight %)	0 at 25ºC
Evaporation Rate:	Not applicable

Vapor Density (mm Hg at 20ºC)	Not applicable
Vapor Density (air = 1)	Not applicable
pH (as-is):	Not applicable
Stability:	Product is stable under normal conditions
Viscosity SUS at 100ºF:	Not applicable

SECTION 10. STABILITY AND REACTIVITY

STABILITY: Stable under normal conditions. Soaked rags or paper may spontaneously combust (see Section 5).
CONDITIONS TO AVOID: Heat and exposure to strong acids or oxidizers. High surface area exposures (such as soaked rags or paper) exposed to oxygen can result in polymerization and heat production.
HAZARDOUS POLYMERIZATION: Will not occur.
HAZARDOUS DECOMPOSITION PRODUCTS: Methanol may be formed by hydrolysis or saponification.
INCOMPATIBLE MATERIALS: Strong acids and oxidizers.

SECTION 11 TOXICOLOGICAL INFORMATION

No component is a known or suspected carcinogen or mutagen. The following data are available for individual components:

EYE EFFECTS: Minimally irritating.
SKIN EFFECTS: Non-irritating.
DERMAL LD_{50}: Minimum of >2000 mg/kg (rabbit).
ORAL LD_{50}: Minimum of >5000 mg/kg (rat).

SECTION 12 ECOLOGICAL INFORMATION

ENTRY TO THE ENVIRONMENT
This product has a low estimated lifetime in the environment, being readily biodegradable.
BIOCONCENTRATION POTENTIAL
This product has a very low bioaccumulative potential.
AQUATIC TOXICITY
No data available.

SECTION 13 DISPOSAL CONSIDERATIONS

Waste Disposal:
Disposal of all materials shall be in full and strict compliance with all federal, state, and local regulations pertaining to phosphates. Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

SECTION 14 TRANSPORT INFORMATION

Not regulated by US DOT, Canada TDG, UN, IMDG, IATA regulations

SECTION 15 REGULATORY INFORMATION

US Federal Regulations
TSCA:
All components in this product are listed on the TSCA inventory.
Health & Safety Reporting List:
None of the chemicals in this product are on the Health & Safety Reporting List.
Chemical Test Rules:
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b:
None of the chemicals in this product are listed under TSCA Section 12b.
TSCA Significant New Use Rule:
None of the chemicals in this product have a SNUR under TSCA.
CERCLA Hazardous Substances and corresponding RQs:
None of the chemicals in this product have an RQ.
SARA Section 302 Extremely Hazardous Substances:
None of the chemicals in this product have a TPQ.
SARA Codes:
Non Applicable
Section 313:
None of chemicals in this product are reportable under Section 313.
Clean Air Act:
This material does not contain any hazardous air pollutants.
This material does not contain any Class 1 or Class 2 Ozone depletors.
Clean Water Act:
None of the chemicals in this product are listed as Hazardous Substances under the CWA.

SECTION 15 REGULATORY INFORMATION (contd.)

None of the chemicals in this product are listed as Priority Pollutants under the CWA.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:
None of the chemicals in this product are considered highly hazardous by OSHA.

FIFRA:
CAS# 8001-22-7 is found on the on the list of FIFRA Active Ingredients Of Registered Pesticides

State:
CAS# 8001-22-7 is found on the on state lists from PA.

California Prop 65:
California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives:

HAZARD SYMBOLS: None

RISK PHRASES: None

SAFETY PHRASES: None

WGK (Water Danger/Protection): VwVwS: legally effective classification in annex 1 or 2 of the VwVwS (Administrative Regulation on the Classification of Substances Hazardous to Waters into Water Hazard Classes)

Canada - DSL/NDSL:
Listed in DSL

Canada – WHMIS:
None of the components in this product could be classified as hazardous in accordance with the hazard criteria of the Controlled Products Regulations of Canada.

Canadian Ingredient Disclosure List:
None of the components in this product are listed on the Canadian Ingredient Disclosure List.

SECTION 16 OTHER INFORMATION

NIOSH:	National Institute for Occupational Safety and Health
MSHA:	Mine Safety and Health Administration
OSHA:	Occupational Safety and Health Administration
NTP:	National Toxicology Program
IARC:	International Agency for Research on Cancer
PEL:	Permissible Exposure Limit
DSL/NDSL:	The Domestic Substances and the Non-Domestic Substances List (Canada)
TLV-TWA:	Threshold Limit Value-Time Weighted Average
CAS:	Chemical Abstract Service
EINECS:	Inventory of Existing Chemical Substances (European) (EC. No.)

The information contained herein is accurate to the best of our knowledge. However, data, safety standards and government regulations are subject to change and, therefore, holders and users should satisfy themselves that they are aware of all current data and regulations relevant to their particular use of product. CARUS CHEMICAL COMPANY DISCLAIMS ALL LIABILITY FOR RELIANCE ON THE COMPLETENESS OR ACCURACY OR THE INFORMATION INCLUDED HEREIN. CARUS CHEMICAL COMPANY MAKES NO WARRANTY, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY WARRANTIES OF MERCHANTIABILITY OR FITNESS FOR PARTICULAR USE OR PURPOSE OF THE PRODUCT DESCRIBED HEREIN. All conditions relating to storage, handling, and use of the product are beyond the control of Carus Corporation, and shall be the sole responsibility of the holder or user of the product.

CARUS CORPORATION, 315 FIFTH STREET, PERU, IL

RESPONSIBLE CARE®
OUR COMMITMENT TO SUSTAINABILITY

Chithambarathanu Pillai

January 2012

Carus Remediation Technologies

CAP 18® and CAP 18 ME®
Anaerobic Bioremediation Products
Estimation Spreadsheet

Input data into box with black font

Site Name: ASH ROAD PROPERTIES

Date:

SITE MODEL:

TREATMENT AREA VOLUME

	Estimates	Units
Length		ft
Width		ft
Thickness		ft
Well Spacing		ft

TREATMENT AREA CHARACTERISTICS

Soil Characteristics		
Nominal Soil Type (enter clay, silt, silty sand, sand, or gravel)		
Bulk Density (accept default or enter *Pb*)		tons/cu. yd
	0.00	lbs/cu. ft
Fraction Organic Carbon (accept default or enter f_{oc})	enter foc	(decimal)
Hydraulic Characteristics		
Total Porosity (accept default or enter *n*)	enter n	(decimal)
Effective Porosity (accept default or enter n_e)	enter ne	(decimal)
Hydraulic Conductivity (accept default or enter *K*)	enter K	ft/day
	#VALUE!	cm/sec
Hydraulic Gradient (accept default or enter i)		ft/ft

CALCULATIONS

Treatment Area	0	sq. ft
Treatment Volume	-	cu. ft
	-	cu. yard
Soil Mass	-	tons
Seepage Velocity (V_x)	#VALUE!	ft/day
	#VALUE!	ft/yr
Total Pore Volume (V_P)	#VALUE!	cu. ft
	#VALUE!	gallons

HYDROGEN DEMAND:

DISSOLVED CONTAMINANT DEMAND

	Concentrations (mg/L)	Mass (lbs)	Stoichiometric Demand (wt/wt H_2)	Hydrogen Demand (lbs)
Tetrachloroethene (PCE)		#VALUE!	20.6	#VALUE!
Trichloroethene (TCE)		#VALUE!	21.7	#VALUE!
cis-1, 2-Dichloroethene (DCE)		#VALUE!	24.0	#VALUE!
Vinyl Chloride		#VALUE!	31.0	#VALUE!
Carbon Tetrachloride		#VALUE!	25.4	#VALUE!
1,1,1-Trichloroethane (TCA)		#VALUE!	33.1	#VALUE!
1,1-Dichloroethane (DCA)		#VALUE!	49.1	#VALUE!
Perchlorate		#VALUE!	6.2	#VALUE!
User-Supplied Electron Donor		#VALUE!	**0.0**	0
User-Supplied Electron Donor		#VALUE!	**0.0**	0

SORBED CONTAMINANT DEMAND

	K_{oc} (L/kg)	Concentrations (mg/kg)	Mass (lbs)	Stoichiometric Demand (wt/wt H_2)	Hydrogen Demand (lbs)
Tetrachloroethene (PCE)		#VALUE!	#VALUE!	20.6	#VALUE!
Trichloroethene (TCE)		#VALUE!	#VALUE!	21.7	#VALUE!
cis-1, 2-Dichloroethene (DCE)		#VALUE!	#VALUE!	24.0	#VALUE!
Vinyl Chloride		#VALUE!	#VALUE!	31.0	#VALUE!
Carbon Tetrachloride		#VALUE!	#VALUE!	25.4	#VALUE!
1,1,1-Trichloroethane (TCA)		#VALUE!	#VALUE!	33.1	#VALUE!
1,1-Dichloroethane (DCA)		#VALUE!	#VALUE!	49.1	#VALUE!
User-Supplied Electron Donor		**0.0**	0.0	**0.0**	0
User-Supplied Electron Donor		**0.0**	0.0	**0.0**	0

BACKGROUND DEMAND

	Concentrations (mg/L)	Mass (lbs)	Stoichiometric Demand (wt/wt H_2)	Hydrogen Demand (lbs)
Oxygen		#VALUE!	7.9	#VALUE!
Nitrate		#VALUE!	10.3	#VALUE!
Manganese		#VALUE!	27.3	#VALUE!
Iron		#VALUE!	55.4	#VALUE!
Sulfate		#VALUE!	11.9	#VALUE!
Water Hardness (as $CaCO_3$)		#VALUE!	69.6	#VALUE!

TOTAL CAP 18 OR CAP 18 ME DEMAND:

	Estimates	Units
Dissolved Contaminant Stoichiometric Hydrogen Demand	#VALUE!	lbs H_2
Sorbed Contaminant Stoichiometric Hydrogen Demand	#VALUE!	lbs H_2
Background Stoichiometric Hydrogen Demand	#VALUE!	lbs H_2
Total Stoichiometric Hydrogen Demand	#VALUE!	lbs H_2
Microbial Degradation Factor (recommend 5x)	5	
Design Contingency Factor (recommend 5x)	5	
Total Hydrogen Demand	#VALUE!	lbs H_2

CALCULATED AMOUNT:

Amount of CAP 18 or CAP 18 ME Recommended: **#VALUE!** lbs

CALCULATED MINIMUM TO ACHIEVE DISTRIBUTION (3 LB/LINEAR FT):

Amount of CAP 18 or CAP 18 ME Recommended: **#DIV/0!** lbs

APPENDIX C

LABORATORY REPORT & QA/QC

Pace Analytical
575 Broad Hollow Road , Melville, NY 11747
TEL: (631) 694-3040 FAX: (631) 420-8436
NYSDOH ID#10478 www.pacelabs.com

LABORATORY RESULTS

Results for the samples and analytes requested

The lab is not directly responsible for the integrity of the sample before receipt at the lab and is responsible only for the certified tests requested.

Geologic NY
37 Copeland Avenue
Homer, NY 13077
Attn To : Susan Cummins
Collected : 2/11/2015 1:50:00 PM
Received : 2/12/2015 12:00:00 PM
Collected By SC99

Lab No. : 1502815-001
Client Sample ID: MW-3

Sample Information:
Type : Water
Origin:

Analytical Method: E200.7 : Prep Method: E200.7 Prep Date: 2/18/2015 1:06:00 PM Analyst: HT

Parameter(s)	Results	Qualifier	D.F.	Units		Analyzed:	Container:
Manganese	8.6		1	mg/L		02/18/2015 11:48 PM	Container-01 of 01

Analytical Method: E300.0 : Analyst: bka

Parameter(s)	Results	Qualifier	D.F.	Units		Analyzed:	Container:
Sulfate	< 5.00		1	mg/L		02/19/2015 3:41 AM	Container-01 of 01

Analytical Method: RSK-175 : Analyst: MaiN

Parameter(s)	Results	Qualifier	D.F.	Units		Analyzed:	Container:
Methane	7,200	D	510	µg/L		02/19/2015 11:45 AM	Container-01 of 04
Surr: Propene	79.0		1	%REC	Limit 21-187	02/19/2015 11:29 AM	Container-01 of 04

Analytical Method: SM5310B : Analyst: MM

Parameter(s)	Results	Qualifier	D.F.	Units		Analyzed:	Container:
Total Organic Carbon	12.5		1	mg/L		02/20/2015	Container-01 of 02

Qualifiers: E = Value above quantitation range, Value estimated.
B = Found in Blank
D.F. = Dilution Factor D = Results for Dilution
H = Received/analyzed outside of analytical holding time
+ = NYSDOH ELAP does not offer certification for this analyte / matrix / method
c = Calibration acceptability criteria exceeded for this analyte
r = Reporting limit > MDL and < LOQ, Value estimated.
J = Estimated value - below calibration range
S = Recovery exceeded control limits for this analyte
N = Indicates presumptive evidence of compound

Caitlin Hutchinson
Project Manager

Test results meet the requirements of NELAC unless otherwise noted.

Date Reported : 2/23/2015

PACE ANALYTICAL
575 Broad Hollow Road
Melville, NY 11747
TEL: (631) 694-3040

Quality Control Report

PACE ANALYTICAL

10478

Analysis: **ICP METALS** **WorkOrder:** **1502815**

Method: **200.7_RT** **Lab Batch ID:** **48548**

Method Blank

RunID: 69938 SeqNo 1522080 Units: mg/L

Analysis Date: 2/18/2015 11:30:40 PM Analyst: CGZ

Analyte	Result	Rep Limit	Rep Qual
Manganese	< 0.020	0.020	

Laboratory Control Sample (LCS/LFB)

RunID: 69938 SeqNo 1522081 Units: mg/L

Analysis Date: 2/18/2015 11:36:51 PM Analyst: CGZ

Analyte	LCS Spike Added	LCS Result	LCS % Recovery	LCSD Spike Added	LCSD Result	LCSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Manganese	2.500	2.6	103						85	115	

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 1502815-001C

RunID: 69938 SeqNo 1522085 Units: mg/L

Analysis Date: 2/19/2015 12:01:21 AM Analyst: CGZ

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	Low Limit	High Limit	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Manganese	8.589	0.5000	9.4	172	70	130								

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
D	Dilution was required.	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
M	Manual Integration used to determine area response	N	Tentatively identified compounds
ND	Not Detected at the Reporting Limit	O	RSD is greater than RSDlimit
PL	Permit Limit	RL	Reporting Detection Limit

PACE ANALYTICAL
575 Broad Hollow Road
Melville, NY 11747
TEL: (631) 694-3040

Quality Control Report

PACE ANALYTICAL

10478

Analysis: DISSOLVED GASES **WorkOrder:** 1502815

Method: RSK-175_W **Lab Batch ID:** R69987

Method Blank

RunID: 69987 SeqNo 1522319 Units: µg/L

Analysis Date: 2/19/2015 11:02:27 AM Analyst: MaiN

Analyte	Result	Rep Limit	Rep Qual
Methane	< 1.0	1.0	
Surr: Propene	10	1.0	

Laboratory Control Sample (LCS/LFB)

RunID: 69987 SeqNo 1522320 Units: µg/L

Analysis Date: 2/19/2015 11:13:51 AM Analyst: MaiN

Analyte	LCS Spike Added	LCS Result	LCS % Recovery	LCSD Spike Added	LCSD Result	LCSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Methane	5.330	5.1	96.2						22	166	
Surr: Propene	10.00	5.9	59.0						21	187	

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
D	Dilution was required.	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
M	Manual Integration used to determine area response	N	Tentatively identified compounds
ND	Not Detected at the Reporting Limit	O	RSD is greater than RSDlimit
PL	Permit Limit	RL	Reporting Detection Limit

PACE ANALYTICAL
575 Broad Hollow Road
Melville, NY 11747
TEL: (631) 694-3040

Quality Control Report

PACE ANALYTICAL

10478

Analysis: ANIONS IN WATER **WorkOrder:** 1502815

Method: ANION300_WW **Lab Batch ID:** R70000

Method Blank

RunID: 70000 SeqNo 1522714 Units: mg/L

Analysis Date: 2/18/2015 4:53:33 PM Analyst: bka

Analyte	Result	Rep Limit	Rep Qual
Sulfate	< 5.00	5.00	

Laboratory Control Sample (LCS/LFB)

RunID: 70000 SeqNo 1522711 Units: mg/L

Analysis Date: 2/18/2015 4:13:00 PM Analyst: bka

Analyte	LCS Spike Added	LCS Result	LCS % Recovery	LCSD Spike Added	LCSD Result	LCSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Sulfate	10.00	10.6	106						90	110	

Laboratory Control Sample (LCS/LFB)

RunID: 70000 SeqNo 1522713 Units: mg/L

Analysis Date: 2/18/2015 4:40:02 PM Analyst: bka

Analyte	LCS Spike Added	LCS Result	LCS % Recovery	LCSD Spike Added	LCSD Result	LCSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Sulfate	10.00	10.8	108						90	110	

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 1502456-002A

RunID: 70000 SeqNo 1522706 Units: mg/L

Analysis Date: 2/18/2015 10:58:16 PM Analyst: bka

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	Low Limit	High Limit	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Sulfate	437.6	200.0	646	104	80	120								

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
D	Dilution was required.	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
M	Manual Integration used to determine area response	N	Tentatively identified compounds
ND	Not Detected at the Reporting Limit	O	RSD is greater than RSDlimit
PL	Permit Limit	RL	Reporting Detection Limit

PACE ANALYTICAL
575 Broad Hollow Road
Melville, NY 11747
TEL: (631) 694-3040

Quality Control Report

PACE ANALYTICAL

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Analysis: **ANIONS IN WATER** **WorkOrder:** **1502815**

Method: **ANION300_WW** **Lab Batch ID:** **R70000**

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 1502029-002A

RunID: 70000 SeqNo 1522734 Units: mg/L

Analysis Date: 2/18/2015 9:23:42 PM Analyst: bka

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	Low Limit	High Limit	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Sulfate	43.30	50.00	95.9	105	80	120								

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 1502856-004C

RunID: 70000 SeqNo 1522741 Units: mg/L

Analysis Date: 2/19/2015 10:00:16 AM Analyst: bka

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	Low Limit	High Limit	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Sulfate	492.9	50.00	540	93.8	80	120								

Method Blank

RunID: 70094 SeqNo 1524835 Units: mg/L

Analysis Date: 2/20/2015 Analyst: MM

Analyte	Result	Rep Limit	Rep Qual
Total Organic Carbon	< 1.0	1.0	

Laboratory Control Sample (LCS/LFB)

RunID: 70094 SeqNo 1524834 Units: mg/L

Analysis Date: 2/20/2015 Analyst: MM

Analyte	LCS Spike Added	LCS Result	LCS % Recovery	LCSD Spike Added	LCSD Result	LCSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Total Organic Carbon	25.0	23.1	92.3						80	120	

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
D	Dilution was required.	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
M	Manual Integration used to determine area response	N	Tentatively identified compounds
ND	Not Detected at the Reporting Limit	O	RSD is greater than RSDlimit
PL	Permit Limit	RL	Reporting Detection Limit

PACE ANALYTICAL
575 Broad Hollow Road
Melville, NY 11747
TEL: (631) 694-3040 FAX: (631) 420-8436
Website: www.pacelabs.com

Sample Receipt Checklist

Client Name **GEO** Date and Time Received: **2/12/2015 12:00:00 PM**

Work Order Number: **1502815** RcptNo: **1** Received by: **Jamie Spero**

Completed by: Reviewed by:

Completed Date: 2/12/2015 2:10:11 PM Reviewed Date: 2/16/2015 3:44:30 PM

Carrier name: FedEx

Chain of custody present?	Yes ☑	No ☐				
Chain of custody signed when relinquished and received?	Yes ☑	No ☐				
Chain of custody agrees with sample labels?	Yes ☑	No ☐				
Are matrices correctly identified on Chain of custody?	Yes ☑	No ☐				
Is it clear what analyses were requested?	Yes ☑	No ☐				
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present	☑		
Samples in proper container/bottle?	Yes ☑	No ☐				
Were correct preservatives used and noted?	Yes ☐	No ☑	NA	☐		
Preservative added to bottles:						
Sample Condition?	Intact ☑	Broken ☐	Leaking	☐		
Sufficient sample volume for indicated test?	Yes ☑	No ☐				
Were container labels complete (ID, Pres, Date)?	Yes ☑	No ☐				
All samples received within holding time?	Yes ☑	No ☐				
Was an attempt made to cool the samples?	Yes ☑	No ☐	NA	☐		
All samples received at a temp. of > 0° C to 6.0° C?	Yes ☑	No ☐	NA	☐		
Response when temperature is outside of range:						
Sample Temp. taken and recorded upon receipt?	Yes ☑	No ☐	To	2.5 º		
Water - Were bubbles absent in VOC vials?	Yes ☑	No ☐	No Vials	☐		
Water - Was there Chlorine Present?	Yes ☐	No ☐	NA	☑		
Water - pH acceptable upon receipt?	Yes ☑	No ☐	No Water	☐		
Are Samples considered acceptable?	Yes ☑	No ☐				
Custody Seals present?	Yes ☐	No ☑				
Airbill or Sticker?	Air Bill ☑	Sticker ☐	Not Present	☐		
Airbill No:	807041330751					

Case Number: SDG: SAS:

Any No response should be detailed in the comments section below, if applicable.

Client Contacted? ☑ Yes ☐ No ☐ NA Person Contacted: Susan Cummins

Contact Mode: ☐ Phone: ☐ Fax: ☑ Email: ☐ In Person:

Client Instructions:

Date Contacted: 2/16/2015 Contacted By: Caitlin Hutchinson

Regarding: Bottles preserved incorrectly

Comments:

RECEIVED 4 VIALS WITH HCL FOR TOC AND METHANE ANALYSIS. TOC REQUIRES SULFURIC ACID PRESERVATIVE. ALIQUOTED FROM UNPRESERVED VOLUME TO 40 ML VIALS WITH SULFURIC. EXTRA VIALS WILL BE USED AS SPARES FOR METHANE.

CorrectiveAction:

Pace Analytical
575 Broad Hollow Road , Melville, NY 11747
TEL: (631) 694-3040 FAX: (631) 420-8436
NYSDOH ID#10478 www.pacelabs.com

WorkOrder :
1502815

Certifications

STATE	CERTIFICATION #
NEW YORK	10478
NEW JERSEY	NY158
CONNECTICUT	PH-0435
MARYLAND	208
MASSACHUSETTS	M-NY026
NEW HAMPSHIRE	2987
RHODE ISLAND	LAO00340
PENNSYLVANIA	68-00350

QUALITY ASSURANCE MANUAL

Quality Assurance/Quality Control Policies and Procedures

Pace Analytical Services – *Schenectady New York*

2190 Technology Drive
Schenectady, NY 12308
(518) 346-4592

CORPORATE APPROVAL

Steve A. Vanderboom
President/CEO
1800 Elm Street, Suite 200
Minneapolis, MN 55414 (612) 607-6400

01/23/2015
Date

Richard M. Henson
Corporate Director of Quality
1800 Elm Street, Suite 200
Minneapolis, MN 55414 (612) 607-6400

01/23/2015
Date

LOCAL APPROVAL

William A Kotas
Laboratory General Manager
(518) 346-4592

01/23/2015
Date

Peggy Siegfried
Laboratory Quality Manager
(518) 346-4592

01/23/2015
Date

Roy Smith
Laboratory Technical Director
(518) 346-4592

01/23/2015
Date

Table of Contents

1.0. INTRODUCTION AND ORGANIZATIONAL STRUCTURE

"Working together to protect our environment and improve our health"
Pace Analytical Services Inc. - Mission Statement

1.1. Introduction to PASI

1.1.1. Pace Analytical Services, Inc. (PASI) is a privately held, full-service analytical testing firm operating a nationwide system of laboratories. PASI offers extensive services beyond standard analytical testing, including: bioassay for aquatic toxicity, air toxics, dioxins and coplanar PCB's by high resolution mass spectroscopy , radiochemical analyses, product testing, pharmaceutical testing, field services and mobile laboratory capabilities. PASI has implemented a consistent Quality System in each of its laboratories and service centers. In addition, the company utilizes an advanced data management system that is highly efficient and allows for flexible data reporting. Together, these systems ensure data reliability and superior on-time performance. This document defines the Quality System and QA/QC protocols.

1.1.2. Our goal is to combine our expertise in laboratory operations with customized solutions to meet the specific needs of our customers.

1.2. Statement of Purpose

1.2.1. To meet the business needs of our customers for high quality, cost-effective analytical measurements and services.

1.3. Quality Policy Statement and Goals of the Quality System

1.3.1. PASI management is committed to maintaining the highest possible standard of service for our customers by following a documented quality system that is fully compliant with the applicable NELAC or TNI standards. The overall objective of this quality system is to provide reliable data of known quality through adherence to rigorous quality assurance policies and quality control procedures as documented in this Quality Assurance Manual.

1.3.2. All personnel within the PASI network are required to be familiar with all facets of the quality system relevant to their position and implement these policies and procedures in their daily work. This daily focus on quality is applied with initial project planning, continued through all field and laboratory activities, and is ultimately included in the final report generation.

1.3.3. PASI management demonstrates its commitment to quality by providing the resources, including facilities, equipment, and personnel to ensure the adherence to these documented policies and procedures and to promote the continuous improvement of the quality system. All PASI personnel must comply with all current applicable state, federal, and industry standards (2003 NELAC Standard, 2009 TNI Standard, etc.), and are required to perform all tests in accordance with stated methods and customer requirements.

1.4. Core Values

1.4.1. **Integrity-** Pace personnel are required to abide by the PASI Code of Ethics and all Pace employees must go through Data Integrity/Ethics training upon initial orientation and as an annual refresher.

1.4.2. **Value Employees-** Pace management views employees as our most important asset and communicates to them the relevance and importance of their activities within their job functions and how they contribute to the achievement of the objectives of the quality management system.

1.4.3. **Know Our Customers-** Pace makes every effort to know our customers and address their sampling and analytical needs. More information on this item can be found in section 2.0.

1.4.4. **Honor Commitments-** Pace labs focus on making solid commitments with regards to quality, capacity, and agreed upon turnaround time to our customers.

1.4.5. **Flexible Response To Demand-** Pace labs are equipped with both the material and personnel resources to enable them to be responsive to the demands of customers when situations or projects need change.

1.4.6. **Pursue Opportunities-** Pace is committed to pursuing opportunities for the growth of the company by constantly exploring markets and areas where we can expand.

1.4.7. **Continuously Improve-** Pace has committed much time and effort into establishing a continuous improvement program where company personnel meet on a regular basis to share ideas in cost reduction, production improvement and standardization in order to develop best practices. This information, as well as company financial and production metrics, are tracked, evaluated, and shared with each Pace facility.

1.5. Code of Ethics

1.5.1. PASI's fundamental ethical principles are as follows:

1.5.1.1. Each PASI employee is responsible for the propriety and consequences of his or her actions;

1.5.1.2. Each PASI employee must conduct all aspects of Company business in an ethical and strictly legal manner, and must obey the laws of the United States and of all localities, states and nations where PASI does business or seeks to do business;

1.5.1.3. Each PASI employee must reflect the highest standards of honesty, integrity and fairness on behalf of the Company with customers, suppliers, the public, and one another.

1.5.1.4. Each PASI employee must recognize and understand that our daily activities in environmental laboratories affect public health as well as the environment and that environmental laboratory analysts are a critical part of the system society depends upon to improve and guard our natural resources:

1.5.2. Strict adherence by each PASI employee to this Code of Ethics and to the Standards of Conduct is essential to the continued vitality of PASI and to continue the pursuit of our common mission to protect our environment and improve our health.

1.5.3. Failure to comply with the Code of Ethics and Standards of Conduct will result in disciplinary action up to and including termination and referral for civil or criminal prosecution where appropriate. An employee will be notified of an infraction and given an opportunity to explain, as prescribed under current disciplinary procedures.

1.5.4. Any Pace employee can contact corporate management to report an ethical concern by calling the anonymous hotline at 612-607-6431.

1.6. Standards of Conduct

1.6.1. **Data Integrity**

1.6.1.1. The accuracy and integrity of the analytical results and its supporting documentation produced at PASI are the cornerstones of the company. Lack of data integrity is an assault on our most basic values putting PASI and its employees at grave financial and legal risk and will not be tolerated. Therefore, employees are to accurately prepare and maintain all technical records, scientific notebooks, calculations, and databases. Employees are prohibited from making false entries or misrepresentations of data for any reason.

1.6.1.2. Managerial staff must make every effort to ensure that personnel are free from any undue pressures that may affect the quality or integrity of their work including commercial, financial, over-scheduling, and working condition pressures.

1.6.2. **Confidentiality**

1.6.2.1. PASI employees must not use or disclose confidential or proprietary information except when in connection with their duties at PASI. This is effective over the course of employment and for an additional period of two years thereafter.

1.6.2.2. Confidential or proprietary information, belonging to either PASI and/or its customers, includes but is not limited to test results, trade secrets, research and development matters, procedures, methods, processes and standards, company-specific techniques and equipment, marketing and customer information, inventions, materials composition, etc.

1.6.3. **Conflict of Interest**

1.6.3.1. PASI employees must avoid situations that might involve a conflict of interest or could appear questionable to others. The employee must be careful in two general areas:

1.6.3.1.1. Participation in activities that conflict or appear to conflict with the employees' PASI responsibilities.

1.6.3.1.2. Offering or accepting anything that might influence the recipient or cause another person to believe that the recipient may be influenced to behave or in a different manner than he would normally. This includes bribes, gifts, kickbacks, or illegal payments.

1.6.3.2. Employees are not to engage in outside business or economic activity relating to a sale or purchase by the Company. Other problematic activities include service on the Board of Directors of a competing or supplier company, significant ownership in a competing or supplier company, employment for a competing or supplier company, or participation in any outside business during the employee's work hours.

1.6.4. **Compliance**

1.6.4.1. All employees are required to read, understand, and comply with the various components of the standards listed in this document. As confirmation that they understand their responsibility, each employee is required to sign an acknowledgment form annually that then becomes part of the employee's permanent record. Employees will be held accountable for complying with the Quality Systems as summarized in the Quality Assurance Manual.

1.7. Laboratory Organization

1.7.1. The PASI Corporate Office centralizes company-wide accounting, business development, financial management, human resources development, information systems, marketing, quality, safety, and training activities. PASI's Director of Quality is responsible for assisting the development, implementation and monitoring of quality programs for the company. See Attachment IIB for the Corporate Organizational structure.

1.7.2. Each laboratory within the system operates with local management, but all labs share common systems and receive support from the Corporate Office.

1.7.3. A Senior General Manager (SGM) oversees all laboratories and service centers in their assigned region. Each laboratory or facility in the company is then directly managed by an SGM, a General Manager (GM), an Assistant General Manager (AGM), or an Operations Manager (OM). Quality Managers (QM) or Senior Quality Managers (SQM) at each laboratory report directly to the highest level of local laboratory management, however named, that routinely makes day-to-day decisions regarding that facility's operations. The QMs and SQMs will also receive guidance and direction from the corporate Director of Quality.

1.7.4. The SGM, GM, AGM or OM, or equivalent functionality in each facility, bears the responsibility for the laboratory operations and serves as the final, local authority in all matters. In the absence of these managers, the SQM/QM serves as the next in command, unless the manager in charge has assigned another designee. He or she assumes the responsibilities of the manager, however named, until the manager is available to resume the duties of their position. In the absence of both the manager and the SQM/QM, management responsibility of the laboratory is passed to the Technical Director, provided such a position is identified, and then to the most senior department manager until the return of the lab manager or SQM/QM. The most senior department manager in charge may include the Client Services Manager or the Administrative Business Manager at the discretion of the SGM/GM/AGM/OM.

1.7.5. A Technical Director who is absent for a period of time exceeding 15 consecutive calendar days shall designate another full-time staff member meeting the qualifications of the technical director to temporarily perform this function. The laboratory SGM/GM/AGM/OM or SQM/QM has the authority to make this designation in the event the existing Technical Director is unable to do so. If this absence exceeds 35 consecutive calendar days, the primary accrediting authority shall be notified in writing.

1.7.6. The SQM/QM has the responsibility and authority to ensure the Quality System is implemented and followed at all times. In circumstances where a laboratory is not meeting the established level of quality or following the policies set forth in this Quality Assurance Manual, the SQM/QM has the authority to halt laboratory operations should he or she deem such an action necessary. The SQM/QM will immediately communicate the halting of operations to the SGM/GM/AGM/OM and keep them posted on the progress of corrective actions. In the event the SGM/GM/AGM/OM and the SQM/QM are not in agreement as to the need for the suspension, the Chief Operating Officer and Director of Quality will be called in to mediate the situation.

1.7.7. The technical staff of the laboratory is generally organized into the following functional groups:

- Organic Sample Preparation
- Wet Chemistry Analysis
- Metals Analysis

- Volatiles Analysis
- Semi-volatiles Analysis
- Radiochemical Analysis
- Microbiology

1.7.8. Appropriate support groups are present in each laboratory. The actual organizational structure for PASI – Schenectady, New York is listed in Attachment IIA. In the event of a change in SGM/GM/AGM/OM, SQM/QM, or any Technical Director, the laboratory will notify its accrediting authorities and revise the organizational chart in the Quality Assurance Manual (QAM) within 30 days. For changes in Department Managers or Supervisors or other laboratory personnel, no notifications will be sent to the laboratory's accrediting agencies; changes to the organizational chart will be updated during or prior to the annual review process. Changes or additions in these key personnel will also be noted by additional signatures on the QAM, as applicable. In any case, the QAM will remain in effect until the next scheduled revision.

1.8. Laboratory Job Descriptions

1.8.1. Senior General Manager

- Oversees all functions of all the operations within their designated region;
- Oversees the development of local GMs/AGMs/OMs within their designated region;
- Oversees and authorizes personnel development including staffing, recruiting, training, workload scheduling, employee retention and motivation;
- Oversees the preparation of budgets and staffing plans for all operations within their designated region;
- Ensures compliance with all applicable state, federal and industry standards;
- Works closely with Regional Sales Management.

1.8.2. General Manager

- Oversees all functions of their assigned operations;
- Authorizes personnel development including staffing, recruiting, training, workload scheduling, employee retention and motivation;
- Prepares budgets and staffing plans;
- Monitors the Quality Systems of the laboratory and advises the SQM/QM accordingly;
- Ensures compliance with all applicable state, federal and industry standards.

1.8.3. Assistant General Manager / Operations Manager

- In the absence of the SGM/GM, performs all duties as listed above for the SGM or GM;
- Oversees the daily production and quality activities of all departments;
- Manages all departments and works with staff to ensure department objectives are met;
- Works with all departments to ensure capacity and customer expectations are accurately understood and met;
- Works with SGM/GM to prepare appropriate budget and staffing plans for all departments;
- Responsible for prioritizing personnel and production activities within all departments;
- Performs formal and informal performance reviews of departmental staff.

1.8.4. Quality Manager

- Responsible for implementing, maintaining and improving the quality system while functioning independently from laboratory operations. Reports directly to the highest level of local laboratory facility management, however named, that routinely makes day-to-day decisions regarding laboratory operations, but receives direction and assistance from the Corporate Director of Quality. They may also report to a Senior Quality Manager within the same facility;
- Ensures that communication takes place at all levels within the lab regarding the effectiveness of the quality system and that all personnel understand their contributions to the quality system;
- Monitors Quality Assurance/Quality Control activities to ensure that the laboratory achieves established standards of quality (as set forth by the Corporate Quality office). The Quality Manager is responsible for reporting the lab's level of compliance to these standards to the Corporate Director of Quality on a quarterly basis;
- Maintains records of quality control data and evaluates data quality;
- Conducts periodic internal audits and coordinates external audits performed by regulatory agencies or customer representatives;
- Reviews and maintains records of proficiency testing results;
- Maintains the document control system;
- Assists in development and implementation of appropriate training programs;
- Provides technical support to laboratory operations regarding methodology and project QA/QC requirements;
- Maintains certifications from federal and state programs;
- Ensures compliance with all applicable state, federal and industry standards;
- Maintains the laboratory training records, including those in the Learning Management System (LMS), and evaluates the effectiveness of training;
- Monitors correctives actions;
- Maintains the currency of the Quality Manual.

1.8.5. Quality Analyst

- Assists the SQM/QM in the performance of quality department responsibilities as delegated by the SQM/QM;
- Assists in monitoring QA/QC data;
- Assists in internal audits;
- Assists in maintaining training records;
- Assists in maintaining the document control system;

1.8.6. Technical Director

- Monitors the standards of performance in quality assurance and quality control data;
- Monitors the validity of analyses performed and data generated;
- Reviews tenders, contracts and QAPPs to ensure the laboratory can meet the data quality objectives for any given project;
- Serves as the manager of the laboratory in the absence of the SGM/GM/AGM/OM and SQM/QM;

- Provides technical guidance in the review, development, and validation of new methodologies.

1.8.7. Administrative Business Manager

- Responsible for financial and administrative management for the entire facility;
- Provides input relative to tactical and strategic planning activities;
- Organizes financial information so that the facility is run as a fiscally responsible business;
- Works with staff to confirm that appropriate processes are put in place to track revenues and expenses;
- Provide ongoing financial information to the SGM/GM/AGM/OM and the management team so they can better manage their business;
- Utilizes historical information and trends to accurately forecast future financial positions;
- Works with management to ensure that key measurements are put in place to be utilized for trend analysis—this will include personnel and supply expenses, and key revenue and expense ratios;
- Works with SGM/GM/AGM/OM to develop accurate budget and track on an ongoing basis;
- Works with entire management team to submit complete and justified capital budget requests and to balance requests across departments;
- Works with project management team and administrative support staff to ensure timely and accurate invoicing.

1.8.8. Client Services Manager

- Oversees all the day to day activities of the Client Services Department which includes Project Management and, possibly, Sample Control;
- Responsible for staffing and all personnel management related issues for Client Services;
- Serves as the primary senior consultant to customers on all project related issues such as set up, initiation, execution and closure;
- Performs or is capable of performing all duties listed for that of Project Manager.

1.8.9. Project Manager

- Coordinates daily activities including taking orders, reporting data and analytical results;
- Serves as the primary technical and administrative liaison between customers and PASI;
- Communicates with operations staff to update and set project priorities;
- Provides results to customers in the requested format (verbal, hardcopy, electronic, etc.);
- Works with customers, laboratory staff, and other appropriate PASI staff to develop project statements of work or resolve problems of data quality;
- Responsible for solicitation of work requests, assisting with proposal preparation and project initiation with customers and maintain customer records;
- Mediation of project schedules and scope of work through communication with internal resources and management;
- Responsible for preparing routine and non-routine quotations, reports and technical papers;
- Interfaces between customers and management personnel to achieve customer satisfaction;
- Manages large-scale complex projects;

- Supervises less experienced project managers and provide guidance on management of complex projects;
- Arranges bottle orders and shipment of sample kits to customers;
- Verifies login information relative to project requirements and field sample Chains-of-Custody.

1.8.10. Project Coordinator

- Responsible for preparation of project specifications and provides technical/project support;
- Coordinates project needs with other department sections and assists with proposal preparation;
- Prepares routine proposals and invoicing;
- Responsible for scanning, copying, assembling and binding final reports;
- Other duties include filing, maintaining forms, process outgoing mail, maintaining training database and data entry.

1.8.11. Department Manager/Supervisor

- Oversees the day-to-day production and quality activities of their assigned department;
- Ensures that quality assurance and quality control criteria of analytical methods and projects are satisfied;
- Assesses data quality and takes corrective action when necessary;
- Approves and releases technical and data management reports;
- Ensures compliance with all applicable state, federal and industry standards.

1.8.12. Group Supervisor/Leader

- Trains analysts in laboratory operations and analytical procedures;
- Organizes and schedules analyses with consideration for sample holding times;
- Implements data verification procedures by assigning data verification duties to appropriate personnel;
- Evaluates instrument performance and supervises instrument calibration and preventive maintenance programs;
- Reports non-compliance situations to laboratory management including the SQM/QM.

1.8.13. Laboratory Analyst

- Performs detailed preparation and analysis of samples according to published methods and laboratory procedures;
- Processes and evaluates raw data obtained from preparation and analysis steps;
- Generates final results from raw data, performing primary review against method criteria;
- Monitors quality control data associated with analysis and preparation. This includes examination of raw data such as chromatograms as well as an inspection of reduced data, calibration curves, and laboratory notebooks;
- Reports data in LIMS, authorizing for release pending secondary approval;
- Conducts routine and non-routine maintenance of equipment as required;
- Performs or is capable of performing all duties associated with that of Laboratory Technician.

1.8.14. Laboratory Technician

- Prepares standards and reagents according to published methods or in house procedures;
- Performs preparation and analytical steps for basic laboratory methods;
- Works under the direction of a Laboratory Analyst on complex methodologies;
- Assists Laboratory Analysts on preparation, analytical or data reduction steps for complex methodologies;
- Monitors quality control data as required or directed. This includes examination of raw data such as chromatograms as well as an inspection of reduced data, calibration curves, and laboratory notebooks.

1.8.15. Field Technician

- Prepares and samples according to published methods, PASI Quality Assurance Manual and/or customer directed sampling objectives;
- Capable of the collection of representative environmental or process related air samples;
- Use computer software to compile, organize, create tables, create graphics and write test reports;
- Reviews project documentation for completeness, method compliance and contract fulfillment;
- Train less experienced environmental technicians and provide guidance on sampling and analysis;
- Responsible for project initiation and contact follow-up;
- Develop sampling plans and prepare test plan documents.

1.8.16. Field Analyst

- Analyzes field samples according to published methods, PASI Quality Assurance Manual and/or customer directed sampling objectives,
- Capable of the collection and analysis of representative environmental or process related air samples,
- Proficient in a variety of analytical tests; specifically on-site gas-phase organic and inorganic compounds by extractive fourier transform infrared spectroscopy (FTIR),
- Train less experienced staff and provide guidance on FTIR sampling and analysis,
- Assist in reporting tasks and project management responsibilities, and
- Perform back-up support for manager tasks such as reporting needs and customer concerns.

1.8.17. Sample Management Personnel

- Signs for incoming samples and verifies the data entered on the Chain of custody forms;
- Enters the sample information into the Laboratory Information Management System (LIMS) for tracking and reporting;
- Stages samples according to EPA requirements;
- Assists Project Managers and Coordinators in filling bottle orders and sample shipments.

1.8.18. Systems Administrator or Systems Manager

- Assists with the creation and maintenance of electronic data deliverables (EDDs);
- Coordinates the installation and use of all hardware, software and operating systems;
- Performs troubleshooting on all aforementioned systems;
- Trains new and existing users on systems and system upgrades;
- Maintains all system security passwords;
- Maintains the electronic backups of all computer systems.

1.8.19. Safety/Chemical Hygiene Officer

- Maintains the laboratory Chemical Hygiene Plan;
- Plans and implements safety policies and procedures;
- Maintains safety records;
- Organizes and/or performs safety training;
- Performs safety inspections and provides corrective/preventative actions;
- Assists personnel with safety issues.

1.8.20. Program Director/Hazardous Waste Coordinator (or otherwise named)

- Evaluates waste streams and helps to select appropriate waste transportation and disposal companies;
- Maintains complete records of waste disposal including waste manifests and state reports;
- Assists in training personnel on waste-related issues such as waste handling and storage, waste container labeling, proper satellite accumulation, secondary containment, etc.;
- Conducts a weekly inspection of the waste storage areas of the laboratory.

1.9. Training and Orientation

1.9.1. Training for Pace employees is managed through a web-based Learning Management System. After a new employee has been instructed in matters of human resources, they are given instructional materials for the LMS and a password for access.

1.9.2. A new hire training checklist is provided to the new employee that lists training items for the employee to work through either independently on LMS or with their supervisor or trainer. The training items that can be completed independently include:

- Reading through applicable Standard Operating Procedures;
- Reviewing the Quality Manual and Chemical Hygiene Plan;
- Core training modules such as quality control indicators, basic laboratory skills, etc.;
- Quality Systems training including traceability of measurements, method calibration, calibration verification, accuracy, precision and uncertainty of measurements, corrective actions, documentation, and root cause analysis;
- Data Integrity/Ethics training.

1.9.3. The new employee's Department Supervisor provides the employee with a basic understanding of the role of the laboratory within the structure of PASI and the basic elements of that individual's position. Supervised training uses the following techniques:

- Hands-on training

- Training checklists/worksheets
- Lectures and training sessions
- Method-specific training
- Conferences and seminars
- Short courses
- Specialized training by instrument manufacturers
- Proficiency testing programs.
- On-line courses

1.9.4. Group Supervisors/Leaders are responsible for providing documentation of training and proficiency for each employee under their supervision. The employee's training file indicates what procedures an analyst or a technician is capable of performing, either independently or with supervision. The files also include documentation of continuing capability, which are fully detailed in Section 3.4. Training documentation files for each person are maintained by the Quality Office either in hardcopy format or within the LMS.

1.9.5. All procedures and training records are maintained and available for review during laboratory audits. These procedures are reviewed/updated periodically by laboratory management. Additional information can be found in SOP S-ALL-Q-020 **Training and Employee Orientation** or its equivalent revision or replacement.

1.10. Data Integrity System

1.10.1. The data integrity system at PASI provides assurances to management that a highly ethical approach is being applied to all planning, training and implementation of methods. Data integrity is crucial to the success of our company and Pace Analytical is committed to creating and maintaining a culture of quality throughout the organization. To accomplish this goal, PASI has implemented a data integrity system that encompasses the following four requirements:

1.10.1.1. A data integrity training program: standardized training is given to each new employee and a yearly refresher is presented to all employees. Key topics addressed by this training include:

1.10.1.1.1. Need for honesty and transparency in analytical reporting
1.10.1.1.2. Process for reporting data integrity issues
1.10.1.1.3. Specific examples of unethical behavior and improper practices
1.10.1.1.4. Documentation of non-conforming data that is still useful to the data user
1.10.1.1.5. Consequences and punishments for unethical behavior
1.10.1.1.6. Examples of monitoring devices used by management to review data and systems

1.10.1.2. Signed data integrity documentation for all employees: this includes a written quiz following the Ethics training session and written agreement to abide by the Code of Ethics and Standards of Conduct explained in the employee manual.

1.10.1.3. In-depth, periodic monitoring of data integrity including peer data review and validation, internal raw data audits, proficiency testing studies, etc.

1.10.1.4. Documentation of any review or investigation into possible data integrity infractions. This documentation, including any disciplinary actions involved, corrective actions taken, and notifications to customers must be retained for a minimum of five years.

1.10.2. PASI management makes every effort to ensure that personnel are free from any undue pressures that affect the quality of their work including commercial, financial, over scheduling, and working condition pressures.

1.10.3. Corporate management also provides all PASI facilities a mechanism for confidential reporting of data integrity issues that ensures confidentiality and a receptive environment in which all employees are comfortable discussing items of ethical concern. The anonymous message line is monitored by the Corporate Director of Quality who will ensure that all concerns are evaluated and, where necessary, brought to the attention of executive management and investigated. Any Pace employee can contact corporate management to report an ethical concern by calling the anonymous hotline at 612-607-6431.

1.11. Laboratory Safety

1.11.1. It is the policy of PASI to make safety and health an integral part of daily operations and to ensure that all employees are provided with safe working conditions, personal protective equipment, and requisite training to do their work without injury. Each employee is responsible for his/her own safety as well as those working in the immediate area by complying with established company rules and procedures. These rules and procedures as well as a more detailed description of the employees' responsibilities are contained in the corporate Safety Manual and Chemical Hygiene Plan.

1.12. Security and Confidentiality

1.12.1. Security is maintained by controlled access to laboratory buildings. Exterior doors to laboratory buildings remain either locked or continuously monitored by PASI staff. Posted signs direct visitors to the reception office and mark all other areas as off limits to unauthorized personnel. All visitors, including PASI staff from other facilities, must sign the Visitor's Logbook maintained by the receptionist. A staff member will accompany them during the duration of their stay on the premises unless the SGM/GM/AGM/OM, SQM/QM, or Technical Director specify otherwise. In this instance, the staff member will escort the visitor back to the reception area at the end of his/her visit where he/she signs out. The last staff member to leave their department for the day must ensure that all outside access points to that area are secure.

1.12.2. Additional security is provided where necessary, (e.g., specific secure areas for sample, data, and customer report storage), as requested by customers, or cases where national security is of concern. These areas are lockable within the facilities, or are securely offsite. Access is limited to specific individuals or their designees. Security of sample storage areas is the responsibility of the Sample Custodian. Security of samples and data during analysis and data reduction is the responsibility of Group Supervisors. Security of customer report archives is the responsibility of the Client Services Manager. These secure areas are locked whenever these individuals or their designees are not present in the facility.

1.12.3. Access to designated laboratory sample storage locations is limited to authorized personnel only. Provisions for lock and key access are provided. No samples are to be removed without proper authorization. If requested by customer or contract, samples are not to be removed from secure storage areas without filling out an associated internal chain of custody.

1.12.4. Standard business practices of confidentiality are applied to all documents and information regarding customer analyses. Specific protocols for handling confidential documents are described in

PASI SOPs. Additional protocols for sample identification by internal laboratory identification numbers only are implemented as required under contract specific Quality Assurance Project Plans (QAPPs).

1.12.5. All information pertaining to a particular customer, including national security concerns will remain confidential. Data will be released to outside agencies only with written authorization from the customer or where federal or state law requires the company to do so.

1.13. Communications

1.13.1. Management within each lab bears the responsibility of ensuring that appropriate communication processes are established and that communication takes place regarding the effectiveness of the management/quality system. These communication processes may include email, regular staff meetings, senior management meetings, etc.

1.13.2. Corporate management bears the responsibility of ensuring that appropriate communication processes are established within the network of facilities and that communication takes place at a company-wide level regarding the effectiveness of the management/quality systems of all Pace facilities. These communication processes may include email, quarterly continuous improvement conference calls for all lab departments, and annual continuous improvement meetings for all department supervisors, quality managers, client services managers, and other support positions.

2.0. SAMPLE CUSTODY

2.1. Sampling Support

2.1.1. Each individual PASI laboratory provides shipping containers, properly preserved sample containers, custody documents, and field quality control samples to support field-sampling events. Guidelines for sample container types, preservatives, and holding times for a variety of methods are listed in Attachment VIII. Note that all analyses listed are not necessarily performed at all PASI laboratories and there may be additional laboratory analyses performed that are not included in these tables. Customers are encouraged to contact their local Pace Project Manager for questions or clarifications regarding sample handling. PASI – Schenectady, New York may provide pick-up and delivery services to their customers when needed.

2.2. Field Services

2.2.1. Pace Analytical has a large Field Services Division which is based in their Minneapolis facility as well as limited field service capabilities in some of our other facilities. Field Services provides comprehensive nationwide service offerings including:

- Stack Testing
- Ambient Air
- CEM Certification Testing
- Air Quality Monitoring
- Onsite Analytical Services- FTIR and GC
- Real-time Process Diagnostic/Optimization Testing
- Wastewater, Groundwater and Drinking Water Monitoring
- Storm Water and Surface Water Monitoring
- Soil and Waste Sampling
- Mobile Laboratory Services

2.2.2. Field Services operates under the PASI Corporate Quality System, with applicable and necessary provisions to address the activities, methods, and goals specific to Field Services. All procedures and methods used by Field Services are documented in Standard Operating Procedures and Procedure Manuals.

2.3. Project Initiation

2.3.1. Prior to accepting new work, the laboratory reviews its performance capability. The laboratory confirms that sufficient personnel, equipment capacity, analytical method capability, etc., are available to complete the required work. Customer needs, certification requirements, and data quality objectives are defined and the appropriate sampling and analysis plan is developed to meet the project requirements by project managers or sales representatives. Members of the management staff review current instrument capacity, personnel availability and training, analytical procedures capability, and projected sample load. Management then informs the sales and client services personnel whether or not the laboratory can accept the new project via written correspondence, email, and/or daily operations meetings.

2.3.2. The laboratory maintains records of all such reviews, including discussions with customers. Routine analytical project documentation of quotes, notes, dates, initials, and/or recordings is maintained in a project folder by project management. Conditions for new and more complex contracts are determined by the SGM/GM/AGM/OM and sales representatives. Quality Management is consulted on technical requirements and operations staff provides input on volume capacities. Evidence of these reviews is maintained in the form of awarded Request for Proposals (RFPs), signed quotes or contracts, and a Customer Relationship Management (CRM) database. If a review identifies a potential mismatch between customer requirements and laboratory capabilities and/or capacities, Pace will specify its level of commitment by listing these exceptions to the requirements within the RFP, quote or contract.

2.3.3. Additional information regarding specific procedures for reviewing new work requests can be found in SOP S-NY-Q-220 **Review of Analytical Requests, Tenders, & Contracts** or its equivalent revision or replacement.

2.4. Chain of Custody

2.4.1. A chain of custody (COC) provides the legal documentation of samples from time of collection to completion of analysis. PASI has implemented Standard Operating Procedures to ensure that sample custody traceability and responsibility objectives are achieved for every project.

2.4.2. Field personnel or client representatives must complete a chain of custody for all samples that are received by the laboratory. The importance of completeness of COCs is stressed to the samplers and is critical to efficient sample receipt and to insure the requested methods are used to analyze the correct samples.

2.4.3. If sample shipments are not accompanied by the correct documentation, the Sample Receiving department notifies a Project Manager. The Project Manager then obtains the correct documentation/information from the customer in order for analysis of samples to proceed.

2.4.4. The sampler is responsible for providing the following information on the chain of custody form:

- Customer project name
- Project location or number
- Field sample number/identification
- Date and time sampled
- Sample matrix
- Preservative
- Requested analyses
- Sampler signature
- Relinquishing signature
- Date and time relinquished
- Sampler remarks as needed
- Custody Seal Number if present
- Regulatory Program Designation
- The state where the samples were collected to ensure all applicable state requirements are met
- Turnaround time requested
- Purchase order number

2.4.5. The COC is filled out completely and legibly with indelible ink. Errors are corrected by drawing a single line through the initial entry and initialing and dating the change. All transfers of samples are recorded on the chain of custody in the "relinquished" and "received by" sections. All information except signatures is printed.

2.4.6. Additional information can be found in S-NY-C-227 **Sample Management** or its equivalent revision or replacement.

2.5. Sample Acceptance Policy

2.5.1. In accordance with regulatory guidelines, PASI complies with the following sample acceptance policy for all samples received.

2.5.2. If the samples do not meet the sample receipt acceptance criteria outlined below, the laboratory is required to document all non-compliances, contact the customer, and either reject the samples or fully document any decisions to proceed with analyses of samples which do not meet the criteria. Any results reported from samples not meeting these criteria are appropriately qualified on the final report.

2.5.3. All samples must:

- Have unique customer identification that is clearly marked with indelible ink on durable waterproof labels affixed to the sample containers that match the chain of custody.
- Have clear documentation on the chain of custody related to the location of the sampling site with the time and date of sample collection.
- Have the sampler's name and signature.
- Have all requested analyses clearly designated on the COC.
- Have clear documentation of any special analytical or data reporting requirements.
- Be in appropriate sample containers with clear documentation of the preservatives used.
- Be correctly preserved unless the method allows for laboratory preservation.
- Be received within holding time. Any samples with hold times that are exceeded will not be processed without prior customer approval.
- Have sufficient sample volume to proceed with the analytical testing. If insufficient sample volume is received, analysis will not proceed without customer approval.
- Be received within appropriate temperature ranges - not frozen but ≤6°C [(See Note 1)], unless program requirements or customer contractual obligations mandate otherwise [(see Note 2)]. The cooler temperature is recorded directly on the COC and the SCUR. Samples that are delivered to the laboratory immediately after collection are considered acceptable if there is evidence that the chilling process has been started. For example, by the arrival of the samples on ice. If samples arrive that are not compliant with these temperature requirements, the customer will be notified. The analysis will NOT proceed unless otherwise directed by the customer. If less than 72 hours remain in the hold time for the analysis, the analysis may be started while the customer is contacted to avoid missing the hold time. Data associated with any deviations from the above sample acceptance policy requirements will be appropriately qualified.

Note 1: Temperature will be read and recorded based on the precision of the measuring device. For example, temperatures obtained from a thermometer graduated to 0.1°C will be read and recorded to

±0.1°C. Measurements obtained from a thermometer graduate to 0.5°C will be read to ±0.5°C. Measurements read at the specified precision are not to be rounded down to meet the ≤6°C limit

Note 2: Some microbiology methods allow sample receipt temperatures of up to 10°C. Consult the specific method for microbiology samples received above 6°C prior to initiating corrective action for out of temperature preservation conditions.

Note 3: Biological Tissue Samples must be received frozen at $\leq 0^{o}$C.

2.5.4. Upon sample receipt, the following items are also checked and recorded:

- Presence of custody seals or tapes on the shipping containers;
- Sample condition: Intact, broken/leaking, bubbles in VOA samples;
- Sample holding time;
- Sample pH and residual chlorine when required;
- Appropriate containers.

2.5.5. Samples for drinking water analysis that are improperly preserved, or are received past holding time, are rejected at the time of receipt, with the exception of VOA samples that are tested for pH at the time of analysis.

2.5.6. Additional information can be found in S-NY-C-227 **Sample Management** or its equivalent revision or replacement.

2.6. Sample Log-in

2.6.1. After sample inspection, all sample information on the chain of custody is entered into the Laboratory Information Management System (LIMS). This permanent record documents receipt of all sample containers including:

- Customer name and contact
- Customer number
- Pace Analytical project number
- Pace Analytical Project Manager
- Sample descriptions
- Due dates
- List of analyses requested
- Date and time of laboratory receipt
- Field ID code
- Date and time of collection
- Any comments resulting from inspection for sample rejection

2.6.2. All samples received are logged into the LIMS within one working day of receipt. Sample login may be delayed due to customer clarification of analysis needed, corrective actions for sample receipt non-conformance, or other unusual circumstances. If the time collected for any sample is unspecified and Pace is unable to obtain this information from the customer, the laboratory will use 08:00 as the time sampled. All hold times will be based on this sampling time and qualified accordingly if exceeded.

2.6.3. The LIMS automatically generates a unique identification number for each sample created in the system. The LIMS sample number follows the general convention of XXXXXX (insert LIMS sample numbering convention). This unique identification number is placed on the sample container as a durable label and becomes the link between the laboratory's sample management system and the customer's field identification; it will be a permanent reference number for all future interactions.

2.6.4. Current division codes are noted below. These division codes are used primarily for accounting purposes and LIMS sample identifications. For smaller facilities, these codes may be used primarily for accounting purposes. More division codes may be added, revised or removed without updating this document.

00 = Corporate	50 = Indianapolis/Columbus
10 = Minnesota/Montana/Virginia MN	51 = Columbus (accounting only)
12 = Virginia/Duluth MN	55/56 = Pace Energy Labs
20 = New Orleans/Puerto Rico	60 = Kansas
30 = Pittsburgh	65 = New York (Schenectady)
35 = Florida/South Florida	70 = Long Island
36 = South Florida (accounting only)	75 = Dallas
40 = Green Bay	92 = Carolinas

2.6.5. Sample labels are printed from the LIMS and affixed to each sample container.

2.6.6. Samples with hold times that are near expiration date/time may be sent directly to the laboratory for analysis at the discretion of the Project Manager and/or SGM/GM/AGM/OM.

2.6.7. Additional information can be found in S-NY-C-227 **Sample Management** or its equivalent revision or replacement.

2.7. Sample Storage

2.7.1. Storage Conditions

2.7.1.1. Samples are stored away from all standards, reagents, or other potential sources of contamination. Samples are stored in a manner that prevents cross contamination. Volatile samples are stored separately from other samples. All sample fractions, extracts, leachates, and other sample preparation products are stored in the same manner as actual samples or as specified by the analytical method.

2.7.1.2. Storage blanks, consisting of two 40mL aliquots of reagent water, are stored with volatile samples and are used to measure cross-contamination acquired during storage. If applicable, laboratories must have documented procedures and criteria for evaluating storage blanks, appropriate to the types of samples being stored.

2.7.2. Temperature Monitoring

2.7.2.1. Samples are taken to the appropriate storage location immediately after sample receipt and check-in procedures are completed. All sample storage areas are located in limited access areas and are monitored to ensure sample integrity.

2.7.2.2. The temperature of each refrigerated storage area is maintained at $\leq 6^{\circ}C$ (but above freezing) unless state or program requirements differ. The temperature of each freezer storage area is maintained at $<-10^{o}C$ unless state or program requirements differ. The temperature of

each storage area is checked and documented each day of use (each calendar day). If the temperature falls outside the acceptable limits, the following corrective actions are taken and appropriately documented:

- The temperature is rechecked after two hours to verify temperature exceedance. Corrective action is initiated and documented if necessary.
- The SQM/QM and/or laboratory management are notified if the problem persists.
- The samples are relocated to a proper environment if the temperature cannot be maintained after corrective actions are implemented.
- The affected customers are notified.
- Documentation is provided on analytical report.

2.7.3. **Hazardous Materials**

2.7.3.1. Pure product or potentially heavily contaminated samples must be tagged as "hazardous" or "lab pack" and stored separately from other samples.

2.7.4. **Foreign/Quarantined Soils**

2.7.4.1. Depending on the soil disposal practices of the laboratory, foreign soils and soils from USDA regulated areas are adequately segregated to enable proper sample disposal. The USDA requires these samples to be incinerated or sterilized by an approved treatment procedure. Additional information regarding USDA regulations and sample handling can be found in applicable local laboratory SOPs.

2.7.4.2. Additional information on sample storage can be found in S-NY-C-227 **Sample Management** or its equivalent revision or replacement.

2.8. Sample Protection

2.8.1. PASI laboratory facilities are operated under controlled access protocols to ensure sample and data integrity. Visitors must register at the front desk and be properly escorted at all times.

2.8.2. Samples are removed from storage areas by designated personnel and returned to the storage areas, if necessary, immediately after the required sample quantity has been taken.

2.8.3. Upon customer request, additional and more rigorous chain of custody protocols for samples and data can be implemented. For example, some projects may require internal chain-of-custody protocols.

2.8.4. Additional information can be found in S-NY-C-227 **Sample Management** or its equivalent revision or replacement.

2.9. Subcontracting Analytical Services

2.9.1. Every effort is made to perform all analyses for PASI customers within the laboratory that receives the samples. When subcontracting to a laboratory other than the receiving laboratory, whether inside or outside the PASI network, becomes necessary, a preliminary verbal communication with that laboratory is undertaken. Customers are notified in writing of the laboratory's intention to subcontract any portion of the testing to another laboratory. Work performed under specific protocols may involve special considerations.

2.9.2. Prior to subcontracting samples to a laboratory outside Pace Analytical, the potential sub-contract laboratory will be pre-qualified by verifying that the subcontractor meets the following criteria:

- All certifications required for the proposed subcontract are in effect,
- Sufficient professional liability and other required insurance coverage is in effect, and
- Is not involved in legal action by any federal, state, or local government agency for data integrity issues and has not been convicted in such investigation at any time during the past 5 years.

2.9.3. The contact and preliminary arrangements are made between the PASI Project Manager and the appropriate subcontract laboratory personnel. The specific terms of the subcontract laboratory agreement include:

- Method of analysis
- Number and type of samples expected
- Project specific QA/QC requirements
- Deliverables required
- Laboratory certification requirement
- Price per analysis
- Turn-around time requirements

2.9.4. Chain-of-custody forms are generated for samples requiring subcontracting to other laboratories. Sample receiving personnel re-package the samples for shipment, create a transfer chain of custody form and record the following information:

- Pace Analytical Laboratory Number
- Matrix
- Requested analysis
- Special instructions regarding turnaround, required detection or reporting limits, or any unusual information known about the samples or analytical procedure.
- Signature in "Relinquished By"

2.9.5. All subcontracted sample data reports are sent to the PASI Project Manager. Pace will provide a copy of the subcontractor's report to the client when requested.

2.9.6. Any Pace Analytical work sent to other labs within the PASI network is handled as subcontracted work and all final reports are labeled clearly with the name of the laboratory performing the work. Any non-TNI work is clearly identified. PASI will not be responsible for analytical data if the subcontract laboratory was designated by the customer.

2.9.7. Additional information can be found in S-NY-C-044 **Subcontracting Samples** or its equivalent revision or replacement.

2.10. Sample Retention and Disposal

2.10.1. Samples, extracts, digestates, and leachates must be retained by the laboratory for the period of time necessary to protect the interests of the laboratory and the customer.

2.10.2. Unused portions of samples are retained by each laboratory based on program or customer requirements for sample retention and storage. The minimum sample retention time is 45 days from receipt of the samples. Samples requiring thermal preservation may be stored at ambient temperature when the hold time is expired, the report has been delivered, and/or allowed by the customer, program, or contract. Samples requiring storage beyond the minimum sample retention time due to

special requests or contractual obligations may be stored at ambient temperature unless the laboratory has sufficient capacity and their presence does not compromise the integrity of other samples.

2.10.3. After this period expires, non-hazardous samples are properly disposed of as non-hazardous waste. The preferred method for disposition of hazardous samples is to return the excess sample to the customer. If it is not feasible to return samples, or the customer requires PASI to dispose of excess samples, proper arrangements will be made for disposal by an approved contractor.

2.10.4. Additional information can be found in S-NY-W-054 **Waste Handling and Management** and S-NY-C-227 **Sample Management** or their equivalent revisions or replacements.

3.0. ANALYTICAL CAPABILITIES

3.1. Analytical Method Sources

3.1.1. PASI laboratories are capable of analyzing a full range of environmental samples from a variety of matrices, including air, surface water, wastewater, groundwater, soil, sediment, biota, and other waste products. The latest valid editions of methodologies are applied from regulatory and professional sources including EPA, ASTM, USGS, NIOSH, Standard Methods, and State Agencies. Section 11 is a representative listing of general analytical protocol references. PASI discloses in writing to its customers and regulatory agencies any instances in which modified methods are being used in the analysis of samples.

3.1.2. In the event of a customer-specific need, instrumentation constraint or regulatory requirement, PASI laboratories reserve the right to use valid versions of methods that may not be the most recent edition available.

3.2. Analytical Method Documentation

3.2.1. The primary form of PASI laboratory documentation of analytical methods is the Standard Operating Procedure (SOP). SOPs contain pertinent information as to what steps are required by an analyst to successfully perform a procedure. The required contents for the SOPs are specified in the company-wide SOP for Preparation of SOPs (S-ALL-Q-001).

3.2.2. The SOPs may be supplemented by other training materials that further detail how methods are specifically performed. This training material will undergo periodic, documented review along with the other Quality System documentation.

3.3. Analytical Method Validation and Instrument Validation

3.3.1. In some situations, PASI develops and validates methodologies that may be more applicable to a specific problem or objective. When non-standard methods are required for specific projects or analytes of interest, or when the laboratory develops or modifies a method, the laboratory validates the method prior to applying it to customer samples. Method validity is established by meeting criteria for precision and accuracy as established by the data quality objectives specified by the end user of the data. The laboratory records the validation procedure, the results obtained and a statement as to the usability of the method. The minimum requirements for method validation include evaluation of sensitivity, quantitation, precision, bias, and selectivity of each analyte of interest.

3.4. Demonstration of Capability (DOC)

3.4.1. Analysts complete an initial demonstration of capability (IDOC) study prior to performing a method or when there is a change in instrument type, personnel, or test method, or at any time that a method has not been performed by the laboratory or analyst in a 12-month period. The mean recovery and standard deviation of each analyte, taken from 4 replicates of a quality control standard is calculated and compared to method criteria (if available) or established laboratory criteria for evaluation of acceptance. Each laboratory maintains copies of all demonstrations of capability, including those that fail acceptance criteria and corresponding raw data for future reference and must

document the acceptance criteria prior to the analysis of the DOC. Demonstrations of capability are verified on an annual basis.

3.4.2. For Continuing Demonstrations of Capability, the laboratories may use Performance Testing (PT) samples in lieu of the 4-replicate approach listed above. For methods or procedures that do not lend themselves to the "4-replicate" approach, the demonstration of capability requirements will be specified in the applicable SOP. Drinking Water DOCs must be done at or below the MCL.

3.4.3. Additional information can be found in SOP S-ALL-Q-020 **Training and Employee Orientation** or its equivalent revision or replacement.

3.5. Regulatory and Method Compliance

3.5.1. PASI understands that expectations of our customers commonly include the assumption that laboratory data will satisfy specific regulatory requirements. Therefore PASI attempts to ascertain, prior to beginning a project, what applicable regulatory jurisdiction, agency, or protocols apply to that project. This information is also required on the chain of custody submitted with samples.

3.5.2. PASI makes every effort to detect regulatory or project plan inconsistencies, based upon information from the customer, and communicate them immediately to the customer in order to aid in the decision making process. PASI will not be liable if the customer chooses not to follow PASI recommendations.

3.5.3. It is PASI policy to disclose in a forthright manner any detected noncompliance affecting the usability of data produced by our laboratories. The laboratory will notify customers within 30 days of fully characterizing the nature of the nonconformance, the scope of the nonconformance and the impact it may have on data usability.

4.0. QUALITY CONTROL PROCEDURES

Quality control data is analyzed and where they are found to be outside pre-defined criteria, planned action is taken to correct the problem in order to prevent incorrect results from being reported. Quality control samples are to be processed in the same manner as client samples.

4.1. Method Blank

4.1.1. A method blank is used to evaluate contamination in the preparation/analysis system and is processed through all preparation and analytical steps with its associated samples.

4.1.2. A method blank is processed at a minimum frequency of one per preparation batch. In the case of a method that has no separate preparation step, a method blank is processed with no more than 20 samples of a specific matrix performed by the same analyst, using the same method, standards, and reagents.

4.1.3. The method blank consists of a matrix similar to the associated samples that is known to be free of analytes of interest. Method blanks are not applicable for certain analyses, such as pH, conductivity, flash point and temperature.

4.1.4. Each method blank is evaluated for contamination. The source of any contamination is investigated and documented corrective action is taken when the concentration of any target analyte is detected above the reporting limit and is greater than 1/10 of the amount of that analyte found in any associated sample. Some labs, due to client requirements, etc., may have to evaluate their method blanks down to ½ the reporting limit or down to the method detection limit as opposed to the reporting limit itself. Corrective actions for blank contamination may include the re-preparation and re-analysis of all samples (where possible) and quality control samples. Data qualifiers must be applied to results that are considered affected by contamination in a method blank.

4.1.5. Deviations made from this policy must be approved by the SQM/QM prior to release of the data.

4.2. Laboratory Control Sample

4.2.1. The Laboratory Control Sample (LCS) is used to evaluate the performance of the entire analytical system including preparation and analysis.

4.2.2. An LCS is processed at a minimum frequency of one per preparation batch. In the case of a method that has no separate preparation step, an LCS will be processed with no more than 20 samples of a specific matrix performed by the same analyst, using the same method, standards, and reagents.

4.2.3. The LCS consists of a matrix similar to the associated samples that is known to be free of the analytes of interest that is then spiked with known concentrations of target analytes.

4.2.4. The LCS contains **all** analytes specified by a specific method or by the customer or regulatory agency, which may include full list of target compounds, with certain exceptions. These exceptions may include analyzing only specific Aroclors when PCB analysis is requested or not spiking with all EPA Appendix IX compounds when a full Appendix IX list of compounds is requested. However, the lab must ensure that all target components in its scope of accreditation are included in the spike

mixture for the LCS over a two (2) year period. In the absence of specified components, the laboratory will spike the LCS with the following compounds:

- For multi-peak analytes (e.g. PCBs, technical chlordane, toxaphene), a representative standard will be processed.
- For methods with long lists of analytes, a representative number of target analytes may be chosen. The following criteria is used to determine the number of LCS compounds used:
  - For methods with 1-10 target compounds, the laboratory will spike with all compounds;
  - For methods with 11-20 target compounds, the laboratory will spike with at least 10 compounds or 80%, whichever is greater;
  - For methods with greater than 20 compounds, the laboratory will spike with at least 16 compounds.

4.2.5. The LCS is evaluated against the method default or laboratory-derived acceptance criteria. For those methods that require laboratory-derived limits, method default control limits may be used until the laboratory has a minimum of 20, but preferably greater than 30, data points from which to derive internal acceptance criteria. Any compound that is outside of these limits is considered to be 'out of control' and must be qualified appropriately. Any associated sample containing an 'out-of-control' compound must either be re-analyzed with a successful LCS or reported with the appropriate data qualifier. When the acceptance criteria for the LCS are exceeded high, and there are associated samples that are non-detects, then those non-detects can be reported with data qualifiers, or when the acceptance criteria are exceeded low, those associated sample results may be reported if they exceed the maximum regulatory limit/decision level with data qualifiers.

4.2.6. For LCSs containing a large number of analytes, it is statistically likely that a few recoveries will be outside of control limits. This does not necessarily mean that the system is out of control, and therefore no corrective action would be necessary (except for proper documentation). TNI has allowed for a minimum number of marginal exceedances, defined as recoveries that are beyond the LCS control limits (3X the standard deviation) but less than the marginal exceedance limits (4X the standard deviation). The number of allowable exceedances depends on the number of compounds in the LCS. If more analyte recoveries exceed the LCS control limits than is allowed (see below) or if any one analyte exceeds the marginal exceedance limits, then the LCS is considered non-compliant and corrective actions are necessary. The number of allowable exceedances is as follows:

- >90 analytes in the LCS- 5 analytes
- 71-90 analytes in the LCS- 4 analytes
- 51-70 analytes in the LCS- 3 analytes
- 31-50 analytes in the LCS- 2 analytes
- 11-30 analytes in the LCS- 1 analyte
- <11 analytes in the LCS- no analytes allowed out)

4.2.7. A matrix spike (MS) can be used in place of a non-compliant LCS in a batch as long as the MS passes the LCS acceptance criteria (this is a TNI allowance). When this happens, full documentation must be made available to the data user. If this is not allowed by a customer or regulatory body, the associated samples must be rerun with a compliant LCS (if possible) or reported with appropriate data qualifiers.

4.2.8. Deviations made from this policy must be approved by the SQM/QM prior to release of the data.

4.3. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

4.3.1. A matrix spike (MS) is used to determine the effect of the sample matrix on compound recovery for a particular method. The information from these spikes is sample or matrix specific and is not used to determine the acceptance of an entire batch unless the MS is actually used as the LCS.

4.3.2. A **Matrix Spike/Matrix Spike Duplicate** (MS/MSD) set is processed at a frequency specified in a particular method or as determined by a specific customer request. This frequency will be specified in the applicable method SOP or customer QAPP. In the absence of such requirements, an MS/MSD set is routinely analyzed once per every 20 samples per matrix per method.

4.3.3. The MS and MSD consist of the sample matrix that is then spiked with known concentrations of target analytes. Laboratory personnel spike customer samples that are specifically designated as MS/MSD samples or, when no designated samples are present in a batch, randomly select samples to spike that have adequate sample volume or weight. Spiked samples are prepared and analyzed in the same manner as the original samples and are selected from different customers if possible.

4.3.4. The MS and MSD contain all analytes specified by a specific method or by the customer or regulatory agency. In the absence of specified components, the laboratory will spike the MS/MSD with the same number of compounds as previously discussed in the LCS section. However, the lab must ensure that all targeted components in its scope of accreditation are included in the spike mixture for the MS/MSD over a two (2) year period.

4.3.5. The MS and MSD are evaluated against the method or laboratory derived criteria. Any compound that is outside of these limits is considered to be 'out of control' and must be qualified appropriately. Batch acceptance, however, is based on method blank and LCS performance, not on MS/MSD recoveries. The spike recoveries give the data user a better understanding of the final results based on their site specific information.

4.3.6. A matrix spike and sample duplicate will be performed instead of a matrix spike and matrix spike duplicate when specified by the customer or method.

4.3.7. Deviations made from this policy must be approved by the SQM/QM prior to release of the data.

4.4. Sample Duplicate

4.4.1. A sample duplicate is a second portion of sample that is prepared and analyzed in the laboratory along with the first portion. It is used to measure the precision associated with preparation and analysis. A sample duplicate is processed at a frequency specified by the particular method or as determined by a specific customer.

4.4.2. The sample and duplicate are evaluated against the method or laboratory derived criteria for relative percent difference (RPD). Any duplicate that is outside of these limits is considered to be 'out of control' and must be qualified appropriately.

4.4.3. Deviations made from this policy must be approved by the SQM/QM prior to release of the data.

4.5. Surrogates

4.5.1. Surrogates are compounds that reflect the chemistry of target analytes and are typically added to samples for organic analyses to monitor the effect of the sample matrix on compound recovery.

4.5.2. Surrogates are added to each customer sample (for applicable organics), method blank, LCS, MS, and calibration standard prior to extraction or analysis. The surrogates are evaluated against the method or laboratory derived acceptance criteria or against project-specific acceptance criteria specified by the client, if applicable. Any surrogate compound that is outside of these limits is considered to be 'out of control' and must be qualified appropriately. Samples with surrogate failures are typically re-extracted and/or re-analyzed to confirm that the out-of-control value was caused by the matrix of the sample and not by some other systematic error. An exception to this would be samples that have high surrogate values but no reportable hits for target compounds. These samples would be reported, with a qualifier, because the implied high bias would not affect the final results. For methods with multiple surrogates, documentation regarding acceptance and associated compounds will be found in the individual method SOPs.

4.5.3. Deviations made from this policy must be approved by the SQM/QM prior to release of the data.

4.6. Internal Standards

4.6.1. Internal Standards are method-specific analytes added to every standard, method blank, laboratory control sample, matrix spike, matrix spike duplicate, sample, and calibration standard at a known concentration, prior to analysis for the purpose of adjusting the response factor used in quantifying target analytes. At a minimum, the laboratory will follow method specific guidelines for the treatment of internal standard recoveries as they are related to the reporting of data.

4.6.2. Deviations made from this policy must be approved by the SQM/QM prior to release of the data.

4.7. Field Blanks

4.7.1. Field blanks are blanks prepared at the sampling site in order to monitor for contamination that may be present in the environment where samples are collected. These field quality control samples are often referenced as field blanks, rinsate blanks, or equipment blanks. The laboratory analyzes these field blanks as normal samples and informs the customer if there are any target compounds detected above the reporting limits.

4.8. Trip Blanks

4.8.1. Trip blanks are blanks that originate from the laboratory as part of the sampling event and are used to monitor for contamination of samples during transport. These blanks accompany the empty sample containers to the field and then accompany the collected samples back to the laboratory. These blanks are routinely analyzed for volatile methods where ambient background contamination is likely to occur.

4.9. Limit of Detection (LOD)

4.9.1. PASI laboratories are required to use a documented procedure to determine a limit of detection for each analyte of concern in each matrix reported. All sample processing steps of the preparation and analytical methods are included in this determination including any clean ups. For any test that does not have a valid LOD, sample results below the limit of quantitation (LOQ) cannot be reported.

4.9.2. The LOD is initially established for the compounds of interest for each method in a clean matrix with no target analytes present and no interferences at a concentration that would impact the results. The LOD is then determined every time there is a change in the test method that affects how the test is performed or when there has been a change in the instrument that affects the sensitivity. If required by customer, method or accreditation body, the LOD will be re-established annually for all applicable methods.

4.9.3. Unless otherwise noted, the method used by PASI laboratories to determine LODs is based on the Method Detection Limit (MDL) procedure outlined in 40 CFR Part 136, Appendix B. Where required by regulatory program or customer, the above referenced procedure will be followed.

4.9.4. Where specifically stated in the published method, LODs or MDLs will be performed at the listed frequency.

4.9.5. The validity of the LOD must be shown by detection (a value above zero) of the analytes in a QC sample in each quality system matrix. The QC sample must contain the analyte at no more than 3X the LOD for a single analyte test and 4X the LOD for multiple analyte tests. This verification must be performed on each instrument used for sample analysis and reporting of data. The validity of the LOD must be verified as part of the LOD determination process. This verification must be done prior to the use of the LOD for sample analysis.

4.9.6. An LOD study is not required for any analyte for which spiking solutions or quality control samples are not available such as temperature.

4.9.7. The LOD, if required, shall be verified annually for each quality system matrix, technology and analyte. In lieu of performing full LOD (MDL) studies annually, the laboratory can verify the LOD (MDL) on an annual basis, providing this verification is fully documented and does not contradict other customer or program requirements that the laboratory must follow. The requirements of this verification are:

- The spike concentration of the verification must be no more than 3X times the LOD for single analyte tests and 4X the LOD for multiple analyte tests.
- The laboratory must verify the LOD on each instrument used for the reporting of sample data.
- The laboratory must be able to identify all target analytes in the verification standard (distinguishable from noise).

4.9.8. Additional information can be found in SOP S-NY-Q-021 **Determination of LOD and LOQ** or its equivalent revision or replacement.

4.10. Limit of Quantitation (LOQ)

4.10.1. A limit of quantitation (LOQ) for every analyte of concern must be determined. For PASI laboratories, this LOQ is referred to as the RL, or Reporting Limit. This RL is based on the lowest calibration standard concentration that is used in each initial calibration. Results below this level are not allowed to be reported without qualification since the results would not be substantiated by a

calibration standard. For methods with a determined LOD, results can be reported out below the LOQ but above the LOD if they are properly qualified (e.g., J flag).

4.10.2. The LOQ must be higher than the LOD.

4.10.3. To verify the LOQ, the laboratory will prepare a sample in the same matrix used for the LCS. The sample will be spiked with each target analyte at a concentration equivalent to the RL or 2X the RL. This sample must undergo the routine sample preparation procedure including any routine sample cleanup steps. The sample is then analyzed and the recovery of each target analyte determined. The recovery for each target analyte must meet the laboratories current control limits for an LCS. The annual LOQ verification is not required if the LOD was determined or verified annually on that instrument.

4.10.4. Additional information can be found in SOP S-NY-Q-021 **Determination of LOD and LOQ** or its equivalent revision or replacement.

4.11. Estimate of Analytical Uncertainty

4.11.1. PASI laboratories can provide an estimation of uncertainty for results generated by the laboratory. The estimate quantifies the error associated with any given result at a 95% confidence interval. This estimate does not include bias that may be associated with sampling. The laboratory has a procedure in place for making this estimation. In the absence of a regulatory or customer-specific procedure, PASI laboratories base this estimation on the recovery data obtained from the Laboratory Control Spikes. The uncertainty is a function of the standard deviation of the recoveries multiplied by the appropriate Student's t Factor at 95% confidence.

4.11.2. The measurement of uncertainty is provided only on request by the customer, as required by specification or regulation and when the result is used to determine conformance within a specification limit.

4.12. Proficiency Testing (PT) Studies

4.12.1. PASI laboratories participate in the TNI defined proficiency testing program. PT samples are obtained from NIST approved providers and analyzed and reported at a minimum of two times per year for the relevant fields of testing per matrix.

4.12.2. The laboratory initiates an investigation whenever PT results are deemed 'unacceptable' by the PT provider. All findings and corrective actions taken are reported to the SQM/QM or their designee. A corrective action plan is initiated and this report is sent to the appropriate state accreditation agencies for their review. Additional PTs will be analyzed and reported as needed for certification purposes.

4.12.3. PT samples are treated as typical customer samples, utilizing the same staff, methods, equipment, facilities, and frequency of analysis. PT samples are included in the laboratory's normal analytical processes and do not receive extraordinary attention due to their nature.

4.12.4. Comparison of analytical results with anyone participating in the same PT study is prohibited prior to the close of the study.

4.12.5. Additional information can be found in SOP S-NY-Q-324 **Proficiency Testing Program** or its equivalent revision or replacement.

4.13. Rounding and Significant Figures

4.13.1. In general, the PASI laboratories report data to no more than three significant digits. Therefore, all measurements made in the analytical process must reflect this level of precision. In the event that a parameter that contributes to the final result has less than three significant figures of precision, the final result must be reported with no more significant figures than that of the parameter in question. The rounding rules listed below are descriptive of the LIMS and not necessarily of any supporting program such as Excel.

4.13.2. Data is compared to the reporting limits and MDLs to determine if qualifiers are needed before the rounding step occurs.

4.13.3. **Rounding:** PASI-Schenectady, New York follows the odd / even guidelines for rounding numbers:

- If the figure following the one to be retained is less than five, that figure is dropped and the retained ones are not changed (with three significant figures, 2.544 is rounded to 2.54).
- If the figure following the ones to be retained is greater than five, that figure is dropped and the last retained one is rounded up (with three significant figures, 2.546 is rounded to 2.55).
- If the figure following the ones to be retained is five and if there are no figures other than zeros beyond that five, then the five is dropped and the last figure retained is unchanged if it is even and rounded up if it is odd (with three significant figures, 2.525 is rounded to 2.52 and 2.535 is rounded to 2.54).

4.13.4. **Significant Digits**

4.13.4.1. Unless specified by federal, state, or local requirements or on specific request by a customer, PASI-Schenectady, New York reports all analytical results to 3 significant digits, regardless of the magnitude of the value reported.

4.14. Retention Time Windows

4.14.1. When chromatographic conditions are changed, retention times and analytical separations are often affected. As a result, two critical aspects of any chromatographic method are the determination and verification of retention times and analyte separation. Retention time windows must be established for the identification of target analytes. The retention times of all target analytes in all calibration verification standards must fall within the retention time windows. If an analyte falls outside the retention time window in an ICV or CCV, new absolute retention time windows must be calculated, unless instrument maintenance fixes the problem. When a new column is installed, a new retention time window study must be performed.

4.14.2. One process for the production of retention time windows: Make 3 injections of all single component or multi-component analytes over a 72-hour period. Record the retention time in minutes for each analyte and surrogate to 3 decimal places. Calculate the mean and standard deviation of the three absolute retention times for each target analyte and surrogate. For multi-component analytes, choose 3-5 major peaks and calculate the mean and standard deviation for each of the peaks. If the standard deviation of the retention times of a target analyte is 0.000, the lab may use a default standard deviation of 0.01. The width of the retention time window for each analyte

and surrogate and major peak in a multi-component analyte is defined as +/- 3 times the standard deviation of the mean absolute retention time established during that 72-hour period or 0.03 minutes, whichever is greater.

4.14.3. The center of the retention time window is established for each analyte and surrogate by using the absolute retention times from the CCV at the beginning of the analytical shift. For samples run with an initial calibration, use the retention time of the mid-point standard of the initial calibration curve.

4.14.4. For more information, please reference the local facility's analytical SOPs.

5.0. DOCUMENT MANAGEMENT AND CHANGE CONTROL

5.1. Document Management

5.1.1. Additional information can be found in SOP S-NY-Q-221 **Document Control and Management** or its equivalent revision or replacement. Information on Pace's policy for electronic signatures can also be found in this SOP.

5.1.2. Pace Analytical Services, Inc. has an established procedure for managing documents that are part of the quality system. The list of managed documents includes, but is not limited to, Standard Operating Procedures (both technical and non-technical), Quality Assurance Manuals, quality policy statements, training documents, work-processing documents, charts, posters, memoranda, notices, forms, software, and any other procedures, tables, plans, etc. that have a direct bearing on the quality system (including applicable data records and non-technical documents).

5.1.3. A master list of all managed documents is maintained at each facility identifying the current revision status and distribution of the controlled documents. This establishes that there are no invalid or obsolete documents in use in the facility. All documents are reviewed periodically and revised if necessary. Obsolete documents are systematically discarded or archived for audit or knowledge preservation purposes.

5.1.4. Each managed document is uniquely identified to include the date of issue, the revision identification, page numbers, the total number of pages and the issuing authorities. For complete information on document numbering, refer to SOP S-ALL-Q-003 **Document Numbering**.

5.1.5. SOPs, specifically, are available to all laboratory staff via the Learning Management System (LMS) which is a secure repository that is accessed through an internet portal. As a local alternative to the hard copy system of controlled documents, secured electronic copies of controlled documents may be maintained on the laboratory's local server. These document files must be read-only for all personnel except the Quality Department and system administrator. Other requirements for this system are as follows:

- Electronic documents must be readily accessible to all facility employees.
- All hardcopy SOPs must be obtained from the Quality Department.

5.1.6. **Quality Assurance Manual (QAM):** The Quality Assurance Manual is the company-wide document that describes all aspects of the quality system for PASI. The base QAM template is distributed by the Corporate Quality Department to each of the SQMs/QMs. The local management personnel modify the necessary and permissible sections of the base template and submit those modifications to the Corporate Director of Quality for review. Once approved and signed by both the CEO and the Director of Quality; the SGM/GM/AGM/OM, the SQM/QM, and any Technical Directors sign the Quality Assurance Manual. Each SQM/QM is then in charge of distribution to employees, external customers or regulatory agencies and maintaining a distribution list of controlled document copies. The Quality Assurance Manual template is reviewed on an annual basis by all of the PASI SQMs/QMs and revised accordingly by the Director of Quality.

5.1.7. **Standard Operating Procedures (SOPs)**

5.1.7.1. SOPs fall into two categories: company-wide documents and facility specific documents. Company-wide SOPs start with the prefix S-ALL- and local SOPs start with the individual facility prefix.

5.1.7.2. The purpose of the company-wide SOPs is to establish policies and procedure that are common and applicable to all PASI facilities. Company-wide SOPs are document-controlled by the corporate quality office and signed copies are distributed to all of the SQMs/QMs. The local management personnel sign the company-wide SOPs. The SQM/QM is then in charge of distribution to employees, external customers, or regulatory agencies and maintaining a distribution list of controlled document copies.

5.1.7.3. Local PASI facilities are responsible for developing facility-specific SOPs applicable to their respective facility. The local facility develops these facility-specific SOPs based on the corporate-wide SOP template. This template is written to incorporate a set of minimum method requirements and PASI best practice requirements. The local facilities may add to or modify the corporate-wide SOP template provided there are no contradictions to the minimum method or best practice requirements. Facility-specific SOPs are controlled by the applicable SQM/QM according to the corporate document management policies.

5.1.7.4. SOPs are reviewed every two years at a minimum although a more frequent review may be required by some state or federal agencies or customers. If no revisions are made based on this review, documentation of the review itself is made by the addition of new signatures on the cover page. If revisions are made, documentation of the revisions is made in the revisions section of each SOP and a new revision number is applied to the SOP. This provides a historical record of all revisions.

5.1.7.5. All copies of superseded SOPs are removed from general use and the original copy of each SOP is archived for audit or knowledge preservation purposes. This ensures that all PASI employees use the most current version of each SOP and provides the SQM/QM with a historical record of each SOP.

5.1.7.6. Additional information can be found in SOP S-NY-Q-001 **Preparation of SOPs** or its equivalent revision or replacement.

5.2. Document Change Control

5.2.1. Changes to managed documents are reviewed and approved in the same manner as the original review. Any revision to a document requires the approval of the applicable signatories. After revisions are approved, a revision number is assigned and the previous version of the document is officially retired. Copies may be kept for audit or knowledge preservation purposes.

5.2.2. All controlled copies of the previous document are replaced with controlled copies of the revised document and the superseded copies are destroyed or archived. All affected personnel are advised that there has been a revision and any necessary training is scheduled.

5.3. Management of Change

5.3.1. The process for documenting necessary changes within the laboratory network are not typically handled using the corrective or preventive action system as outlined in section 9.0. Management of Change is a proactive approach to dealing with change to minimize the potential negative impact of systematic change in the laboratory and to ensure that each change has a positive desired outcome. This process will primarily be used for the implementation of large scale projects and information system changes as a means to apply consistent systems or procedures within the laboratory network. The request for change is submitted by the initiator and subsequently assigned to

an individual or team for development and planning. The final completion of the process culminates in final approval and verification that the procedure was effectively implemented.

6.0. EQUIPMENT AND MEASUREMENT TRACEABILITY

Each PASI facility is equipped with sufficient instrumentation and support equipment to perform the relevant analytical testing or field procedures performed by each facility. Support equipment includes chemical standards, thermometers, balances, disposable and mechanical pipettes, etc. This section details some of the procedures necessary to maintain traceability and to perform proper calibration of instrumentation and support equipment. See Attachment III for a list of equipment currently used at the Schenectady, New York PASI facility.

6.1. Standards and Traceability

6.1.1. Each PASI facility retains all pertinent information for standards, reagents, and chemicals to assure traceability to a national standard. This includes documentation of purchase, receipt, preparation, and use.

6.1.2. Upon receipt, all purchased standard reference materials are recorded into a standard logbook or database and assigned a unique identification number. The entries include the facility's unique identification number, the chemical name, manufacturer name, manufacturer's identification numbers, receipt date, and expiration date. Vendor's certificates of analysis for all standards, reagents, or chemicals are retained for future reference.

6.1.3. Subsequent preparations of intermediate or working solutions are also documented in a standard logbook or database. These entries include the stock standard name and lot number, the manufacturer name, the solvents used for preparation, the solvent lot number and manufacturer, the preparation steps, preparation date, expiration dates, preparer's initials, and a unique PASI identification number. This number is used in any applicable sample preparation or analysis logbook so the standard can be traced back to the standard preparation record. This process ensures traceability back to the national standard.

6.1.4. All prepared standard or reagent containers include the PASI identification number, the standard or chemical name, the date of preparation, the date of expiration, the concentration with units, and the preparer's initials. This ensures traceability back to the standard preparation logbook or database.

6.1.5. For containers that are too small to accommodate labels that list all of the above information associated with a standard, the minimum required information will be PASI standard ID, concentration, and expiration date. This assures that no standard will be used past its assigned expiration date.

6.1.6. If a second source standard is required to verify an existing calibration or spiking standard, this standard must be obtained from a different manufacturer or from a different lot unless client specific QAPP requirements state otherwise.

6.1.7. Additional information concerning standards and reagent traceability can be found in the SOP S-NY-Q-321 **Standard and Reagent Management and Traceability** or its equivalent revision or replacement.

6.2. General Analytical Instrument Calibration Procedures (Organic and Inorganic)

6.2.1. All support equipment and instrumentation are calibrated or checked before use to ensure proper functioning and verify that the laboratory's requirements are met. All calibrations are performed by, or

under the supervision of, an experienced analyst at scheduled intervals against either certified standards traceable to recognized national standards or reference standards whose values have been statistically validated.

6.2.2. Calibration standards for each parameter are chosen to establish the linear range of the instrument and must bracket the concentrations of those parameters measured in the samples. The lowest calibration standard is the lowest concentration for which quantitative data may be reported. Data reported below this level is considered to have less certainty and must be reported using appropriate data qualifiers or explained in a narrative. The highest calibration standard is the highest concentration for which quantitative data may be reported. Data reported above this level is considered to have less certainty and must be reported using appropriate data qualifiers or explained in the narrative. Any specific method requirement for number and type of calibration standards supersedes the general requirement. Instrument and method specific calibration criteria are explained within the specific analytical standard operating procedures for each facility.

6.2.3. Results from all calibration standards analyzed must be included in constructing the calibration curve with the following exceptions:

6.2.3.1. The lowest level calibration standard may be removed from the calibration as long as the remaining number of concentration levels meets the minimum established by the method and standard operating procedure. For multi-parameter methods, this may be done on an individual analyte basis. The reporting limit must be adjusted to the lowest concentration included in the calibration curve;

6.2.3.2. The highest level calibration standard may be removed from the calibration as long as the remaining number of concentration levels meets the minimum established by the method and standard operating procedure. For multi-parameter methods, this may be done an individual analyte basis. The upper limit of quantitation must be adjusted to the highest concentration included in the calibration curve;

6.2.3.3. Multiple points from either the high end or the low end of the calibration curve may be excluded as long as the remaining points are contiguous in nature and the minimum number of levels remains as established by method or standard operating procedure. The reporting limit or quantitation range, whichever is appropriate, must be adjusted accordingly;

6.2.3.4. Results from a concentration level between the lowest and highest calibration levels can only be excluded from an initial calibration curve for a documentable and acceptable cause with approval from the responsible department supervisor and the local SQM/QM or their designee. An acceptable cause is defined as an obvious sample introduction issue that resulted in no response, documentation of an incorrectly prepared standard, or a documented response of a single standard that is greater than 2X the difference from the expected value of that standard. The results for all analytes are to be excluded and the point must be replaced by re-analysis. Re-analysis of this interior standard must occur within the same 12-hour tune time period for GC/MS methodologies and within 8 hours of the initial analysis of that standard for non-GC/MS methodologies. All samples analyzed prior to the re-analyzed calibration curve point must be re-analyzed after the calibration curve is completed and re-processed against the final calibration curve.

6.2.4. Instrumentation or support equipment that cannot be calibrated to specification or is otherwise defective is clearly labeled as out-of-service until it has been repaired and tested to demonstrate it meets the laboratory's specifications. All repair and maintenance activities including service calls are documented in the maintenance log. Equipment sent off-site for calibration testing is packed and transported to prevent breakage and is in accordance with the calibration laboratory's recommendations.

6.2.5. In the event that recalibration of a piece of test equipment indicates the equipment may have been malfunctioning during the course of sample analysis, an investigation is performed. The results of the investigation along with a summary of the information reviewed are documented and maintained by the quality manager. Customers must be notified within 30 days after the data investigation is completed and the impact to final results is assessed. This allows for sufficient investigation and review of documentation to determine the impact on the analytical results. Instrumentation found to be consistently out of calibration is either repaired and positively verified or taken out of service and replaced.

6.2.6. Raw data records are retained to document equipment performance. Sufficient raw data is retained to reconstruct the instrument calibration and explicitly connect the continuing calibration verification to the initial calibration.

6.2.7. **General Organic Calibration Procedures**

6.2.7.1. Calibration standards are prepared at a minimum of five concentrations for organic analyses (unless otherwise stipulated in the method).

6.2.7.2. Initial calibration curves are evaluated against appropriate statistical models as required by the analytical methods. Curves that do not meet the appropriate criteria require corrective action that may include re-running the initial calibration curve. Rounding to meet initial calibration criteria is not allowed, that is, 15.3 cannot be rounded down to meet a $\leq$ 15% RSD requirement. This also applies to linear and non-linear fit requirements. All initial calibrations are verified with an initial calibration verification standard (ICV) obtained from a second manufacturer or second lot from the same manufacturer if that lot can be demonstrated as prepared independently from other lots prior to the analysis of samples. Sample results are quantitated from the initial calibration unless otherwise required by regulation, method, or program.

6.2.7.3. The calibration curve is periodically verified by the analysis of a mid-level continuing calibration verification (CCV) standard during the course of sample analysis. This standard is from the same source as the initial calibration unless otherwise specified in the source method to be from an alternate source material. Rounding to meet continuing calibration criteria is not allowed. Continuing calibration verification is performed at the beginning and end of each analytical batch except if an internal standard is used, then only one verification at the beginning of the batch is needed, whenever it is expected that the analytical system may be out of calibration, if the time period for calibration has expired, or for analytical systems that have specific calibration verification requirements. This verification standard must meet acceptance criteria in order for sample analysis to proceed.

6.2.7.4. In the event that the CCV does not meet the acceptance criteria, a second CCV may be injected as part of the diagnostic evaluation and corrective action investigation. If the second CCV is acceptable, the analytical sequence may be continued. If both CCVs fail, the analytical sequence is terminated and corrective action is initiated. Sample analysis cannot begin until after documented corrective action has been completed and either two consecutive passing CCVs have been analyzed or the instrument has successfully passed a new initial calibration. All samples analyzed since the last compliant CCV are re-analyzed for methodologies utilizing external calibration.

6.2.7.5. When instruments are operating unattended, autosamplers may be programmed to inject consecutive CCVs as a preventative measure against CCV failure with no corrective action. In this case, both CCVs must be evaluated to determine potential impact to the results. A summary of the decision tree and necessary documentation are listed below:

- If both CCVs meet the acceptance criteria, the analytical sequence is allowed to continue without corrective action. The 12 hour clock begins with the injection of the second CCV.
- If the first CCV does not meet the acceptance criteria and the second CCV is acceptable, the analytical sequence is continued and the results are reported.
- If the first CCV meets the acceptance criteria and the second CCV is out of control, the samples after the out of control CCV must be re-analyzed in a compliant analytical sequence.
- If both CCVs are out of control, all samples since the last acceptable CCV must be re-analyzed in a compliant analytical sequence.

6.2.7.6. Some analytical methods require that samples be bracketed by passing CCVs analyzed both before and after the samples. This is specific to each method but, as a general rule, all external calibration methods require bracketing CCVs. Most internal standard calibrations do not require bracketing CCVs.

6.2.7.7. Some analytical methods require verification based on a time interval; some methods require a frequency based on an injection interval. The type and frequency of the calibration verifications is dependent on both the analytical method and possibly on the quality program associated with the samples. The type and frequency of calibration verification will be documented in the method specific SOP employed by each laboratory.

6.2.8. General Inorganic Calibration Procedures

6.2.8.1. The instrument is initially calibrated with standards at multiple concentrations to establish the linearity of the instrument's response. A calibration blank is also included. Initial calibration curves are evaluated against appropriate statistical models as required by the analytical methods. Rounding to meet initial calibration criteria is not allowed. This also applies to linear and non-linear fit requirements. The number of calibration standards used depends on the specific method criteria or customer project requirements, although normally a minimum of three standards is used.

6.2.8.2. The ICP and ICP/MS can be standardized with a zero point and a single point calibration if:

- Prior to analysis, the zero point and the single point calibration are analyzed and a linear range has been established,
- Zero point and single point calibration standards are analyzed with each batch
- A standard corresponding to the LOQ is analyzed with the batch and meets the established acceptance criteria
- The linearity is verified at the frequency established by the method or manufacturer.

6.2.8.3. All initial calibrations are verified with an initial calibration verification standard (ICV) obtained from a second manufacturer or second lot from the same manufacturer if the lot can be demonstrated as prepared independently from other lots prior to the analysis of samples. Sample results are quantitated from the initial calibration unless otherwise required by regulation, method, or program.

6.2.8.4. During the course of analysis, the calibration curve is periodically verified by the analysis of calibration verification standards (CCV). A calibration verification standard is analyzed within each analytical batch at method/program specific intervals to verify that the initial calibration is still valid. The CCV is also analyzed at the end of the analytical batch.

6.2.8.5. A calibration blank is also run with each calibration verification standard to verify the cleanliness of the system. All reported results must be bracketed by acceptable CCVs. Instrument and method specific calibration acceptance criteria are explained within the specific analytical standard operating procedures for each facility.

6.2.8.6. Interference check standards are also analyzed per method requirements and must meet acceptance criteria for metals analyses.

6.3. Support Equipment Calibration Procedures

6.3.1. All support equipment is calibrated or verified at least annually using NIST traceable references over the entire range of use. The results of calibrations or verifications must be within the specifications required or the equipment will be removed from service until repaired. The laboratory maintains records to demonstrate the correction factors applied to working thermometers.

6.3.2. On each day the equipment is used, balances, ovens, refrigerators (those used to keep samples and standards at required temperatures), freezers, and water baths are checked in the expected use range with NIST traceable references in order to ensure the equipment meets laboratory specifications and these checks are documented appropriately.

6.3.3. **Analytical Balances**

6.3.3.1. Each analytical balance is calibrated or verified at least annually by a qualified service technician. The calibration of each balance is verified each day of use with weights traceable to NIST bracketing the range of use. Calibration weights are ASTM Class 1 or other class weights that have been calibrated against a NIST standard weight and are re-certified every 5 years at a minimum against a NIST traceable reference. Some accrediting agencies may require more frequent checks. If balances are calibrated by an external agency, verification of their weights must be provided. All information pertaining to balance maintenance and calibration is recorded in the individual balance logbook and/or is maintained on file in the Quality department.

6.3.4. **Thermometers**

6.3.4.1. Certified, or reference, thermometers are maintained for checking calibration of working thermometers. Reference thermometers are provided with NIST traceability for initial calibration and are re-certified, at a minimum, annually with equipment directly traceable to NIST.

6.3.4.2. Working thermometers are compared with the reference thermometers annually according to corporate metrology procedures. Each thermometer is individually numbered and assigned a correction factor based on the NIST reference source. In addition, working thermometers are visually inspected by laboratory personnel prior to use and temperatures are documented.

6.3.4.3. Laboratory thermometer inventory and calibration data are maintained in the Quality department.

6.3.5. **pH/Electrometers**

6.3.5.1. The meter is calibrated before use each day, using fresh buffer solutions.

6.3.6. **Spectrophotometers**

6.3.6.1. During use, spectrophotometer performance is checked at established frequencies in analysis sequences against initial calibration verification (ICV) and continuing calibration verification (CCV) standards.

6.3.7. **Mechanical Volumetric Dispensing Devices**

6.3.7.1. Mechanical volumetric dispensing devices including bottle top dispensers (those that are critical in measuring a required amount of reagent), pipettes, and burettes, excluding Class A volumetric glassware, are checked for accuracy on a quarterly basis.

6.3.7.2. Additional information regarding calibration and maintenance of laboratory support equipment can be found in SOP S-NY-Q-008 **Support Equipment** or its equivalent revision or replacement.

6.4. Instrument/Equipment Maintenance

6.4.1. The objectives of the Pace Analytical maintenance program are twofold: to establish a system of instrument care that maintains instrumentation and equipment at required levels of calibration and sensitivity, and to minimize loss of productivity due to repairs.

6.4.2. The Operations Manager and/or department manager/supervisors are responsible for providing technical leadership to evaluate new equipment, solve equipment problems, and coordinate instrument repair and maintenance. Analysts have the primary responsibility to perform routine maintenance.

6.4.3. To minimize downtime and interruption of analytical work, preventative maintenance is routinely performed on each analytical instrument. Up-to-date instructions on the use and maintenance of equipment are available to staff in the department where the equipment is used.

6.4.4. Department manager/supervisors are responsible for maintaining an adequate inventory of spare parts required to minimize equipment downtime. This inventory includes parts and supplies that are subject to frequent failure, have limited lifetimes, or cannot be obtained in a timely manner should a failure occur.

6.4.5. All major equipment and instrumentation items are uniquely identified to allow for traceability. Equipment/instrumentation is, unless otherwise stated, identified as a system and not as individual pieces. The laboratory maintains equipment records that include the following:

- The name of the equipment and its software
- The manufacturer's name, type, and serial number
- Approximate date received and date placed into service
- Current location in the laboratory
- Condition when received (new, used, etc.)
- Copy of any manufacturer's manuals or instructions
- Dates and results of calibrations and next scheduled calibration (if known)
- Details of past maintenance activities, both routine and non-routine
- Details of any damage, modification or major repairs

6.4.6. All instrument maintenance is documented in maintenance logbooks that are assigned to each particular instrument or system.

6.4.7. The maintenance log entry must include a summary of the results of that analysis and verification by the analyst that the instrument has been returned to an in-control status. In addition, each entry must include the initials of the analyst making the entry, the dates the maintenance actions were performed, and the date the entry was made in the maintenance logbook, if different from the date(s) of the maintenance.

6.4.8. Any equipment that has been subjected to overloading or mishandling, or that gives suspect results, or has been shown to be defective, is taken out of service and clearly identified. The equipment shall not be used to analyze customer samples until it has been repaired and shown to perform satisfactorily. In the event of instrumentation failure, to avoid hold time issues, the lab may subcontract the necessary samples to another Pace lab or to an outside subcontract lab if possible.

7.0. CONTROL OF DATA

Analytical results processing, verification, and reporting are procedures employed that result in the delivery of defensible data. These processes include, but are not limited to, calculation of raw data into final concentration values, review of results for accuracy, evaluation of quality control criteria and assembly of technical reports for delivery to the data user.

All analytical data undergo a well-defined, well-documented multi-tier review process prior to being reported to the customer. This section describes procedures used by PASI for translating raw analytical data into accurate final sample reports as well as PASI data storage policies.

7.1. Analytical Results Processing

7.1.1. When analytical, field, or product testing data is generated, it is either recorded in a bound laboratory logbook (e.g., Run log or Instrument log) or copies of computer-generated printouts that are appropriately labeled and filed. These logbooks and other laboratory records are kept in accordance with each facility's Standard Operating Procedure for documentation storage and archival. If the laboratory chooses to minimize or eliminate its paper usage, these records can be kept on electronic media. In this case, the laboratory must ensure that there are sufficient redundant electronic copies so no data is lost due to unforeseen computer issues.

7.1.2. The primary analyst is responsible for initial data reduction and review. This includes confirming compliance with required methodology, verifying calculations, evaluating quality control data, noting non-conformances in logbooks or as footnotes or narratives, and uploading analytical results into the LIMS. The primary analyst must be clearly identified in all applicable logbooks, spreadsheets and LIMS fields.

7.1.3. The primary analyst then compiles the initial data package for verification. This compilation must include sufficient documentation for data review. It may include standard calibrations, chromatograms, manual integration documentation, electronic printouts, chain of custody forms, and logbook copies.

7.1.4. Some agencies or customers require different levels of data reporting. For these special levels, the primary analyst may need to compile additional project information, such as initial calibration data or extensive spectral data, before the data package proceeds to the verification step.

7.2. Data Verification

7.2.1. Data verification is the process of examining data and accepting or rejecting it based on pre-defined criteria. This review step is designed to ensure that reported data are free from calculation and transcription errors, that quality control parameters are evaluated, and that any non-conformances are properly documented.

7.2.2. Analysts performing the analysis and subsequent data reduction have primary responsibility for quality of the data produced. The primary analyst initiates the data verification process by reviewing and accepting the data, provided QC criteria have been met for the samples being reported. Data review checklists, either hardcopy or electronic, are used to document the data review process. The primary analyst is responsible for the initial input of the data into the LIMS. The primary analyst and reviewer must be clearly identified on all applicable data review checklists.

7.2.3. The completed data package is then sent to a designated qualified reviewer (this cannot be the primary analyst). The following criteria have been established to qualify someone as a data reviewer. To perform secondary data review, the reviewer must:

7.2.3.1. Have a current Demonstration of Capability (DOC) study on file and have an SOP acknowledgement form on file for the method/procedure being reviewed; or, See Note

7.2.3.2. Have a DOC on file for a similar method/technology (i.e., GC/MS) and have an SOP acknowledgment form on file for the method/procedure being reviewed; or, See Note

7.2.3.3. Supervise or manage a Department and have an SOP acknowledgment form on file for the method/procedure being reviewed; or,

7.2.3.4. Have significant background in the department/methods being reviewed through education or experience and have an SOP acknowledgment form on file for the method/procedure being reviewed.

7.2.4. **Note:** Secondary reviewer status must be approved personally by the SQM/QM or SGM/GM/AGM/OM in the event that this person has no prior experience on the specific method or general technology.

7.2.5. This reviewer provides an independent technical assessment of the data package and technical review for accuracy according to methods employed and laboratory protocols. This assessment involves a quality control review for use of the proper methodology and detection limits, compliance to quality control protocol and criteria, presence and completeness of required deliverables, and accuracy of calculations and data quantitation. The reviewer validates the data entered into the LIMS and documents approval of manual integrations.

7.2.6. Once the data have been technically reviewed and approved, authorization for release of the data from the analytical section is indicated by initialing and dating the data review checklist or otherwise initialing and dating the data (or designating the review of data electronically). The Operations or Project Manager examines the report for method appropriateness, detection limits and QC acceptability. Any deviations from the referenced methods are checked for documentation and validity, and QC corrective actions are reviewed for successful resolution. Alternately, final reports can be set to auto email to the client after the analytical results are final and have been run through the Data Checker program for errors. These are set up on a case-by-case basis.

7.2.7. Additional information regarding data review procedures can be found in SOP S-NY-Q-219 **Data Control, Data Review, and Manual Integrations** or its equivalent revision or replacement.

7.3. Data Reporting

7.3.1. Data for each analytical fraction pertaining to a particular PASI project number are delivered to the Project Manager for assembly into the final report. All points mentioned during technical and QC reviews are included in data qualifiers on the final report or in a separate case narrative if there is potential for data to be impacted.

7.3.2. Final reports are prepared according to the level of reporting required by the customer and can be transmitted to the customer via hardcopy or electronic deliverable. A standard PASI final report consists of the following components:

7.3.2.1. A title which designates the report as “Final Report”, “Laboratory Results”, “Certificate of Results”, etc.;

7.3.2.2. Name and address of laboratory (or subcontracted laboratories, if used);

7.3.2.3. Phone number and name of laboratory contact to where questions can be referred;

7.3.2.4. A unique identification number for the report. The pages of the report shall be numbered and a total number of pages shall be indicated;

7.3.2.5. Name and address of customer and name of project;

7.3.2.6. Unique identification of samples analyzed as well as customer sample IDs;

7.3.2.7. Identification of any sample that did not meet acceptable sampling requirements of the relevant governing agency, such as improper sample containers, holding times missed, sample temperature, etc.;

7.3.2.8. Date and time of collection of samples, date of sample receipt by the laboratory, dates of sample preparation and analysis, and times of sample preparation and analysis when the holding time for either is 72 hours or less;

7.3.2.9. Identification of the test methods used;

7.3.2.10. Identification of sampling procedures if sampling was conducted by the laboratory;

7.3.2.11. Deviations from, additions to, or exclusions from the test methods. These can include failed quality control parameters, deviations caused by the matrix of the sample, etc., and can be shown as a case narrative or as defined footnotes to the analytical data;

7.3.2.12. Identification of whether calculations were performed on a dry or wet-weight basis;

7.3.2.13. Reporting limits used;

7.3.2.14. Final results or measurements, supported by appropriate chromatograms, charts, tables, spectra, etc.;

7.3.2.15. A signature and title, electronic or otherwise, of person accepting responsibility for the content of the report;

7.3.2.16. Date report was issued;

7.3.2.17. A statement clarifying that the results of the report relate only to the samples tested or to the samples as they were received by the laboratory;

7.3.2.18. If necessary, a statement indicating that the report must not be reproduced except in full, without the written approval of the laboratory;

7.3.2.19. Identification of all test results provided by a subcontracted laboratory or other outside source;

7.3.2.20. Identification of results obtained outside of quantitation levels.

In addition to the requirements listed above, final reports shall also contain the following items when necessary for the interpretation of results:

7.3.2.21. Deviations from, additions to, or exclusions from the test method, and information on specific test conditions, such as environmental conditions;

7.3.2.22. Where relevant, a statement of compliance/non-compliance with requirements and/or specifications (e.g., the TNI standard);

7.3.2.23. Where applicable, a statement on the estimated uncertainty of measurement; information on uncertainty is needed in test reports when it is relevant to the validity or application of the test results, when a customer's instruction so requires, or when the uncertainty affects compliance to a specification limit;

7.3.2.24. Where appropriate and needed, opinions and interpretations, which may include opinions on the compliance/non-compliance of the results with requirements, fulfillment of contractual requirements, recommendations on how to use the results, and guidance to be used for improvement;

7.3.3. Any changes made to a final report shall be designated as "Revised" or equivalent wording. The laboratory must keep sufficient archived records of all laboratory reports and revisions. For higher levels of data deliverables, a copy of all supporting raw data is sent to the customer along with a final report of results. When possible, the PASI facility will provide electronic data deliverables (EDD) as required by contracts or upon customer request.

7.3.4. Customer data that requires transmission by telephone, telex, facsimile or other electronic means undergoes appropriate steps to preserve confidentiality.

7.3.5. The following positions are the only approved signatories for PASI final reports:

- Senior General Manager
- General Manager
- Assistant General Manager
- Senior Quality Manager
- Quality Manager
- Client Services Manager
- Project Manager
- Project Coordinator

7.4. Data Security

7.4.1. All data including electronic files, logbooks, extraction/digestion/distillation worksheets, calculations, project files and reports, and any other information used to produce the technical report are maintained secured and retrievable by the PASI facility.

7.5. Data Archiving

7.5.1. All records compiled by PASI are maintained legible and retrievable and stored secured in a suitable environment to prevent loss, damage, or deterioration by fire, flood, vermin, theft, and/or environmental deterioration. Records are retained for a minimum of five years unless superseded by federal, state, contractual, and/or accreditation requirements. These records may include, but are not limited to, customer data reports, calibration and maintenance of equipment, raw data from instrumentation, quality control documents, observations, calculations, and logbooks. These records are retained in order to provide for possible historical reconstruction including sampling, receipt, preparation, analysis, and personnel involved. TNI-related records will be made readily available to accrediting authorities. Access to archived data is documented and controlled by the SQM/QM or a designated Data Archivist.

7.5.1.1. Insert special data retention requirements per agency, client or state.

7.5.2. Records that are computer generated have either a hard copy or electronic write protected backup copy. Hardware and software necessary for the retrieval of electronic data is maintained with the applicable records. Archived electronic records are stored protected against electronic and/or magnetic sources.

7.5.3. In the event of a change in ownership, accountability or liability, reports of analyses performed pertaining to accreditation will be maintained by the acquiring entity for a minimum of five years. In the event of bankruptcy, laboratory reports and/or records will be transferred to the customer and/or the appropriate regulatory entity upon request.

7.6. Data Disposal

7.6.1. Data that has been archived for the facility's required storage time may be disposed of in a secure manner by shredding, returning to customer, or utilizing some other means that does not jeopardize data confidentiality. Records of data disposal will be archived for a minimum of five years unless superseded by federal, contractual, and/or accreditation requirements. Data disposal includes any preliminary or final reports that are disposed.

8.0. QUALITY SYSTEM AUDITS AND REVIEWS

8.1. Internal Audits

8.1.1. Responsibilities

8.1.1.1. The SQM/QM is responsible for designing and/or conducting internal audits in accordance with a predetermined schedule and procedure. Since internal audits represent an independent assessment of laboratory functions, the auditor must be functionally independent from laboratory operations to ensure objectivity. The auditor must be trained, qualified, and familiar enough with the objectives, principles, and procedures of laboratory operations to be able to perform a thorough and effective evaluation. The SQM/QM evaluates audit observations and verifies the completion of corrective actions. In addition, a periodic corporate audit will be conducted. The corporate audits will focus on the effectiveness of the Quality System as outlined in this manual but may also include other quality programs applicable to an individual laboratory.

8.1.2. Scope and Frequency of Internal Audits

8.1.2.1. The complete internal audit process consists of the following four sections:

- Raw Data Review audits- conducted according to a schedule per local SQM/QM. A certain number of these data review audits are conducted per quarter to accomplish this yearly schedule;
- Quality System audits- considered the traditional internal audit function and includes analyst interviews to help determine whether practice matches method requirements and SOP language;
- Final Report reviews;
- Corrective Action Effectiveness Follow-up.

8.1.2.2. Internal systems audits are conducted yearly at a minimum. The scope of these audits includes evaluation of specific analytical departments or a specific quality related system as applied throughout the laboratory.

8.1.2.3. Where the identification of non-conformities or departures cast doubt on the laboratory's compliance with its own policies and procedures, the lab must ensure that the appropriate areas of activity are audited as soon as possible. Examples of system-wide elements that can be audited include:

- Quality Systems documents, such as Standard Operating Procedures, training documents, Quality Assurance Manual, and all applicable addenda
- Data records and non-technical documents
- Personnel and training files.
- General laboratory safety protocols.
- Chemical handling practices, such as labeling of reagents, solutions, and standards as well as all associated documentation.
- Documentation concerning equipment and instrumentation, calibration/maintenance records, operating manuals.
- Sample receipt and management practices.
- Analytical documentation, including any discrepancies and corrective actions.

- General procedures for data security, review, documentation, reporting, and archiving.
- Data integrity issues such as proper manual integrations.

8.1.2.4. When the operations of a specific department are evaluated, a number of additional functions are reviewed including:

- Detection limit studies
- Internal chain of custody documentation
- Documentation of standard preparations
- Quality Control limits and Control charts

8.1.2.5. Certain projects may require an internal audit to ensure laboratory conformance to site work plans, sampling and analysis plans, QAPPs, etc.

8.1.2.6. A representative number of data audits are completed annually. Findings from these data audits are handled in the same manner as those from other internal and external audits.

8.1.2.7. The laboratory, as part of their overall internal audit program, ensures that a review is conducted with respect to any evidence of inappropriate actions or vulnerabilities related to data integrity. Discovery and reporting of potential data integrity issues are handled in a confidential manner. All investigations that result in findings of inappropriate activity are fully documented, including the source of the problem, the samples and customers affected the impact on the data, the corrective actions taken by the laboratory, and which final reports had to be re-issued. Customers must be notified within 30 days after the data investigation is completed and the impact to final results is assessed.

8.1.3. Internal Audit Reports and Corrective Action Plans

8.1.3.1. Additional information can be found in SOP S-NY-Q-335 **Internal and External Audits** or its equivalent revision or replacement.

8.1.3.2. A full description of the audit, including the identification of the operation audited, the date(s) on which the audit was conducted, the specific systems examined, and the observations noted are summarized in an internal audit report. Although other personnel may assist with the performance of the audit, the SQM/QM writes and issues the internal audit report identifying which audit observations are deficiencies that require corrective action.

8.1.3.3. When audit findings cast doubt on the effectiveness of the operations or on the correctness of validity of the laboratory's environmental test results, the laboratory will take timely corrective action and notify the customer in writing within three business days, if investigations show that the laboratory results may have been affected.

8.1.3.4. Once completed, the internal audit report is issued jointly to the SGM/GM/AGM/OM and the manager(s)/supervisor(s) of the audited operation at a minimum. The responsible manager(s)/supervisor(s) responds within 14 days with a proposed plan to correct all of the deficiencies cited in the audit report. The SQM/QM may grant additional time for responses to large or complex deficiencies (not to exceed 30 days). Each response must include timetables for completion of all proposed corrective actions.

8.1.3.5. The SQM/QM reviews the audit responses. If the response is accepted, the SQM/QM uses the action plan and timetable as a guideline for verifying completion of the corrective action(s). If the SQM/QM determines that the audit response does not adequately address the correction of cited deficiencies, the response will be returned for modification.

8.1.3.6. To complete the audit process, the SQM/QM performs a re-examination of the areas where deficiencies were found to verify that all proposed corrective actions have been implemented. An audit deficiency is considered closed once implementation of the necessary corrective action has been audited and verified. This is usually within 60-90 days after implementation. If corrective action cannot be verified, the associated deficiency remains open until that action is completed.

8.2. External Audits

8.2.1. PASI laboratories are audited regularly by regulatory agencies to maintain laboratory certifications and by customers to maintain appropriate specific protocols.

8.2.2. Audit teams external to the company review the laboratory to assess the effectiveness of systems and degree of technical expertise. The SQM/QM and other QA staff host the audit team and assist in facilitation of the audit process. Generally, the auditors will prepare a formalized audit report listing deficiencies observed and follow-up requirements for the laboratory. In some cases, items of concern are discussed during a debriefing convened at the end of the on-site review process.

8.2.3. The laboratory staff and supervisors develop corrective action plans to address any deficiencies with the guidance of the SQM/QM. The SGM/GM/AGM/OM provides the necessary resources for staff to develop and implement the corrective action plans. The SQM/QM collates this information and provides a written response to the audit team. The response contains the corrective action plan and expected completion dates for each element of the plan. The SQM/QM follows-up with the laboratory staff to ensure corrective actions are implemented and that the corrective action was effective.

8.3. Quarterly Quality Reports

8.3.1. The SQM/QM is responsible for preparing a quarterly report to management summarizing the effectiveness of the laboratory Quality Systems. This status report will include:

- Overview of quality activities for the quarter
- Certification status
- Proficiency Testing study results
- SOP revision activities
- Internal audit (method/system) findings
- Manual integration audit findings (Mintminer)
- Raw Data and Final Report review findings
- MDL activities
- Other significant Quality System items

8.3.2. The Corporate Director of Quality utilizes the information from each laboratory to make decisions impacting the quality program compliance of the company as a whole. Each

SGM/GM/AGM/OM utilizes the quarterly report information to make decisions impacting Quality Systems and operational systems at a local level.

8.3.3. Additional information can be found in SOP S-ALL-Q-014 **Quarterly Quality Review** or its equivalent revision or replacement.

8.4. Annual Managerial Review

8.4.1. A managerial review of Management and Quality Systems is performed on an annual basis at a minimum. This allows for assessing program effectiveness and introducing changes and/or improvements.

8.4.2. The managerial review must include the following topics of discussion:

- Suitability of quality management policies and procedures
- Manager/Supervisor reports
- Internal audit results
- Corrective and preventive actions
- External assessment results
- Proficiency testing studies
- Sample capacity and scope of work changes
- Customer feedback, including complaints
- Recommendations for improvement,
- Other relevant factors, such as quality control activities, resources, and staffing.

8.4.3. This managerial review must be documented for future reference by the SQM/QM and copies of the report are distributed to laboratory staff. Results must feed into the laboratory planning system and must include goals, objectives, and action plans for the coming year. The laboratory shall ensure that any actions identified during the review are carried out within an appropriate and agreed upon timescale.

8.5. Customer Service Reviews

8.5.1. As part of the annual managerial review listed previously, the sales staff is responsible for reporting on customer feedback, including complaints. The acquisition of this information is completed by performing surveys.

8.5.2. The sales staff continually receives customer feedback, both positive and negative, and reports this feedback to the laboratory management in order for them to evaluate and improve their management system, testing activities and customer service.

8.5.3. In addition, the labs must be willing to cooperate with customers or their representatives to clarify customer requests and to monitor the laboratory's performance in relation to the work being performed for the customers. This cooperation may include providing the customer reasonable access to relevant areas of the lab for the witnessing of tests being performed; or the preparation of samples or data deliverables to be used for verification purposes.

8.5.4. Customer service is an important aspect to Pace's overall objective of providing a quality product. Good communication should be provided to the customer's throughout projects. The lab should inform the customer of any delay or major deviations in the performance of analytical tests.

9.0. CORRECTIVE ACTION

Additional information can be found in SOP S-NY-Q-325 **Corrective and Preventive Actions** or its equivalent revision or replacement.

During the process of sample handling, preparation, and analysis, or during review of quality control records, or during reviews of non-technical portions of the lab, certain occurrences may warrant the necessity of corrective actions. These occurrences may take the form of analyst errors, deficiencies in quality control, method deviations, or other unusual circumstances. The Quality System of PASI provides systematic procedures for the documentation, monitoring, completion of corrective actions, and follow-up verification of the effectiveness of these corrective actions. This can be done using PASI's LabTrack system or other system that lists among at a minimum, the deficiency by issue number, the deficiency source, responsible party, root cause, resolution, due date, and date resolved.

9.1. Corrective Action Documentation

9.1.1. The following items are examples of sources of laboratory deviations or non-conformances that warrant some form of documented corrective action:

- Internal Laboratory Non-Conformance Trends
- PE/PT Sample Results
- Internal and External Audits
- Data or Records Review (including non-technical records)
- Client Complaints
- Client Inquiries
- Holding Time violations

9.1.2. Documentation of corrective actions may be in the form of a comment or footnote on the final report that explains the deficiency (e.g., matrix spike recoveries outside of acceptance criteria) or it may be a more formal documentation (either paper system or computerized spreadsheet). This depends on the extent of the deficiency, the impact on the data, and the method or customer requirements for documentation.

9.1.3. The person who discovers the deficiency or non-conformance initiates the corrective action documentation on the Non-Conformance Corrective/ Preventive Action report and/or LabTrack. The documentation must include the affected projects and sample numbers, the name of the applicable Project Manager, the customer name, and the sample matrix involved. The person initiating the corrective action documentation must also list the known causes of the deficiency or non-conformance as well as any corrective/preventative actions that they have taken. Preventive actions must be taken in order to prevent or minimize the occurrence of the situation.

9.1.4. In the event that the laboratory is unable to determine the cause, laboratory personnel and management staff will start a root cause analysis by going through an investigative process. During this process, the following general steps must be taken into account: defining the non-conformance, assigning responsibilities, determining if the condition is significant, and investigating the root cause of the nonconformance. General non-conformance investigative techniques follow the path of the sample through the process looking at each individual step in detail. The root cause must be documented within LabTrack or on the Corrective/Preventive Action Report.

9.1.5. After all the documentation is completed, the routing of the Corrective/Preventive Action Report and /or LabTrack will continue from the person initiating the corrective action, to their immediate supervisor or the applicable Project Manager and finally to the SQM/QM, if applicable, who may be responsible for final review and signoff of corrective/preventive actions.

9.1.6. In the event that analytical testing or results do not conform to documented laboratory policies or procedures, customer requirements, or standard specifications, the laboratory shall investigate the significance of the non-conformance and document appropriate corrective actions. The proper level of laboratory management will review any departure from these requirements for technical suitability. These departures are permitted only with the approval of the SGM/GM/AGM/OM or the SQM/QM. Where necessary, Project Management will notify the customer of the situation and will advise of any ramifications to data quality (with the possibility of work being recalled). The procedures for handling non-conforming work are detailed in SOP S-NY-Q-325 **Corrective and Preventive Actions** or its equivalent revision or replacement.

9.2. Corrective Action Completion

9.2.1. Internal Laboratory Non-Conformance Trends

9.2.1.1. There are several types of non-conformance trends that may occur in the laboratory that would require the initiation of a corrective action report. Laboratories may choose to initiate a corrective action for all instances of one or more of these categories if they so choose, however the intent is that each of these would be handled according to its severity; one time instances could be handled with a footnote or qualifier whereas a systemic problem with any of these categories may require an official corrective action process. These categories, as defined in the Corrective Action SOP are as follows:

- Login error
- Preparation Error
- Contamination
- Calibration Failure
- Internal Standard Failure
- LCS Failure
- Laboratory accident
- Spike Failure
- Instrument Failure
- Final Reporting error

9.2.2. PE/PT Sample Results

9.2.2.1. Any PT result assessed as “not acceptable” requires an investigation and applicable corrective actions. The operational staff is made aware of the PT failures and they are responsible for reviewing the applicable raw data and calibrations and list possible causes for error. The SQM/QM reviews their findings and initiates another external PT sample or an internal PT sample to try and correct the previous failure. Replacement PT results must be monitored by the SQM/QM and reported to the applicable regulatory authorities.

9.2.3. Internal and External Audits

9.2.3.1. The SQM/QM is responsible for documenting all audit findings and their corrective actions. This documentation must include the initial finding, the persons responsible for the corrective action, the due date for responding to the auditing body, the root cause of the finding, and the corrective actions needed for resolution. The SQM/QM is also responsible for providing any back-up documentation used to demonstrate that a corrective action has been completed.

9.2.4. **Data Review**

9.2.4.1. In the course of performing primary and secondary review of data or in the case of raw data reviews (e.g., by the SQM/QM), errors may be found which require corrective actions. Any finding that affects the quality of the data requires some form of corrective action, which may include revising and re-issuing of final reports.

9.2.5. **Client Complaints**

9.2.5.1. Project Managers are responsible for issuing corrective action forms, when warranted, for customer complaints. As with other corrective actions, the possible causes of the problem are listed and the form is passed to the appropriate analyst or supervisor for investigation. After potential corrective actions have been determined, the Project Manager reviews the corrective action form to ensure all customer needs or concerns are being adequately addressed.

9.2.6. **Client Inquiries**

9.2.6.1. When an error on the customer report is discovered, the Project Manager is responsible for initiating a formal corrective action form that describes the failure (e.g., incorrect analysis reported, reporting units are incorrect, or reporting limits do not meet objectives). The Project Manager is also responsible for revising the final report if necessary and submitting it to the customer.

9.2.7. **Holding Time Violations**

9.2.7.1. In the event that a holding time has been missed, the analyst or supervisor must complete a formal corrective action form. The Project Manager and the SQM/QM must be made aware of all holding time violations.

9.2.7.2. The Project Manager must contact the customer in order that appropriate decisions are made regarding the hold time excursion and the ultimate resolution is then documented and included in the customer project file.

9.3. Preventive Action Documentation

9.3.1. Pace laboratories can take advantage of several available information sources in order to identify needed improvements in all of their systems including technical, managerial, and quality. These sources may include:

- Management Continuous Improvement Plan (CIP) metrics which are used by all production departments within Pace. When groups compare performance across the company, ways to improve systems may be discovered. These improvements can be made within a department or laboratory-wide.
- Annual managerial reviews- part of this TNI-required and NVLAP-required review is to look at all processes and procedures used by the laboratory over the past year and to determine ways to improve these processes in the future.
- Quality systems reviews- any frequent checks of quality systems (monthly logbook reviews, etc.) can uncover issues that can be corrected or adjusted before they become a larger issue.

9.3.2. When improvement opportunities are identified or if preventive action is required, the laboratory can develop, implement, and monitor preventive action plans.

10.0. GLOSSARY

The source of some of the definitions is indicated previous to the actual definition (e.g., TNI, DoD).

Terms and Definitions	
3P Program	The Pace Analytical continuous improvement program that focuses on Process, Productivity, and Performance. Best Practices are identified that can be used by all PASI labs.
Acceptance Criteria	TNI- Specified limits placed on characteristics of an item, process, or service defined in requirement documents.
Accreditation	TNI- The process by which an agency or organization evaluates and recognizes a laboratory as meeting certain predetermined qualifications or standards, thereby accrediting the laboratory.
Accuracy	TNI- The degree of agreement between an observed value and an accepted reference value. Accuracy includes a combination of random error (precision) and systematic error (bias) components that are due to sampling and analytical operations; a data quality indicator.
Aliquot	A discrete, measured, representative portion of a sample taken for analysis.
Analysis	A combination of sample preparation and instrument determination.
Analysis Code (Acode)	All the set parameters of a test, such as Analytes, Method, Detection Limits and Price.
Analysis Sequence	A compilation of all samples, standards and quality control samples run during a specific amount of time on a particular instrument in the order they are analyzed.
Analyst	TNI- The designated individual who performs the “hands-on” analytical methods and associated techniques and who is the one responsible for applying required laboratory practices and other pertinent quality controls to meet the required level of quality.
Analyte	The specific chemicals or components for which a sample is analyzed; it may be a group of chemicals that belong to the same chemical family and are analyzed together.
Analytical Uncertainty	TNI- A subset of Measurement Uncertainty that includes all laboratory activities performed as part of the analysis.
Assessment	TNI - The evaluation process used to measure or establish the performance, effectiveness, and conformance of an organization and/or its system to defined criteria (to the standards and requirements of laboratory accreditation).
Atomic Absorption Spectrometer	Instrument used to measure concentration in metals samples.
Atomization	A process in which a sample is converted to free atoms.
Audit	TNI- A systematic and independent examination of facilities, equipment, personnel, training, procedures, record-keeping, data validation, data management, and reporting aspects of a system to determine whether QA/QC and technical activities are being conducted as planned and whether these activities will effectively achieve quality objectives.

Batch	TNI- Environmental samples that are prepared and/or analyzed together with the same process and personnel, using the same lot(s) of reagents. A **preparation batch** is composed of one to 20 environmental samples of the same quality systems matrix, meeting the above-mentioned criteria and with a maximum time between the start of processing of the first and last sample in the batch to be 24 hours. An analytical batch is composed of prepared environmental samples (extracts, digestates or concentrates) which are analyzed together as a group. An analytical batch can include prepared samples originating from various quality system matrices and can exceed 20 samples.
Bias	TNI- The systematic or persistent distortion of a measurement process, which causes errors in one direction (i.e., the expected sample measurement is different from the sample's true value).
Blank	TNI - A sample that has not been exposed to the analyzed sample stream in order to monitor contamination during sampling, transport, storage or analysis. The blank is subjected to the usual analytical and measurement process to establish a zero baseline or background value and is sometimes used to adjust or correct routine analytical results.
Blind Sample	A sub-sample for analysis with a composition known to the submitter. The analyst/laboratory may know the identity of the sample but not its composition. It is used to test the analyst's or laboratory's proficiency in the execution of the measurement process.
BNA (Base Neutral Acid compounds)	A list of semi-volatile compounds typically analyzed by mass spectrometry methods. Named for the way they can be extracted out of environmental samples in an acidic, basic or neutral environment.
BOD (Biochemical Oxygen Demand)	Chemical procedure for determining how fast biological organisms use up oxygen in a body of water.
Calibration	TNI- A set of operations that establish, under specified conditions, the relationship between values of quantities indicated by a measuring instrument or measuring system, or values represented by a material measure or a reference material, and the corresponding values realized by standards. 1) In calibration of support equipment, the values realized by standards are established through the use of reference standards that are traceable to the International System of Units (SI); 2) In calibration according to test methods, the values realized by standards are typically established through the use of Reference Materials that are either purchased by the laboratory with a certificate of analysis or purity, or prepared by the laboratory using support equipment that has been calibrated or verified to meet specifications.
Calibration Curve	TNI- The mathematical relationship between the known values, such as concentrations, of a series of calibration standards and their instrument response.
Calibration Method	A defined technical procedure for performing a calibration.

Calibration Range	The range of values (concentrations) between the lowest and highest calibration standards of a multi-level calibration curve. For metals analysis with a single-point calibration, the low-level calibration check standard and the high standard establish the linear calibration range, which lies within the linear dynamic range.
Calibration Standard	TNI- A substance or reference material used for calibration.
Certified Reference Material (CRM)	TNI- Reference material accompanied by a certificate, having a value, measurement uncertainty, and stated metrological traceability chain to a national metrology institute.
Chain of Custody	An unbroken trail of accountability that verifies the physical security of samples, data, and records.
Chain of custody Form (COC)	TNI- Record that documents the possession of the samples from the time of collection to receipt in the laboratory. This record generally includes: the number and type of containers; the mode of collection, the collector, time of collection; preservation; and requested analyses.
Chemical Oxygen Demand (COD)	A test commonly used to indirectly measure the amount of organic compounds in water.
Client (referred to by ISO as Customer)	Any individual or organization for whom items or services are furnished or work performed in response to defined requirements and expectations.
Code of Federal Regulations (CFR)	A codification of the general and permanent rules published in the Federal Register by agencies of the federal government.
Comparability	An assessment of the confidence with which one data set can be compared to another. Comparable data are produced through the use of standardized procedures and techniques.
Completeness	The percent of valid data obtained from a measurement system compared to the amount of valid data expected under normal conditions. The equation for completeness is: % Completeness = (Valid Data Points/Expected Data Points)*100
Confirmation	TNI- Verification of the identity of a component through the use of an approach with a different scientific principle from the original method. These may include, but are not limited to: second-column confirmation; alternate wavelength; derivatization; mass spectral interpretation; alternative detectors; or additional cleanup procedures.
Conformance	An affirmative indication or judgment that a product or service has met the requirements of the relevant specifications, contract, or regulation; also the state of meeting the requirements.
Congener	A member of a class of related chemical compounds (e.g., PCBs, PCDDs).
Consensus Standard	A standard established by a group representing a cross-section of a particular industry or trade, or a part thereof.
Continuing Calibration Blank (CCB)	A blank sample used to monitor the cleanliness of an analytical system at a frequency determined by the analytical method.
Continuing Calibration Check Compounds (CCC)	Compounds listed in mass spectrometry methods that are used to evaluate an instrument calibration from the standpoint of the integrity of the system. High variability would suggest leaks or active sites on the instrument column.

Continuing Calibration Verification	The verification of the initial calibration. Required prior to sample analysis and at periodic intervals. Continuing calibration verification applies to both external and internal standard calibration techniques, as well as to linear and non-linear calibration models.
Continuing Calibration Verification (CCV) Standard	Also referred to as a CVS in some methods, it is a standard used to verify the initial calibration of compounds in an analytical method. CCVs are analyzed at a frequency determined by the analytical method.
Continuous Emission Monitor (CEM)	A flue gas analyzer designed for fixed use in checking for environmental pollutants.
Contract Laboratory Program (CLP)	A national network of EPA personnel, commercial labs, and support contractors whose fundamental mission is to provide data of known and documented quality.
Contract Required Detection Limit (CRDL)	Detection limit that is required for EPA Contract Laboratory Program (CLP) contracts.
Contract Required Quantitation Limit (CRQL)	Quantitation limit (reporting limit) that is required for EPA Contract Laboratory Program (CLP) contracts.
Control Chart	A graphic representation of a series of test results, together with limits within which results are expected when the system is in a state of statistical control (see definition for Control Limit)
Control Limit	A range within which specified measurement results must fall to verify that the analytical system is in control. Control limit exceedances may require corrective action or require investigation and flagging of non-conforming data.
Correction	Action taken to eliminate a detected non-conformity.
Corrective Action	The action taken to eliminate the causes of an existing non-conformity, defect, or other undesirable situation in order to prevent recurrence. A root cause analysis may not be necessary in all cases.
Corrective and Preventative Action (CAPA)	The primary management tools for bringing improvements to the quality system, to the management of the quality system's collective processes, and to the products or services delivered which are an output of established systems and processes.
Customer	Any individual or organization for which products or services are furnished or work performed in response to defined requirements and expectations.
Data Quality Objective (DQO)	Systematic strategic planning tool based on the scientific method that identifies and defines the type, quality, and quantity of data needed to satisfy a specified use or end user.
Data Reduction	TNI- The process of transforming the number of data items by arithmetic or statistical calculation, standard curves, and concentration factors, and collating them into a more usable form.
Definitive Data	Analytical data of known quantity and quality. The levels of data quality on precision and bias meet the requirements for the decision to be made. Data that is suitable for final decision-making.
Demonstration of Capability	TNI- A procedure to establish the ability of the analyst to generate analytical results of acceptable accuracy and precision.

Detection Limit (DL)	The smallest analyte concentration that can be demonstrated to be different than zero or a blank concentration at the 99% confidence. At the DL, the false positive rate (Type 1 error) is 1%. A DL may be used as the lowest concentration for reliably reporting a detection of a specific analyte in a specific matrix with a specific method with 99% confidence.
Diesel Range Organics (DRO)	A range of compounds that denote all the characteristic compounds that make up diesel fuel (range can be state or program specific).
Digestion	A process in which a sample is treated (usually in conjunction with heat and acid) to convert the sample to a more easily measured form.
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 controlled to ensure use of the correct version at the location where the prescribed activity is performed.
Documents	Written components of the laboratory management system (e.g., policies, procedures, and instructions).
Dry Weight	The weight after drying in an oven at a specified temperature.
Duplicate (also known as Replicate or Laboratory Duplicate)	The analyses or measurements of the variable of interest performed identically on two subsamples of the same sample. The results of duplicate analyses are used to evaluate analytical or measurement precision but not the precision of sampling, preservation or storage internal to the laboratory.
Electron Capture Detector (ECD)	Device used in GC methods to detect compounds that absorb electrons (e.g., PCB compounds).
Electronic Data Deliverable (EDD)	A summary of environmental data (usually in spreadsheet form) which clients request for ease of data review and comparison to historical results.
Eluent	A solvent used to carry the components of a mixture through a stationary phase.
Elute	To extract, specifically, to remove (absorbed material) from an absorbent by means of a solvent.
Elution	A process in which solutes are washed through a stationary phase by movement of a mobile phase.
Environmental Data	Any measurements or information that describe environmental processes, locations, or conditions; ecological or health effects and consequences; or the performance of environmental technology.
Environmental Monitoring	The process of measuring or collecting environmental data.

Environmental Sample	A representative sample of any material (aqueous, non-aqueous, or multimedia) collected from any source for which determination of composition or contamination is requested or required. Environmental samples can generally be classified as follows: • Non Potable Water (Includes surface water, ground water, effluents, water treatment chemicals, and TCLP leachates or other extracts) • Drinking Water - Delivered (treated or untreated) water designated as potable water • Water/Wastewater - Raw source waters for public drinking water supplies, ground waters, municipal influents/effluents, and industrial influents/effluents • Sludge - Municipal sludges and industrial sludges. • Soil - Predominately inorganic matter ranging in classification from sands to clays. • Waste - Aqueous and non-aqueous liquid wastes, chemical solids, and industrial liquid and solid wastes
Equipment Blank	A sample of analyte-free media used to rinse common sampling equipment to check effectiveness of decontamination procedures.
Facility	A distinct location within the company that has unique certifications, personnel and waste disposal identifications.
False Negative	A result that fails to identify (detect) an analyte or reporting an analyte to be present at or below a level of interest when the analyte is actually above the level of interest.
False Positive	A result that erroneously identifies (detects) an analyte or reporting an analyte to be present above a level of interest when the analyte is actually present at or below the level of interest.
Field Blank	A blank sample prepared in the field by filling a clean container with reagent water and appropriate preservative, if any, for the specific sampling activity being undertaken.
Field Measurement	Determination of physical, biological, or radiological properties, or chemical constituents that are measured on-site, close in time and space to the matrices being sampled/measured, following accepted test methods. This testing is performed in the field outside of a fixed-laboratory or outside of an enclosed structure that meets the requirements of a mobile laboratory.
Field of Accreditation	TNI- Those matrix, technology/method, and analyte combinations for which the accreditation body offers accreditation.
Finding	TNI- An assessment conclusion referenced to a laboratory accreditation standard and supported by objective evidence that identifies a deviation from a laboratory accreditation standard requirement.
Flame Atomic Absorption Spectrometer (FAA)	Instrumentation used to measure the concentration of metals in an environmental sample based on the fact that ground state metals absorb light at different wavelengths. Metals in a solution are converted to the atomic state by use of a flame.
Flame Ionization Detector (FID)	A type of gas detector used in GC analysis where samples are passed through a flame which ionizes the sample so that various ions can be measured.

Gas Chromatography (GC)	Instrumentation which utilizes a mobile carrier gas to deliver an environmental sample across a stationary phase with the intent to separate compounds out and measure their retention times.
Gas Chromatograph/ Mass Spectrometry (GC/MS)	In conjunction with a GC, this instrumentation utilizes a mass spectrometer which measures fragments of compounds and determines their identity by their fragmentation patterns (mass spectra).
Gasoline Range Organics (GRO)	A range of compounds that denote all the characteristic compounds that make up gasoline (range can be state or program specific).
Graphite Furnace Atomic Absorption Spectrometry (GFAA)	Instrumentation used to measure the concentration of metals in an environmental sample based on the absorption of light at different wavelengths that are characteristic of different analytes.
High Pressure Liquid Chromatography (HPLC)	Instrumentation used to separate, identify and quantitate compounds based on retention times which are dependent on interactions between a mobile phase and a stationary phase.
Holding Time	TNI- The maximum time that can elapse between two specified activities. 40 CFR Part 136- The maximum time that samples may be held prior to preparation and/or analysis as defined by the method and still be considered valid or not compromised. For sample prep purposes, hold times are calculated using the time of the start of the preparation procedure.
Homogeneity	The degree to which a property or substance is uniformly distributed throughout a sample.
Homologue	One in a series of organic compounds in which each successive member has one more chemical group in its molecule than the next preceding member. For instance, methanol, ethanol, propanol, butanol, etc., form a homologous series.
Inductively Coupled Plasma Atomic Emission Spectrometry (ICP-AES)	Analytical technique used for the detection of trace metals which uses plasma to produce excited atoms that emit radiation of characteristic wavelengths.
Inductively Coupled Plasma- Mass Spectrometry (ICP/MS)	An ICP-AES that is used in conjunction with a mass spectrometer so that the instrument is not only capable of detecting trace amounts of metals and non-metals but is also capable of monitoring isotopic speciation for the ions of choice.
Infrared Spectrometer (IR)	An instrument that uses infrared light to identify compounds of interest.
Initial Calibration (ICAL)	The process of analyzing standards, prepared at specified concentrations, to define the quantitative response relationship of the instrument to the analytes of interest. Initial calibration is performed whenever the results of a calibration verification standard do not conform to the requirements of the method in use or at a frequency specified in the method.
Initial Calibration Blank (ICB)	A blank sample used to monitor the cleanliness of an analytical system at a frequency determined by the analytical method. This blank is specifically run in conjunction with the Initial Calibration Verification (ICV) where applicable.

Initial Calibration Verification (ICV)	Verifies the initial calibration with a standard obtained or prepared from a source independent of the source of the initial calibration standards to avoid potential bias of the initial calibration.
Instrument Blank	A clean sample (e.g., distilled water) processed through the instrumental steps of the measurement process; used to determine instrument contamination.
Instrument Detection Limits (IDLs)	Limits determined by analyzing a series of reagent blank analyses to obtain a calculated concentration. IDLs are determined by calculating the average of the standard deviations of three runs on three non-consecutive days from the analysis of a reagent blank solution with seven consecutive measurements per day.
Interference, spectral	Occurs when particulate matter from the atomization scatters incident radiation from the source or when the absorption or emission from an interfering species either overlaps or is so close to the analyte wavelength that resolution becomes impossible.
Interference, chemical	Results from the various chemical processes that occur during atomization and later the absorption characteristics of the analyte.
Internal Standards	TNI- A known amount of standard added to a test portion of a sample as a reference for evaluating and controlling the precision and bias of the applied analytical method.
Intermediate Standard Solution	Reference solutions prepared by dilution of the stock solutions with an appropriate solvent.
International System of Units (SI)	The coherent system of units adopted and recommended by the General Conference on Weights and Measures.
Ion Chromatography (IC)	Instrumentation or process that allows the separation of ions and molecules based on the charge properties of the molecules.
Isomer	One of two or more compounds, radicals, or ions that contain the same number of atoms of the same element but differ in structural arrangement and properties. For example, hexane (C6H14) could be n-hexane, 2-methylpentane, 3-methylpentane, 2,3-dimethylbutane, 2,2-dimethylbutane.
Laboratory	A body that calibrates and/or tests.
Laboratory Control Sample (LCS)	TNI- (however named, such as laboratory fortified blank (LFB), spiked blank, or QC check sample): A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes and taken through all sample preparation and analytical steps of the procedure unless otherwise noted in a reference method. It is generally used to establish intra-laboratory or analyst-specific precision and bias or to evaluate the performance of all or a portion of the measurement system.
Laboratory Duplicate	Aliquots of a sample taken from the same container under laboratory conditions and processed and analyzed independently.
Laboratory Information Management System (LIMS)	The entirety of an electronic data system (including hardware and software) that collects, analyzes, stores, and archives electronic records and documents.
LabTrack	Database used by Pace Analytical to store and track corrective actions and other laboratory issues.

Learning Management System (LMS)	A web-based database used by the laboratories to track and document training activities. The system is administered by the corporate training department and each laboratory's learn centers are maintained by a local administrator.
Legal Chain-of-Custody Protocols	TNI- Procedures employed to record the possession of samples from the time of sampling through the retention time specified by the client or program. These procedures are performed at the special request of the client and include the use of a Chain-of-Custody (COC) Form that documents the collection, transport, and receipt of compliance samples by the laboratory. In addition, these protocols document all handling of the samples within the laboratory.
Limit(s) of Detection (LOD)	TNI- A laboratory's estimate of the minimum amount of an analyte in a given matrix that an analytical process can reliably detect in their facility.
Limit(s) of Quantitation (LOQ)	TNI- The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence.
Linear Dynamic Range	Concentration range where the instrument provides a linear response.
Liquid chromatography/ tandem mass spectrometry (LC/MS/MS)	Instrumentation that combines the physical separation techniques of liquid chromatography with the mass analysis capabilities of mass spectrometry.
Lot	A quantity of bulk material of similar composition processed or manufactured at the same time.
Management	Those individuals directly responsible and accountable for planning, implementing, and assessing work.
Management System	System to establish policy and objectives and to achieve those objectives.
Manager (however named)	The individual designated as being responsible for the overall operation, all personnel, and the physical plant of the environmental laboratory. A supervisor may report to the manager. In some cases, the supervisor and the manager may be the same individual.
Matrix	TNI- The substrate of a test sample.
Matrix Duplicate	TNI- A replicate matrix prepared in the laboratory and analyzed to obtain a measure of precision.
Matrix Spike (MS) (spiked sample or fortified sample)	TNI- A sample prepared, taken through all sample preparation and analytical steps of the procedure unless otherwise noted in a referenced method, by adding a known amount of target analyte to a specified amount of sample for which an independent test result of target analyte concentration is available. Matrix spikes are used, for example, to determine the effect of the matrix on a method's recovery efficiency.
Matrix Spike Duplicate (MSD) (spiked sample or fortified sample duplicate)	TNI- A replicate matrix spike prepared in the laboratory and analyzed to obtain a measure of the precision of the recovery for each analyte.
Measurement Performance Criteria (MPC)	Criteria that may be general (such as completion of all tests) or specific (such as QC method acceptance limits) that are used by a project to judge whether a laboratory can perform a specified activity to the defined criteria.

Measurement System	TNI - A test method, as implemented at a particular laboratory, and which includes the equipment used to perform the sample preparation, test and the operator(s).
Measurement Uncertainty	An estimate of the error in a measurement often stated as a range of values that contain the true value, within a certain confidence level. The uncertainty generally includes many components which may be evaluated from experimental standard deviations based on repeated observations or by standard deviations evaluated from assumed probability distributions based on experience or other information.
Method	TNI- A body of procedures and techniques for performing an activity (e.g., sampling, chemical analysis, quantification), systematically presented in the order in which they are to be executed.
Method Blank	TNI- A sample of a matrix similar to the batch of associated samples (when available) that is free from the analytes of interest and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences are present at concentrations that impact the analytical results for sample analyses.
Method Detection Limit (MDL)	One way to establish a Detection Limit; defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte.
Method of Standard Additions	A set of procedures adding one or more increments of a standard solution to sample aliquots of the same size in order to overcome inherent matrix effects. The procedures encompass the extrapolation back to obtain the sample concentration.
MintMiner	Program used by Pace Analytical to review large amounts of chromatographic data to monitor for errors or data integrity issues.
Mobile Laboratory	TNI- A portable enclosed structure with necessary and appropriate accommodation and environmental conditions for a laboratory, within which testing is performed by analysts. Examples include but are not limited to trailers, vans, and skid-mounted structures configured to house testing equipment and personnel.
National Institute of Standards and Technology (NIST)	TNI- A federal agency of the US Department of Commerce's Technology Administration that is designed as the United States national metrology institute (or NMI).
National Pollutant Discharge Elimination System (NPDES)	A permit program that controls water pollution by regulating point sources that discharge pollutants into U.S. waters.
Negative Control	Measures taken to ensure that a test, its components, or the environment do not cause undesired effects, or produce incorrect test results.
Nitrogen Phosphorus Detector (NPD)	A detector used in GC analyses that utilizes thermal energy to ionize an analyte. With this detector, nitrogen and phosphorus can be selectively detected with a higher sensitivity than carbon.
Nonconformance	An indication or judgment that a product or service has not met the requirement of the relevant specifications, contract, or regulation; also the state of failing to meet the requirements.

Not Detected (ND)	The result reported for a compound when the detected amount of that compound is less than the method reporting limit.
Performance Based Measurement System (PBMS)	An analytical system wherein the data quality needs, mandates or limitations of a program or project are specified and serve as criteria for selecting appropriate test methods to meet those needs in a cost-effective manner.
Photo-ionization Detector (PID)	An ion detector which uses high-energy photons, typically in the ultraviolet range, to break molecules into positively charged ions.
Polychlorinated Biphenyls (PCB)	A class of organic compounds that were used as coolants and insulating fluids for transformers and capacitors. The production of these compounds was banned in the 1970's due to their high toxicity.
Positive Control	Measures taken to ensure that a test and/or its components are working properly and producing correct or expected results from positive test subjects.
Post-Digestion Spike	A sample prepared for metals analyses that has analytes spike added to determine if matrix effects may be a factor in the results.
Power of Hydrogen (pH)	The measure of acidity or alkalinity of a solution.
Practical Quantitation Limit (PQL)	Another term for a method reporting limit. The lowest reportable concentration of a compound based on parameters set up in an analytical method and the laboratory's ability to reproduce those conditions.
Precision	TNI- The degree to which a set of observations or measurements of the same property, obtained under similar conditions, conform to themselves; a data quality indicator. Precision is usually expressed as standard deviation, variance or range, in either absolute or relative terms.
Preservation	TNI - Any conditions under which a sample must be kept in order to maintain chemical, physical, and/or biological integrity prior to analysis.
Procedure	TNI- A specified way to carry out an activity or process. Procedures can be documented or not.
Proficiency Testing	TNI- A means of evaluating a laboratory's performance under controlled conditions relative to a given set of criteria through analysis of unknown samples provided by an external source.
Proficiency Testing Program	TNI- The aggregate of providing rigorously controlled and standardized environmental samples to a laboratory for analysis, reporting of results, statistical evaluation of the results and the collective demographics and results summary of all participating laboratories.
Proficiency Testing Sample (PT)	TNI- A sample, the composition of which is unknown to the laboratory and is provided to test whether the laboratory can produce analytical results within the specified acceptance criteria.
Protocol	TNI- A detailed written procedure for field and/or laboratory operation (e.g., sampling, analysis) that must be strictly followed.
Qualitative Analysis	Analysis designed to identify the components of a substance or mixture.
Quality Assurance (QA)	TNI- An integrated system of management activities involving planning, implementation, assessment, reporting and quality improvement to ensure that a process, item, or service is of the type and quality needed and expected by the client.
Quality Assurance Manual (QAM)	A document stating the management policies, objectives, principles, organizational structure and authority, responsibilities, accountability, and implementation of an agency, organization, or laboratory, to ensure the quality of its product and the utility of its product to its users.

Quality Assurance Project Plan (QAPP)	A formal document describing the detailed quality control procedures by which the quality requirements defined for the data and decisions pertaining to a specific project are to be achieved.
Quality Control (QC)	TNI- The overall system of technical activities that measures the attributes and performance of a process, item, or service against defined standards to verify that they meet the stated requirements established by the customer; operational techniques and activities that are used to fulfill requirements for quality; also the system of activities and checks used to ensure that measurement systems are maintained within prescribed limits, providing protection against "out of control" conditions and ensuring that the results are of acceptable quality.
Quality Control Sample (QCS)	TNI- A sample used to assess the performance of all or a portion of the measurement system. One of any number of samples, such as Certified Reference Materials, a quality system matrix fortified by spiking, or actual samples fortified by spiking, intended to demonstrate that a measurement system or activity is in control.
Quality Manual	TNI- A document stating the management policies, objectives, principles, organizational structure and authority, responsibilities, accountability, and implementation of an agency, organization, or laboratory, to ensure the quality of its product and the utility of its product to its users.
Quality System	TNI - A structured and documented management system describing the policies, objectives, principles, organizational authority, responsibilities, accountability, and implementation plan of an organization for ensuring quality in its work processes, products (items), and services. The quality system provides the framework for planning, implementing, and assessing work performed by the organization and for carrying out required quality assurance and quality control activities.
Quality System Matrix	TNI - These matrix definitions are to be used for purposes of batch and quality control requirements: • **Air and Emissions**: Whole gas or vapor samples including those contained in flexible or rigid wall containers and the extracted concentrated analytes of interest from a gas or vapor that are collected with a sorbant tube, impinger solution, filter, or other device • **Aqueous**: Any aqueous sample excluded from the definition of Drinking Water or Saline/Estuarine. Includes surface water, groundwater effluents, and TCLP or other extracts. • **Biological Tissue**: Any sample of a biological origin such as fish tissue, shellfish or plant material. Such samples shall be grouped according to origin. • **Chemical Waste**: A product or by-product of an industrial process that results in a matrix not previously defined. • **Drinking Water**: Any aqueous sample that has been designated a potable or potentially potable water source. • **Non-aqueous liquid**: Any organic liquid with <15% settleable solids • **Saline/Estuarine**: Any aqueous sample from an ocean or estuary, or other salt water source such as the Great Salt Lake. • **Solids**: Includes soils, sediments, sludges, and other matrices with >15% settleable solids.

Quantitation Range	The range of values (concentrations) in a calibration curve between the LOQ and the highest successively analyzed initial calibration standard. The quantitation range lies within the calibration range.
Quantitative Analysis	Analysis designed to determine the amounts or proportions of the components of a substance.
Random Error	The EPA has established that there is a 5% probability that the results obtained for any one analyte will exceed the control limits established for the test due to random error. As the number of compounds measured increases in a given sample, the probability for statistical error also increases.
Raw Data	TNI- The documentation generated during sampling and analysis. This documentation includes, but is not limited to, field notes, electronic data, magnetic tapes, untabulated sample results, QC sample results, print outs of chromatograms, instrument outputs, and handwritten records.
Reagent Blank (method reagent blank)	A sample consisting of reagent(s), without the target analyte or sample matrix, introduced into the analytical procedure at the appropriate point and carried through all subsequent steps to determine the contribution of the reagents and of the involved analytical steps.
Reagent Grade	Analytical reagent (AR) grade, ACS reagent grade, and reagent grade are synonymous terms for reagents that conform to the current specifications of the Committee on Analytical Reagents of the American Chemical Society.
Records	The output of implementing and following management system documents (e.g., test data in electronic or hand-written forms, files, and logbooks).
Reference Material	TNI- Material or substance one or more of whose property values are sufficiently homogenized and well established to be used for the calibration of an apparatus, the assessment of a measurement method, or for assigning values to materials.
Reference Standard	TNI- Standard used for the calibration of working measurement standards in a given organization or at a given location.
Relative Percent Difference (RPD)	A measure of precision defined as the difference between two measurements divided by the average concentration of the two measurements.
Reporting Limit (RL)	The level at which method, permit, regulatory and customer-specific objectives are met. The reporting limit may never be lower than the Limit of Detection (i.e., statistically determined MDL). Reporting limits are corrected for sample amounts, including the dry weight of solids, unless otherwise specified. There must be a sufficient buffer between the Reporting Limit and the MDL.
Reporting Limit Verification Standard (or otherwise named)	A standard analyzed at the reporting limit for an analysis to verify the laboratory's ability to report to that level.
Representativeness	A quality element related to the ability to collect a sample reflecting the characteristics of the part of the environment to be assessed. Sample representativeness is dependent on the sampling techniques specified in the project work plan.
Requirement	Denotes a mandatory specification; often designated by the term "shall".
Retention Time	The time between sample injection and the appearance of a solute peak at the detector.

Sample	Portion of material collected for analysis, identified by a single, unique alphanumeric code. A sample may consist of portions in multiple containers, if a single sample is submitted for multiple or repetitive analysis.
Sample Condition Upon Receipt Form (SCURF)	Form used by Pace Analytical sample receiving personnel to document the condition of sample containers upon receipt to the laboratory (used in conjunction with a COC).
Sample Delivery Group (SDG)	A unit within a single project that is used to identify a group of samples for delivery. An SDG is a group of 20 or fewer field samples within a project, received over a period of up to 14 calendar days. Data from all samples in an SDG are reported concurrently.
Sample Receipt Form (SRF)	Letter sent to the client upon login to show the tests requested and pricing.
Sample Tracking	Procedures employed to record the possession of the samples from the time of sampling until analysis, reporting and archiving. These procedures include the use of a Chain of custody Form that documents the collection, transport, and receipt of compliance samples to the laboratory. In addition, access to the laboratory is limited and controlled to protect the integrity of the samples.
Sampling	TNI- Activity related to obtaining a representative sample of the object of conformity assessment, according to a procedure.
Selective Ion Monitoring (SIM)	A mode of analysis in mass spectrometry where the detector is set to scan over a very small mass range, typically one mass unit. The narrower the range, the more sensitive the detector.
Selectivity	TNI- The ability to analyze, distinguish, and determine a specific analyte or parameter from another component that may be a potential interferent or that may behave similarly to the target analyte or parameter within the measurement system.
Sensitivity	TNI- The capability of a method or instrument to discriminate between measurement responses representing different levels (e.g., concentrations) of a variable of interest.
Serial Dilution	The stepwise dilution of a substance in a solution.
Shall	Denotes a requirement that is mandatory whenever the criterion for conformance with the specification requires that there be no deviation. This does not prohibit the use of alternative approaches or methods for implementing the specification as long as the requirement is fulfilled.
Should	Denotes a guideline or recommendation whenever noncompliance with the specification is permissible.
Signal-to-Noise Ratio (S/N)	S/N is a measure of signal strength relative to background noise. The average strength of the noise of most measurements is constant and independent of the magnitude of the signal. Thus, as the quantity being measured (producing the signal) decreases in magnitude, S/N decreases and the effect of the noise on the relative error of a measurement increases.
Spike	A known mass of target analyte added to a blank sample or sub-sample; used to determine recovery efficiency or for other quality control purposes.
Standard (Document)	TNI- The document describing the elements of a laboratory accreditation that has been developed and established within the consensus principles of standard setting and meets the approval requirements of standard adoption organizations procedures and policies.

Standard (Chemical)	Standard samples are comprised of a known amount of standard reference material in the matrix undergoing analysis. A standard reference material is a certified reference material produced by US NIST and characterized for absolute content, independent of analytical test method.
Standard Blank (or Reagent Blank)	A calibration standard consisting of the same solvent/reagent matrix used to prepare the calibration standards without the analytes. It is used to construct the calibration curve by establishing instrument background.
Standard Method	A test method issued by an organization generally recognized as competent to do so.
Standard Operating Procedure (SOP)	TNI- A written document that details the method for an operation, analysis, or action with thoroughly prescribed techniques and steps. SOPs are officially approved as the methods for performing certain routine or repetitive tasks.
Standard Reference Material (SRM)	A certified reference material produced by the US NIST or other equivalent organization and characterized for absolute content, independent of analytical method.
Statement of Qualifications (SOQ)	A document that lists information about a company, typically the qualifications of that company to compete on a bid for services.
Stock Standard	A concentrated reference solution containing one or more analytes prepared in the laboratory using an assayed reference compound or purchased from a reputable commercial source.
Storage Blank	A sample of analyte-free media prepared by the laboratory and retained in the sample storage area of the laboratory. A storage blank is used to record contamination attributable to sample storage at the laboratory.
Supervisor	The individual(s) 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.
Surrogate	A substance with properties that mimic the analyte of interest. It is unlikely to be found in environment samples and is added to them for quality control purposes.
Systems Audit	An on-site inspection or assessment of a laboratory's quality system.
Target Analytes	Analytes or chemicals of primary concern, identified by the customer on a project-specific basis.
Technical Director	Individual(s) who has overall responsibility for the technical operation of the environmental testing laboratory.
Technology	TNI- A specific arrangement of analytical instruments, detection systems, and/or preparation techniques.
Test	A technical operation that consists of the determination of one or more characteristics or performance of a given product, material, equipment, organism, physical phenomenon, process or service according to a specified procedure. The result of a test is normally recorded in a document sometimes called a test report or a test certificate.
Test Method	A definitive procedure that determines one or more characteristics of a given substance or product.

Test Methods for Evaluating Solid Waste, Physical/ Chemical (SW-846)	EPA Waste's official compendium of analytical and sampling methods that have been evaluated and approved for use in complying with RCRA regulations.
Total Petroleum Hydrocarbons (TPH)	A term used to denote a large family of several hundred chemical compounds that originate from crude oil. Compounds may include gasoline components, jet fuel, volatile organics, etc.
Toxicity Characteristic Leaching Procedure (TCLP)	A solid sample extraction method for chemical analysis employed as an analytical method to simulate leaching of compounds through a landfill.
Traceability	TNI- The ability to trace the history, application, or location of an entity by means of recorded identifications. In a calibration sense, traceability relates measuring equipment to national or international standards, primary standards, basic physical conditions or properties, or reference materials. In a data collection sense, it relates calculations and data generated throughout the project back to the requirements for the quality of the project.
Training Document	A training resource that provides detailed instructions to execute a specific method or job function.
Trip Blank	This blank sample is used to detect sample contamination from the container and preservative during transport and storage of the sample. A cleaned sample container is filled with laboratory reagent water and the blank is stored, shipped, and analyzed with its associated samples.
Tuning	A check and/or adjustment of instrument performance for mass spectrometry as required by the method.
Ultraviolet Spectrophotometer (UV)	Instrument routinely used in quantitative determination of solutions of transition metal ions and highly conjugated organic compounds.
Uncertainty Measurement	The parameter associated with the result of a measurement that characterized the dispersion of the values that could be reasonably attributed to the measurand (i.e. the concentration of an analyte).
Unethical actions	Deliberate falsification of analytical or quality control results, where failed method or contractual requirements are made to appear acceptable.
Validation	The confirmation by examination and provision of objective evidence that the particular requirements for a specific intended use are fulfilled.
Verification	TNI- Confirmation by examination and objective evidence that specified requirements have been met. Note: In connection with the management of measuring equipment, verification provides a means for checking that the deviations between values indicated by a measuring instrument and corresponding known values of a measured quantity are consistently smaller than the maximum allowable error defined in a standard, regulation or specification peculiar to the management of the measuring equipment. The result of verification leads to a decision either to restore in service, to perform adjustment, to repair, to downgrade, or to declare obsolete. In all cases, it is required that a written trace of the verification performed shall be kept on the measuring instrument's individual record.
Whole Effluent Toxicity (WET)	The aggregate toxic effect to aquatic organisms from all pollutants contained in a facility's wastewater (effluent).

11.0. REFERENCES

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12.0. REVISIONS

The PASI Corporate Quality Office files both a paper copy and electronic version of a Microsoft Word document with tracked changes detailing all revisions made to the previous version of the Quality Assurance Manual. This document is available upon request. All revisions are summarized in the table below.

Document Number	Reason for Change	Date
Quality Assurance Manual 17.0	Section 2.6.5: Updated facility codes. Section 6.2.3.4: Reworded language regarding calibrations. Section 6.3.7.1: Removed last sentence about syringes. Section 6.4.8: Added sentence about instrumentation failure. Section 7.2.6: Added language regarding auto email function. Section 7.5.1.1: Added red letter section for special data retention requirements. Section 9.2.7.2: Removed sentence regarding hold time reporting by QMs. Section 10: Updated DoD definitions per DoD/DOE QSM, revision 5.0. Also added definitions for LC/MS/MS and UCMR. Section 11: Revised DoD reference and added UCMR3 reference. Attachment VIII: added several drinking water methods and added note 4 regarding hexavalent holding time and preservation.	16April2014

ATTACHMENT I- QUALITY CONTROL CALCULATIONS

PERCENT RECOVERY (%REC)

$$\%REC = \frac{(MSConc - SampleConc)}{TrueValue} * 100$$

NOTE: The SampleConc is zero (0) for theLCS and Surrogate Calculations

PERCENT DIFFERENCE (%D)

$$\%D = \frac{MeasuredValue - TrueValue}{TrueValue} * 100$$

where:
TrueValue = Amount spiked (can also be the $\overline{CF}$ or $\overline{RF}$ of the ICAL Standards)
Measured Value = Amount measured (can also be the CF or RF of the CCV)

PERCENT DRIFT

$$\%Drift = \frac{CalculatedConcentration - TheoreticalConcentration}{TheoreticalConcentrtion} * 100$$

RELATIVE PERCENT DIFFERENCE (RPD)

$$RPD = \frac{|(R1 - R2)|}{(R1 + R2)/2} * 100$$

where:
R1 = Result Sample 1
R2 = Result Sample 2

CORRELATION COEFFICIENT (R)

$$CorrCoeff = \frac{\sum_{i=1}^{N} W_i * (X_i - \overline{X}) * (Y_i - \overline{Y})}{\sqrt{\left(\sum_{i=1}^{N} W_i * (X_i - \overline{X})^2\right) * \left(\sum_{i=1}^{N} W_i * (Y_i - \overline{Y})^2\right)}}$$

With:		
	N	Number of standard samples involved in the calibration
	i	Index for standard samples
	Wi	Weight factor of the standard sample no. i
	Xi	X-value of the standard sample no. i
	X(bar)	Average value of all x-values
	Yi	Y-value of the standard sample no. i
	Y(bar)	Average value of all y-values

ATTACHMENT I- QUALITY CONTROL CALCULATIONS (CONTINUED)

STANDARD DEVIATION (S)

$$S = \sqrt{\sum_{i=1}^{n} \frac{(X_i - \overline{X})^2}{(n-1)}}$$

where:
n = number of data points
X_i = individual data point
$\overline{X}$ = average of all data points

AVERAGE ($\overline{X}$)

$$\overline{X} = \frac{\sum_{n=1}^{i} X_i}{n}$$

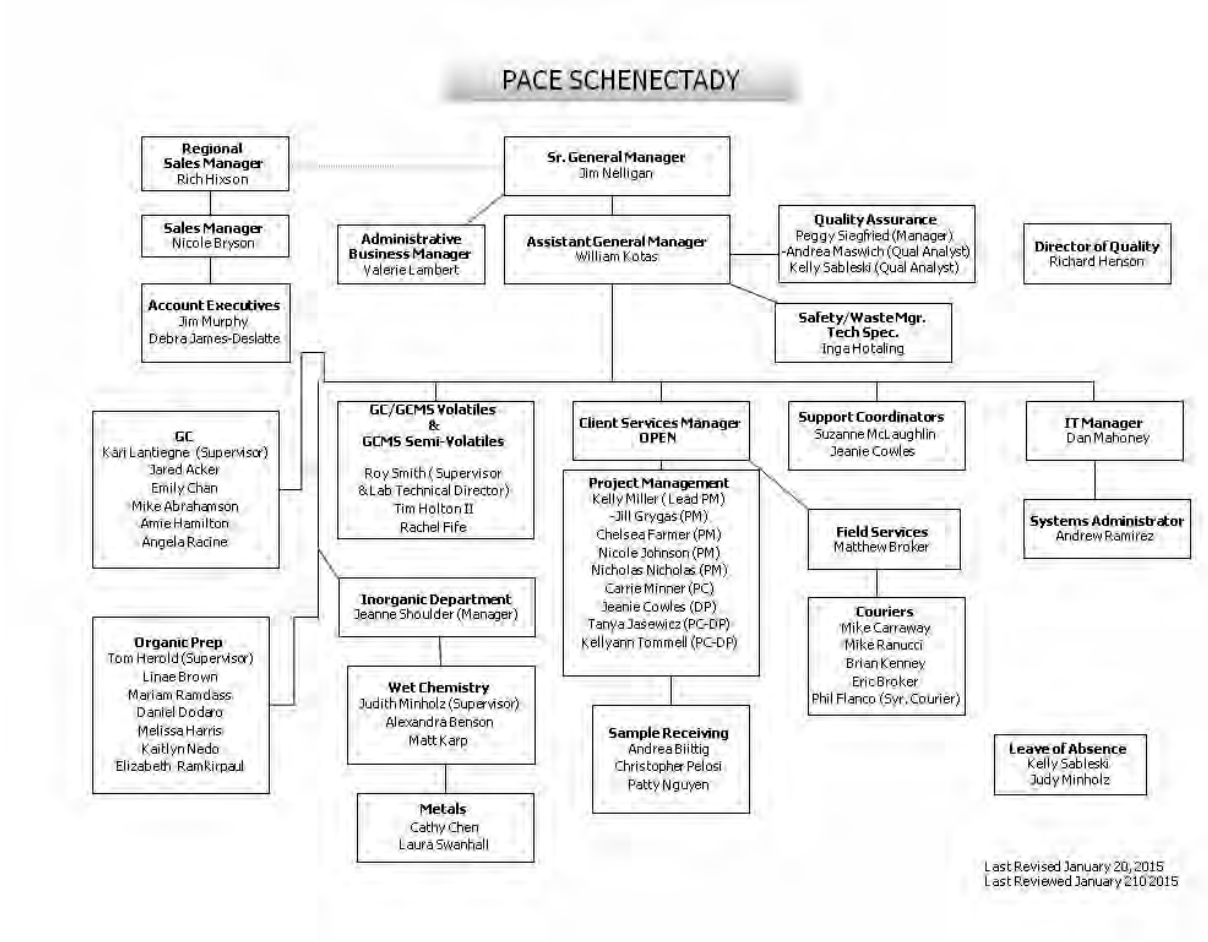
where:
n = number of data points
X_i = individual data point

RELATIVE STANDARD DEVIATION (RSD)

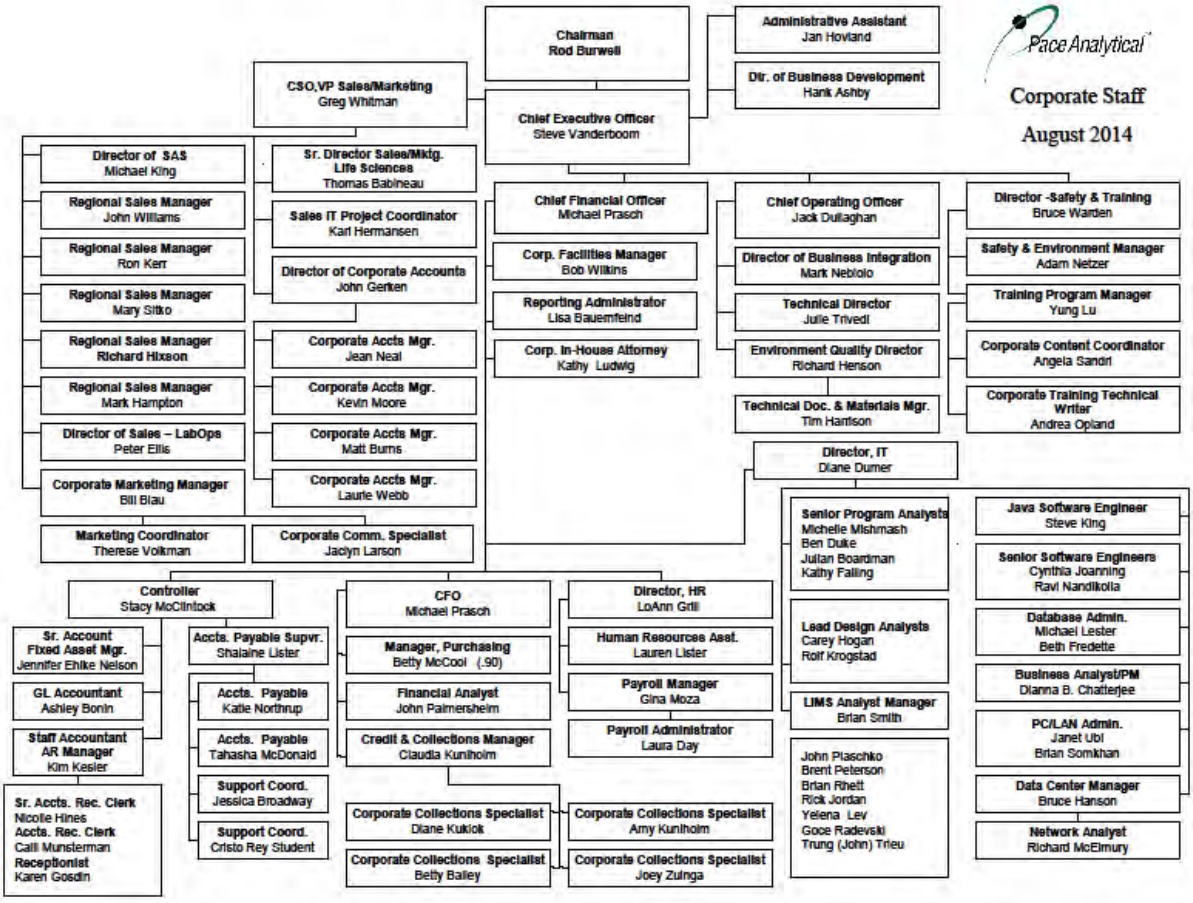
$$RSD = \frac{S}{\overline{X}} * 100$$

where:
S = Standard Deviation of the data points
$\overline{X}$ = average of all data points

ATTACHMENT IIA- LABORATORY ORGANIZATIONAL CHART (CURRENT AS OF ISSUE DATE)



ATTACHMENT IIB- CORPORATE ORGANIZATIONAL CHART (CURRENT AS OF ISSUE DATE)



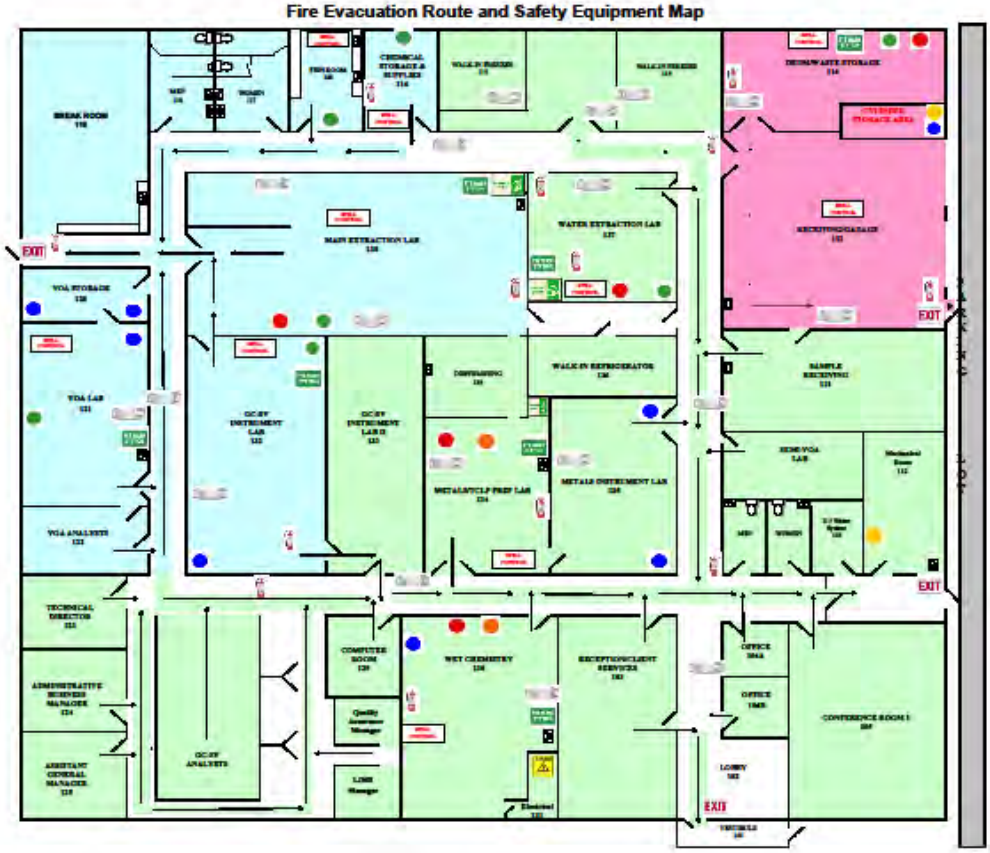
ATTACHMENT III- EQUIPMENT LIST (CURRENT AS OF ISSUE DATE)

Department	Number	Instrument
GC	17	Gas Chromatographs (GC/ECD) and (GC -FID) Agilent and Varian (Bruker)
VOA/SVOA	7	GC/MS Systems -Varian (Bruker) and Thermo
Metals	1	ICP-Thermo
Metals	1	Mercury Analyzer-Leeman
Wet Chemistry	3	Total Organic Carbon Analyzer- Shimadzu and Tekmar Dohrman
Wet Chemistry	1	Lachat QuikChem Auto Analyzer
Wet Chemistry	1	Hach Spectrophotometer
Wet Chemistry	2	Precision 815 Incubator
Wet Chemistry	1	Hach HQ 440d Multi Meter for BOD and CBOD
Wet Chemistry	2	Associated Design TCLP Tumblers
Oraganics	3	Milestone Ethos EX Microwave Extraction System
Oraganics	5	Dionex ASE 200 Accelerated Solvent Extractor
Oraganics	96	Soxhlet Extraction Units
Oraganics	16	Horizon SPE-DEX 4790 Series Automated Solid Phase Extractor

ATTACHMENT IV- LABORATORY FLOOR PLAN (CURRENT AS OF ISSUE DATE)

Pace Analytical Services, Inc.
2190 Technology Dr.
Schenectady, NY 12308

Fire Evacuation Route and Safety Equipment Map



2190 Technology Drive

Legend

Fire Extinguisher
Emergency Light
Eye Wash Station
Shower Station
Acids
Liquid Gases
Solvents
Bases
SINK
Emergency Spill Control Kit
Main Electricity
Compressed Gases
You are here

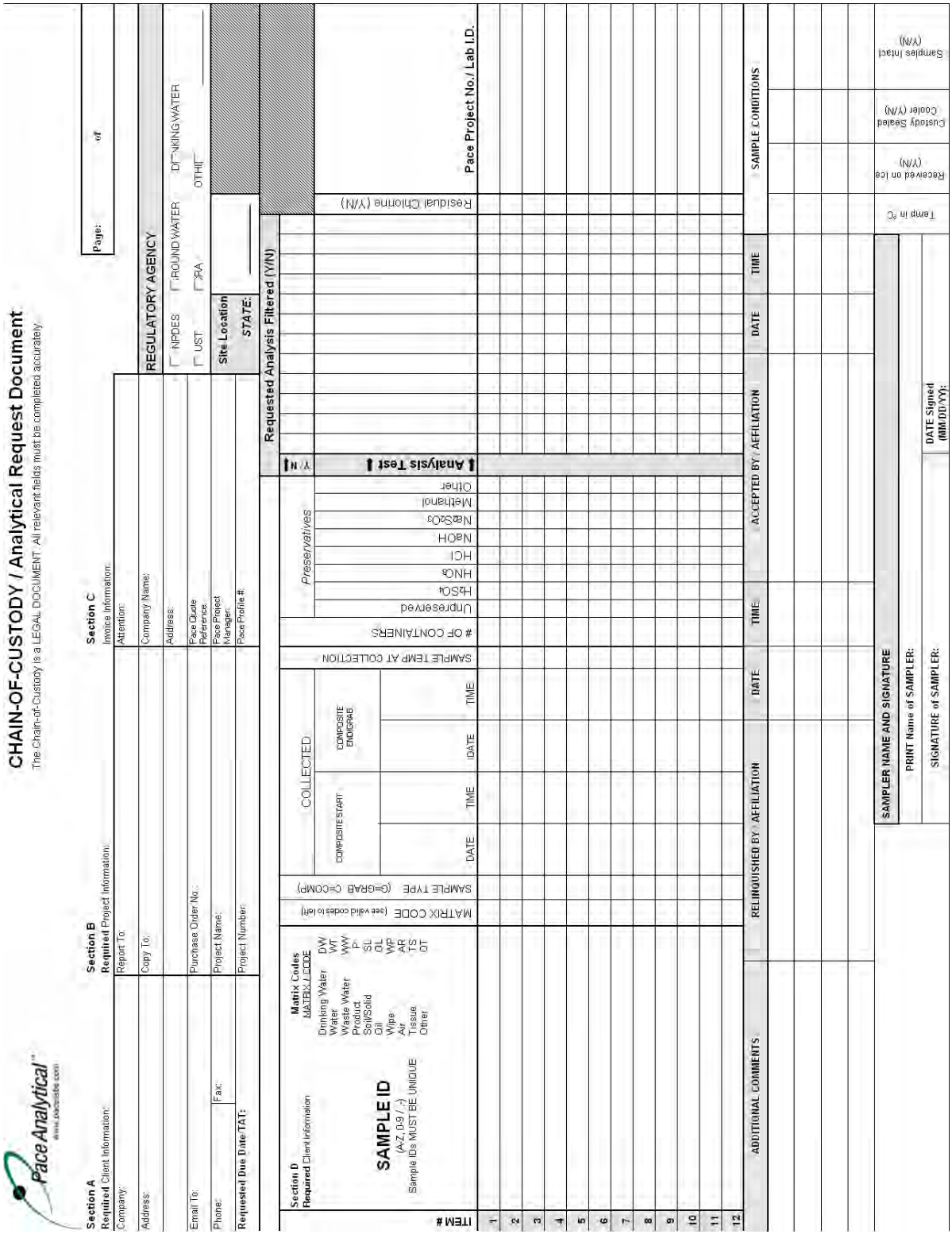
Emergency Contacts:
Schenectady Fire Dept. 374-3111
Schenectady Police Dept. 374-7744
Dan Pfalzer 716-818-3424
Inga Hotaling 518-421-9943

ATTACHMENT V- LABORATORY SOP LIST (CURRENT AS OF ISSUE DATE)

ATTACHMENT VI- LABORATORY CERTIFICATION LIST (CURRENT AS OF ISSUE DATE)
SCOPE AND APPLICATION CERTIFICATES ARE MAINTAINED AND FILED IN THE LOCAL QUALITY DEPARTMENT

State/Agency	Certification #	Primary or Secondary TNI
New York	11078	Primary
New Jersey	NY026	Secondary
Connecticut	PH-0337	Secondary
Massachusetts	M-NY906	Secondary
Virginia	2644	Secondary

ATTACHMENT VII- PACE CHAIN-OF-CUSTODY (CURRENT AS OF ISSUE DATE)



ATTACHMENT VIII- METHOD HOLD TIME, CONTAINER AND PRESERVATION GUIDE (CURRENT AS OF ISSUE DATE)

THE HOLDING TIME INDICATED IN THE CHART BELOW IS THE MAXIMUM ALLOWABLE TIME FROM COLLECTION TO EXTRACTION AND/OR ANALYSIS PER THE ANALYTICAL METHOD. FOR METHODS THAT REQUIRE PROCESSING PRIOR TO ANALYSIS, THE HOLDING TIME IS DESIGNATED AS 'PREPARATION HOLDING TIME/ANALYSIS HOLDING TIME'.

Parameter	Method	Matrix	Container	Preservative	Max Hold Ti
Acidity	SM2310B	Water	Plastic/Glass	$\leq 6^oC$	14 Days
Actinides	HASL-300	Water		pH<2 HNO_3	180 Days
Actinides	HASL-300	Solid		None	180 Days
Alkalinity	SM2320B/310.2	Water	Plastic/Glass	$\leq 6^oC$	14 Days
Alkylated PAHs		Water	1L Amber Glass	$\leq 6^oC$; pH<2 1:1 HCl (optional)	14/40 Days preserved; 7/4 Days unpreser
Alkylated PAHs		Solid	8oz Glass	$\leq 10^oC$	1 Year/40 Day
Total Alpha Radium (see note 3)	9315/903.0	Water	Plastic/Glass	pH<2 HNO_3	180 days
Total Alpha Radium (see note 3)	9315	Solid		None	180 days
Anions (Br, Cl, F, NO_2, NO_3, o-Phos, SO_4, bromate, chlorite, chlorate)	300.0/300.1/SM4110B	Water	Plastic/Glass	$\leq 6^oC$; EDA if bromate or chlorite run	All analytes 2 days except: NO_2, NO_3, o-Phos (48 Hou chlorite (immediately 300.0; 14 Day for 300.1). NO_2/NO_3 com 28 days.
Anions (Br, Cl, F, NO_2, NO_3, o-Phos, SO_4, bromate, chlorite, chlorate)	300.0	Solid	Plastic/Glass	$\leq 6^oC$	All analytes 2 days except: NO_2, NO_3, o-Phos (48 hour chlorite (immediately) NO_2/NO_3 com 28 days.
Anions (Br, Cl, F, NO_2, NO_3, o-Phos, SO_4	9056	Water/ Solid	Plastic/Glass	$\leq 6^oC$	28 days
Aromatic and Halogenated Volatiles (see note 1)	8021	Solid	5035 vial kit	See note 1	14 days
Aromatic and Halogenated Volatiles	602/8021	Water	40mL vials	pH<2 HCl; $\leq 6^oC$; $Na_2S_2O_3$ if Cl present	14 Days (7 Da for aromatics unpreserved)
Acid Volatile Sulfide	Draft EPA 1629	Solid	8oz Glass	$\leq 6^oC$	14 Days
Bacteria, Total Plate Count	SM9221D	Water	Plastic/WK	$\leq 6^oC$; $Na_2S_2O_3$	24 Hours
Base/Neutrals and Acids	8270	Solid	8oz Glass	$\leq 6^oC$	14/40 Days

Parameter	Method	Matrix	Container	Preservative	Max Hold Ti
Base/Neutrals and Acids	625/8270	Water	1L Amber Glass	$\leq 6^oC$; $Na_2S_2O_3$ if Cl present	7/40 Days
Base/Neutrals, Acids & Pesticides	525.2	Water	1L Amber Glass	pH<2 HCl; $\leq 6^oC$; Na sulfite if Cl present	14/30 Days
Biomarkers		Water	$\leq 6^oC$; pH<2 1:1 HCl (optional)	14/40 Days preserved; 7/40 Days unpreserved	$\leq 6^oC$; pH<2 1 HCl (optional
Biomarkers		Solid	$\leq 10^oC$	1 Year/40 Days	$\leq 10^oC$
BOD/cBOD	SM5210B	Water	Plastic/Glass	$\leq 6^oC$	48 hours
BTEX/Total Hydrocarbons	TO-3	Air	Summa Canister	None	14 Days
BTEX/Total Hydrocarbons	TO-3	Air	Tedlar Bag or equivalent	None	48 Hours
Carbamates	531.1	Water	Glass	$Na_2S_2O_3$, Monochloroacetic acid pH <3; $\leq 6^oC$	28 Days
Cation/Anion Balance	SM1030E	Water	Plastic/Glass	None	None
Cation Exchange	9081	Solid	8oz Glass	None	unknown
Chloride	SM4500Cl-C,E	Water	Plastic/Glass	None	28 Days
Chlorine, Residual	SM4500Cl-D,E,G/330.5/Hach 8167	Water	Plastic/Glass	None	15 minutes
Chlorophyll	SM10200H	Water	Opaque bottle or aluminum foil	$\leq 6^oC$	48 Hours to filtration
COD	SM5220C, D/410.4/Hach 8000	Water	Plastic/Glass	pH<2 H_2SO_4; $\leq 6^oC$	28 Days
Coliform, Fecal	SM9222D	Water	100mL Plastic	$\leq 6^oC$	8 Hours
Coliform, Fecal	SM9222D	Solid	100mL Plastic	$\leq 6^oC$	8 Hours
Coliform, Fecal	SM9221E	Water	100mL Plastic	$\leq 6^oC$	8 Hours
Coliform, Fecal	SM9221E	Solid	100mL Plastic	$\leq 6^oC$	24 Hours
Coliform, Total	SM9222B	Water	100mL Plastic	$\leq 6^oC$	8 Hours
Coliform, Total	SM9221B	Solid	100mL Plastic	$\leq 6^oC$	8 Hours
Coliform, Total and E. coli	SM9223B	Drinking Water	100mL Plastic	$\leq 10^oC$	30 Hours after collection
Color	SM2120B,E	Water	Covered Plastic/Acid Washed Amber Glass	$\leq 6^oC$	24 Hours
Condensable Particulate Emissions	EPA 202	Air	Solutions	None	180 Days
Cyanide, Reactive	SW846 chap.7	Water	Plastic/Glass	None	28 Days
Cyanide, Reactive	SW846 chap.7	Solid	Plastic/Glass	None	28 Days
Cyanide, Total and Amenable	SM4500CN-A,B,C,D,E,G,I,N/9010/9012/335.4	Water	Plastic/Glass	pH≥12 NaOH; $\leq 6^oC$; ascorbic acid if Cl present	14 Days (24 Hours if sulfide presen

Parameter	Method	Matrix	Container	Preservative	Max Hold Ti
					applies to SM4500CN o
Diesel Range Organics- Alaska DRO	AK102	Solid	8oz Glass	≤ 6°C	14/40 Days
Diesel Range Organics- Alaska DRO	AK102	Water	1L Glass	pH<2 HCl; ≤ 6°C	14/40 Days
Diesel Range Organics- TPH DRO	8015	Solid	8oz Glass Jar	≤ 6°C	14/40 Days
Diesel Range Organics- TPH DRO	8015	Water	1L Amber Glass	≤ 6°C; $Na_2S_2O_3$ if Cl present	7/40 Days
Diesel Range Organics- TPH DRO	8015	Tissue	1L Amber Glass	≤ - 10°C	1 Year if frozen/40 Day
Diesel Range Organics- NwTPH-Dx	Nw-TPH-Dx	Solid	8oz Glass Jar	≤ 6°C	14/40 Days
Diesel Range Organics- NwTPH-Dx	Nw-TPH-Dx	Water	1L Amber Glass	pH <2 HCl; ≤ 6°C	14/40 Days; 7 Days from collection to extraction if unpreserved
Diesel Range Organics- Wisconsin DRO	WI MOD DRO	Solid	Tared 4oz Glass Jar	≤ 6°C	10/47 Days
Diesel Range Organics- Wisconsin DRO	WI MOD DRO	Water	1L Amber Glass	≤ 6°C; pH <2 HCl	14/40 Days
Dioxins and Furans	1613B	Solid	8oz Glass	≤ 6°C	1 year
Dioxins and Furans	1613B	Water	1L Amber Glass	≤ 6°C; $Na_2S_2O_3$ if Cl present	1 year
Dioxins and Furans	1613B	Fish/ Tissue	Aluminum foil	≤ 6°C	1 year
Dioxins and Furans	8290	Water	1L Amber Glass	≤ 6°C; $Na_2S_2O_3$ if Cl present	30/45 Days
Dioxins and Furans	8290	Solid	8oz Glass	≤ 6°C	30/45 Days
Dioxins and Furans	8290	Fish/ Tissue	Not specified	< -10°C	30/45 Days
Dioxins and Furans	TO-9	Air	PUF	None	30/45 Days
Diquat/Paraquat	549.2	Water	Amber Plastic	≤ 6°C; $Na_2S_2O_3$	7/21 Days
EDB/DBCP (8011) EDB/DBCP/1,2,3-TCP (504.1)	504.1/8011	Water	40mL vials	≤ 6°C; $Na_2S_2O_3$ if Cl present	14 Days
Endothall	548.1	Water	Amber Glass	≤ 6°C; $Na_2S_2O_3$	7/14 Days
Enterococci	EPA 1600	Water	100mL Plastic	≤ 6°C	8 Hours
Explosives	8330/8332	Water	1L Amber Glass	≤ 6°C	7/40 Days
Explosives	8330/8332	Solid	8oz Glass Jar	≤ 6°C	14/40 Days
Extractable Petroleum Hydrocarbons (aliphatic and aromatic)	MA-EPH	Water	1L Amber Glass	pH<2 HCl; ≤ 6°C	14/40 Days
Extractable Petroleum	MA-EPH	Solid	4oz Glass Jar	≤ 6°C	7/40 Days

Parameter	Method	Matrix	Container	Preservative	Max Hold Ti
Hydrocarbons (aliphatic and aromatic)					
Fecal Streptococci	SM9230B	Water	100mL Plastic	$\leq 6^oC$	8 Hours
Ferrous Iron	SN3500Fe-D; Hach 8146	Water	Glass	None	Immediate
Flashpoint/Ignitability	1010	Liquid	Plastic/Glass	None	28 Days
Florida PRO	FL PRO DEP (11/1/95)	Liquid	Glass, PTFE lined cap	$\leq 6^oC$; pH <2 H_2SO_4 or HCl	7/40 Days
Fluoride	SM4500Fl-C,D	Water	Plastic	None	28 Days
Gamma Emitting Radionuclides	901.1	Water	Plastic/Glass	pH<2 HNO_3	180 days
Gasoline Range Organics	8015	Water	40mL vials	pH<2 HCl	14 Days
Gasoline Range Organics	8015	Solid	5035 vial kit	See note 1	14 days
Gasoline Range Organics-Alaska GRO	AK101	Solid	5035 vial kit	See 5035 note*	28 Days if GR only (14 Days with BTEX)
Gasoline Range Organics-Alaska GRO	AK101	Water	40mL vials	pH<2 HCl; $\leq 6^oC$	14 Days
Gasoline Range Organics-NwTPH-Gx	Nw-TPH-Gx	Water	40mL vials	pH<2 HCl; $\leq 6^oC$	7 Days unpreserved; 1 Days preserve
Gasoline Range Organics-NwTPH-Gx	Nw-TPH-Gx	Solid	40mL vials	$\leq 6^oC$; packed jars with no headspace	14 Days
Gasoline Range Organics-Wisconsin GRO	WI MOD GRO	Water	40mL vials	pH<2 HCl; $\leq 6^oC$	14 Days
Gasoline Range Organics-Wisconsin GRO	WI MOD GRO	Solid	40mL MeOH vials	$\leq 6^oC$ in MeOH	21 Days
Glyphosate	547	Water	Glass	$\leq 6^oC$; $Na_2S_2O_3$	14 Days (18 Months frozen
Gross Alpha (NJ 48Hr Method)	NJAC 7:18-6	Water	Plastic/Glass	pH<2 HNO_3	48 Hrs
Gross Alpha and Gross Beta	9310/900.0	Water	Plastic/Glass	pH<2 HNO_3	180 Days
Gross Alpha and Gross Beta	9310	Solid	Glass	None	180 Days
Haloacetic Acids	552.1/552.2	Water	40mL Amber vials	NH_4Cl; $\leq 6^oC$	14/7 Days if extracts stored 6^oC or 14/14 Days if extrac stored at $\leq$ -10
Hardness, Total ($CaCO_3$)	SM2340B,C/130.1	Water	Plastic/Glass	pH<2 HNO_3	6 Months
Heterotrophic Plate Count (SPC/HPC)	SM9215B	Water	100mL Plastic	$\leq 6^oC$	24 Hours
Heterotrophic Plate Count (SPC/HPC)	SimPlate	Water	100mL Plastic	$\leq 6^oC$	8 Hours
Herbicides, Chlorinated	8151	Solid	8oz Glass Jar	$\leq 6^oC$	14/40 Days
Herbicides, Chlorinated	8151	Water	1L Amber Glass	$\leq 6^oC$; $Na_2S_2O_3$ if Cl present	7/40 Days
Herbicides, Chlorinated	515.1/515.3	Water	1L Amber Glass	$\leq 6^oC$; $Na_2S_2O_3$ if Cl present	14/28 Days

Parameter	Method	Matrix	Container	Preservative	Max Hold Ti
Hexavalent Chromium	7196/218.6/SM3500Cr-B, C, D	Water	Plastic/Glass	≤ 6°C	24 Hours (see note 4)
Hexavalent Chromium	7196/218.6/SM3500Cr-B, C, D	Water	Plastic/Glass	Ammonium Buffer pH 9.3-9.7	28 Days (see n 4)
Hexavalent Chromium	218.6/218.7	Drinking Water	Plastic/Glass	Ammonium Buffer pH >8	14 Days (see n 4)
Hexavalent Chromium	7196 (with 3060A)	Solid		≤ 6°C	24 Hours after extraction
Hydrogen Halide and Halogen Emissions	EPA 26	Air	Solutions	None	6 Months
Ignitability of Solids	1030	Non-liquid Waste	Plastic/Glass	None	28 Days
Lead Emissions	EPA 12	Air	Filter/Solutions	None	6 Months
Lipids	Pace Lipids	Tissue	Plastic/Glass	≤ -10°C	1 Year if froze
Mercury, Low-Level	1631E	Solid	Glass	None	28 Days
Mercury, Low-Level	1631E	Water	Fluoropolymer bottles (Glass if Hg is only analyte being tested)	12N HCl or BrCl	48 Hours for preservation o analysis; 28 D to preservation sample oxidiz in bottle; 90 D for analysis if preserved
Mercury, Low-Level	1631E	Tissue	Plastic/Glass	≤ - 10°C	28 Days if fro
Mercury	7471	Solid	8oz Glass Jar	≤ 6°C	28 Days
Mercury	7470/245.1/245.2	Water	Plastic/Glass	pH<2 HNO_3	28 Days
Mercury	7471/245.6	Tissue	Plastic/Glass	≤ - 10°C	28 Days if fro
Metals (GFAA)	7000/200.9	Water	Plastic/Glass	pH<2 HNO_3	180 Days
Metals (ICP)	NIOSH 7300A/7303	Air	Filters	None	180 Days
Metals (ICP/ICPMS)	6010/6020	Solid	8oz Glass Jar	None	180 Days
Metals (ICP/ICPMS)	6010/6020/200.7/200.8	Water	Plastic/Glass	pH<2 HNO_3	180 Days
Metals (ICP/ICPMS)	6020	Tissue	Plastic/Glass	≤ -10°C	180 Days if frozen
Methane, Ethane, Ethene	8015 modified	Water	40mL vials	HCl	14 Days
Methane, Ethane, Ethene	RSK-175	Water	40mL vials	HCl	14 Days; 7 Da unpreserved
Methane, Ethane, Ethene	EPA 3C	Air	Summa Canister	None	14 Days
Methane, Ethane, Ethene	EPA 3C	Air	Tedlar Bag or equivalent	None	48 Hours
Methanol, Ethanol	8015 modified	Water	40mL vials	≤ 6°C	14 Days
Methanol, Ethanol	8015 modified	Solid	2oz Glass	≤ 6°C	14 Days
Nitrogen, Ammonia	SM4500NH3/350.1	Water	Plastic/Glass	pH<2 H_2SO_4; ≤ 6°C	28 Days
Nitrogen, Kjeldahl (TKN)	351.2	Solid	Plastic/Glass	≤ 6°C	28 Days
Nitrogen, Kjeldahl (TKN)	SM4500-Norg/351.2	Water	Plastic/Glass	pH<2 H_2SO_4; ≤ 6°C	28 Days

Parameter	Method	Matrix	Container	Preservative	Max Hold Ti
Nitrogen, Nitrate	SM4500-NO3/352.1	Water	Plastic/Glass	≤ 6°C	24 Hours preferred
Nitrogen, Nitrate & Nitrite combination	353.2	Solid	Plastic/Glass	≤ 6°C	28 Days
Nitrogen, Nitrate & Nitrite combination	SM4500-NO3/353.2	Water	Plastic/Glass	pH<2 H_2SO_4; ≤ 6°C	28 Days
Nitrogen, Nitrite or Nitrate separately	SM4500-NO2/353.2	Water	Plastic/Glass	≤ 6°C	48 Hours
Nitrogen, Organic	SM4500-Norg/351.2	Water	Plastic/Glass	pH<2 H_2SO_4; ≤ 6°C	28 Days
Non-Methane Organics	EPA 25C	Air	Summa Canister	None	14 Days
Non-Methane Organics	EPA 25C	Air	Tedlar Bag or equivalent	None	48 Hours
Odor	SM2150B	Water	Glass	≤ 6°C	24 Hours
Oil and Grease/HEM	1664A/SM5520B/9070	Water	Glass	pH<2 H_2SO_4 or HCl; ≤ 6°C	28 Days
Oil and Grease/HEM	9071	Solid	Glass	≤ 6°C	28 Days
PBDEs	1614	Water	1L Amber Glass	≤ 6°C	1 Year/1 Year
PBDEs	1614	Solid	Wide Mouth Jar	≤ 6°C	1 Year/1 Year
PBDEs	1614	Tissue	Aluminum Foil	≤ -10°C	1 Year/1 Year
PCBs and Pesticides, Organochlorine (OC)	TO-4/TO-10	Air	PUF	None	7/40 Days
PCBs and Pesticides, Organochlorine (OC)	608	Water	1L Amber Glass		Pest: 7/40 Day PCB: 1 Year/1 Year
PCBs, Pesticides (OC), Herbicides	508.1	Water	Glass	Na2SO3; pH<2 HCl; ≤ 6°C	14/30 Days
Perchlorate	331	Water	Plastic/Glass	>0-6°C	28 Days
Pesticides, Organochlorine (OC)	8081	Water	1L Amber Glass	≤ 6°C; $Na_2S_2O_3$ if Cl present	7/40 Days
Pesticides, Organochlorine (OC)	8081	Solid	8oz Glass Jar	≤ 6°C	14/40 Days
Pesticides, Organochlorine (OC)	8081	Tissue	8oz Glass Jar	≤ -10°C	1 Year if frozen/40 Day
Pesticides, Organophosphorous (OP)	8141	Solid	8oz Glass Jar	≤ 6°C	14/40 Days
Pesticides, Organophosphorous (OP)	8141	Water	1L Amber Glass	pH 5-8 with NaOH or H_2SO_4; ≤ 6°C; $Na_2S_2O_3$ if Cl present	7/40 Days
PCBs (Aroclors)	8082	Water	1L Amber Glass	≤ 6°C; $Na_2S_2O_3$ if Cl present	1 Year/1 Year
PCBs (Aroclors)	8082	Solid	8oz Glass Jar	≤ 6°C	1 Year/1 Year
PCBs (Aroclors)	8082	Tissue	Plastic/Glass	≤ -10°C	1 Year if froze Year
PCB Congeners	1668A	Water	1L Amber Glass	≤ 6°C but above freezing	1 Year/1 Year
PCB Congeners	1668A	Solid	4-8oz Glass Jar	≤ 6°C but above freezing	1 Year/1 Year

Parameter	Method	Matrix	Container	Preservative	Max Hold Ti
PCB Congeners	1668A	Tissue	4-8oz Glass Jar	$\leq$ -10°C	1 Year/1 Year
Oil Range Organics- ORO					
Oxygen, Dissolved (Probe)	SM4500-O	Water	Glass	None	15 minutes
Paint Filter Liquid Test	9095	Water	Plastic/Glass	None	N/A
Particulates	PM-10	Air	Filters	None	180 Days
Permanent Gases	EPA 3C	Air	Summa Canister	None	14 Days
Permanent Gases	EPA 3C	Air	Tedlar Bag or equivalent	None	48 Hours
pH	SM4500H+B/9040	Water	Plastic/Glass	None	15 minutes
pH	9045	Solid	Plastic/Glass	None	
Phenol, Total	420.1/420.4/9065/9066	Water	Glass	pH<2 H_2SO_4; $\leq$ 6°C	28 Days
Phosphorus, Orthophosphate	SM4500P/365.1/365.3	Water	Plastic	Filter; $\leq$ 6°C	Filter within 1 minutes, Analyze withi 48 Hours
Phosphorus, Total	SM4500P/ 365.1/365.3/365.4	Water	Plastic/Glass	pH<2 H_2SO_4; $\leq$ 6°C	28 Days
Phosphorus, Total	365.4	Solid	Plastic/Glass	$\leq$ 6°C	28 Days
Polynuclear Aromatic Hydrocarbons (PAH)	TO-13	Air	PUF	None	7/40 Days
Polynuclear Aromatic Hydrocarbons (PAH)	8270 SIM	Solid	8oz Glass Jar	$\leq$ 6°C	14/40 Days
Polynuclear Aromatic Hydrocarbons (PAH)	8270 SIM	Water	1L Amber Glass	$\leq$ 6°C; $Na_2S_2O_3$ if Cl present	7/40 Days
Polynuclear Aromatic Hydrocarbons (PAH)	8270 SIM	Tissue	Plastic/Glass	$\leq$ -10°C	1 Year if frozen/40 Day
Radioactive Strontium	905.0	Water	Plastic/Glass	pH<2 HNO_3	180 days
Radium-226	903.0/903.1	Water	Plastic/Glass	pH<2 HNO_3	180 days
Radium-228 (see note 3)	9320/904.0	Water	Plastic/Glass	pH<2 HNO_3	180 days
Radium-228 (see note 3)	9320	Solid			
Residual Range Organics- Alaska RRO	AK103	Solid	8oz Glass	$\leq$ 6°C	14/40 Days
Saturated Hydrocarbons		Water	$\leq$ 6°C; pH<2 1:1 HCl (optional)	14/40 Days preserved; 7/40 Days unpreserved	$\leq$ 6°C; pH<2 1 HCl (optional
Saturated Hydrocarbons		Solid	$\leq$ 10°C	1 Year/40 Days	$\leq$ 10°C
Silica, Dissolved	SM4500Si-D	Water	Plastic	$\leq$ 6°C	28 Days
Solids, Settleable	SM2540F	Water	Glass	$\leq$ 6°C	48 Hours
Solids, Total	SM2540B	Water	Plastic/Glass	$\leq$ 6°C	7 Days
Solids, Total	SM2540G	Solid	Plastic/Glass	$\leq$ 6°C	7 Days
Solids, Total (FOC, OM, Ash)	ASTM D2974	Solid	Plastic/Glass	$\leq$ 6°C	7 Days
Solids, Total Dissolved	SM2540C	Water	Plastic/Glass	$\leq$ 6°C	7 Days
Solids, Total Suspended	SM2540D/USGS I-3765-85	Water	Plastic/Glass	$\leq$ 6°C	7 Days
Solids, Total Volatile	160.4/SM2540E	Water	Plastic/Glass	$\leq$ 6°C	7 Days

Parameter	Method	Matrix	Container	Preservative	Max Hold Ti
Solids, Total Volatile	160.4	Solid	Plastic/Glass	≤ 6°C	7 Days
Specific Conductance	SM2510B/9050/120.1	Water	Plastic/Glass	≤ 6°C	28 Days
Stationary Source Dioxins and Furans	EPA 23	Air	XAD Trap	None	30/45 Days
Stationary Source Mercury	EPA 101	Air	Filters	None	180 Days, 28 Days for Hg
Stationary Source Metals	EPA 29	Air	Filters	None	180 Days, 28 Days for Hg
Stationary Source PM10	EPA 201A	Air	Filters	None	180 Days
Stationary Source Particulates	EPA 5	Air	Filter/Solutions	None	180 Days
Sulfate	SM4500SO4/9036/ 9038/375.2/ASTM D516	Water	Plastic/Glass	≤ 6°C	28 Days
Sulfide, Reactive	SW-846 Chap.7	Water	Plastic/Glass	None	28 Days
Sulfide, Reactive	SW-846 Chap.7	Solid	Plastic/Glass	None	28 Days
Sulfide, Total	SM4500S/9030	Water	Plastic/Glass	pH>9 NaOH; ZnOAc; ≤ 6°C	7 Days
Sulfite	SM4500SO3	Water	Plastic/Glass	None	15 minutes
Surfactants (MBAS)	SM5540C	Water	Plastic/Glass	≤ 6°C	48 Hours
Total Organic Carbon (TOC)	SM5310B,C,D/9060	Water	Glass	pH<2 H_2SO_4 or HCl; ≤ 6°C	28 Days
Total Organic Carbon (TOC)	9060/Walkley Black	Solid	Glass	≤ 6°C	14 Days
Total Organic Halogen (TOX)	SM5320/9020/9021	Water	Glass; no headspace	≤ 6°C	14 Days
Tritium	906.0	Water	Glass	None	180 days
Turbidity	SM2130B/180.1	Water	Plastic/Glass	≤ 6°C	48 Hours
Total Uranium	908.0/ASTM D5174-97	Water	Plastic/Glass	pH<2 HCl	180 days
Volatile Petroleum Hydrocarbons (aliphatic and aromatic)	MA-VPH	Water	40mL vials	pH<2 HCl; ≤ 6°C	14 Days preserved
Volatile Petroleum Hydrocarbons (aliphatic and aromatic)	MA-VPH	Solid	4-8oz Glass Jar	≤ 6°C; packed jars with no headspace	7/28 Days
Volatiles	TO-14	Air	Summa Canister	None	30 Days
Volatiles	TO-14	Air	Tedlar Bag or equivalent	None	48 Hours
Volatiles	TO-15	Air	Summa Canister	None	30 Days
Volatiles	TO-18/8260	Air	Tedlar Bag or equivalent	None	72 Hours
Volatiles	8260	Solid	5035 vial kit	See note 1	14 days
Volatiles	8260	Water	40mL vials	pH<2 HCl; ≤ 6°C; $Na_2S_2O_3$ if Cl present	14 Days
Volatiles	8260	Conc. Waste	5035 vial kit or 40mL vials	≤ 6°C	14 Days
Volatiles	624	Water	40mL vials	pH<2 HCl; ≤ 6°C; $Na_2S_2O_3$ if	14 Days (7 Da

Parameter	Method	Matrix	Container	Preservative	Max Hold Ti
				Cl present	for aromatics unpreserved)
Volatiles (see note 2)	524.2	Water	40mL vials (in duplicate)	pH<2 HCl; ≤ 6°C; Ascobic acid or $Na_2S_2O_3$ if Cl present[2]	14 Days
UCMR3 Metals	200.8	Water	Plastic or glass	pH<2 HNO_3	28 Days
UCMR3 Hexavalent Chromium	218.7	Water	HDPE or propylene	$Na_2CO_3/NaHCO_3/(NH_4)_2SO_4$; pH>8	14 Days
UCMR3 Chlorate	300.1	Water	Plastic or glass	EDA	28 Days
UCMR3 Hormones	539	Water	Amber glass	$Na_2S_2O_3$, 2-mercaptopyridine-1-oxide, sodium salt	28 Days
UCMR3 Perfluorinated Compounds	537	Water	Polypropylene	Trizma	14 Days
UCMR3 Volatiles	524.3	Water	40 mL amber glass vials	Ascorbic acid. Maleic acid pH~2	14 Days
UCMR3 1, 4 Dioxane	522	Water	Glass	Na_2SO_3, $NaHSO_4$; pH<4	28 Days
UV254	SM5910B	Water	Glass	≤ 6°C	48 Hours

[1] **5035/5035A Note**: 5035 vial kit typically contains 2 vials water, preserved by freezing **or**, 2 vials aqueous sodium bisulfate preserved at 4°C, **and** one vial methanol preserved at ≤6°C **and** one container of unpreserved sample stored at ≤6°C.

[2] Method 524.2 lists ascorbic acid as the preservative when residual chlorine is suspected, unless gases or Table 7 compounds are NOT compounds of interest and then sodium thiosulfate is the preservative recommended.

[3] Methods 9315 and 9320 both state that if samples are unpreserved, the samples should be brought to the lab within 5 days of collection, preserved in the lab, and then allowed to sit for a minimum of 16 hours before sample preparation/analysis.

[4] The holding time for hexavalent chromium may be extended by the addition of the ammonium buffer listed in EPA 218.6 per the 2012 EPA Method Update Rule. Although Method 218.6 stipulates a different pH range (9.0 to 9.5) for buffering, this method requirement was modified in the Method Update Rule to a pH range of 9.3 to 9.7.For non-potable waters, adjust the pH of the sample to 9.3 to 9.7 during collection with the method required ammonium sulfate buffer to extend the holding time to 28 days. For potable waters, addition of the buffer during collection will extend the holding time for 14 days per EPA 218.7 and the EPA UCMR3 program.

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QUALITY ASSURANCE

QUALITY CONTROL MANUAL

This document has been read and approved by:

Joann M. Slavin
General Manager

2/14/14
Date

Nicole R. Crespi
Quality Assurance Manager

2/14/14
Date

Table of Contents

This document has been read and approved for continued acceptance by:

Signature	Title	Date
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Revision History

Revision Number	Revision Date	Revisions made
09	02/19/09	Add signature page, effective date. Combine document into one revision. Streamline information into tables. Added continued acceptance provision. Added the appendix. Removed floor plan, instrument listing, vendor listing, approved methods, resumes, org chart to the Appendix.
10	6/14/09	Moved approval signatures to cover page. Added NYELAP to section 1.1.2. Add logbooks to table 3.0. Define temporary and archival storage. Change table 6.0 name to Bacti Reagent Grade (laboratory pure) Water. Added more details to Data Integrity procedures.
11	7/8/11	Updated Personnel. Added reference to document ADMIN001 *Plan for Going Out of Business or Transfer of Ownership* and reference to document ADMIN002 for Computers and Programs. Hardcopy of lab reports not retained, only electronic. Retain PW lead and copper records for 12 years. Master list of documents using an excel spreadsheet. Data packages burned to CD semi-annually. Ursual Middel approved lab report signatory. James Bidas approved for pesticide package review. Refrigerators 0-6.0ºC. Freezers recommended -5 to -15 ºC. ICV meet CCV criteria. LOD must be lower than LOQ. Updated bottle and preservation tables. Added details to housekeeping measures. Consumable storage in area of use. Control of waste room by special process supervisor or designee. QC limits generally not updated if confirmed to maintain consistency. Added policy on stress reduction and quality of work. T.O.C. updated to reflect changes. Updated Appendix.
12	8/2/11	Table 3- 12 years retention for all. 20.1.7-20.1.8 chlorine checks for DW organics. 20.1.9 and Table8&9 -Bacteria acceptance 1-inch headspace and procedure for over filled samples. 20.1.14 and Table 9 -NW unpreserved metals – wait 24 hrs after preservation for analysis. pH 3 for 531.1 in Table 8, also added RSK to Tables 8&9. Added reference #38.
13	6/27/12	Updated to address requirements of the DoD.
14	10/13/12	Added Thomas Powell. Sec 8.4-8.4 NELAC checklist used to specify records for data review. 8.10 “QA” in LIMS means data has been reviewed and validated as correct. Table 4 record min/max temp. for weekend as backup Added DoD methods and instruments to Appendix. 18.7 added reference to current LOD/LOQ.23.0 updated water

		supply units.27.2.1.1 get COA at purchase276.3.1if no exp. date, use 10yrs.27.10.1 record date put in service on COA. 30.10ms/msd spike. 33.1.7.1.1 review date on SOP cover35.2.9 determine time frame for CA.
15	7/5/13	JMS as Lab Director. Added to Purchasing of Services and Supplies- approved vendors. Electronic maintenance records in the LIMS. SOP retention. PT reporting on pt provider report forms and results posted to website. DOC procedure for parameters where LFBs don't apply, store electronically. Section on LIMS, EDDs & Test Reports. Updated T.O.C.
16	2/10/14	Lab name change. Changes to Personnel, organizational structure, job description, training. Removed references to DoD. T.O.C. updated to reflect changes. Updated Appendix and removed resumes.

1.0 Quality Policy Statement

Pace Analytical Services, Inc. has established systems, policies, programs, and procedures in order to assure the quality of the test results of the laboratory. Laboratory personnel are committed to exceptional professional and ethical practices and to the quality of its environmental testing in servicing its clients.

1.1 Quality System Policies and Objectives

1.1.1 The overall quality system objectives are documented in the quality policy statement and are issued under authority of Joann Slavin, Lab Director.

1.1.2 The laboratories standard of service is intended to meet or exceed the requirements of the NY ELAP, National Environmental Laboratory Accreditation Program (NELAC/TNI) and the USEPA Contract Laboratory Program.. All staff will be committed to being in compliance with these standards.

1.1.3 The QAM is supported by a larger collection of Standard Operating Procedures (SOPs) and documents for all programs in the laboratory.

1.1.4 All laboratory personnel concerned with environmental testing activities within the laboratory will familiarize themselves with the laboratories system policies and objectives.

1.1.5 The QA Manager will maintain evidence on file that demonstrates that each employee has read, understood, and is using the latest version of the laboratory's in-house quality documentation, which relates to his/her job responsibilities.

1.1.6 Opportunities for improvement of operations and processes are identified by managers on a continual basis from ongoing feedback on operations and through management reviews.

1.1.7 Inputs for improvement opportunities may be obtained from the following sources:

1.1.7.1 Customer satisfaction surveys

1.1.7.2 Employees

1.1.7.3 Internal and external audits of the management system

1.1.7.4 Records of service nonconformities

1.1.8 Opportunities for improvement from daily feedback are evaluated by the General or Quality Manager(s) and are implemented through the preventative and correction action procedures.

1.1.9 Opportunities for improvement from analysis of longer-term data and trends are evaluated and implemented through the management review process.

2.0 Organization and Management Structure

2.1 Organization Chart (See the Appendix, Section 1.0)

2.2 The PASI Corporate Office centralizes company-wide accounting, business development, financial management, human resources development, information systems, marketing, quality, safety, and training activities. PASI's Director of Quality is responsible for assisting the development, implementation and monitoring of quality programs for the company. See the Appendix, Section 1.0 for the Corporate Organizational structure.

2.3 Each laboratory within the system operates with local management, but all labs share common systems and receive support from the Corporate Office.

2.4 A Senior General Manager (SGM) oversees all laboratories and service centers in their assigned region. Each laboratory or facility in the company is then directly managed by an SGM, a General Manager (GM), an Assistant General Manager (AGM), or an Operations Manager (OM). Quality Managers (QM) or Senior Quality Managers (SQM) at each laboratory report directly to the highest level of local laboratory management, however named, that routinely makes day-to-day decisions regarding that facility's operations. The QMs and SQMs will also receive guidance and direction from the corporate Director of Quality.

2.5 The SGM, GM, AGM or OM, or equivalent functionality in each facility, bears the responsibility for the laboratory operations and serves as the final, local authority in all matters. In the absence of these managers, the SQM/QM serves as the next in command. He or she assumes the responsibilities of the manager, however named, until the manager is available to resume the duties of their position. In the absence of both the manager and the SQM/QM, management responsibility of the laboratory is passed to the Technical Director, provided

such a position is identified, and then to the most senior department manager until the return of the lab manager or SQM/QM. The most senior department manager in charge may include the Client Services Manager or the Administrative Business Manager at the discretion of the SGM/GM/AGM/OM.

2.6 A Technical Director who is absent for a period of time exceeding 15 consecutive calendar days shall designate another full-time staff member meeting the qualifications of the technical director to temporarily perform this function. The laboratory SGM/GM/AGM/OM or SQM/QM has the authority to make this designation in the event the existing Technical Director is unable to do so. If this absence exceeds 35 consecutive calendar days, the primary accrediting authority shall be notified in writing.

2.7 The SQM/QM has the responsibility and authority to ensure the Quality System is implemented and followed at all times. In circumstances where a laboratory is not meeting the established level of quality or following the policies set forth in this Quality Assurance Manual, the SQM/QM has the authority to halt laboratory operations should he or she deem such an action necessary. The SQM/QM will immediately communicate the halting of operations to the SGM/GM/AGM/OM and keep them posted on the progress of corrective actions. In the event the SGM/GM/AGM/OM and the SQM/QM are not in agreement as to the need for the suspension, the Chief Operating Officer and Director of Quality will be called in to mediate the situation.

2.8 The technical staff of the laboratory is generally organized into the following functional groups:

- Organic Sample Preparation
- Wet Chemistry Analysis
- Metals Analysis
- Volatiles Analysis
- Semi-volatiles Analysis
- Radiochemical Analysis
- Microbiology

2.9 Appropriate support groups are present in each laboratory. The actual

organizational structure for PASI – Long Island is listed in the Appendix, Section 1.0. In the event of a change in SGM/GM/AGM/OM, SQM/QM, or any Technical Director, the laboratory will notify its accrediting authorities and revise the organizational chart in the Quality Assurance Manual (QAM) within 30 days. For changes in Department Managers or Supervisors or other laboratory personnel, no notifications will be sent to the laboratory's accrediting agencies; changes to the organizational chart will be updated during or prior to the annual review process. Changes or additions in these key personnel will also be noted by additional signatures on the QAM, as applicable. In any case, the QAM will remain in effect until the next scheduled revision.

3.0 Laboratory Job Descriptions

3.1 Senior General Manager

- Oversees all functions of all the operations within their designated region;
- Oversees the development of local GMs/AGMs/OMs within their designated region;
- Oversees and authorizes personnel development including staffing, recruiting, training, workload scheduling, employee retention and motivation;
- Oversees the preparation of budgets and staffing plans for all operations within their designated region;
- Ensures compliance with all applicable state, federal and industry standards;
- Works closely with Regional Sales Management.

3.2 General Manager

- Oversees all functions of their assigned operations;
- Authorizes personnel development including staffing, recruiting, training, workload scheduling, employee retention and motivation;
- Prepares budgets and staffing plans;
- Monitors the Quality Systems of the laboratory and advises the SQM/QM accordingly;

- Ensures compliance with all applicable state, federal and industry standards.

3.3 Senior Quality Manager

- Provides quality oversight for multiple laboratories where there is not a local quality manager or for labs where there are multiple and separately distinct quality systems in the same facility;
- Responsible for implementing, maintaining and improving the quality system while functioning independently from laboratory operations. Reports directly to the highest level of local laboratory facility management, however named, that routinely makes day-to-day decisions regarding laboratory operations, but receives direction and assistance from the Corporate Director of Quality;
- Ensures that communication takes place at all levels within the lab regarding the effectiveness of the quality system and that all personnel understand their contributions to the quality system;
- Monitors Quality Assurance/Quality Control activities to ensure that the laboratory achieves established standards of quality (as set forth by the Corporate Quality office). The Quality Manager is responsible for reporting the lab's level of compliance to these standards to the Corporate Director of Quality on a quarterly basis;
- Maintains records of quality control data and evaluates data quality;
- Conducts periodic internal audits and coordinates external audits performed by regulatory agencies or customer representatives;
- Reviews and maintains records of proficiency testing results;
- Maintains the document control system;
- Assists in development and implementation of appropriate training programs;
- Provides technical support to laboratory operations regarding methodology and project QA/QC requirements;
- Maintains certifications from federal and state programs;

- Ensures compliance with all applicable state, federal and industry standards;
- Maintains the laboratory training records, including those in the Learning Management System (LMS), and evaluates the effectiveness of training;
- Monitors correctives actions;
- Maintains the currency of the Quality Manual.

3.4 Quality Manager

- Responsible for implementing, maintaining and improving the quality system while functioning independently from laboratory operations.
- Reports directly to the highest level of local laboratory facility management, however named, that routinely makes day-to-day decisions regarding laboratory operations, but receives direction and assistance from the Corporate Director of Quality. They may also report to a Senior Quality Manager within the same facility;
- Ensures that communication takes place at all levels within the lab regarding the effectiveness of the quality system and that all personnel understand their contributions to the quality system;
- Monitors Quality Assurance/Quality Control activities to ensure that the laboratory achieves established standards of quality (as set forth by the Corporate Quality office). The Quality Manager is responsible for reporting the lab's level of compliance to these standards to the Corporate Director of Quality on a quarterly basis;
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- Maintains the laboratory training records, including those in the Learning Management System (LMS), and evaluates the effectiveness of training;
- Monitors correctives actions;
- Maintains the currency of the Quality Manual.

3.5 Quality Analyst

- Assists the SQM/QM in the performance of quality department responsibilities as delegated by the SQM/QM;
- Assists in monitoring QA/QC data;
- Assists in internal audits;
- Assists in maintaining training records;
- Assists in maintaining the document control system;

3.6 Administrative Business Manager

- Responsible for financial and administrative management for the entire facility;
- Provides input relative to tactical and strategic planning activities;
- Organizes financial information so that the facility is run as a fiscally responsible business;
- Works with staff to confirm that appropriate processes are put in place to track revenues and expenses;
- Provide ongoing financial information to the SGM/GM/AGM/OM and the management team so they can better manage their business;
- Utilizes historical information and trends to accurately forecast future financial positions;
- Works with management to ensure that key measurements are put in place to be utilized for trend analysis—this will include personnel and supply expenses, and key revenue and expense ratios;

- Works with SGM/GM/AGM/OM to develop accurate budget and track on an ongoing basis;
- Works with entire management team to submit complete and justified capital budget requests and to balance requests across departments;
- Works with project management team and administrative support staff to ensure timely and accurate invoicing.

3.7 Client Services Manager

- Oversees all the day to day activities of the Client Services Department which includes Project Management and, possibly, Sample Control;
- Responsible for staffing and all personnel management related issues for Client Services;
- Serves as the primary senior consultant to customers on all project related issues such as set up, initiation, execution and closure;
- Performs or is capable of performing all duties listed for that of Project Manager.

3.8 Project Manager

- Coordinates daily activities including taking orders, reporting data and analytical results;
- Serves as the primary technical and administrative liaison between customers and PASI;
- Communicates with operations staff to update and set project priorities;
- Provides results to customers in the requested format (verbal, hardcopy, electronic, etc.);
- Works with customers, laboratory staff, and other appropriate PASI staff to develop project statements of work or resolve problems of data quality;
- Responsible for solicitation of work requests, assisting with proposal preparation and project initiation with customers and maintain customer records;
- Mediation of project schedules and scope of work through communication with internal resources and management;

- Responsible for preparing routine and non-routine quotations, reports and technical papers;
- Interfaces between customers and management personnel to achieve customer satisfaction;
- Manages large-scale complex projects;
- Supervises less experienced project managers and provide guidance on management of complex projects;
- Arranges bottle orders and shipment of sample kits to customers;
- Verifies login information relative to project requirements and field sample Chains-of-Custody.

3.9 Project Coordinator

- Responsible for preparation of project specifications and provides technical/project support;
- Coordinates project needs with other department sections and assists with proposal preparation;
- Prepares routine proposals and invoicing;
- Responsible for scanning, copying, assembling and binding final reports;
- Other duties include filing, maintaining forms, process outgoing mail, maintaining training database and data entry.

3.10 Department Manager/Supervisor

- Oversees the day-to-day production and quality activities of their assigned department;
- Ensures that quality assurance and quality control criteria of analytical methods and projects are satisfied;
- Assesses data quality and takes corrective action when necessary;
- Approves and releases technical and data management reports;
- Ensures compliance with all applicable state, federal and industry standards.

3.11 Group Supervisor/Leader

- Trains analysts in laboratory operations and analytical procedures;
- Organizes and schedules analyses with consideration for sample holding times;
- Implements data verification procedures by assigning data verification duties to appropriate personnel;
- Evaluates instrument performance and supervises instrument calibration and preventive maintenance programs;
- Reports non-compliance situations to laboratory management including the SQM/QM.

3.12 Laboratory Analyst

- Performs detailed preparation and analysis of samples according to published methods and laboratory procedures;
- Processes and evaluates raw data obtained from preparation and analysis steps;
- Generates final results from raw data, performing primary review against method criteria;
- Monitors quality control data associated with analysis and preparation. This includes examination of raw data such as chromatograms as well as an inspection of reduced data, calibration curves, and laboratory notebooks;
- Reports data in LIMS, authorizing for release pending secondary approval;
- Conducts routine and non-routine maintenance of equipment as required;
- Performs or is capable of performing all duties associated with that of Laboratory Technician.

3.13 Laboratory Technician

- Prepares standards and reagents according to published methods or in house procedures;
- Performs preparation and analytical steps for basic laboratory methods;
- Works under the direction of a Laboratory Analyst on complex methodologies;

- Assists Laboratory Analysts on preparation, analytical or data reduction steps for complex methodologies;
- Monitors quality control data as required or directed. This includes examination of raw data such as chromatograms as well as an inspection of reduced data, calibration curves, and laboratory notebooks.

3.14 Sample Management Personnel

- Signs for incoming samples and verifies the data entered on the Chain of custody forms;
- Enters the sample information into the Laboratory Information Management System (LIMS) for tracking and reporting;
- Stages samples according to EPA requirements;
- Assists Project Managers and Coordinators in filling bottle orders and sample shipments.

3.15 Systems Administrator or Systems Manager

- Assists with the creation and maintenance of electronic data deliverables (EDDs);
- Coordinates the installation and use of all hardware, software and operating systems;
- Performs troubleshooting on all aforementioned systems;
- Trains new and existing users on systems and system upgrades;
- Maintains all system security passwords;
- Maintains the electronic backups of all computer systems.

3.16 Safety/Chemical Hygiene Officer

- Maintains the laboratory Chemical Hygiene Plan;
- Plans and implements safety policies and procedures;
- Maintains safety records;
- Organizes and/or performs safety training;
- Performs safety inspections and provides corrective/preventative actions;
- Assists personnel with safety issues.

3.17 Program Director/Hazardous Waste Coordinator (or otherwise named)

- Evaluates waste streams and helps to select appropriate waste transportation and disposal companies;
- Maintains complete records of waste disposal including waste manifests and state reports;
- Assists in training personnel on waste-related issues such as waste handling and storage, waste container labeling, proper satellite accumulation, secondary containment, etc.;
- Conducts a weekly inspection of the waste storage areas of the laboratory.

4.0 Record Retention

4.1 All records are retained as required by regulatory requirements and client contractual agreements. The system shall produce unequivocal, accurate records that document all laboratory activities.

4.2 Instrument raw data is backed up daily to the network.

4.3 The Laboratory Information Management System (LIMs) is maintained in a fireproof room. In addition, a copy of the operating system is stored off-site.

4.4 Electronic files are backed up daily to the network. (Refer to document ADMIN002 for computers and programs.)

4.5 In the case of transfer of ownership or if the lab goes out of business, all records are to be transferred to the new owner or retained by the current Lab Director for the required time period. For a more detailed documented plan for going out of business or transfer of ownership refer to document ADMIN001, *Plan for Going Out of Business or Transfer of Ownership*.

Table 1.0: Temporary Storage (held on-site)

Record	Retention	Hardcopy	Location	Organization
Current Lab Reports	10 year	No	LIMs and Network	Lab Number
Current Data Packages	3-6 months	Yes	QC Department	Alphabetized by month
Standard Operating Procedures	Current Version	Electronic Copy	LIMs and Network	Directories and Sub-directories

Completed Logbooks	1-2 years	Yes	In the lab	Numbered
Accreditation Support Data	3 years	Yes	QA Office	Study number and date
Data Integrity Issues	5 years	Yes	QA Office	Date
Employee File/ Training Records	Current Employees	Yes	QA Office	Alphabetized

Table 2.0: Archival Storage (held off-site)

Record	Retention	Hardcopy	Location	Electronic	Location
Accreditation Support Data	5 years	Yes	QA office	Yes	Computer Directories
Raw Data/ Test Report Data/Lab Reports	12 years	Yes	Off-site storage	Yes	Tape storage/ CDs
Data Integrity Issues	5 years	No	Off-site storage	Yes	Tape storage/ CDs
Method Evaluations	5 years	Yes	QA Office	NO	N/A
Water Quality Tests	12 years	Yes	Off-site Storage	Yes	Tape storage/ CDs
Drinking Water Program	10 years 12 years for lead and copper	Yes	Off-site Storage	Yes	Tape storage/ CDs
Potable and Non-Potable Water Microbiology	5 years	Yes	Off-site Storage	Yes	Tape storage/ CDs
Employee File/ Training Records	10 years	Only original SDGs folder Case files	Off-site storage	NO	NA
CLP Reports	5 years	No	N/A	Yes	Tape Storage/ CDs stored onsite

Record	Retention	Hardcopy	Location	Electronic	Location
SOPs	5 years or per regulatory or client requirements, whichever is greater.	Signature Page only	QA Office	Yes	Server Network
Completed Logbooks	12 years	Yes	Off-site storage	Yes	Tape

5.0 Document Control

5.1 All records, documents and manuals generated by the laboratory will be maintained and controlled through a document control system. The purpose of the document control system is to ensure that only the most recent versions are available to the appropriate personnel, that revisions are timely, and that the document receives the required approvals. This system allows for retrieval of information such as lab reports, raw data as well as control of manuals, documents and Standard Operating Procedures produced.

5.2 The Quality Assurance Manager or designee is responsible for the document control system and maintains a master list of the location of all documents and their current revision by using an excel spreadsheet.

5.3 Document Approval

5.3.1 The Laboratory Director/General Manager and the Quality Assurance Manager approve all newly released documents and revised documents.

5.3.2 The Laboratory Director/ General Manager and the Quality Assurance Manager approve the QAM.

5.3.3 Controlled documents will have an approval signature page and a revision change record.

5.3.4 The central repository for controlled documents is on the local server.

5.4 Revision Control

5.4.1 All documents will contain the following control information:

5.4.1.1 Document Title

5.4.1.2 Revision Date

5.4.1.3 Revision Number

5.4.1.4 Effective Date (date of approval signature)

5.5 Obsolete Documents

5.5.1 The Quality Assurance Manager will maintain one electronic copy of an obsolete standard operating procedure in an archive folder on the server/network.

5.5.2 The original hardcopy signature page from the obsolete standard operating procedure is stored in the QA Office.

5.6 Document Archive

5.6.1 All hardcopy records are legible.

5.6.2 Completed laboratory logbooks are individually numbered.

5.6.3 Final archival is completed by the following:

5.6.3.1 Records are boxed.

5.6.3.2 Each box is labeled with a consecutive number that is generated by an electronic notebook.

5.6.4 The electronic notebook (archival storage) serves as the index for archived items.

5.6.5 Items removed from archive are done using an access log that records the following:

- Date removed
- Requested by
- Box Number
- Item number and description
- Authorized by
- Date returned

5.6.6 All archived data is stored to an off site document storage facility at Central Avenue in Farmingdale, NY.

5.6.7 The storage facility is locked, is free of vermin and is environmentally stable in regard to temperature and humidity and is kept safe from loss.

5.7 Data Package Archive

5.7.1 Data packages are scanned to a file (adobe PDF format) and saved to the local and network drives.

5.7.2 Original chain-of-custody, narratives, and title and chronicle pages are removed and filed in the case file in the QC department.

5.7.3 The PDF files are burned to a CD on a semi-annual basis.

5.7.4 After 3 to 6 months, the paper copy is destroyed.

5.8 Changes to Documents

5.8.1 Changes to documents will be reviewed and approved by the same function that performed the original review.

5.8.2 Where practicable, the altered or new text shall be identified in the document or the appropriate attachments.

5.8.3 Changes to any document will be made so as not to obscure or delete the previous data entry.

5.8.4 All changes will be crossed out and the correct entry made alongside.

5.8.5 Mistakes are not erased, made illegible, or deleted.

5.8.6 All alterations to records are signed or initialed by the person making the correction.

5.8.7 The lab developed error codes will be applied to the correction to explain the change.

5.8.8 Hand amendments of standard operating procedures are only permitted by those personnel authorized to do so.

5.8.9 Hand amendments of standard operating procedures, pending the re-issue of the documents, will be clearly marked, initialed and dated.

5.8.10 The QA Manager, prior to implementation as a new or modified procedure, will approve all hand amendments.

5.9 Laboratory Logbooks

5.9.1 Templates of some logbooks are maintained in the QC department and new books are generated and issued through this department.

5.9.2 In some cases, an electronic run log is generated using the instrument software, printed out, comments written where necessary. Final storage is in a binder.

5.9.3 Logbooks are bound and the pages in all logbooks are numbered sequentially to maintain the integrity of the document.

5.9.4 The books are given a book number and are signed out by the QC department, which maintains a master record of all logbooks.

5.9.5 Upon completion, the logbook binder is labeled with the test, start and completion date, and run number and is then logged back into the electronic notebook for archiving.

5.9.6 Analysts are required to sign initials and date next to all analyses performed.

5.9.7 For GC and GC/MS, the instrument program is to be listed as well as sample ID, amount of sample injected and reason, if any, for re-analysis (under remarks).

5.9.8 For wet chemistry tests, all raw data used in calculations is to be recorded in the logbook.

5.9.9 For sample preparation, all weights and/or exact volume of sample extracted are to be listed as well as type of cleanup performed and date extracted.

5.10 Document Distribution

5.10.1 Only the most recent versions of SOPs and the QAM are available on the document central repository.

5.10.2 The central repository to be used by employees for all current versions of laboratory documents is the server/network.

5.10.3 The Document Control Officer in the QC Department maintains instrument and logbooks and data packages.

5.10.4 A signed statement is on file that demonstrates that each employee has read, understood, and is using the latest version of the laboratory's QAM documentation, which relates to his/her job responsibilities.

5.10.5 When revisions are made to documents such as SOPs and the QAM, affected personnel are notified by the distribution of a new certification signature page along with a summary of the changes. In some cases (as with the QAM when significant revisions are made), a lab employee meeting may take place, where the document is projected on screen to review the changes as a group.

5.10.6 Each analyst must certify by signature that they have read, understand

and agreed to perform the most recent version of the test method, the approved method or standard operating procedure as defined by this document control system.

6.0 Lab Approved Signatures

6.1 The Quality Assurance Manual is approved by the Laboratory Director/ General Manager and the Quality Assurance Manager.

6.2 Lab reports generated by the lab must be approved prior to release to client except if data is stamped "Preliminary Results".

6.3 The approved signatories are:

6.3.1 General Manager

6.3.2 QA Manager.

6.3.3 Project Managers

6.4 Case narratives, which are part of a data package, list any non-compliances pertaining to the package and require a signature that certifies that the analyses were performed in accordance with the said requirements.

6.4.1 The individual that reviewed the data package signs the narrative.

6.5 Data package reporters sign a form indicating that the data was reported truthfully.

6.5.1 This form is generated for each fraction and is included at the end of each data package fraction.

6.6 In the case where the person requiring a signature for the narrative or chain of custody is not present it is permitted to either sign the persons name followed by your initials or sign your name followed by "for" and the individual's name.

7.0 Data Reduction and Data Review Procedure

7.1 Laboratory validation of the data begins with the processing of data and continues through data review and reporting of analytical results.

7.2 Data processing can be performed by the analyst who obtained the data or by another analyst.

7.3 Data review starts with an analyst independent of the data acquisition and processing, reviewing (validating) the data to determine if the data processing was performed correctly. The review continues through verifying that the

reported analytical results correspond to the data acquired and processed.

7.4 Data review checklists have been developed and are used to specify which records must be included in data review. Checklists are stored on the network in O/QC/Documents and Forms.

7.4.1 There are two general checklists used which specify records to be checked.

7.4.1.1 The records specified in the NELAC Chemistry Checklist for the appropriate method must be included in the review.

7.4.1.2 Package Review Checklists are also used and are submitted in the data package, when required.

7.4.2 In addition to the items specified in the checklists, the complete data report must be checked for

7.4.2.1 Complete and accurate explanations of anomalous results, corrective action, and the use of data qualifiers in the case narrative.

7.4.2.2 Consistency with project-specific measurement quality objectives, if such exists.

7.5 In general, data will be processed by an analyst in one of the following manners:

7.5.1 manual computation of results directly on the data sheet or on calculation pages that are attached to the data sheet

7.5.2 input of raw data for computer processing

7.5.3 direct acquisition and processing of raw data by computer

7.6 If data is manually processed by an analyst, all steps in the computation shall be provided including:

7.6.1 equations used

7.6.2 the source of input parameters such as response factors (RF), dilution factors, calibration constants

7.6.3 if calculations are not performed directly on the data sheet, calculations shall be attached to the data sheets.

7.7 Analysts shall record observations about the sample and/or test conditions that may be pertinent for the reconstruction or interpretation of sample results (i.e., deviations from, additions to or exclusions from the test method, or non-

standard conditions)

7.8 Deviations that may have affected the quality of results or that are necessary for the interpretation of the test result shall be included on the test report.

7.9 Analysts enter data into the LIMS where the data is computer processed to apply final calculations if necessary.

7.9.1 In the LIMS, after a final check of results, the analyst validates the data as reviewed ("QA" the data). When validating the data, a record is electronically kept of the analyst who reviewed the data and date and time. This validation step indicates data has been reviewed and data has been validated as correct.

7.10 The samples analyzed shall be evident on the raw data and the input is signed and dated by the analyst.

7.11 If data is directly acquired from instrumentation and imported into the LIMS, the analyst shall verify that the following are correct:

7.11.1 sample numbers

7.11.2 calibration constants and RF

7.11.3 output parameters such as units and numerical values used for reporting limits .

7.12 Where manual integrations are performed, the before and after chromatograms shall be retained. The person performing the manual integration must sign and date each chromatogram and document the rationale for the integration. The use of established codes may be used to document the rationale directly on the chromatogram. This applies to all samples, QC samples and calibration standards.

8.0 LIMS, Electronic Data Deliverables and Test Reports

8.1 LIMS

8.1.1 The lab uses Omega by Khemia Laboratory Information Management System(LIMS). The system is an Access based system. The system was designed to ensure the integrity and security of the sample information. The integrity of the data is ensured throughout input, storage, transmission, and processing. The LIMS administrator maintains a logbook documenting changes to the system and the date implemented

to insure version control of the software.

8.1.2 The LIMS system maintains the integrity and the security of the data. The system has limited access. An individual login name and password are used to log on to the system. Passwords are encrypted. A tracking changes feature is part of the LIMS. This allows for computer documentation of changes made to analytical results in the system. This includes the change made, person that made the change.

8.1.3 A logging record is printed for each client grouping of samples received that day and verified by the Project Manager to verify tests selected, pricing and sample information.

8.1.4 The finalized data from the analyses are input into the LIMS system. The instrument's files are converted to a format compatible for import into the Omega LIMS system. Some tests without the capability of electronic output, such as many of the traditional wet chemistry parameters, require manual entry into the system. A series of EXCEL spreadsheets have been setup to aid in the entry of the data. These spreadsheets are then imported directly into the LIMS.

8.1.5 Once the data has been imported, the data is calculated for preparation factors, dilution factors and percent moisture. The analyst importing the files, checks the data for errors. If the data is acceptable, the analyst verifies ("QA Sequence") the data. As a secondary quality check, an automated electronic check system has been designed to run when importing any data into the LIMS. This check system will notify the user of multiple possible situations i.e., spikes/surrogates out of limits, missing data, exceeding calibration range etc. The analyst will need to then certify that the data is correct and may enter related comments. The name of analyst and a date/time stamp is recorded.

8.1.6 Once the data is verified a final report is generated. This data can also be accessed and generated by the Omega CLP reporting modules to provide a full data package.

8.2 Electronic Data Deliverables (EDDs)

8.2.1 EDDs are produced in the QC department. This data is verified by

checking for transcription errors prior to releasing the EDD either manually or by using an automated data checker. EDDs are either sent to the client via e-mail, FTP transfer or are transferred onto a disk and mailed with the data package.

8.3 Test Reports

8.3.1 Lab reports are generated by the LIMS system and contain the following information:

8.3.1.1 Title (e.g.,"Laboratory Results");

8.3.1.2 Name and address of the laboratory,

8.3.1.3 Unique identification of the test report (such as work order, lab number and page numbers which are identified as a number of the total report pages (example: 1 of 20).

8.3.1.4 Client name, address, and project name if applicable

8.3.1.5 Client sample ID

8.3.1.6 Sample container analyzed (i.e., container1 of 2)

8.3.1.7 If relevant, specific sample information

8.3.1.8 Date/time of collection, collected by and date /time of receipt

8.3.1.9 Date and time of prep/analysis

8.3.1.10 Test method

8.3.1.11 Results, units, dry or wet weight

8.3.1.12 Analyst initials

8.3.1.13 Electronically produced signature and title of person authorized to release report and date of issue

8.3.1.14 a statement that the results relate only to the samples and analytes requested

8.3.1.15 a statement that the lab is not directly responsible for the integrity of the sample before receipt at the lab and is responsible only for the certified tests requested.

8.3.1.16 statement that the certificate or report shall not be reproduced except in full, without the written approval of the laboratory;

8.3.1.17 statement that the Test results meet the requirements of

NELAC unless otherwise noted.

8.3.1.18 Deviations from the test method that may affect the quality of results (i.e., non-compliant QC, non-standard conditions) and the use of qualifiers and definitions.

8.3.1.19 A statement of the estimated uncertainty of measurement only when required by client

8.3.1.20 When the test report contains results of tests performed by subcontractors, the subcontractor report will be attached and submitted to client. ,

8.3.1.21 Amendments to test reports are identified and include a report reissue date.

9.0 Data Reporting and Authorization Procedures

9.1 Completed data packages are generated in the departments.

9.2 Data reported to the clients in Massachusetts will be reported with the addition of a parameter list indicating the certified parameter list in that state.

9.3 Either the department supervisor, Quality Analyst, Laboratory Manager/Director or QA Manager, reviews all data packages.

9.4 Any deviations or non-compliances are documented in the "case narrative" written by the reviewer and /or noted with the use of data qualifiers and their definitions.

9.5 Any omissions or errors are listed and the data package is rejected and returned to the department for correction.

9.6 After corrections have been made, the reviewer verifies the corrections, the case narrative is revised as necessary, and the case narrative is signed by the reviewer.

9.7 Data shall be reported according to methodological protocols and/or client project-specific requirements, where such exists.

10.0 Personnel Authorized to Review Data Packages

Metals and Metals Inorganic:	Metals Supervisor Wet Chem Supervisor	Al Badsha Christopher Otterberg

	Senior Analyst	Vincent Stancampiano
	Senior Analyst	Michael Miller
	QA Manager	Nicole R. Crespi
	Quality Analyst	Ursula Middel
	Laboratory Director	Joann Slavin
Pesticides:	Quality Analyst	Ursula Middel
	QA Manager	Nicole R. Crespi
	Laboratory Director	Joann Slavin
	Scientist IV	Elizabeth Gustin
	SVOA and Organic Prep Supervisor	James Bidas
	Senior Analyst	Michael Miller
GC/MS:	VOA Supervisor	Glen Bochicchio
	Quality Analyst	Ursula Middel
	QA Manager	Nicole R. Crespi
	Laboratory Director	Joann Slavin
	Senior Analyst	Michael Miller

11.0 Traceability of Measurements

11.1 Measurement Traceability is defined as ensuring that all equipment used for environmental tests, including equipment for subsidiary measurements (e. g. for environmental conditions) having a significant effect on the accuracy or validity of the result of the environmental test or sampling shall be calibrated before being put into service and on a continuing basis.

11.2 Table 4 lists the program and verification of the measuring and testing equipment.

11.3 All measurement and support equipment are maintained in proper working order in accordance with the manufacturer instructions.

11.4 The lab utilizes an outside calibration service to perform its annual calibration of equipment and instruments.

11.5 Records of maintenance activities are kept.

11.6 During annual calibration of equipment, (depending on the severity of the

issue) item(s) that are found to be out of tolerance will undergo the following corrective actions (by sectional supervisor and management):

11.6.1 The data will be evaluated for anomalies and out of performance specifications from the last acceptable calibration.

11.6.2 Any analyses that could potentially be impacted will be reviewed to determine possible effects on reported results.

11.6.3 If reported results are affected, data must be recalled, re-reported and qualified.

Table 3: Verification of Measurement and Testing Equipment

Equipment	**Requirement**	**Frequency**	**QC Limits**
Analytical Balances	Calibrated by Integrated Service Solutions	Annually	Certificate of Calibration
Analytical Balances	Balance calibration check using two traceable standard weights that bracket the expected weight	Daily or before each use	± 0.1% or ±0.5 mg, whichever is greater (unless method specific guidance exists)
Top-loading Balances	Calibration by Integrated Service Solutions	Annually	Certificate of Calibration
Top-loading Balances	Calibration check in-house Balance calibration check using two traceable standard weights that bracket the expected weight (micro and soils) using 150g weight	Daily or before each use	± 2% or ± 0.02 g, whichever is greater Must detect 0.1g at 150g load
Traceable standard	Calibrated by National	Every 5 years	Certificate of Calibration

Equipment	Requirement	Frequency	QC Limits
weights	Calibration Services		
pH meter	Calibration with standard buffers of pH 4.0 and 10.0. Slope verified with standard buffer of pH 7.0	Daily or before each use	Slope verification must be ±0.1 pH units to proceed
Conductivity Meter	Calibration check with 0.01, 0.001, and 0.005M KCL solution	Day of use	±20% of the expected value
Conductivity Meter	Cell constant determination using a 0.01M KCl solution	Annually or as needed	±1% of the manufacturer's specifications
Dissolved Oxygen Meter	Calibration of Meter and probe against winkler method	Day of use	
Spectrophotometers	Verify wavelength settings using NIST traceable color standards or their equivalent	Annually	See manufacturers specifications
NIST Thermometers	Calibrated by Integrated Service Solutions	Annually, at all points of interest	Certificate of Calibration
Liquid in Glass Working Thermometers	Calibration verses the NIST.	Before first use and Annually thereafter, at temperature (s) of interest	apply correction factor. Correction factor > 1 ºC should be discarded
Digital Thermometers	Must read to 3 significant figures. Calibration verses NIST	Before first use and Annually thereafter, at temperature (s) of interest.	apply correction factor
IR Thermometers	Calibration verses NIST.	Quarterly. Should be checked on day of use at single point.	apply correction factor
Dial Thermometers	Calibration	Quarterly	apply correction factor

Equipment	Requirement	Frequency	QC Limits
	verses NIST.		
Turbidimeters	Initial Calibration with formazin or AMCO-AEPA-1	Annually	Results within manufacturers specifications
Turbidimeters	Checked with a Polymer sphere standard in the range(s) of interest.	Daily or each use	Must fall within the standard control limits.
Refrigerators	Temperature checks	Daily *	0-6.0ºC
Freezers	Temperature checks	Daily*	Recommended -5 to -15 ºC
BOD Incubators	Temperature checks	Daily*	20ºC ±1 ºC
Bacteriological Incubators	Temperature Checks monitored on each shelf	Daily*	35ºC ±0.5 ºC
Ovens	Temperature check	Beginning and end of cycle and/or daily if left on always	Must maintain the target temperature of interest during use.
Autoclaves	Temperature Check	Beginning and end of cycle	Must maintain sterilization temperatures during the sterilization cycle. Cycle must be completed within 45 minutes when a 10-12 minute sterilization period is used.
Autoclaves	Autoclave automatic and mechanical timing device check verses a NIST digital timer.	Quarterly	Within 120 seconds
Autoclaves	Demonstration of sterilization	Biological indicators weekly OR continuous monitoring	Indicators must show sterility or continuous monitoring must indicate correct

Equipment	Requirement	Frequency	QC Limits
			temperature
Bacteriological Water Baths	Temperature check	Daily	Must maintain a temperature of 44.5 ºC ±0.2 ºC
Volumetric Dispensing Devices	Calibrated at all levels of use	By lot before first use and Quarterly	Calculate %accuracy and %error Mean ± 2% RSD ≤1% (based on 10 replicate measurements)
Syringes	Certified calibrated from the vendor	NA	Store certificates
Class A and B Volumetric Labware	Volume verification	Class B: By lot before first use. Class A and B: Upon evidence of deterioration	Bias: Mean within ± 2% of nominal volume Precision: RSD ≤ 1% of nominal volume (based on 10 replicate measurements)
Non-volumetric labware (Applicable only when used for measuring initial sample volume or final extract/digestate volume)	Volume verification	By lot before first use or upon evidence of deterioration	Bias: Mean within ± 3% of nominal volume Precision: RSD ≤ 3% of stated value (based on 10 replicate measurements)

*Daily meaning 7 days/week. Staff is scheduled for weekend monitoring. Min/max thermometers are in use. In the event that personnel are unable to be at the lab for weekend monitoring, the min/max temperature will be documented.

Table 4.0: Working Thermometers

Equipment	Requirement	QA Limits
Freezer	Dedicated and calibrated. Immersed in liquid.	Graduations no greater than 1ºC.
BOD Incubator	Dedicated and calibrated. Immersed in liquid.	Graduations no greater than 0.2 ºC
Ovens	Dedicated and calibrated. Immersed in sand.	Graduations no greater than 1.0 ºC

Refrigerators	Dedicated and calibrated. Immersed in liquid.	Graduations no greater than 1.0 ºC
Bacteriological Air Bath Incubators	Dedicated and calibrated located on each shelf in the incubator.	Graduations no greater than 0.1 ºC
Bacteriological Water Bath Incubators	Dedicated and calibrated located on each shelf in the incubator.	Graduations no greater than 0.1 ºC

(Digital thermometers, thermocouples, or other similar electronic temperature measuring devices are exempt from the requirement that it be immersed in sand or liquid if the temperature measurement can be taken without altering the environment being measured)

Table 5.0: Reagent Grade (Laboratory pure) Water

Parameter	Frequency	Acceptance Criteria
Conductivity (at 25°C)	Daily or when maintenance is performed	<2 micromhos/cm at 25°C
Free residual chlorine	Monthly or when maintenance is performed	<0.1 mg/L
Standard plate count	Monthly or when maintenance is performed	<500 colonies/mL
Suitability test	Yearly or when maintenance is performed	Ratio between 0.8 to 3.0
Heavy metals	Yearly or when maintenance is performed	< 50 ug/L for each metal collectively <100 ug/L

12.0 Accredited Test Methods

12.1 See the Appendix, Section 3.0

13.0 Contract Review

13.1 Records of request, tender and contract review, including significant changes, are maintained. Records of pertinent discussions with customers relating to the customer's requirements or work during the period of execution of the contract are also maintained.

13.2 Routine Work

13.2.1 For review of routine work and other simple tasks, the date and identification of the person on the chain-of-custody who is responsible for accepting the samples is considered adequate.

13.3 Written Contract Work

13.3.1 Prior to acceptance of new written contract work, the Project Manager thoroughly reviews the requirements of the written contract to ensure that the laboratory has the appropriate facility and resources to successfully complete the project. Criteria considered includes, but it not limited to:

13.3.1.1 Methodology

13.3.1.2 Detection Limits

13.3.1.3 Project specific data reporting requirements, including:

13.3.1.3.1 Conventions for reporting results below the LOQ

13.3.1.3.2 Specifications for the use of data qualifiers

13.3.1.4 Personnel requirements

13.3.1.5 Turn-around-time

13.3.2 At this time, guidance from the various departments and/or QC and Administration are provided. If a project specific quality plan is provided, it is reviewed in the above manner.

13.3.3 After initial review by the Project Manager and subsequent review by departmental personnel, the contract is then reviewed for legal considerations. Any questions or issues may be discussed with an Officer of the Company for approval.

13.4 Questions, modifications, or changes to the contract are then discussed and resolved prior to agreeing to the terms of the contract. An amendment to the contract may be included if needed.

13.5 The mutually agreed upon contract is then signed by an authorized representative of the firm.

14.0 Review of New Work

14.1 To maintain current methodologies and implement new regulations new test methods and procedures are occasionally added to the scope of testing in the laboratory.

14.2 There are varying degrees to the addition of new work. These include:

14.2.1 The addition of an analyte to an existing method.

14.2.2 Complete start-up of an established method.

14.2.3 Analyte requested with no established method.

14.3 Addition of an Analyte to an Existing Method

14.3.1 The analytical method is reviewed to determine if its use is appropriate for the new analyte. The standard is purchased from a commercial vendor and prepared. If the analyte is available from more than one source, a second source may be purchased to verify the calibration standard. The standard is analyzed to determine its elution time in the scan.

14.3.2 A calibration curve is produced to determine linearity. If preparatory steps are required, four replicates of the standard are carried through all phases of the method. The initial start-up procedure is documented.

14.3.3 A MDL or IDL is performed and the detection limit is determined.

14.3.4 An in-house SOP is written and used by the analysts. Demonstration of capability is maintained on file.

14.3.5 If necessary, the appropriate state accreditation is sought for the additional analyte following approved state certification processes.

14.4 Complete Start-Up of an Established Method

14.4.1 The method is obtained and reviewed by the Department Supervisor, Quality Analyst or Manager or senior analyst to determine if new instrumentation or reagents/standards are required by the method.

14.4.2 If the required instrumentation is currently available in the laboratory,

the reagents, standards and other supplies are gathered/purchased.

14.4.3 If more than one analyte is quantified in the method, the analytes may be initially analyzed individually to determine elution time.

14.4.4 A second source is purchased to verify the calibration standard.

14.4.5 A calibration curve is produced to determine linearity. If preparatory steps are required, four replicates of the standard are carried through all phases of the method and compared to the established QC of the method. The initial start-up procedure is documented.

14.4.6 A MDL or IDL is performed and the detection limit is determined.

14.4.7 An in-house SOP is written and used by the analysts. Demonstration of capability is maintained on file.

14.4.8 The samples and standards and associated QC samples are carried through the procedure and the QC is compared to the method QC acceptance criteria.

14.4.9 If necessary, the appropriate state accreditation is sought for the additional analyte following approved state certification processes.

14.5 Analyte Requested with No Established Method

14.5.1 The analyte to be analyzed is researched and reviewed to determine the compound classification.

14.5.2 After the compound classification is complete, it is determined if it can be analyzed by an existing method. If not, it is determined if perhaps a modification to an existing method would allow successful determination of the compound.

14.5.3 Different approaches to testing the analyte may be tried, comparing the efficiency of the various approaches. The method that allows for acceptable precision and accuracy is used.

14.5.4 If more than one analyte is quantified in the method, the analytes may be initially analyzed individually to determine elution time.

14.5.5 If the required analytes are available from more than one source, a second source is purchased to verify the calibration standard. A calibration curve is produced to determine linearity.

14.5.6 If preparatory steps are required, four replicates of the standard are

carried through all phases of the method and compared to the established QC of the method. The initial start-up procedure is documented.

14.5.7 A MDL or IDL is performed and the detection limit is determined.

14.5.8 An in-house SOP is written and used by the analysts. Demonstration of capability is maintained on file.

14.5.9 The samples and standards and associated QC samples are carried through the procedure and the QC is compared to the method QC acceptance criteria.

14.5.10 If necessary, the appropriate state accreditation is sought for the additional analyte following approved state certification processes.

15.0 Conflict of Interest

15.1 PASI employees must avoid situations that might involve a conflict of interest or could appear questionable to others. The employee must be careful in two general areas:

15.1.1 Participation in activities that conflict or appear to conflict with the employees' PASI responsibilities.

15.1.2 Offering or accepting anything that might influence the recipient or cause another person to believe that the recipient may be influenced to behave or in a different manner than he would normally. This includes bribes, gifts, kickbacks, or illegal payments.

15.2 Employees are not to engage in outside business or economic activity relating to a sale or purchase by the Company. Other problematic activities include service on the Board of Directors of a competing or supplier company, significant ownership in a competing or supplier company, employment for a competing or supplier company, or participation in any outside business during the employee's work hours.

16.0 Confidentiality

16.1 PASI employees must not use or disclose confidential or proprietary information except when in connection with their duties at PASI. This is effective over the course of employment and for an additional period of two years thereafter.

16.2 Confidential or proprietary information, belonging to either PASI and/or its customers, includes but is not limited to test results, trade secrets, research and development matters, procedures, methods, processes and standards, company-specific techniques and equipment, marketing and customer information, inventions, materials composition, etc.

17.0 Subcontracting

17.1 Occasionally, it is necessary to subcontract samples to other approved laboratories if Pace Long Island does not perform an analysis, instruments are down, or there is a current overload of work making meeting holding times questionable.

17.2 No samples are subcontracted to an outside laboratory without prior permission of the client.

17.3 Subcontract labs must possess the appropriate certifications and accreditations for the required work.

17.4 Prior to shipping of subcontract samples, the specific client requirements are reviewed with the laboratory including:

17.4.1 Specific method requirements

17.4.2 Reporting and detection limits

17.4.3 QC requirements

17.4.4 Submission of a project QAPjP SOP, if required.

17.5 Once the requirements are reviewed with the subcontract laboratory, a copy of their state certification is reviewed and maintained on file.

17.6 All subcontract results are generated on the subcontract laboratories report forms and submitted to Pace Long Island.

17.7 Results may be transcribed onto Pace Long Island's lab report with the qualifier that an outside laboratory performed the results. The Pace Long Island laboratory report shows the test subcontracted out and has the notation "see attached".

17.8 Copies of the subcontract process are maintained in individual client files. The information need only be filled out once for an ongoing project.

17.9 Project Management maintains a file with the current laboratory certifications from the laboratories used for subcontracting. These certifications will be

updated annually.

17.10 It is the responsibility of the person providing the quote or setting up the project to notify the client that their samples will be subcontracted.

17.11 Any Pace Analytical work sent to other labs within the PASI network is handled as subcontracted work and all final reports are labeled clearly with the name of the laboratory performing the work.

17.12 Any non-TNI work is clearly identified. PASI will not be responsible for analytical data if the subcontract laboratory was designated by the customer.

18.0 MDL/DL, LOD and LOQ

18.1 A detection limit (MDL/DL) is established for each analyte-matrix-method (where appropriate), including surrogates, by the completion of an MDL Study.

18.2 The MDL study is is based on the Method Detection Limit (MDL) procedure outlined in 40 CFR Part 136, Appendix B and is the analysis and statistical evaluation of seven replicates of blanks spiked with the level of the analytes of interest at estimated detection limits, for the purpose of determining the MDL levels. If an MDL study is not performed, the detection limit may be established by use of another scientifically sound procedure.

18.3 Limit of Detection (LOD): An estimate of the minimum amount of a substance that an analytical process can reliably detect. An LOD is analyte-and matrix-specific and may be laboratory-dependent. According to NELAC, the LOD equates with the MDL.

18.3.1 Once a detection limit is established, it is used to determine a Limit of Detection (LOD) for each analyte and matrix as well as for all preparatory and cleanup methods routinely used on samples. For NELAC/TNI, the LOD is the MDL.

18.3.2 The LOD must be < or = to the LOQ (lowest calibration standard).

18.3.3 LODs must be verified annually on instruments where results are to be reported below the LOQ.

18.3.4 LOD verifications must meet the following requirements;

- The apparent signal to noise ratio at the LOD must be at least three and the results must meet all method requirements for analyte

identification (e.g., ion abundance, second-column confirmation, or pattern recognition.) For data systems that do not provide a measure of noise, the signal produced by the verification sample must produce a result that is at least three standard deviations greater than the mean method blank concentrations.

- If a laboratory uses multiple instruments for a given method the LOD must be verified on each.
- If the LOD verification fails, then the laboratory must repeat the detection limit determination and LOD verification at a higher concentration or perform and pass two consecutive LOD verifications at a higher concentration and set the LOD at the higher concentration.

18.4 The Limit of Quantitation (LOQ) is the lowest calibration standard.

18.4.1 The LOQ and the highest calibration standard of a multi-level calibration curve establish the quantitation range. For metals analysis with a single-point calibration, the LOQ and the calibration standard establish the quantitation range, which must lie within the linear dynamic range.

18.4.2 The LOQ must be verified annually.

18.4.3 The LOQ is verified with a successful analysis of a QC sample containing the analytes of concern in each quality system matrix at a concentration of 1-2 times the LOQ.

18.5 The analysis of the LOQ is quantitative (while the LOD is qualitative). A successful LOQ verification is one where the recovery of each analyte is within the established test method acceptance criteria or client data quality objectives. In the absence of these criteria, the accuracy should fall within EPA recommended advisory limits of 50-150%.

18.6 Current LODs and LOQs can be found on the Server in O/QC/LOD_LOQ.

19.0 Measurement of Uncertainty

19.1 An estimation of uncertainty for results generated by the laboratory may be provided to the data user upon request. The estimate quantifies the error

associated with any given result at a 99% confidence interval. This estimate does not include bias that may be associated with sampling procedures. The laboratory has a procedure in place for making this estimation based on recovery data obtained from the Laboratory Control Samples. The uncertainty is a function of the standard deviation of the recoveries multiplied by the appropriate Student's t Factor at 99% confidence. Additional information pertaining to the estimation of uncertainty may be found in the latest revision of the *Procedure for the Measurement of Uncertainty* SOP. The measurement of uncertainty is provided only upon request by the customer.

20.0 Calibration and/or Verification Test Procedures

20.1 Calibration and/or verification procedures are designed to insure that the data will be of known quality and the results are appropriate for a given regulation or decision.

20.2 Raw data is retained to reconstruct the calibration used to calculate the sample result.

Table 6.0: Calibration and Verification

QC Requirement	Frequency	QC Limits	Correction
Instrument Calibration	Per the requirements of the method	Linear Regression: Correlation coefficient (r^2) >0.995 unless demonstrated that a lower r^2 can produce acceptable data. Average Response Factor: as per method requirements Calibration Factor: as per method requirements	Analysis cannot proceed unless an acceptable calibration is produced unless covered under the exceptionally permitted departures from procedure. All departures are reviewed by section supervisors. Data may be reported if determined acceptable by supervisor and will be documented in the run log.
Calibration Documentation	Each time instrument is calibrated	Labeled with the method used, instrument, date of analysis, analyte concentrations and response factor or calibration factor.	
Initial Calibration Verification (ICV) Second source	Immediately following initial	Unless specified otherwise in the analytical method, the	

QC Requirement	Frequency	QC Limits	Correction
Standard (second source must be from a different vendor except in the case of gas cylinders, where a different lot is acceptable)	calibration	measured value of the analyte must meet the criteria of the continuing calibration verification.	
Mid-point Standard	Daily or as required by analytical method		
Instrument Blank	Daily or as required by the method		
Limit of Quantitation (LOQ) Lowest Concentration Level Reported	Each Initial Calibration and verified annually	The lowest calibration standard is the lowest concentration level reported.	Results reported below this standard are considered estimated and the data are flagged with a qualifier and/or discussed in the case narrative.
Highest Level Concentration	Each Initial Calibration	The highest calibration standard is the highest concentration reported without dilution	Results reported above this standard (unless from a diluted run) are considered estimated and the data flagged with a qualifier and/or discussed in the case narrative.
Method Detection Limit (MDL)	Annually	Determined for all analytes where spiking solutions are available. The MDL must be <LOQ	Results reported down to MDL are qualified as estimated (J).
Limit of Detection (LOD)	Verified annually if results are to be reported below LOQ.	Determined for all analytes where spiking solutions are available. The LOD must be </= LOQ	Results reported between LOQ and LOD/MDL are qualified as estimated (J)

21.0 Procedures for Handling Submitted Samples

Personnel are in the laboratory: Monday to Friday 7am to 11pm

Saturday and Sunday: 9am to 3pm

If deliveries must be made later than 6pm on weekdays, or anytime on weekends, the laboratory must be contacted in advance so that arrangements can be made with our staff to ensure proper receipt of samples.

21.1 External Chain of Custody

21.1.1 Sample tracking is accomplished through the use of chains of custody.

21.1.2 A sample is considered to be in custody if it is:

- In an individual's actual possession;
- In view, after being in physical possession;
- Locked so that no one can tamper with it, after having been in physical custody;
- In a secured area, restricted to authorized personnel only.

21.1.3 All samples are handled under conditions, which avoid contamination, deterioration or damage to samples, and which secure their use for litigation purposes.

21.1.4 The chain of custody (COC) procedure begins with either sample collection or bottle preparation depending on client's needs.

21.1.5 Every sample container received shall be assigned a unique identification number that is entered on the COC.

21.1.5.1 All bottles are identified with the lab ID number and a suffix of A, B, C, D, etc. when samples are fractionated.

21.1.5.2 The total number of bottles received is entered.

21.1.5.3 If the sample is not fractionated, the bottles are all listed as A

21.1.5.4 In all cases, the total quantity of bottles is differentiated by the number of bottles as indicated by the designation "1 of 3, 2 of 3, etc." on the sample labels.

21.1.5.5 The sample container used for analysis is recorded in the LIMS.

21.1.6 The COC includes:

- container type
- preservative type
- number of containers for each sample location (including MS/MSD, trip blank and field blank)
- any distinctive notification

- signature of sampler
- receiver's signature
- date/time of relinquishment.

21.1.7 Upon receipt of the samples by a lab representative, the first "relinquished by/received by" blocks shall be completed on the COC.

21.1.8 The date and time of receipt in the lab is entered on the external COC form.

21.1.9 The shipment is checked for integrity, completeness and the samples are examined for damage.

21.1.9.1 All sample bottles are checked to verify that they are sealed properly, that they have no breakage, air bubbles (volatiles), and proper labeling.

21.1.9.2 Any shortages and damage is noted on the external COC.

21.1.9.3 If any problems occur, the project manager will be notified.

21.1.9.3.1 If the samples aren't in jeopardy of holding time exceedences, they are assigned cold storage before proceeding with sample accession until laboratory-receiving personnel receive instructions.

21.1.9.3.2 If the samples need to be analyzed immediately, the samples will be giving a laboratory number.

21.1.9.3.3 If the samples analyzed need to be re-collected, a new work order with a new number will be generated for the re-collected samples.

21.1.9.4 A sample receipt checklist is prepared in the sample-receiving department to account for any breakage or discrepancy in sample documentation, as compared to the sample shipment

21.1.10 The temperature of the cooler is checked for samples that require storage at <= 6ºC.

21.1.10.1 A temperature blank is sent out with the coolers.

21.1.10.2 A 100ml plastic bottle filled with water and labeled Temperature Blank is placed in the cooler during cooler set up.

21.1.10.3 This bottle is read with the IR gun upon receipt in the lab and logged on the COC form.

21.1.10.4 Local samples may not be in transit long enough to be chilled, however there must be evidence that the preservation process has begun, such as receipt on ice.

21.1.10.5 If no temperature blank is present, a clear plastic or glass bottle may be used for the temperature blank.

21.1.10.6 Amber bottles are not to be used to check the temperature nor are vials or bottles wrapped in bubble pack.

21.1.11 A cooler checklist form is completed for samples received after normal business hours or on weekends.

21.1.11.1 The cooler temperature is checked as is the custody seal.

21.1.11.2 The COC is signed and placed back in the cooler and stored in the lab walk-in refrigerator.

21.1.12 Samples that have not been properly stored during transport to the lab will either be rejected and a resample collected or it will be noted in the LIMS, on the non-conformance report and on the final lab report.

21.1.13 A copy of the external COC is returned to the project manager.

21.1.14 The sample custodian places the original in the lab's client file.

21.1.15 The lab project manager will notify the client of non-conformances.

21.2 DC-1 Form Completion

21.2.1 If applicable to the samples received, the USEPA sample login form (Form DC-1) is completed. This form is used to document the receipt and inspection of the samples and coolers.

21.2.2 One original of the DC-1 form is required per cooler.

21.2.3 If the samples in a single cooler must be assigned to more than one Sample Delivery Group (SDG), the original DC-1 accompanies the deliverables for the SDG of the lowest Arabic number and a copy accompanies the other SDG's.

21.2.4 The copies must be stamped "COPY" and the location of the original noted on the copy.

21.2.5 The following information will be required to complete the DC-1 form:

21.2.5.1 Lab Name

21.2.5.2 Log-in data

21.2.5.3 Print and signature of lab personnel who received samples

21.2.5.4 Case number

21.2.5.5 SDG number

21.2.5.6 SAS number

21.2.5.7 Condition of shipping coolers

21.2.5.8 Sign and date air bill

21.2.5.9 Record the presence/absence of custody seals and their condition in item 1 of the form

21.2.5.10 Add pH of cyanide and metals samples as verified upon receipt in the laboratory. Cyanide must be greater than 12.

21.2.5.11 Record the air bill or sticker number in item 6

21.2.5.12 Record condition of bottles and presence or absence of sample tags in items 7 and 8 on the form

21.2.5.13 Review shipping documents and compare information on all documents and complete item 9

21.2.5.14 If there are no problems, sign, date and indicate time on the DC-1 form.

21.2.5.15 Record the sample tag I.D. numbers and assigned lab numbers.

21.2.5.16 Cross reference lab numbers with the SMO.

21.2.5.17 Project coordinator will document communication in the CLP communication logbook

21.2.5.18 Record the fraction and area stored in the sample transfer space and sign and date.

21.3 Internal Chain-of-Custody

21.3.1 The sample custodian assigns laboratory identification numbers to the samples and then transfers the samples to department custodians.

21.3.2 An internal COC form is completed with the project number, date of receipt and listing of samples by number and laboratory identification numbers.

21.3.3 The sample custodian and department custodian sign for transfer with date and time indicated.

21.3.4 The department custodian places samples in secured areas for storage.

21.3.5 The department custodian relinquishes samples to the technicians for sample preparation and/or analysis.

21.3.6 The analysts sign for the samples and extracts/digestates each time the samples exchange hands.

21.3.7 Upon completion of analysis, any remaining original sample matrix containers are returned to the appropriate sample custodian.

21.4 Internal Verification of COC Procedures

21.4.1 The sample custodian gives a copy of the external and internal COCs to the project manager as well as any information received with the sample to the document control section of the QA Department.

21.4.2 All paperwork is reviewed and checked for any transcription errors.

21.4.3 If there are any transcription errors, the sample custodian and any affected departments are contacted.

21.4.4 Verification that corrections were made properly is the responsibility of the laboratory's document control section or QA Department.

21.4.5 The samples are automatically entered into a status spreadsheet and the sample delivery group folder is prepared including all pertinent information.

21.4.6 The folder is labeled with the SDG number and filed.

21.5 Initial Sample Storage

21.5.1 All samples are stored in an area free from secondary contamination. Samples are stored separate from standards and high concentration samples and away from foodstuffs.

21.5.2 When cross contamination is a possibility, samples suspected of containing high concentrations of targeted analytes shall be isolated from other samples. Samples or extracts designated for volatile organic analysis must be segregated from other samples and extracts. Samples suspected of containing high concentrations of volatile organics shall be further isolated from other volatile organic samples.

21.5.2.1 Information is requested from the client of any known high concentration of volatile samples based upon historic information or prescreening in the field. If high concentration levels of samples are suspected, proper procedures to prevent secondary contamination during transport must be taken.

21.5.2.2 High concentration samples are segregated in a separate cooler by field personnel and sample vials or soil jars are transported in sealed zip lock bags with at least 3 ounces of activated carbon. The chain of custody form should be documented with the statement **"suspected high concentration volatile sample".**

21.5.2.3 Upon receipt of samples in the laboratory, accessioning personnel will segregate the samples by opening the cooler in a hood in the metals digestion lab (no organic solvents are utilized in this area). All samples are taken out of the cooler, placed inside the hood and inspected for breakage, leakage etc.

21.5.2.4 The samples will be accessioned into the LIMS system with a note in the LIMS indicating that "the samples are suspected high concentration level volatiles keep separate from other samples"

21.5.3 Volatiles

21.5.3.1 Samples are stored in refrigerators in either the GC/MS or the GC lab (depending on analysis requested) at 4ºC (±2ºC) and are protected from light from the time of receipt until analysis.

21.5.3.2 The high concentration level volatile water sample vials are stored in the zip lock bags with at least 3 ounces of activated carbon in a sealed container.

21.5.3.2.1 These samples are stored in a separate refrigerator.

21.5.3.2.2 The refrigerator is labeled **High concentration volatile samples only** on the door.

21.5.3.2.3 A storage blank is placed in the refrigerator, if samples are present, for every batch of samples of high

concentration volatile organics received and analyzed with each batch. The storage blank is a head space free 40 ml vial filled with deionized water.

21.5.3.2.4 If samples are deemed to be high concentration after analysis, the samples will be removed from the non–high level volatile refrigerator as soon as possible after the concentration level has been determined and placed in the high concentration level refrigerator until the samples are placed in storage or flagged for disposal.

21.5.3.2.5 The concentration level of greater than 2500ppb is utilized in the lab for storage in the high concentration level refrigerator.

21.5.3.2.6 The storage blanks are used to determine if cross contamination may have occurred.

21.5.3.2.6.1 The storage blank is analyzed for the same analyte list of compounds as the samples stored in the refrigerator as well as TICs.

21.5.3.2.6.2 The sample results of the storage blank are evaluated and a form 1 issued with the concentration levels of targeted analytes as well as TICs identified. The results are submitted in the data package.

21.5.3.2.6.3 No subtraction of any blank is to be performed.

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21.5.3.2.6.4 If the storage blank is contaminated, the means of sample storage needs to be reevaluated; a nonconformance report prepared and distributed for corrective action and the results shall be reported with appropriate data qualifiers.

21.5.4 BNA, Pesticide/PCB

21.5.4.1 Samples are stored in the Special Process section in refrigerators or the walk-in refrigerator at 4ºC (±2ºC) and are protected from light upon receipt until extraction and analysis.

21.5.4.2 After analysis, extracts and unused samples are protected from light and stored at 4ºC (±2ºC).

21.5.4.3 The extracts are stored in the refrigerator between the GC/MS and Special Process sections.

21.5.5 Metals

21.5.5.1 Water samples are stored in a refrigerator in the Metals section.

21.5.5.2 Soil samples are stored in a refrigerator in the metals section and maintained at 4ºC (±2ºC).

21.5.6 Cyanide

21.5.6.1 Samples are stored in a refrigerator at 4ºC (±2ºC) in the Wet Chemistry storage area.

21.5.7 All CLP samples are stored in locked refrigerators.

21.6 Final Sample Storage

21.6.1 The time that samples are held after completion of analysis is dependent on the client's requirements.

21.6.2 Some samples are stored for 6 months.

21.6.3 Most samples are stored for 60 days after report generation.

22.0 Sample Preservation, Containers, and Holding Times

A summary of preservation, container and holding times is found in Tables 7.0-9.0

22.1 Sample Preservation

22.1.1 The addition of preservative is verified upon receipt and documented.

22.1.2 The pH of all preserved samples (except volatile samples and oil and grease which are verified in the departments) are verified in the receiving department by the use of pH paper.

22.1.3 A small aliquot of sample is poured over the pH paper.

22.1.4 Do not dip the paper into the sample.

22.1.5 The verification of pH preservation is noted in the LIMS on the Sample Receipt Checklist.

22.1.6 Volatile aqueous samples are checked for proper preservative by the use of pH paper after sample analysis and recorded in the sample logbook.

22.1.7 Chlorine residual checks are performed for samples submitted for organic drinking water analyses using chlorine test strips.

22.1.8 Chlorine residual checks will take place in the departments, except for the methods that also need pH preservative verification; these will be checked in the receiving department (i.e., 525.2, 531.1, 549, 508.1).

22.1.9 In instances where there is unpreserved sample available to check for chlorine residual, the unpreserved bottle will be used. If no chlorine is present in that bottle, then it can be safely assumed that there is no chlorine present in any of the sample bottles for a particular location, and no further testing is required. If the unpreserved sample contains chlorine, then all bottles (524,531,549) will be checked individually for the presence of chlorine.

22.1.10 Bacteria samples must be received with 1-inch headspace to allow for proper mixing.

22.1.10.1 If a sample bottle is filled too full to allow for proper mixing, do not pour off and discard a portion of the sample. Rather, pour the entire sample into a larger sterile container, mix properly, and proceed with the analysis.

22.1.11 Sample preservation should be rechecked if continued preservation of the sample is in question (i.e., the sample may not be compatible with the preservation) or if deterioration of the preservation is suspected.

22.1.12 Tables 7.0-9..0 contain proper sample preservations.

22.1.13 For USEPA samples, note the pH on the DC-1 form.

22.1.14 Bottles without preservative will be noted on the COC and if allowable, preservative will be added at the laboratory.

22.1.15 Notify the project manager if preservations have been added at the

laboratory and record on sample receipt checklist.

22.1.16 If non-potable water samples submitted for metals analyses are received unpreserved, preservative may be added at the lab, however, acid must be added at least 24 hours before analysis to dissolve any metals that adsorb to the container walls.

22.1.16.1 The receiving department must note the time of preservation in the LIMS and on the sample bottle so the metals department is aware of the 24-hour time period.

22.1.16.2 Clients must be notified immediately if rush turn around time is requested (i.e., 24 TAT).

22.1.17 If sample preservations do not comply with the requirements in Table 7.0-9.0, notify the project manager immediately.

22.1.18 The client will be notified as soon as possible.

22.2 Sample Containers

22.2.1 Sample containers are usually provided by the lab, except where otherwise specified by the client.

22.2.2 Several different sampling containers may be used for one project.

22.2.3 Materials must be selected that would not result in interference with the analysis.

22.2.4 Each sample container will have a durable waterproof label, which contains all the information necessary to identify the sample.

22.2.5 New clients are given a summary of which bottle to use for what test to ensure that the correct bottle is used for the test requested.

22.2.6 The amount of information on the label may vary depending on the source and other factors, but, in general may include:

- Number of bottles per analysis
- Collector's name
- Sample location
- Date and time of collection
- Depth of sample
- Atmospheric conditions

22.2.7 The bottles used are verified as non-contaminated by monthly checking of bottles. This is done by filling the bottle with distilled water and

analyzing the water for the parameters that would normally be analyzed from that bottle.

22.2.8 This record is kept on file in the QC Department.

22.2.9 Any positive readings for any analytes are flagged and the supervisor and QA Manager are notified.

22.2.10 No bottles from the affected lot are used until the source of contamination is determined and remedied.

22.3 Holding Time Status

22.3.1 On a daily basis, holding times are monitored as a check on the different departments and the supervisors notify staff if holding times are drawing near (at least two days in advance).

22.3.2 A status report is available to all laboratory employees in the LIMs.

22.3.3 To ensure that the status report is kept current, all analysts are required to update sample status on a daily basis.

22.3.4 After completion of a project, the Package Production section coordinates collation of the data package and reviews that all required forms are included and that the package is mailed within the required time frame.

Table 7.0 Potable Water Bottle and Preservation Requirements

Analyte	**Bottle**	**Preservation**	**Holding Time**
The information contained in this item comes from the Code of Federal Regulations (40 CFR 141). Note 1: Maximum holding time includes the time elapsed from collection of the sample to placement in the incubator. Note 2: Consumer collected samples may be left unpreserved for up to 14 days. Note 3: E. coli samples enumerated for reporting to EPA under the LT2 rule may be tested when the 8 hour hold time is exceeded and within 30 hours from the time of collection to set-up only when preservation is documented intact. All data generated outside of the 8 hour hold time must be qualified as such in the report to the client. No samples older than 30 hours shall be tested. Note 4: ELAP offers Nitrate or Nitrite only for accreditation. ELAP does not offer combined Nitrate-Nitrite. The preservation and holding time requirements for combined Nitrate-Nitrite is Cool to 4ºC, H2SO4 to pH<2, and 28 days. **Note 5: For bacteriological tests, when the sample is collected, leave ample air space in the bottle (at least 2.5 cm or 1 in) to facilitate mixing by shaking.**			
Bacteriological Tests: Note 5 Fully processed Drinking Water (40 CFR 141.21(f)(3)):			

Analyte	Bottle	Preservation	Holding Time
Coliform (Total) and E. coli presence/absence	Sterile P,G	0.008% Na2S2O3	30 hours NOTE 1
Standard Plate Count	Sterile P,G	0.008% Na2S2O3	8 hours NOTE 1
Coliphage	P	Cool to 4°C, 0.5mL 10% Na2S2O3 per L of sample	48 hours
Surface Water (40 CFR 141.74(a)(1)):			
Coliform (Total) and E. coli enumeration	P,G	Cool to 4°C	8 hours NOTE 1, 3
Standard Plate Count	P,G	Cool to 4°C	8 hours NOTE 1
Coliphage	P	Cool to 4°C	48 hours
Inorganic Tests			
Alkalinity	P,G	Separate bottle completely filled to the exclusion of air, cool, 4°C	14 days
Metals (Sb, As, Ba, Be, Cd, Ca, Cr, Cu, Pb, Ni, Se, Ag, Na, Tl)	P,G	HNO3 to pH<2	6 months NOTE 2
Bromate	P,G	50 mg/L EDA	28 days
Chloride	P,G	None	28 days
Chlorite	P,G	50 mg/L EDA, Cool to 4oC	14 days
Color	P,G	Cool, 4°C	48 hours
Conductivity	P,G	Cool, 4°C	28 days
Cyanide	P,G	Cool, 4°C NaOH to pH<12 1.2 g/L ascorbic acid	14 days
Fluoride	P,G	None	28 days
Mercury	G	HNO3 to pH<2	28 days
Mercury	P	HNO3 to pH<2	28 days
Nitrate By Ion Chromatography	P,G	Cool, 4°C	48 hours NOTE 4
Nitrate Chlorinated Supplies	P,G	Cool, 4°C	14 days NOTE 4

Analyte	Bottle	Preservation	Holding Time
Nitrate Non-chlorinated Supplies	P,G	H2SO4 to pH<2	48 hours NOTE 4
Nitrite	P,G	Cool, 4°C	48 hours
Phosphorus (as Orthophosphate)	P,G	Cool, 4°C	48 hours
Silica	P	Cool, 4°C	28 days
Sulfate	P,G	Cool, 4°C	28 days
Total Filterable Residue	P,G	Cool, 4°C	7 days
Turbidity	P,G	Cool, 4°C	48 hours
UV254 Absorbance	P,G	Cool, 4°C	48 hours
Organic Tests			
Trihalomethanes Bromodichloromethane Bromoform Chlorodibromomethane Chloroform	Glass with Teflon-lined Septum	0.008%Na2S2O3 Cool 4°C	14 days
Volatile Halocarbon and Volatile Aromatics: Methy-tert-butyl ether	Glass with Teflon-lined Septum	Na2S2O3 (10 mg/40 mL is sufficient for up to 5 ppm Cl_2) added to empty sample bottle then add 1:1 HCl to pH<2. Cool 4°C	14 days
Microextractables: Method 504.1	Glass with Teflon-lined Septum	Cool, 4°C 3 mg Na2S2O3 per 40 ml vial	28 days
Method 505	40-ml glass vial with cap liner	3 mg Na2S2O3 Cool, 4°C	7 days
Method 506	1-L (or qt.) amber glass with TFE lined cap	60 mg Na2S2O3 Cool, 4°C	14 days until extraction, then 14 days after extraction
Method 507	1-L Borosilicate glass, graduated, with TFE lined cap	80 mg Na2S2O3 Cool, 4°C Protect from light	14 days until extraction, then 14 days after extraction

Analyte	Bottle	Preservation	Holding Time
Method 508	1-L Borosilicate glass, graduated, with TFE lined cap	80 mg $Na_2S_2O_3$ Cool, 4°C Protect from light	7 days until extraction, then 14 days after extraction
Method 508A PCB's, Total as decachlorobiphenyl	1-L glass, with TFE lined cap	Cool, 4°C	14 days until extraction, then 30 days after extraction
Method 508.1	1-L glass with TFE lined cap	50 mg $Na_2S_2O_3$ then 1:1 HCl to pH<2 Cool, 4°C	14 days until extraction then 30 days after extraction
Method 515.1: 515.2, 515.3 Chlorinated Acids	1-L Borosilicate glass, graduated, with TFE lined cap	80 mg $Na_2S_2O_3$ Cool, 4°C Protect from light	14 days until extraction, then 14 days after extraction
Method 525.2	Refrigerated glass sample containers, sampling must be free of plastic tubing, gaskets, etc. that may leach analytes into water	Cool, 4°C Remove Cl residual; adjust pH<2 with6 N HCl	Extract within14 days. Analyze within 30 days of sample extraction
Method 531.1 Methylcarbamate pesticides	60-ml vial with PTFE silicone faced septa	1.8 ml acetic acid Buffer to pH 3±0.2, 4.8 mg $Na_2S_2O_3$ Ship 4oC Store at-4°C.	28 days
Glyphosate	60-ml vial PTFE faced Silicone	6 mg $Na_2S_2O_3$ Cool 4oC; Protect from light	14 days
Endothall	40-ml amber glass vial with TFE lined cap	Cool 4°C; Protect from light	7 days
Diquat	1-L amber plastic or silanized glass with screw cap	100 mg $Na_2S_2O_3$ H_2SO_4 to pH=2, Cool to 4°C, Protect from light	7 days until extraction, then 21 days after extraction

Analyte	Bottle	Preservation	Holding Time
Benzo(a)pyrene	1-L (or qt.) amber glass with TFE lined cap	100 mg Na2S2O3 1:1 HCl to pH<2; Cool to 4°C; Protect from light	7 days until extraction then 30 (40 for Method 550.1) days after extraction
Method 551.1	60 ml glass vials Teflon lined Septum	Sodium Sulfite or Ammonium Chloride (for microextractables) , pH 4.5-5.0 with phosphate buffer Cool, 4°C	14 days until extraction, then 14 days after extraction
Method 552.1	Amber glass with TFE liner	Add NH4Cl to a concentration of 100mg/L in sample; Cool 4°C	Extract within 28 days of collection. Analyze extract within 48 hours if stored at 4oC or less.
Method 552.2	Amber glass with TFE liner	Add NH4Cl to a concentration of 100mg/L in sample; Cool 4°C	Extract within 28 days of collection. Analyze extract within 7 days if stored dark at 4oC or less or 14 days if 10oC or less.
Method 555	glass TFE lined	Acidify to pH2 with 1:1 HCl; Dechlorinate with 5mg NaSO3 per 100mL sample; Cool 4°C Protect from light	Analyze after extraction, within 14 days of collection
Dissolved Gases Method RSK-175	40 mL Glass with Teflon lined Septum	HCL to pH<2. Cool to <=6°C	14 days

Table 8.0 Non-potable Water Bottle and Preservation Requirements

Analyte	Bottle	Preservation	Holding Time
♦ Note that where "Cool to <=6ºC" is stated, samples are not to be frozen. Rounding down to 6ºC may not be used to meet the <=6ºC requirement. The preservation temperature does not apply to samples that are analyzed immediately (less than 15 minutes). ♦ **For bacteriological tests, when the sample is collected, leave ample air space in the bottle (at least 2.5 cm or 1 in) to facilitate mixing by shaking.** ♦ **For metals tests, an aqueous sample may be collected and shipped without acid preservation. However, acid must be added at least 24 hours before analysis to dissolve any metals that adsorb to the container walls.**			
Bacteriological Tests			
Coliform, Total, Fecal, and E. coli, and Enterococcus	P,G	Cool to <=6ºC	8 hours*
Coliform, Total, Fecal, and E. coli and Enterococcus in chlorinated samples	P,G	Cool to <=6ºC 0.008% Na2S2O3	8 hours*
Standard Plate Counts	P,G	Cool to <=6ºC, 0.008% Na2S2O3	8 hours*
*Maximum holding time includes the time elapsed from collection of the sample to placement into the incubator.			
Inorganic Tests ** ELAP offers Nitrate or Nitrite only for accreditation. ELAP does not offer combined Nitrate-Nitrite. The preservation and holding time requirements for combined Nitrate-Nitrite is cool to ≤ 6ºC, H2SO4 to pH<2, and 28 days (40 CFR 136, Table II).			
Acidity	P, FP,G Separate bottle completely filled to the exclusion of air	Cool to <=6ºC	14 days
Alkalinity	P, FP,G Separate bottle completely filled to the exclusion of air	Cool to <=6ºC	14 days

Analyte	Bottle	Preservation	Holding Time
Metals (Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Au, Fe, Pb, Mn, Mg, Mo, Ni, Pd, Pt, Ag, Tl, Sn, Ti, V)	P, FP,G	Cool to <=6ºC, H2SO4 to pH<2	28 days
Biochemical oxygen demand	P, FP,G	Cool to <=6ºC	48 hours
Bromide	P, FP,G	None	28 days
Biochemical oxygen demand, carbonaceous	P, FP,G	Cool to <=6ºC	48 hours
Chemical oxygen demand	P, FP,G	Cool to <=6ºC, H2SO4 to pH<2	28 days
Chloride	P, FP,G	None	28 days
Chlorine Residual	P, G	None	Analyze within 15 minutes
Chromium VI	P, FP,G	Cool to <=6ºC	24 hours
Chromium VI	P, FP,G	Cool to <=6ºC, Plus pH9.3-9.7 with (NH4)2SO4	28 Days
Color	P, FP,G	Cool to <=6ºC	48 hours
Cyanide, total and amendable to chlorination	P, FP,G	Cool to <=6ºC, NaOH to pH>12, 0.6g No Sulfide	48 Hrs
Cyanide, total and amendable to chlorination	P, FP,G	Cool to <=6ºC, NaOH to pH>12, 0.6g No Sulfide: Plus mitigate for interferences	14 Days
Fluoride	P	None	28 days
Hardness	P, FP,G	HNO3 or H2SO4 to pH<2	6 months
Hydrogen ion (pH)	P, FP,G	None	Analyze within 15 Minutes
Kjeldahl and organic nitrogen	P, FP,G	Cool to <=6ºC, H2SO4 to pH<2	28 days
Mercury	P, FP,G	HNO3 to pH<2	28 days
Nitrate	P, FP,G	Cool to <=6ºC	48 hours
Nitrate-nitrite	P, FP,G	Cool to <=6ºC, H2SO4 to pH<2	28 days
Nitrite	P, FP,G	Cool to <=6ºC	48 hours

Analyte	Bottle	Preservation	Holding Time
Oil and Grease	G	Cool to <=6°C, HCl or H2SO4 to pH<2	28 days
Organic carbon	P, FP,G	Cool to <=6°C, HCl or H3PO4, or H2SO4 to pH<2	28 days
Orthophosphate	P, FP,G	Filter within 15 minutes, Cool to <=6°C	48 hours
Phenols	G	Cool to <=6°C H2SO4 to pH<2	28 days
Phosphorus, total	P, FP,G	Cool to <=6°C, H2SO4 to pH<2	28 days
Residue, Total	P, FP,G	Cool to <=6°C	7 days
Residue, Filterable	P, FP,G	Cool to <=6°C	7 days
Residue, Non-filterable	P, FP,G	Cool to <=6°C	7 days
Residue, Settleable	P, FP,G	Cool to <=6°C	7 days
Silica	P, Quartz	Cool to <=6°C	28 days
Specific Conductance	P, FP,G	Cool to <=6°C	28 days
Sulfate	P, FP,G	Cool to <=6°C	28 days
Sulfide	P, FP,G	Cool to <=6°C, add zinc acetate plus sodium hydroxide to pH>9	7 days
Surfactants	P, FP,G	Cool to <=6°C	48 hours
Temperature	P, FP,G	None	Analyze within 15 Minutes
Turbidity	P, FP,G	Cool to <=6°C	48 hours
Organic Tests			
Purgeable Halocarbons plus Benzyl Chloride and Epichlorohydrin	G, Teflon- lined septum	Cool to <=6°C, Ascorbic Acid (25 mg/40 ml) for residual chlorine	14 days (7 days if not preserved)
Purgeable Aromatics	G, Teflon-lined septum	Cool to <=6°C, 0.008%Na2S2O3 for residual chlorine Preserve as above and HCl to pH<2	14 days (7days if not preserved)

Analyte	Bottle	Preservation	Holding Time
Acrolein and Acrylonitrile	G, Teflon-lined septum	Cool to <=6ºC, 0.008%Na2S2O3 for residual chlorine Preserve as above and pH to 4-5	14 days for acrylonitrile, 3 days for acrolein 14 days
Phenols	G, Teflon- lined cap	Cool to <=6ºC, 0.008% Na2S2O3 for residual chlorine	7 days until extraction 40 days after extraction
Benzidines	G, Teflon- lined cap	Cool to <=6ºC, 0.008% Na2S2O3 for residual chlorine	7 days until extraction 7 days after extraction if stored under inert gas
Phthalate Esters	G, Teflon- lined cap	Cool to <=6ºC	7 days until extraction 40 days after extraction
Nitrosamines	G, Teflon- lined cap	Cool to <=6ºC, store in dark, 0.008% Na2S2O3 for residual chlorine. For diphenylnitrosamine add 0.008% Na2S203 and adjust pH 7-10 with NaOH within 24 hours of sampling	7 days until extraction 40 days after extraction
Nitroaromatics and Isophorone	G, Teflon lined cap	Cool to <=6ºC, 0.008% Na2S2O3 for residual chlorine, store in dark	7 days until extraction 40 days after extraction
PCBs	G, Teflon-lined cap	Cool to <=6ºC	1 year until extraction 1 year after extraction

Analyte	Bottle	Preservation	Holding Time
Pesticides	G, Teflon-lined cap	Cool to <=6ºC Cool to <=6ºC, pH 5-9, 0.008% Na2S2O3 for residual chlorine if aldrin is to be determined	72 hours 7 days until extraction 40 days after extraction
Polynuclear Aromatic Hydrocarbons	G, Teflon-lined cap	Cool to <=6ºC, 0.08%Na2S2O3 for residual chlorine only, store in dark	7 days until extraction 40 days after extraction
Haloethers	G, Teflon-lined cap	Cool to <=6ºC, 0.008%Na2S2O3 for residual chlorine only	7 days until extraction 40 days after extraction
Chlorinated Hydrocarbons	G-Teflon-lined cap	Cool to <=6oC	7 days until extraction 40 days after extraction
Dissolved Gases Method RSK-175	40 mL Glass with Teflon lined Septum	HCL to pH<2. Cool to <=6ºC	14 days
***When the extractable analytes of concern fall within a single chemical category, the specified preservative and maximum holding times should be observed to safeguard sample integrity. When the analytes fall within two or more chemical categories, the sample may be preserved by cooling to ≤ 6°C, reducing residual chlorine with 0.008% Na2S2O3, storing in the dark, and adjusting the pH to 6-9; samples preserved in this manner may be held for 7 days before extraction and for 40 days after extraction. Exceptions to this procedure are noted in footnotes to 40 CFR 136 Table II and the approved methods.			

Table 9.0 Solid/Hazardous Waste Bottle and Preservation Requirements

Analyte	Bottle	Preservation	Holding Time
Note: Due to the variety of possible sample types, only generalizations can be made. Most solid samples are best preserved by refrigeration to 4 ºC. Analysis should begin as soon as possible. If SW846 does not list a holding time, then the holding time must not exceed the holding time listed for water samples. A complete record should be maintained on each sample to provide a history of sample handling from collection to analysis.			

Analyte	Bottle	Preservation	Holding Time
HCr+6	P	≤6 °C	30 days to digestion, 7 days from extraction to analysis
Mercury	P	≤6 °C	28 days
Metals	P	None	6 months
HEM, Grease & Oil	P	≤6 °C	28 days
Cyanide	P	≤6 °C	14 days
pH	P	None	Analyze immediately
Total Organic Carbon	P	≤6 °C	28 days
Volatile Organics	P	≤6 °C	14 days
Semi-volatile Organics Pesticides Herbicides	125-mL wide-mouth glass with PTFE-lined lid	≤6 °C	Samples extracted within 14 days and extracts analyzed within 40 days following extraction
PCBs	250-mL wide-mouth glass container with PTFE-lined lid.	Cool to ≤6 °C.	Samples extracted within 14 days and extracts analyzed within 40 days following extraction

23.0 Laboratory Water Supply

23.1 The water used for reagents and blanks (trip, field, method, holding) and general laboratory procedures is derived from two sources: Aries High Purity and Thermo Scientific Barnstead Nanopure Water System

23.2 Aries High Purity Water System

23.2.1 Used for all organic work and all blanks sent to clients (field, trip).

23.2.2 GC and GC/MS sections use this water as the source for the method blanks for extractions and volatile organics.

23.2.3 The water is verified on a daily basis by the analysis of a method blank and determined to be free of organic contaminates. The resistivity is checked on a daily basis and logged into a logbook.

23.2.4 The conductivity is checked on a monthly basis and the values recorded in a notebook.

23.2.5 The cartridges are replaced when the resistivity is no longer within the allowable range (0.5 to 2.0 megohms-cm).

23.2.6 No volatile organics greater than the reporting limit can be detected in this water.

23.3 Thermo Scientific Barnstead Nanopure Water System

23.3.1 Used for all inorganic work (except for BOD)

23.3.2 The conductivity is checked daily and must be within the limits of 0.5 to 2.0 megohms/m.

23.3.3 This result will be recorded daily in a logbook.

23.4 Field and Trip Blank Sample Preparation

23.4.1 Laboratory distilled water, certified as pure, is used for all field and trip blanks.

23.4.2 This water is verified as pure by analysis prior to filling the trip and field blank bottles by analysis for volatiles, semi-volatiles and pesticide/PCBs.

23.4.3 All organic analytes must be detected at less than the reporting limit.

23.4.4 A record of this analysis is kept on file in the QC department.

23.4.5 Preservations are added to the sample containers prior to shipment.

24.0 Major Equipment and Reference Measurement Standards

24.1 Preventative Maintenance Procedures

24.1.1 The preventative maintenance procedures are designed to generate consistent production of a quality product. The proper calibration and verification of equipment is critical.

24.1.2 Preventative maintenance is important in preventing probable down time and instrument problems by instituting a proactive program to ensure that the routine maintenance procedures are performed to prevent failure of the equipment during use.

24.1.3 The calibration and maintenance on all the instruments are documented in the calibration log books and the individual instrument

maintenance logbooks (most electronic maintenance records are in the LIMS).

24.1.4 See the Appendix Section 5 for general preventative maintenance.

24.2 Responsibility for Maintenance

24.2.1 The responsibility for the preventative maintenance lies with the analyst and the supervisor of the department.

24.2.2 All staff are trained to perform routine daily maintenance on instrumentation.

24.3 Service Contracts

24.3.1 All major laboratory instrumentation is covered under service contracts from either the instrument manufacturer or an outside service organization (Compco Analytical).

24.3.2 The service agreements include preplanned service during the course of the contract to minimize downtime. Examples include:

24.3.2.1 Source Cleaning, changing pump oil, cleaning the source and other routine maintenance.

24.3.3 Trained staff observes all external source maintenance

24.3.4 Once maintenance is requested, the time frame for arrival to the site is anywhere from 48 hours to 4 days depending on the specific agreement.

24.4 Equipment Redundancy

24.4.1 All major equipment has a back-up instrument that can be used in a situation where an instrument failure occurs.

24.4.2 All GC, GC/MS, ICP instrumentation have more than one instrument available at all times.

24.4.3 Spare parts for small consumables and columns are kept on site.

24.4.4 In the event that an instrument fails and no redundant instrument is available, the client is notified and arrangements are made to subcontract the impacted samples.

24.4.5 Equipment that fails is taken out of service, clearly marked, and appropriately stored (if applicable) until it has been repaired and shown by calibration test to perform correctly.

24.5 Reference Standards

24.5.1 Reference standards are obtained or calibrated by a body that can provide traceability (National Institute of Standards and Technology(NIST)).

24.5.2 Reference standards of measurement held by the laboratory are used for calibration only and for no other purpose, unless it can be shown that their performance as reference standards would not be invalidated.

25.0 Facilities

25.1 Pace Analytical Services, Inc.(Long Island) is located at:

575 Broad Hollow Road (Route 110)
Melville, New York 11747
Exit 49 South of the Long Island Expressway (495)

25.2 The laboratory comprises approximately 10,400 square feet in size (see Floor Plan, Appendix, Section 2.0)

25.3 The laboratory is subdivided into six sections:

25.3.1 Shipping/Receiving

25.3.2 Inorganic Chemistry (Wet Chemistry)

25.3.3 Inorganic Chemistry (Metals)

25.3.4 Organic Chemistry (GC)

25.3.5 Organic Chemistry (GC/MS)

25.3.6 Organic Prep Laboratory

25.4 The laboratory is staffed by approximately 50 technically qualified scientists, technicians, and support staff whose educational backgrounds vary depending on specific job functions.

25.5 The laboratories air supply is designed to minimize cross-contamination in various lab areas (e.g. sample preparation and volatile organic analysis). The air supply is monitored via computer and records of temperature fluctuations and humidity are available.

25.5.1 Negative pressure exists between the organic prep room and the rest of the laboratory to eliminate contamination of extraction solvents in the volatile organic testing areas.

25.6 Bench tops and floors are made of impervious, smooth easily cleaned

materials.

25.7 There is at least two linear meters workspace per analyst while working.

25.8 Specific work areas are defined and access is controlled. Only authorized personnel and escorted signed-in visitors may enter the work area. This limits the access of unauthorized personnel from entering work areas with potentially hazardous chemicals.

25.9 Good housekeeping measures are employed to avoid the possibility of contamination as well as to maintain safety. Good Housekeeping is critical to a safe, efficient, clean and pleasant work environment.

25.9.1 Reducing unwanted clutter helps to avoid accidents and potential for fires.

25.9.2 Maintaining standards of housekeeping conveys a sense of professionalism to those who work in and visit the laboratory.

25.9.3 An outside service provides daily cleaning of the garbage, recyclables, cleaning of the floors and cleaning of the bathrooms and cafeteria.

25.9.4 A lab maintenance person is responsible for maintenance of the lighting, water spills and all around building issues.

25.9.5 Adequate lighting and ventilation is important for a safe work environment. Safe storage of chemicals and compressed gas cylinders must be in place to prevent accidents.

25.9.6 The use of personal protective wear such as safety glasses, gloves and lab coats are to be worn in the lab areas only, not outside the lab to prevent cross contamination.

25.9.7 Emergency equipment must be in view and easily accessible: this includes but is not limited to: telephones, eye wash stations, first aid kits, fire extinguishers, fire alarms, and spill kits.

25.9.8 Keeping the floor and bench tops free of clutter also helps in keeping the lab area safe and presentable.

26.0 Security

26.1 The entire building is equipped with a security system monitored by a private alarm company.

26.2 The laboratory area is divided into separate zones.

26.3 The access doors to these areas are wired with sensors so that the zones can be operated individually.

26.4 Each employee is assigned a FOB, which allows access to the building during a preset time schedule.

26.4.1 The FOBs are codes with the analyst information and are given to each analyst.

26.4.2 The number of FOBs and responsible persons is controlled.

26.4.3 FOBs are signed for by each analyst and handed in to Human Resources if employment ends.

26.5 Access to the building is monitored both internally and by an outside security company.

26.6 The lab is equipped with a hand scanner that limits entry to the building to employees that have been scanned in for approved entry.

26.7 All other entries are made by made by either the receptionist or receiving personnel electronically opening the door.

27.0 Purchasing of Services and Supplies

27.1 Non-capital purchases in the laboratory are centralized.

27.2 Purchases of services and supplies are made from approved suppliers.

27.3 Suppliers are evaluated and approved for acceptability based on:

27.3.1 The ability to deliver services or supplies of an adequate quality to ensure confidence in the results.

27.3.2 Suppliers must be approved by the appropriate accreditation body, when applicable.

27.3.3 Reference materials shall, where possible provide evidence of traceability to SI units of measurement/NIST.

27.3.4 The ability to deliver parts and supplies in a timely matter

27.3.5 The cost must be fair.

27.4 A listing of approved vendors may be found in the Appendix, Section 4.0. These vendors are identified in the LIMS, where additional information can be found.

27.4.1 Each vendor is assigned a “vendor type”. Vendor types identified as “office supplies”, “courier” and “other” are not subject to the quality

evaluation of approved suppliers.

27.5 If no independent assurance of the quality is available, the lab must document that the product was inspected, calibrated or otherwise verified before use.

27.6 "Standing orders" are arranged as often as possible to ensure a constant supply of consumable materials while not requiring storage on site.

27.7 On a weekly basis, each department evaluates their needs for supplies.

27.8 A requisition for needed services or supplies is created from the approved vendor list, reviewed and verified by the department supervisors.

27.9 Requisitions are submitted to the purchasing agent.

27.10 All requisitions are approved by the Laboratory Director; dated with signature, before orders are placed

27.11 Records of all suppliers are maintained.

27.12 Records for services and supplies that may affect the quality of environmental tests must include the following (where applicable):

- 27.12.1 Date of receipt
- 27.12.2 Date opened
- 27.12.3 Expiration Date
  - 27.12.3.1 If no expiration date is given, the lab will use 10 years from receipt (i.e., for certain chemicals.)
- 27.12.4 Source
- 27.12.5 Lot or serial number
- 27.12.6 Calibration and verification records
- 27.12.7 Certifications

27.13 Packing slips are checked against package content labels and matched with the purchase order.

27.14 Once accepted, the packing slip is dated and initialed as evidence of compliance.

27.15 Certificates of analysis (COA) are maintained on file after the COA is checked to ensure the received item meets the minimum specifications. COAs must also be retained for analytical columns.

27.15.1 Date received is recorded on the COA and date put into service, if

applicable.

27.16 Consumables are stored in the area of use.

28.0 Waste Generation, Storage and Disposal

28.1 Waste Storage Facility

28.1.1 The waste storage room was designed and constructed according to Article XII of the Suffolk County Sanitary Code.

28.1.2 The room includes secondary containment for 15-55 gallon drums, explosion proof lighting/HVAC systems, and a fire suppression system.

28.1.3 The storage room is located adjacent to the laboratory's eastern lobby.

28.1.4 The waste room is restricted to certain personnel and is controlled by the Organic Prep Supervisor or designee.

28.1.5 Entrance to the waste room is obtained by submitting to the Special Organic Prep Supervisor, or designee a list of types and quantities of wastes to be transferred.

28.1.6 The list is reviewed and maintained by the Organic Prep Supervisor, or designee, to document the types and quantities of wastes transferred.

28.1.7 On a weekly basis, an inspection of the storage facility is conducted and documented.

Under no circumstances are any hazardous wastes discharged into any sink or drain

28.2 Bulk and Small Quantity Hazardous Wastes

28.2.1 These wastes are initially accumulated in the section of the laboratory where they are generated.

28.2.2 Bulk wastes are initially stored in containers ranging from 1 liter to 5 gallons in size.

28.2.3 After accumulation of a maximum of 5 gallons in size, the waste is transferred to a designated 55-gallon drum in the hazardous waste storage facility by the department supervisor or authorized hazardous waste handler.

28.3 Hazardous Waste Storage

28.3.1 Major Waste is segregated into 55 gallon drums as follows:

28.3.1.1 Waste acids

28.3.1.2 Waste methylene chloride/chloroform

28.3.1.3 Waste ether

28.3.1.4 Waste granulated activated carbon

28.4 Small Quantity Waste Storage

28.4.1 Small quantity waste consists primarily of contaminated samples, prepared samples, and expired or off-spec analytical standards.

28.5 Hazardous Waste Removal

28.5.1 All hazardous waste is removed for final disposal by a fully licensed transporter and treatment, storage and storage facility (TSD).

28.5.2 During transfer of wastes from the storage room by the disposal contractor, spill control equipment is on-site to respond to potential spills.

28.5.3 All final waste is processed through physical treatment and/or incineration.

28.6 Refer to the most current version of the *Waste Disposal Manual* for a comprehensive description of the laboratory policy.

29.0 Standard Reference Materials

29.1 Solvents, Reagents, and Absorbent Check Analysis

29.1.1 All solvents, absorbent materials, and reagents are routinely demonstrated to be free from contamination under the conditions of the analysis by analyzing a reagent blank.

29.1.2 All solvents, absorbent materials and reagents are stored so as to ensure their integrity by preventing against deterioration, contamination, and loss of identity.

29.1.3 Traceability of solvents, reagents and reference materials is documented by monitoring and recording:

29.1.3.1 Date received

29.1.3.2 Date opened

29.1.3.3 Expiration date

29.1.3.4 Lot numbers

29.1.3.5 Calibration or verification records

29.1.3.6 Certifications

29.2 Reference Material Use

29.2.1 Stock Standards

29.2.1.1 All stock standards purchased, if available, are traceable to NIST (National Institute of Standards and Technology).

29.2.1.2 All stocks come with documentation from the vendor attesting to the integrity of the standard solution.

29.2.2 Volatile Organic Standards

29.2.2.1 Generally, volatile standards are replaced every month or sooner if necessary.

29.2.2.2 Gas standard solutions are replaced on a weekly basis.

29.2.3 Semi-volatile and GC/ECD

29.2.3.1 Standards are generally replaced every 6 months or sooner if necessary.

29.2.4 Metals

29.2.4.1 Stock standards are generally used up to the date of expiration.

29.2.4.2 Working standards for metals analysis are prepared on a daily basis.

29.2.5 Wet Chemistry

29.2.5.1 Stock standards are generally used up to the date of expiration.

29.2.5.2 Working standards are prepared at a frequency prescribed by the analytical method.

29.2.6 Working Solutions, Prepared reagents

29.2.6.1 In addition to items listed in Section 27.12 (where applicable) all prepared solutions and reagents must include the following:

29.2.6.1.1 Date Prepared

29.2.6.1.2 Preparer's Initials

29.3 Proficiency Samples

29.3.1 The lab participates in the NYSDOH proficiency sample program.

29.3.2 In addition, other state regulatory agencies as well as outside vendors

such as ERA, Phenova or Absolute Standards provide scheduled proficiency samples for various parameters. The vendor used must be a NELAC/TNI approved PT provider.

29.3.2.1 Other vendors are used to supplement the NYSDOH PT program for parameters not supplied by the NYSDOH that are on the laboratory's scope of accreditation (i.e., other states like NJ).

29.3.3 The NYSDOH proficiency samples are performed twice a year per matrix.

29.3.4 The samples are incorporated into the analytical system and analyzed in the same manner as normal environmental samples utilizing the same staff and methods as used for routine analysis including procedures, equipment, facilities, and frequency of analysis.

29.3.5 The results of proficiency samples are reported on the supplied PT provider report forms.

29.3.6 Results are posted on the appropriate data reporting website.

29.3.6.1 NYSDOH evaluates the data and scores are assigned to each analyte as satisfactory or unsatisfactory.

29.3.6.2 No response is required for satisfactory results.

29.3.6.3 In the case of an unsatisfactory result, a review of the test and its accompanying QC is performed and the cause of the unsatisfactory result is investigated.

29.3.6.4 A report listing the cause and the corrective action is generated. This report may be provided to the pertinent accreditation authorities, when applicable.

29.4 Double Blind Samples

29.4.1 A double blind sample is one that replicates a real environmental sample in composition and appearance.

29.4.2 Laboratory sample bottles are used to prepare whole-volume PT samples by an outside standard vendor company and usually submitted as a fictitious engineering firm.

29.4.3 The full range of services provided to the customer is checked including turn around time, correctness, and customer service.

29.4.4 A report is generated documenting the accuracy of the results submitted.

30.0 Internal Quality Control

30.1 The data acquired from QC procedures are used to estimate the quality of the data to determine the need for corrective action, and to interpret results following corrective actions that were implemented.

30.2 Details of each method stipulated QC is stated in the method standard operating procedure (SOP).

30.3 When no method limits exist, QC limits are generated in-house.

30.4 If less than 20 data points are available, interim QC limits are used, i.e., 70-130% for accuracy and ±20% relative percent difference for precision.

30.5 For spiking data when 20 data points become available, limits are calculated based on the mean recovery ±3 standard deviations.

30.5.1 Results that are slightly *above* the LCS QC limit are not counted toward the allowable number of analytes outside the QC limits.

30.5.2 This situation must still be noted in the case narrative.

30.6 For duplicate data when 20 points become available, limits are calculated based on the mean of the historical difference.

30.7 Quality control measures are assessed and evaluated on an on-going basis to monitor trend analysis through control charts.

30.8 Long standing established limits are generally not updated as long as they are confirmed in order to maintain consistent Q. C.

30.9 Marginal Exceedences (ME)

30.9.1 For methods that contain a large number of analytes in the LCS, it is statistically unlikely that all analytes will be in control.

30.9.2 Upper and Lower marginal exceedence (ME) limits may be established to determine if corrective action is needed (3 standard deviation units around the mean).

30.9.3 An ME is defined as being beyond the LCS control limit but within the marginal exceedence limit.

30.9.4 The ME is calculated as being between 3 and 4 standard deviation

units around the mean.

30.9.5 Marginal exceedences must be random. If the same analyte is consistently outside the LCS control limits, the cause must be investigated.

Table 10.0: Spiking Requirements

Number of Analytes in Method	Minimum Number of Analytes to be Spiked	Number of analytes to fall outside the marginal exceedence (ME)
<10	all	0
11 to 30	80%	1
31 to 50	Spike at least 16 parameters.	2
51 to 70		3
71 to 90		4
>90		5

30.10 Matrix Spike/Matrix Spike Duplicates

30.10.1 The components to be spiked shall be as specified by the mandated test method. Any permit specified analytes, as specified by regulation or client requested analytes shall also be included.

30.10.2 If there are no specified components, the laboratory shall spike per the spiking requirements in Table 10.0. (ME do not apply).

30.10.3 The laboratory shall insure that all targeted components are included in the spike mixture over a 2-year period.

30.11 Failure to Meet QC Requirements/Customer Requirements

30.11.1 If the non-conformance requires a resampling or re-extraction, the analyst completes a form and distributes it to the QA Manager and the QC Department.

30.11.2 If there is a specific project manager, they also would receive a copy.

30.11.3 The QA department then reviews the non-compliance and takes action by either contacting the client to inform them and asking for feedback or initiating an investigation by a technical nature to determine the root cause of the problem.

30.11.4 If data must be reported even though all QC requirements were not

met, the affected sample results must be qualified in the case narrative (if applicable) or by qualifying the data on the report form.

30.12 Positive Results

30.12.1 All drinking water samples, with positive results without a historical background associated with it are re-prepped and re-analyzed for confirmation prior to reporting the result to the client.

30.12.2 A resample may be collected to confirm results, especially for SOCs.

Table 11.0: Summary of Essential QC for Chemical Analysis

REFERENCE	TYPE OF CONTROL	FREQUENCY	CRITERIA
Negative control	Method blank	1 per batch/matrix type/sample extraction or prep method	Must be less than1/10 of regulatory level or 1/10 any positive result except for normal laboratory contaminants which are addressed in SOPs and methods.
Positive control	Matrix spikes	1 per 20 samples/matrix type/prep method	Advisory only
Positive control	Lab fortified blank	1 per batch/prep procedure	Method dependent
Positive control	Laboratory control Sample	1 per batch/prep procedure	Method dependent
Precision	Matrix spike/matrix spike duplicate or duplicates	1per20/ matrix /prep procedure	Advisory
Method evaluation	Demonstration of capability	Initial verification per analyst	Method dependent
Method evaluation	Calibration	Initially with daily verification	Method dependent
Method evaluation	Proficiency results	NELAC freq	NELAC spec

REFERENCE	TYPE OF CONTROL	FREQUENCY	CRITERIA
Sensitivity	Method detection limit	Yearly	Method dependent
Data reduction	Documentation	Not specified	Protocol dependent
Quality of standards and reagents	Reagent quality checks	Reagent grade	Per label
Quality of standards and reagents	Water quality checks	Bottle checks monthly	Less than reporting limit
Selectivity	Absolute retention time and relative retention time	Method dependent	Instrument dependent
Constant and consistent test conditions	Instrument stability	None specified	Method dependent
Constant and consistent test conditions	Glassware cleaning	Method dependent	Protocol dependent

Table 12.0 Summary of Essential QC for Microbiological Analysis

REQUIREMENTS	TYPE OF CONTROL	FREQUENCY	CRITERIA
Negative control	Sterility checks and Blanks	Method specified	Method specified
Negative control	Un-inoculated control	Method specified	None specified
Positive control	Positive	Monthly	None specified
Precision	Duplicates	5% of suspected positives	None specified
Precision	Proficiency tests	NELAC	None specified
Method Evaluation	Proficiency tests	NELAC	To be specified

REQUIREMENTS	TYPE OF CONTROL	FREQUENCY	CRITERIA
Method Evaluation	Method validation	Method dependent	None specified
Test Performance	Media appropriateness	Check prior to use	None specified
Data Reduction	Analyst counting	Verify ability to count monthly	None specified
Quality of Standards, Reagents and Media	Shelf life for reagents and media	Manufacturer specified	Manufacturer specified
Quality of Standards, Reagents and Media	Water quality	Free from bacterial and inhibitory substances	Method specified
Selectivity	Traceability/selectivity	Reference cultures	Not specified
Selectivity	Confirmation/verification	Method specified	Method specified
Quality of Standards, Reagents and Media	Detergent inhibition	Check detergent lot(initially verify)	Not specified
Constant and Consistent Test Conditions	Contaminant monitoring	Trend analysis	Not specified
Constant and Consistent Test Conditions	Autoclave performance	Within temperature tolerances	Method specified
Constant and Consistent Test Conditions	Performance of volumetric equipment	Manufacturer specified	Manufacturer specified
Constant and Consistent Test	Measurement instruments	Manufacturer specified	Manufacturer specified

REQUIREMENTS	TYPE OF CONTROL	FREQUENCY	CRITERIA
Conditions			

Table 13.0 Purgeable Organics QC Summary

	Tune Performance	System Evaluation	Calibration Check	Instrument Blank	Matrix Spike Sample/ Matrix Spike Duplicate	Matrix Spike Blank	System Monitoring Compound Recoveries	Internal STD Area and RT
Measure Taken	BFB Injection	Initial calibration standards 5 levels	Continuing calibration standard run	Analyze Nanopure water	Run sample spiked with select standard mix	Run reagent water spiked with select standard mix	Add system monitoring compounds	Compare I.S. area and RT of 12 hour Std to samples
Frequency	Every 12 hours	Good until cont. calibration not met or change in system	Every 12 hours	Every 12 hours	One per 20 samples or SDG or matrix or 7 days sampling	One per 20 samples or SDG or matrix or 7 days sampling	All standards, blanks, samples, MS/MSD, MSB	every sample
Accep-tance Criteria	Ion abundance must meet ASP criteria in Table 7.2F	Maximum %RSD and minimum RRF in Table 7.2G	Maximum %D and minimum RRF in Table 7.2G	Common solvents <5 x CRQL Others <CRQL	See lab established limits	See lab established limits	See lab established limits	RT: ± 30 seconds from Std, I.S. area -50% to +100% from Std
Corrective Action	Tune with FC 43 or PFTBA	1.New standard 2.Leak check 3.Column 4.Trap	Recalibrate Using the 5 levels	1.Check spikes for contam-ination 2.Bake instrument 3.Re-analyze samples assoc.	Not required	1.Re-analyze MSB/MS/ MSD 2.Check solution 3.Check system	1.Check for calc errors 2.Check inst. 3.Re-analyze	1.Inspect MS system 2.Re-analyze samples

Table 14.0 CLP Semi-Volatile Organics QC Summary

	Tune Performance	System Evalua-tion	Calibratio n Check	Instru-ment Blank	Matrix Spike Sample/ Matrix Spike Duplicate	Matrix Spike Blank	System Monitoring Compound Recoveries	Internal STD Area and RT
Measure Taken	DFTPP Injection	Five calibration standard runs	Continuin g calibration standard run	Analyze Nanopure filtered water	Run sample spiked with select standard in duplicate	Run reagent water with spiked select standard	Spike system monitoring compounds into samples, blank standards, MS, MSD,	Monitor I.S. area and RT of samples and compare samples

							MSB	
Frequency	Every 12 hours	Good until cont. calibration not met or change in system	Every 12 hours	Per Extraction batch	One per 20 samples or SDG or matrix or 7 days collection	One per 20 samples or SDG or matrix or 7 days collection	All standards, blanks, samples, MS standards, MSD, MSB	Every 12 hours
Accept-ance Criteria	Ion abundance must meet ASP criteria in Table 7.3F	Maximum %RSD and minimum RRF in Table 7.3G	Maximum %D and minimum RRF in Table 7.3G	Common phthalate esters <5 x CRQL all others <CRQL	See lab established limits	See lab established limits	See lab established limits	RT: 30 seconds from Std, I.S. area: within –50% to +100%
Corrective Action	Tune with FC 43 or PFTBA	1.New standard 2.Leak check 3.Column 4.Trap	1.Recalibrate 2.Re-do initial calibration	1.Alleviate phthalate source 2.Re-extract SDG	Advisory	1.Check spiking 2.Re-analyze 3.MS/MSD	1.Check solution 2.Check system 3.Re-analyze	1.Check solutions 2.Check system 3.Re-analyze

Table 15.0 CLP Pesticide/PCBs QC Summary

	Initial and Continuing Calibration Column Resolution	**Initial Calibration Linearity**	**Initial and Continuous Calibration Breakdown**	**Matrix Spike Blank**	**Method Blank**
Measure Taken	Initial and continuing calibration and PEM and resolution check std (RESC)	Determine linearity by analyzing min 3 levels of Std for mixture standard single level for multi-component	Initial and continuing calibration and PEM analyzed and endrin and DDT breakdown calculated in the PEM	Reagent water spiked with select list of analytes and surrogates extracted	Reagent water Spiked with surrogate
Frequency	Initially or when continuing calibration not met or major change to system	Initially or when continuing calibration not met or major change to system	Initially or when continuing calibration not met or major change to system	Each SDG or 7 days or matrix or 20 samples	Each batch of Samples Extracted
Accept-ance Criteria	PEM: all peaks must be 90% resolved on columns Ind. A&B: midpoint conc. Resolution must be $\geq$90% %D: $\leq$ 25% of true value, %RSD $\leq$ 20%, %RSD surrog. $\leq$ 30% except <25% - and -BHC Resc. 60% resolution Two may be out but must be $\leq$ 30%		Breakdown of DDT and endrin in the PEM $\leq$ 20%, combined breakdown $\leq$ 30%	See Lab established limits	Less than CRQL
Corrective Action	1. Change the parameter (e.g. temp. prog or flow) 2. Re-analyze	Re-calibrate	1. Clip column 2. Clean injection port area	1. Check solution 2. Check instrument response 3. Re extract and reanalyze	1. Determine cause of contamination 2. Re-extract and re-analyses

Table 16.0 Organphosphorus Pesticide QC Summary

	INITIAL CALIBRATION LINEARITY	CONTINUING CALIBRATION	SURROGATE STANDARD RECOVERY	MS/MSD	LAB FORTIFIED BLANK	METHOD BLANK
Measure Taken	Six calibration standard runs	Analyze continuing Calibration Standard	Run sample spi With select standard In duplicate	Run sample spik W/ select standa In duplicate	Run reagent Water spiked W/ select standa	Analyze Nanopore water
Frequency	Good until calibration not Met or change in syster	Initially and afte Every 10 sample	All standards, blanks, Samples, MS/MSD, LFB	One per 20 samp Or SDG, or Matrix Or 7 days collection	One per 20 samp Or SDG, or mat Or 7 days collection	One per Extraction batch
Acceptance Criteria	%RSD < 20%	%D < 15% on quantitation column	Achieve recoveri	See lab establish limitable limits	See lab establish limtable limits	< CRQL
Corrective Action	1.Linear regressi function used 2.Or second ord function 3.Or quadratic curve	1.reinject 2.new solution 3.instrument corrective action 4.analyze new initial calibratio	1.Check solution 2.Check system 3.Re-analyze	Advisory	Check solution Check system Re-analyze MSB MS/MSD	Identify source Of contaminatio Re-analyze

Table 17.0 Herbicide QC Summary

	INITIAL CALIBRATIO LINEARITY	CONTINUING CALIBRATION	SURROGATE STANDARD RECOVERY	MS/MSD	LAB FORTIFIED BLANK	METHOD BLANK
Measure Taken	Six calibration standard runs	Analyze continuing Calibration Standard	Run sample spiked With select standard In duplicate	Run sample spiked W/ select standard In duplicate	Run reagent Water spiked W/ select standard	Analyze Nanopore water
Frequency	Good until calibration not Met or change in system	Initially and after Every 10 samples	All standards, blanks, Samples, MS/MSD, LFB	One per 20 samples Or SDG, or Matrix Or 7 days collection	One per 20 samples Or SDG, or matrix Or 7 days collection	One per Extraction batch
Acceptance Criteria	%RSD < 20%	%D < 15% on quantitation column	Achieve recoveries	Lab established limits	Lab established limits	< CRQL
Corrective Action	1.Linear regression function used 2.Or second order function 3.Or quadratic curve	1.Reinject 2.new solution 3.instrument corrective action 4.analyze new initial calibration	1.Check solution 2.Check system 3.Re-analyze	Advisory	1.Check solution 2.Check system 3.Re-analyze MSB/ MS/MSD	1.Identify source of contamination 2.Re-analyze

Table 18.0 CLP-M TAL Metals QC Summary

	Verification Of Linearity At CRQL	System Evaluation Calibration	Calibration Check ICV and CCV	Instrument Blank	Spiked Sample	Duplicate	Preparation Blank	ICP Interference Check Sample	Laboratory Control Sample (.CS)	ICP Serial Dilution
Measure Taken		Analyze a blank standard independence for calibration levels	Analyze standard independent from calibration	Analyze ICB and CCBs	Sample spiked with analytes	Analyze a sample twice	A prep blank carried through prep and analysis	Analyze ICS, ICS A and ICS B	Carry through prep. & analyze aqueous and solid LCS	Analyze a 5 fold dilution of sample that is 50x IDL
Frequency	After the ICV in each analysis	Each 24 hours of use	10% or every 2 hrs during analysis whichever is more frequent	10% or every 2 hrs during analysis whichever is more frequent	One per matrix and conc. or SDG whichever is more frequent	One per matrix and conc. or SDG which-ever is more frequent	One per SDG or with each batch of samples digested whichever is more frequent	At beginning and end of analysis run of minimum of 2x per 8-hr.whichever is more frequent	One LCS per batch digested per matrix or per SDG whichever is more frequent except Hg and Cn	If analyte conc. is at minimum of factor of 50 above IDL on each group of samples of a similar matrix or for each SDG
Acceptance Criteria	Advisory	± 5% of true value except at CRDL	See Table 7.5B	Absolute value must be less than or equal to the CRDL	Spike recov. Should be between 75-125% except if sample conc. 4x > spike conc.	> 5x CRQL RPD 20%, < 5x CRQL or one above and one below RPD ± CRQL	The absolute value must be less than or equal to CRQL	ICS AB must be within ± 20% of true value	80–120% except Ag & Sb, soil/sed's limits provided 10/LCS	Dilution must be within 10% of the original determination
Corrective Action	None	Re-calculate	1.Stop analysis 2.Correct problem 3.Re-calibrate 4.Re-analyze	1.Stop analysis 2.Correct problem 3.Re-calculate 4.Re-analyze	Flag with "N" and for non-furnace & Hg elements also perform a post-spike	Flag with "*"	If above CRDL, the lowest conc. in the smpls must be 10x blank conc. or re-digested and re-analyzed	1.Stop analysis 2.Correct problem 3.Re-calibrate 4.Re-analyze	1.Terminate 2.Correct 3.Re-digest/ re-analyze	Flag with "E"

Table 19.0 Wet Chemistry QC Summary

Parameter	Method	ICV/ CCV/ Freq	ICV/ CCV Limits	Matrix Spike Freq	Matrix Spike Limits *	ICB/ CCB Freq	ICB/ CCB Limits	DUP Freq	RPD Limits
Alkalinity	SM2320B	1 per 10	± 20%	1 per 20	± 25%	1 per 10	± CRQL	1 per 20	± 20
BOD	SM5210B	1 per 20	± 20%	NA	NA%	1 per20	± CRQL	1 per 20	± 20%
Chloride	SM4500 ClE	1 per 10	± 20%	1 per 20	± 25%	1 per 10	± CRQL	1 per 20	± 20% or CRQL
Nitrate	353.2	1 per 10	± 20%	1 per 20	± 25%	1 per 10	± CRQL	1 per 20	± 20% or CRQL
Sulfate	SM4500 SO4E	1 per 5	± 20%	1 per 20	± 25%	1 per 10	± CRQL	1 per 20	± 20% or CRQL
TDS	SM2540C	1 per 10	±20%	1 per 20	±25%	1 per 10	± CRQL	1 per 20	± 20% or CRQL
TSS	SM2540 D	1 at start of run	±20%	NA	NA	1 per 10	± CRQL	1 per 20	± 20% or CRQL
Color	SM2120B	1 per 10	± 20%	NA	NA	1 per 20	± CRQL	1 per 20	± 20% or CRQL

Turbidity	180.1	1 per 10	± 10%	NA	NA	1 per 10	± CRQL	1 per 20	± 20%
Hex. Chrom	SM3500 CRD	1 per 10	± 20%	1 per 20	± 25%	1 per 10	± CRQL	1 per 20	± 20%
TPH	1664A	1 per 10	± 20%	1 per 20	± 25%	1 per 10	± CRQL	1 per 20	± 20%
TOC	SM5310B	1 per 10	± 20%	1 per 20	± 25%	1 per 10	± CRQL	1 per 20	± 20%
TOC	9060	1 per 10	± 20%	1 per 20	± 25%	1 per 10	± CRQL	Quad 1 per 20	± 3 SD
Total Phenols	420.1	1 per 10	± 10%	1 per 20	± 25%	1 per 10	± CRQL	1 per 20	± 20% or CRQL
Ammonia	350.1	1 per 10	± 20%	1 per 20	± 25%	1 per 10	± CRQL	1 per 20	± 20% or CRQL
COD	410.4	1 per 10	± 20%	1 per 20	± 25%	1 per 10	± CRQL	1 per 20	± 20% or CRQL
TKN	351.2	1 per 10	± 20%	1 per 20	± 25%	1 per 10	± CRQL	1 per 20	± 20% or CRQL
Hardness	SM2340C	1 per 10	± 10%	1 per 20	± 25%	1 per 10	± CRQL	1 per 20	± 20% or CRQL
Oil & Grease	1664A	1 per 20	± 20 &	1 per 20	± 25%	1 per 20	+ CRQL	1 per 20	± 20% or CRQL
Sulfide	SM4500 SE	1 per 10	± 20%	1 per 20	± 25%	1 per 10	± CRQL	1 per 20	± 20% or CRQL

* = If outside limits, repeat matrix spike analysis once.

31.0 Departures from Documented Policies and Procedures

31.1 All policies and procedures in place in the laboratory must be adhered.

31.2 Departures from documented policies and procedures may be permitted if approved by the QA Manager, Laboratory Manager, or Technical Manager.

31.3 This departure must be fully documented and include the reason for departure and signed and dated by either the Technical Manager, Laboratory Manager, or the QA Manager.

31.4 No departures are permitted unless this procedure is followed.

32.0 Instrument Corrective Action

32.1 Specific corrective action protocols for handling out-of-control QC are stated in each SOP.

32.2 Instrument Corrective Action

32.2.1 The analyst is responsible for reviewing the initial calibration, blank and QC check criteria for adherence to the method requirements prior to initiating sample analysis.

32.2.2 On going QC is checked by the analyst either in real time or the

following morning for an overnight run.

32.2.3 The analyst is responsible for reviewing the data in comparison with the QC of the method.

32.2.4 Analysis proceeds if all QC is met and analysis is halted if the QC requirements are not met.

32.2.5 Corrective actions are taken to correct instrument non-compliances that may include:

32.2.5.1 Checking calculation

32.2.5.2 Verification of standard

32.2.5.3 Recalibrating instrument

32.2.5.4 Baking out the instrument, etc.

32.2.6 If the corrective action doesn't correct the instrument non-compliance, the department supervisor is notified and is involved in the decision making process of corrective action.

32.2.7 If due to holding time constraints analysis must proceed, another instrument will be used if available.

32.2.8 If another instrument is not available, the QC Manager and Laboratory Manager are notified and if the QC requirement does not affect the sample results, the sample analysis may be approved and the discrepancy noted on the report or in the case narrative.

32.2.9 The QA Manager or Laboratory Manager may override the QC requirement.

32.2.10 This is documented in the run log by the initials, date and a short statement of the non-compliance and that it was approved.

32.2.11 Either the QA Manager or Laboratory Manager grants approval with the documentation in the run log only.

32.2.12 General procedures are followed to determine when departures from quality control have occurred.

32.3 Due to sampling schedule and time frame of analysis, it is not always possible to repeat the analysis if the quality control measures are not acceptable.

32.4 If a quality control measure is found to be out-of-control and the data is to be reported, all samples associated with the failed quality control measure are

reported with the data qualified.

32.4.1 This may occur by the addition of the qualifier to the result:

32.4.1.1 B – analyte detected in method blank

32.4.1.2 E – concentration level over calibration

32.4.1.3 J – estimated result

32.4.2 It may also be documenting the discrepancy in the case narrative (if it is a full data package) or by indicating the non-conformance in the remarks section in the lab report.

32.4.3 A non-conformance report is completed documenting the out-of-control QC event and stating corrective measures to prevent re-occurrence.

33.0 Systems/Internal Audits

33.1 The laboratory has a program of audits to ensure the effective operation of the quality system. Several different types of audit procedures are used in the laboratory. These include the following:

33.1.1 Non-conformance Summary Reports

33.1.1.1 This form is used intra as well as interdepartmental to note any deficiencies, systematic or human errors for specific samples.

33.1.2 LIMs Holding Time Worksheet

33.1.2.1 The ACCESS-based LIMs has the capability to monitor samples and required analyses by holding time.

33.1.2.2 A daily printout lists the sample and the date by which it must be prepared/analyzed.

33.1.2.3 This is reviewed on a daily basis by the Laboratory supervisors to ensure that holding times are met.

33.1.3 Data Package Review

33.1.3.1 All data packages are reviewed by the QA Manager, QA Analyst or departmental supervisors.

33.1.4 Internal Audit of Chain-of- Custody (COC)

33.1.4.1 The QA Manager or designated representative conducts random audits of the internal COC records.

33.1.4.2 A sample is tracked throughout the internal custody of the department to ensure consistency.

33.1.4.3 Since all COC documentation is submitted in the data packages, the COC is also reviewed at that time.

33.1.5 Internal Audit of QC Measures and Records

33.1.5.1 The QA Manager or designated representative conducts random inspections of the various laboratory departments.

33.1.5.2 This may be formal (use of checklist) or informal.

33.1.5.3 These inspections include logbook review, QC records, standard preparation logs and instrument maintenance records.

33.1.5.4 This may include retesting of samples, intralaboraory comparison of results and interlaboratory comparisons.

33.1.6 Data Package Audit

33.1.6.1 On a weekly basis, an update of the status of deliverable requirements is prepared in the QA Department and given to all managers and supervisors to monitor the progress of the data packages.

33.1.6.2 Corrective measures are taken if the department or reporting of the various components of the package is not on schedule.

33.1.7 Methods Audit

33.1.7.1 Analyst reviews of the in-house SOPs are occasionally performed to ensure compliance with the method.

33.1.7.1.1 If no updates are necessary, a review date will be recorded on the SOP cover page with reviewer's signature either manually or electronically.

33.1.7.2 The analyst will review the most recent version of the SOP and make edits if necessary to comply with the method. A new revision may be required.

33.1.8 Quality System Audit

33.1.8.1 An annual quality systems audit of technical activities is performed. These audits are designed to verify that activities are conducted in accordance with the requirements of the laboratory

quality system.

33.1.8.2 Internal audits of aspects of the quality system as well as the technical methods utilized in the laboratory are audited according to a schedule implemented by lab management for the year.

33.1.8.3 All aspects of the quality systems in the lab are audited on an annual basis by qualified personnel.

33.1.8.4 The following documents the qualifications and experience of the personnel required to conduct audits and the requirements for documenting audits and follow-up.

33.1.8.4.1 The management team of the lab will be performing the majority of the internal audits. The managers will be independent of the activity that they are auditing.

33.1.8.4.2 The training requirements and experience required for the various training activities is as follows: The staff performing the audits in the laboratory must be experienced in the area in the lab that they are auditing. Training on conducting an audit will be performed for all members of the audit team to allow for consistency. The departmental audits will be performed by individuals with expertise in those areas. The minimum requirements for experience are 5 years working in the lab area. A formalized and consistent approach to documentation of the audit findings and response is established and will be given to the audit team for use in the audit procedure.

33.1.8.4.3 The audits for method review will be a witnessing audit. The auditor will have a copy of the SOP as well as the analytical method. The analyst will perform the method witnessed by the auditor.

Questions will be raised while auditing and an assessment form will be completed by the auditor. A document of the deficiencies/deviations will be forwarded to the department supervisor for review and response. The supervisor will review the audit findings with the analysts and prepare a corrective action form for response to the audit. This will be submitted to the auditor for review and acceptance. A follow-up assessment will occur to ensure that the corrective actions have been implemented. This will also be documented and placed in the audit file. The audit file will be forwarded to the QA Manager for review and retention.

33.1.8.5 In cases where the audit identifies circumstances in which the correctness or validity of test results is questioned, the laboratory must take corrective action immediately and notify all clients whose work may have been affected.

34.0 Performance/External Audits

34.1 Several procedures are in place for monitoring the performance of the product produced by the laboratory.

34.1.1 External Data Validation

34.1.1.1 A minimum of 20% of the data packages produced by the laboratory undergo data validation by an outside service.

34.1.1.2 A report is generated listing the comments by noted by the validator.

34.1.1.3 The QA Manager responds to the comments noted by the validator, and if necessary, corrective action measures are introduced in the appropriate department.

34.1.2 Internal Data Validation

34.1.2.1 The review of the data covers:

34.1.2.1.1 appropriateness of equations used

34.1.2.1.2 correctness of numerical input

34.1.2.1.3 numerical correctness of all calculations (accomplished by re-performing numerical computations)

34.1.2.2 The review process must be thorough enough to verify the results.

34.1.2.3 If the reviewer disagrees with any part of the computations, the reviewer marks through the number with a single line and places the revised number above it.

34.1.2.4 All large corrections are returned to the analyst for modification.

34.1.2.5 The originator of the data shall review any changes made by the reviewer.

34.1.2.6 If the originator agrees with the change, no action is necessary.

34.1.2.7 If the originator disagrees, then both the originator and reviewer must resolve the difference so that they agree with the result presented.

34.1.3 Inter-Laboratory Comparison Testing Programs

34.1.3.1 Testing in regards to blind samples or comparison of data inter-laboratory is performed periodically.

34.1.4 State/Federal Laboratory Audits

34.1.4.1 The laboratory is certified in several states.

34.1.4.2 The laboratory is audited for all methods in use on an ongoing basis.

34.1.5 Consultant/Customer Laboratory Audits

34.1.5.1 Clients may choose to audit the laboratory at any stage during project development and analysis.

34.1.6 Proficiency Sample Program

34.1.6.1 The laboratory participates the NYSDOH Proficiency Program as well as outside PT provider programs.

34.1.7 Double Blind Samples

34.1.7.1 An outside supplier may be utilized to evaluate the capability of the laboratory through the use of double blind samples.

35.0 Corrective and Preventive Action

35.1 Preventive Action

35.1.1 A proactive approach is taken in regards to the initiation of preventative actions where the process includes the identification of opportunities for improvement rather than a reaction to the problem.

35.1.2 Improvements and potential sources of non-conformances, either technical or concerning the quality system, shall be identified on an ongoing basis.

35.1.3 Opportunities for improvements may be identified through management reviews/meetings, quality system reviews, internal and external audits, client feedback/customer complaints or staff observations.

35.1.4 If preventative action is required, plans will be put into place and monitored for effectiveness.

35.1.5 Some examples of preventative action are:

35.1.5.1 The use of holding time worksheets

35.1.5.2 Analyst monitoring of method QC requirements

35.1.5.3 Instrument maintenance

35.1.5.4 Column Replacement

35.1.5.5 Preparation of new solutions as needed

35.1.5.6 Checking calculations

35.1.5.7 Performing re-analysis

35.1.5.8 Schedule changes

35.1.5.9 Data Validation

35.1.5.10 Internal Audits

35.1.5.11 Non-conformance reports

35.1.5.12 Double Blind Samples

35.2 Corrective Action

35.2.1 Corrective Action is implemented to document the reasons behind and

remediation for an isolated event or a pattern of events that could potentially raise concerns about data integrity should they not be properly recorded.

35.2.2 The first step in corrective action is to identify the root causes.

35.2.2.1 Potential root causes that are evaluated are problems with:

35.2.2.1.1 Customer requirements

35.2.2.1.2 Samples

35.2.2.1.3 Sample specifications

35.2.2.1.4 Methods and procedures

35.2.2.1.5 Personnel skills and training

35.2.2.1.6 Consumable materials

35.2.2.1.7 Equipment

35.2.2.1.8 Calibration

35.2.3 Where corrective action is needed, the laboratory shall identify potential corrective actions.

35.2.4 Corrective actions are designed to select and implement the action(s) most likely to eliminate the problem and to prevent recurrence.

35.2.5 Corrective actions shall be to a degree appropriate to the magnitude and the risk of the problem.

35.2.6 The QA Manager shall document and implement any required changes resulting from corrective action investigations.

35.2.7 The QA Manager shall monitor the results to ensure that the corrective actions taken have been effective.

35.2.8 Where the identification of non-conformances or departures casts doubts on the laboratory's compliance with its own policies and procedures, or on its compliance with regulations, the laboratory shall ensure that the appropriate areas of activity are audited as soon as possible.

35.2.9 An agreed upon time frame shall be determined, as appropriate, for the completion of corrective measures. The time frame for notifying clients of events that cast doubt on the validity of results is immediately.

36.0 Quality System Report to Management

36.1 On an annual basis the laboratory's executive management performs a review of the laboratories quality system and environmental testing activities to ensure their continuing suitability and effectiveness, and to introduce necessary changes or improvements.

36.2 The review shall take account of:

36.2.1 the suitability of policies and procedures

36.2.2 reports from managerial and supervisory personnel

36.2.3 the outcome of recent internal audits

36.2.4 corrective and preventive actions

36.2.5 assessments by external bodies

36.2.6 the results of interlaboratory comparisons or proficiency tests

36.2.7 changes in the volume and type of the work

36.2.8 client feedback

36.2.9 complaints

36.2.10 other relevant factors, such as quality control activities, resources and staff training

36.3 Findings from management reviews and the actions that arise from them shall be recorded.

36.4 All actions will be addressed within 90 days of their identification.

37.0 Procedure for Dealing with Complaints

37.1 Records of all complaints received from clients or other parties are maintained as well as the investigations and potential corrective actions that arise from the compliant.

37.2 Customer Service/Timeliness of Reports/Invoice Issues

37.2.1 Complaints that deal with responsiveness to the client are handled by laboratory staff.

37.2.2 If a client complains that they have not received resolution to a complaint, the call may be forwarded to the Project Manager, QA Manager or Laboratory Manager for resolution.

37.2.3 These issues are documented via email or phone log.

37.3 Quality of Product

37.3.1 All complaints received regarding the quality of the data produced are handled by the QC department.

37.3.2 The date and the name of the person receiving the complaint, source of complaint, resolution and any written material associated with the complaint are documented and kept on file in the project management department.

37.3.3 The form is completed by the individual who received the complaint and forwarded to the QA Manager for investigation.

37.3.4 The complaint is investigated by the QA officer or designee and a technical review of the suspected test is undertaken.

37.3.5 The results of the investigation are documented on a customer complaint form.

37.3.6 This information is to be used by all laboratory personnel that have contact with clients.

37.3.7 These forms need to be filled out each time there is a customer complaint (for example- late results, client left message and was not called back, etc).

37.3.8 These files are located in S:\LABSHARE\NELACLOGS\

38.0 Training and Orientation

38.1 Training for Pace employees is managed through a web-based Learning Management System. After a new employee has been instructed in matters of human resources, they are given instructional materials for the LMS and a password for access.

38.2 A new hire training checklist is provided to the new employee that lists training items for the employee to work through either independently on LMS or with their supervisor or trainer. The training items that can be completed independently include:

- Reading through applicable Standard Operating Procedures;
- Reviewing the Quality Manual and Chemical Hygiene Plan;

- Core training modules such as quality control indicators, basic laboratory skills, etc.;
- Quality Systems training including traceability of measurements, method calibration, calibration verification, accuracy, precision and uncertainty of measurements, corrective actions, documentation, and root cause analysis;
- Data Integrity/Ethics training.

38.3 The new employee's Department Supervisor provides the employee with a basic understanding of the role of the laboratory within the structure of PASI and the basic elements of that individual's position. Supervised training uses the following techniques:

- Hands-on training
- Training checklists/worksheets
- Lectures and training sessions
- Method-specific training
- Conferences and seminars
- Short courses
- Specialized training by instrument manufacturers
- Proficiency testing programs.
- On-line courses

38.4 Group Supervisors/Leaders are responsible for providing documentation of training and proficiency for each employee under their supervision. The employee's training file indicates what procedures an analyst or a technician is capable of performing, either independently or with supervision. The files also include documentation of continuing capability. Training documentation files for each person are maintained by the Quality Office either in hardcopy format or within the LMS.

38.5 All procedures and training records are maintained and available for review during laboratory audits. These procedures are reviewed/updated periodically by laboratory management.

39.0 Data Integrity System

39.1 The data integrity system at PASI provides assurances to management that a highly ethical approach is being applied to all planning, training and implementation of methods. Data integrity is crucial to the success of our company and Pace Analytical is committed to creating and maintaining a culture of quality throughout the organization. To accomplish this goal, PASI has implemented a data integrity system that encompasses the following four requirements:

39.1.1 A data integrity training program: standardized training is given to each new employee and a yearly refresher is presented to all employees. Key topics addressed by this training include:

39.1.1.1 Need for honesty and transparency in analytical reporting

39.1.1.2 Process for reporting data integrity issues

39.1.1.3 Specific examples of unethical behavior and improper practices

39.1.1.4 Documentation of non-conforming data that is still useful to the data user

39.1.1.5 Consequences and punishments for unethical behavior

39.1.1.6 Examples of monitoring devices used by management to review data and systems

39.1.2 Signed data integrity documentation for all employees: this includes a written quiz following the Ethics training session and written agreement to abide by the Code of Ethics and Standards of Conduct explained in the employee manual.

39.1.3 In-depth, periodic monitoring of data integrity including peer data review and validation, internal raw data audits, proficiency testing studies, etc.

39.1.4 Documentation of any review or investigation into possible data integrity infractions. This documentation, including any disciplinary actions involved, corrective actions taken, and notifications to customers must be retained for a minimum of five years.

39.2 PASI management makes every effort to ensure that personnel are free from any undue pressures that affect the quality of their work including commercial, financial, over scheduling, and working condition pressures.

39.3 Corporate management also provides all PASI facilities a mechanism for

confidential reporting of data integrity issues that ensures confidentiality and a receptive environment in which all employees are comfortable discussing items of ethical concern. The anonymous message line is monitored by the Corporate Director of Quality who will ensure that all concerns are evaluated and, where necessary, brought to the attention of executive management and investigated. Any Pace employee can contact corporate management to report an ethical concern by calling the anonymous hotline at 612-607-6431.

40.0 Demonstration of Capability (DOC)

40.1 A demonstration of capability is a procedure to establish the ability of the analyst to generate acceptable accuracy.

40.2 Analysts complete an initial DOC study prior to analyzing samples by a given method or when there is a change in instrument type, personnel or test method.

40.3 The mean recovery and standard deviation of each analyte, taken from 4 replicates of a quality control standard is calculated and compared to method criteria (if available) or in-house control limits.

40.3.1 For parameters where this does not apply, the analysis of authentic samples may be analyzed by another trained analyst with statistically identical results.

40.4 If the parameters meet the required limits analysis may proceed.

40.5 If not, performance is deemed unacceptable for that parameter and corrective measures are taken to determine the problem.

40.6 All attempts to demonstrate capability shall be documented and available for review.

40.7 Analysis is not permitted until acceptable performance has been demonstrated.

40.7.1 A certification statement is completed and the statement and raw data are placed in the employee files, which includes electronic files stored on the network.

40.7.2 The newly trained analyst is permitted to perform sample analysis independently, still under close supervision of the instructor.

40.8 The QA Manager and/or Supervisors maintains all raw data associated with the DOC on file and monitors progression of training of individuals in the

various tasks.

40.8.1 Tables for the departments are maintained, reflecting the tests that can be performed by each analyst.

40.8.2 These tables are periodically updated in the computer system to provide a reference for management about capabilities of each employee to perform testing and training requirements.

40.8.3 The analyst's capabilities are verified annually (continuing demonstration of capability) by various means such as proficiency testing, Lab fortified blank analysis, blind duplicate testing or another DOC.

41.0 Policy on Stress Reduction and Quality of Work

41.1 Open communication is encouraged for all employees of the laboratory. The Human Resources Department, the QA Manager and the Laboratory Manager have an open door policy for discussion of issues and concerns.

41.2 Procedures are in place to allow the staff to be free of undue pressures and stress.

41.2.1 These include a means of technical communication to allow for the notification of noncompliant data and the corrective action needed. All analysts are empowered with a stop work authority to allow for maintenance and to notify upper management of the need for corrective action and additional support in correcting an issue.

41.2.2 The department supervisor, QA Manger, and the Technical Managers are all empowered to assist the analyst with technical issues to resolve problems.

41.2.3 A nonconformance form is filled out to allow for notification of noncompliant data and the corrective action.

41.2.4 The case narrative and comment field on lab reports allows for communication to the clients of nonconformances as well.

41.3 An additional means of reducing the stress of the work place has been implemented.

41.3.1 This includes wellness programs to allow for a change of focus from

work only to the health and well being of the person. Seminars, group fitness activities such as yoga and healthy lifestyle discussions are part of the program. Several of the seminars that have been held during the work day are as follows:

41.3.1.1 Emotional freedom: Techniques for Immediate Relief of Stress, Anxiety and Cravings, Sleepless in Long Island, Life's Simple 7: Tips for Healthier Living, Beating the Sugar Blues, Wellness from Within-The Mind Body Connection, Symptoms of heart Disease and Strokes.

41.3.1.2 The lab has implemented "fruit Wednesday" where fresh fruit is served all day to allow for a break from the routine.

41.3.1.3 These personal focuses have allowed a break from the work only mentality.

42.0 Standard Operation Procedures

42.1 Electronic copies of SOPs are available to all employees.

42.2 The SOP lists the title, revision number the effective date and signatures of the approving authority.

42.3 SOPs .

42.4 Each method SOP contains the following information or references where the information may be found.

42.5 The information listed in the SOP may not be in the following order:

42.5.1 Identification of test method

42.5.2 Applicable matrix or matrices

42.5.3 Detection limit

42.5.4 Scope and application to be analyzed

42.5.5 Summary of the test method

42.5.6 Definitions

42.5.7 Interference's

42.5.8 Safety

42.5.9 Equipment and supplies

42.5.10 Reagents and standards

42.5.11 Sample collection, preservation, and storage

42.5.12 Quality control

42.5.13 Calibration and standardization

42.5.14 Calculations

42.5.15 Method performance

42.5.16 Pollution prevention

42.5.17 Data assessment and acceptance criteria

42.5.18 Corrective action for out of control data

42.5.19 Contingencies for handling out of control data

42.5.20 Waste management

42.5.21 References

42.5.22 Any tables, diagrams, flow charts and validation data

42.5.23 Equipment/instrument maintenance, computer hardware and software and troubleshooting

43.0 References

1. "New York State Department of Environmental Protection Analytical Services Protocol" October 1995, or most recent approved version.

2. "New York State Department of Environmental Protection Analytical Services Protocol" June 2000, or most recent approved version.

3. "New York State Department of Environmental Protection Analytical Services Protocol" July 2005, or most recent approved version.

4. "Methods for the Determination of Organic Compounds in Drinking Water", EPA/600/4-88/039, USEPA Office of Research and Development, Washington D.C., December 1988, revised July 1991, or most recent approved version.

5. "Method for the Low Level Determination of Total Organic Carbons", USEPA Environmental Monitoring and Support Laboratory, Cincinnati, Ohio, April 1978, or most recent approved version.

6. "The Determination of Total Organic Halide", Interim Method 450.1, USEPA Environmental Monitoring and Support laboratory, Cincinnati, Ohio, November 1980, or most recent approved version.

7. "Methods for Chemical Analysis of Water and Wastes", E600/4-79/020, USEPA Environmental Monitoring and Support Laboratory, Cincinnati, Ohio Revised 1983, or most recent approved version.

8. "Standard Methods for the Examination of Water and Wastewater", 18th Edition, 1992, American Public Health Association (APHA), or most recent approved version.

9. "Analytical Handbook", New York State Department of Health, Analytical Methods Toxicology Institute, Division of Laboratories and Research, Albany, New York, Revised January 1986, or most recent approved version.

10. "Methods for the Determination of Organic Compounds in Drinking Water", Supplement I, EPA600/4-90/020, USEPA Office of Research and Development, Washington, D.C., December 1988, revised July 1991, or most recent approved version.

11. "Methods for the Determination of Organic Compounds in Drinking Water -Supplement II", EPA/600/R-92/129, USEPA Office of Research and Development, Washington, D.C., December 1988, revised July 1991, or most recent approved version.

12. "Test Methods for Evaluating Solid Waste", EPA/SW-846, USEPA, Water Characterization Branch, Update 3 Dec. 1996, or most recent approved version.

13. "Handbook for Analytical Quality control in Water and Wastewater Laboratories". USEPA, Office of Research and Development, Cincinnati, Ohio 1979, or most recent approved version.

14. "Methods for Organochlorine Pesticides and Chlorophenoxy Acid Herbicides in Drinking Water and Raw Source Water", EPA/600/4-81/053, USEPA, EMSL Cincinnati, Ohio July 1978, or most recent approved version.

15. "Methods for the Determination of Organic Compounds in Finished Drinking Water and Raw Source Water":, USEPA, EMSL, USEPA Cincinnati, Ohio, Revised December 1988, or most recent approved version.

16. USEPA Contract Laboratory Protocol Statement of Work for Inorganic Analysis, SOW, ILMO 4.1, Revised 1999, or most recent approved version.

17. USEPA Contract Laboratory Protocol Statement of Work For Organic, OLMO 4.2 Revised May 1999, or most recent approved version.

18. "Compendium of Methods for the Determination of Air Pollutants in Indoor Air". USEPA Office of Research and Development, Washington, D.C., April 1990, or most recent approved version.

19. "Guidance for Performing Tests On Dredged Material to be Disposed of in Ocean Waters", US Army Corps of Engineers, December 1984, or most recent approved version.

20. "EPA Regulations On Test Procedures for the Analysis of Pollutants", USEPA 40 CFR 136, October 1984, revised August 1990, or most recent approved version.

21. "NIOSH Manual of Analytical Methods, Fourth Edition", U. S. Department of Health and Human Services, Cincinnati, Ohio, August 1994, or most recent approved version.

22. "Analytical Handbook", New York State Department of Health, Laboratory of Organic Analytical Chemistry, Albany, NY 1988, or most recent approved version.

23. "Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air", EPA/600/4-84/041, USEPA Environmental Monitoring System Laboratory, April 1984, Revised June 1998, or most recent approved version.

24. "Protocol for the Collection and Analysis of Volatile POHCs Using VOST", Environdyne Engineers, Inc., St. Louis, Missouri, March 1984, or most recent approved version.

25. "Validation of the VOST Protocol, Volume 2 – Field Validation Phase", NTIS, PEI Associates, Inc., Cincinnati, Ohio, January 1986, or most recent approved version.

26. "USEPA Contract Laboratory Program – Volatile Organics Analysis of Ambient Air', Revised VCAA 01.0, December 1991, or most recent approved version.

27. "USEPA Contract Laboratory Program – Metal Analysis of Ambient Air", Revised MAA 01.0, December 1991, or most recent approved version.

28. "USEPA Contract Laboratory Program – Semi-volatile Organics Analysis of Ambient Air",

Revised SVAA 01.0, January 1992, or most recent approved version.

29. "Superfund Analytical Methods for Low Concentration Water for Organics Analysis", EPA/540/R-94/087, USEPA Office of Solid Waste and Emergency Response, Cincinnati, Ohio, December 1994, or most recent approved version.

30. "Methods for the Determination of Inorganic Substances in Environmental Samples", EPA/600/R-93/100, USEPA Office of Research and Development, Washington, D.C., August 1993, or most recent approved version.

31. "USEPA Contract Laboratory Program – Multimedia High – Concentration", 50W No. Rev 9/88 including Rev. 4/89, or most recent approved version.

32. "Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air', USEPA Office of Research and Development, Research Triangle Park N.C. EPA/600/4-89/018, June 1988, or most recent approved version.

33. "Environmental Laboratory Approval Program Certification Manual", New York State Department of Health, Wadsworth Center, 10/99 update, or most recent approved version.

34. "Methods and Guidance for Analysis of Water", USEPA Office of Water, Washington, D.C., EPA 827 C97001, April 1997, or most recent approved version.

35. "Determination of Metals in Environmental Samples", Supplement I, EPA 600/R-94/11, May 1994, or most recent approved version.

36. "Methods for the Determination of Organic Compounds in Drinking Water -Supplement III", EPA/600/R-95/131, USEPA Office of Research and Development, Washington, D.C., December 1988, revised August 1995, or most recent approved version.

37. "Standard Methods for the Examination of Water and Wastewater", 19th Edition, 1995, American Public Health Association (APHA), or most recent approved version.

38. "Manual for the Certification of Laboratories Analyzing Drinking Water, Criteria and Procedures Quality Assurance" USEPA Office of Water, Office of Ground Water and Drinking Water, Technical Support Center, Cincinnati, Ohio 45268, EPA 815-R-05-004, January 2005, Fifth Edition.

39. "Definition and Procedure for the Determination of the Method Detection Limit- Revision 1.11" 40 CFR Part 136, Appendix B

40. National Environmental Laboratory Accreditation Conference (NELAC) Constitution, Bylaws and Standard, approved June 5, 2003, (EPA/600/R-04/003)

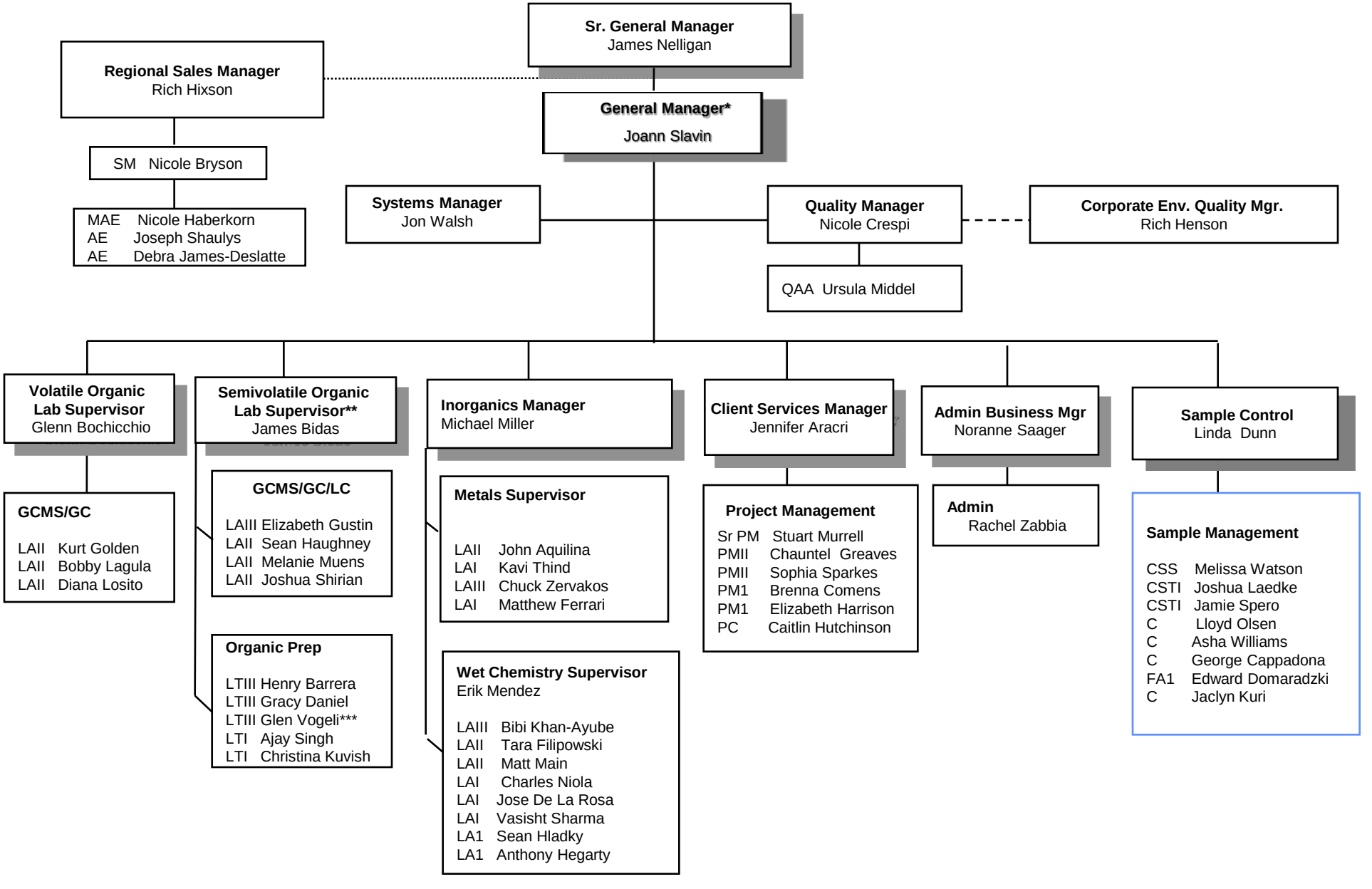
41. 2009 TNI Laboratory Accreditation Standards

42. ISO/IEC 17025:2005, General requirements for the competence of testing and calibration laboratories.

QUALITY ASSURANCE
QUALITY CONTROL MANUAL
Appendix

Section 1.0 Organizational Chart

Pace Long Island



*TNI Technical Director

**Waste Coordinator

***Safety Officer

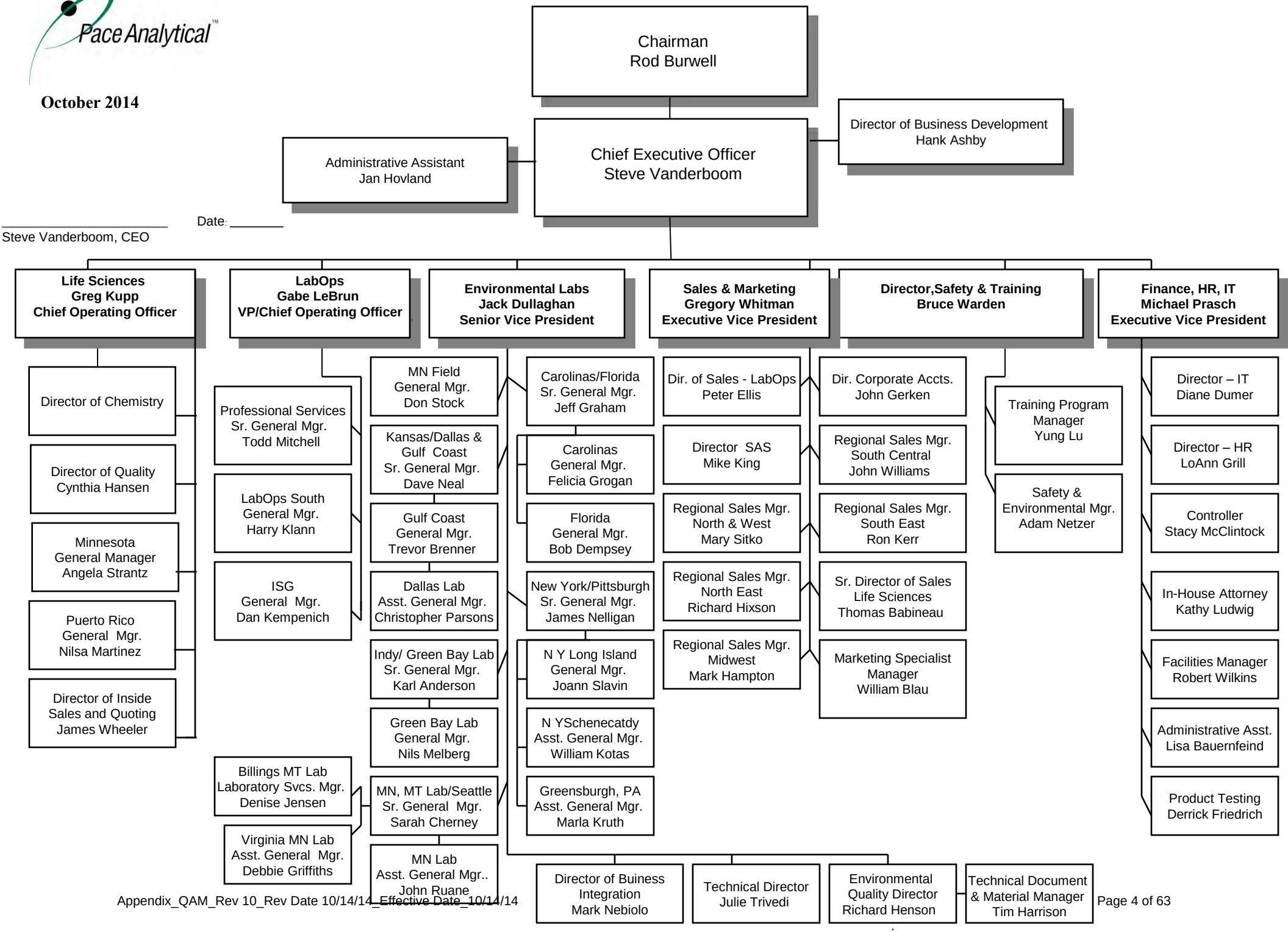
Last Revised: September 11, 2014

Last Reviewed: September 11, 2014

CORPORATE/MANAGEMENT STRUCTURE

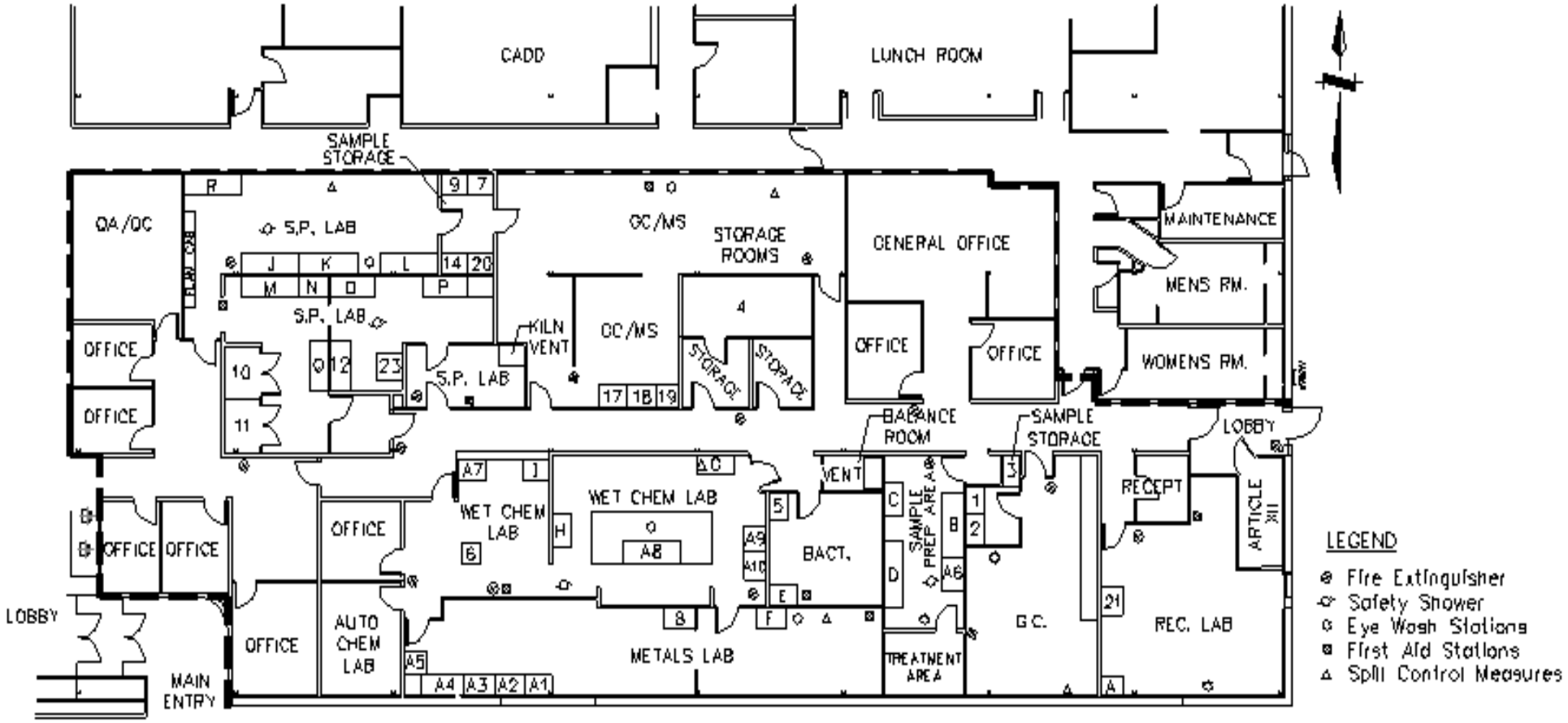
Pace Analytical™

October 2014



Section 2.0 Floor Plan

LABORATORY FLOOR PLAN



REFRIGERATOR NUMBER	REFRIGERATOR NUMBER	CABINET NUMBER (METALS)	FUME HOODS	FUME HOODS (SPECIAL PROCESS)
1 - Standards (GC)	12 - Drinking H2O BNA/Pest Samples	A1 - Water (not digested)	A - Receiving-3' hood	J - 8' hood Concentrations
2 - Potable H2O Samples VOA (GC)	13 - Not in Use	A2 - Water (not digested)	B - Inorganic Sample Prep-8' hood	K - 8' hood
3 - Not in Use	14 - Semi-volatile Extracts Non-Evidentiary	A3 - Furnace Digestate	C - Inorganic Sample Prep-4' hood	I - 8' hood Auto-extractions Standard Prep
4 - Walk-in Refrigerator	15 - Not in Use	A4 - Evening Access	D - Inorganic Sample Prep-8' hood	M - 8' hood w/sink
5 - Bacteriology Lab Samples	16 - Not Currently in Use	A5 - Flame Digestate	E - None	N - 4' hood
6 - Wet Chem Routine	17 - GC/MS Volatile Evidentiary	A6 - Evidentiary Sample Digestate	F - Metals Lab-4' hood	O - 6' hood
7 - Wet Chem	18 - VOA Standards Freezer	A7 - Flame Digestate	G - Wet Chem Lab-5' hood	P - 6' hood Herbicide Extractions
8 - Metals CLP	19 - GC/MS Volatile Non-Evidentiary	A8 - Flame Digestate	H - Wet Chem Lab-5' hood	Q - 6' hood Soil Extractions
9 - BNA Extracts	20 - Semi-VOA Standards Freezer	A9 - Furnace Digestate	I - Wet Chem Lab-4' hood	R 10' hood Atuo Extractions
10 - Routine BNA/Pest Samples	21 - Receiving	A10 - Furnace Digestate		
11 - CLP BNA/Pest Samples	22 Not in Use			
	23 Semi-volatile Extracts			

Note: Limited Access Laboratories (locked) are: GC, GC/MS, Metals, Bacteriology, Special Process

Revised 4/00

Section 3.0 Accredited Test Methods

Matrix	Analyte	Method	Technology
NW	Biochemical Oxygen Demand	SM 5210B-01,-11	TITR
NW	Carbonaceous BOD	SM 5210B-01,-11	TITR
NW	Chemical Oxygen Demand	EPA 410.4 Rev. 2.0	COLOR
NW	Settleable Solids	SM 2540 F-97,-11	GRAV
NW	Solids, Total Dissolved	SM 2540 C-97,-11	GRAV
NW	Solids, Total Suspended	SM 2540 D-97,-11	GRAV
NW	Solids, Total	SM 2540 B-97,-11	GRAV
NW	Solids, Volatile	SM 2540 E-97,-11	GRAV
NW	Coliform, Fecal	SM 9221C,E-06	FB-QN
NW	Standard Plate Count	SimPlate	F-HPC-QN
NW	Coliform, Total	SM 9221B-06	FB-QN
NW	Enterococci	ASTM D6503-99	PAF-QN
NW	Enterococci	Enterolert	PAF-QN
NW	Acidity	SM 2310B-97,-11	TITR
NW	Alkalinity	SM 2320B-97,-11	TITR
NW	Chloride	EPA 300.0 Rev. 2.1	IC-COND
NW	Chloride	SM 4500-Cl- E-97,-11	COLOR
NW	Chloride	EPA 9056A	IC-COND
NW	Fluoride, Total	EPA 300.0 Rev. 2.1	IC-COND
NW	Fluoride, Total	EPA 9056A	IC-COND
NW	Calcium Hardness	EPA 200.7 Rev. 4.4	ICP-AES
NW	Hardness, Total	SM 2340C-97,-11	TITR
NW	Hardness, Total	EPA 200.7 Rev. 4.4	ICP-AES
NW	Sulfate (as SO4)	EPA 300.0 Rev. 2.1	IC-COND
NW	Sulfate (as SO4)	EPA 9056A	IC-COND
NW	Ammonia (as N)	SM 4500-NH3 H-97,-11	AUTO
NW	Ammonia (as N)	EPA 350.1 Rev. 2.0	AUTO
NW	Ammonia (as N)	SM 4500-NH3 B-97,-11	PREP
NW	Kjeldahl Nitrogen, Total	EPA 351.2 Rev. 2.0	AUTO
NW	Nitrate (as N)	EPA 353.2 Rev. 2.0	AUTO
NW	Nitrate (as N)	EPA 300.0 Rev. 2.1	IC-COND
NW	Nitrate (as N)	EPA 9056A	IC-COND
NW	Nitrite (as N)	EPA 353.2 Rev. 2.0	AUTO
NW	Nitrite (as N)	EPA 300.0 Rev. 2.1	IC-COND
NW	Nitrite (as N)	EPA 9056A	IC-COND
NW	Orthophosphate (as P)	EPA 300.0 Rev. 2.1	IC-COND
NW	Orthophosphate (as P)	SM 4500-P E-99,-11	COLOR
NW	Orthophosphate (as P)	EPA 9056A	IC-COND
NW	Phosphorus, Total	SM 4500-P B(5)-99,-11	PREP
NW	Phosphorus, Total	SM 4500-P E-99,-11	COLOR
NW	Barium, Total	EPA 200.7 Rev. 4.4	ICP-AES
NW	Barium, Total	EPA 3005A	PREP
NW	Barium, Total	EPA 6010C	ICP-AES
NW	Barium, Total	EPA 6020A	ICP-MS
NW	Barium, Total	EPA 200.8 Rev. 5.4	ICP-MS
NW	Cadmium, Total	EPA 200.7 Rev. 4.4	ICP-AES
NW	Cadmium, Total	EPA 3005A	PREP
NW	Cadmium, Total	EPA 6010C	ICP-AES
NW	Cadmium, Total	EPA 6020A	ICP-MS
NW	Cadmium, Total	EPA 200.8 Rev. 5.4	ICP-MS
NW	Calcium, Total	EPA 200.7 Rev. 4.4	ICP-AES
NW	Calcium, Total	EPA 3005A	PREP
NW	Calcium, Total	EPA 6010C	ICP-AES
NW	Chromium, Total	EPA 200.7 Rev. 4.4	ICP-AES

Matrix	Analyte	Method	Technology
NW	Chromium, Total	EPA 3005A	PREP
NW	Chromium, Total	EPA 6010C	ICP-AES
NW	Chromium, Total	EPA 6020A	ICP-MS
NW	Chromium, Total	EPA 200.8 Rev. 5.4	ICP-MS
NW	Copper, Total	EPA 200.7 Rev. 4.4	ICP-AES
NW	Copper, Total	EPA 3005A	PREP
NW	Copper, Total	EPA 6010C	ICP-AES
NW	Copper, Total	EPA 6020A	ICP-MS
NW	Copper, Total	EPA 200.8 Rev. 5.4	ICP-MS
NW	Iron, Total	EPA 200.7 Rev. 4.4	ICP-AES
NW	Iron, Total	EPA 3005A	PREP
NW	Iron, Total	EPA 6010C	ICP-AES
NW	Lead, Total	EPA 200.7 Rev. 4.4	ICP-AES
NW	Lead, Total	EPA 3005A	PREP
NW	Lead, Total	EPA 6010C	ICP-AES
NW	Lead, Total	EPA 6020A	ICP-MS
NW	Lead, Total	EPA 200.8 Rev. 5.4	ICP-MS
NW	Magnesium, Total	EPA 200.7 Rev. 4.4	ICP-AES
NW	Magnesium, Total	EPA 3005A	PREP
NW	Magnesium, Total	EPA 6010C	ICP-AES
NW	Manganese, Total	EPA 200.7 Rev. 4.4	ICP-AES
NW	Manganese, Total	EPA 3005A	PREP
NW	Manganese, Total	EPA 6010C	ICP-AES
NW	Manganese, Total	EPA 6020A	ICP-MS
NW	Manganese, Total	EPA 200.8 Rev. 5.4	ICP-MS
NW	Nickel, Total	EPA 200.7 Rev. 4.4	ICP-AES
NW	Nickel, Total	EPA 3005A	PREP
NW	Nickel, Total	EPA 6010C	ICP-AES
NW	Nickel, Total	EPA 6020A	ICP-MS
NW	Nickel, Total	EPA 200.8 Rev. 5.4	ICP-MS
NW	Potassium, Total	EPA 200.7 Rev. 4.4	ICP-AES
NW	Potassium, Total	EPA 3005A	PREP
NW	Potassium, Total	EPA 6010C	ICP-AES
NW	Silver, Total	EPA 200.7 Rev. 4.4	ICP-AES
NW	Silver, Total	EPA 3005A	PREP
NW	Silver, Total	EPA 6010C	ICP-AES
NW	Silver, Total	EPA 6020A	ICP-MS
NW	Silver, Total	EPA 200.8 Rev. 5.4	ICP-MS
NW	Sodium, Total	EPA 200.7 Rev. 4.4	ICP-AES
NW	Sodium, Total	EPA 3005A	PREP
NW	Sodium, Total	EPA 6010C	ICP-AES
NW	Strontium, Total	EPA 200.7 Rev. 4.4	ICP-AES
NW	Strontium, Total	EPA 3005A	PREP
NW	Strontium, Total	EPA 6010C	ICP-AES
NW	Strontium, Total	EPA 6020A	ICP-MS
NW	Strontium, Total	EPA 200.8 Rev. 5.4	ICP-MS
NW	Aluminum, Total	EPA 200.7 Rev. 4.4	ICP-AES
NW	Aluminum, Total	EPA 3005A	PREP
NW	Aluminum, Total	EPA 6010C	ICP-AES
NW	Aluminum, Total	EPA 6020A	ICP-MS
NW	Aluminum, Total	EPA 200.8 Rev. 5.4	ICP-MS
NW	Antimony, Total	EPA 200.7 Rev. 4.4	ICP-AES
NW	Antimony, Total	EPA 3005A	PREP
NW	Antimony, Total	EPA 6010C	ICP-AES

Matrix	Analyte	Method	Technology
NW	Antimony, Total	EPA 6020A	ICP-MS
NW	Antimony, Total	EPA 200.8 Rev. 5.4	ICP-MS
NW	Arsenic, Total	EPA 200.7 Rev. 4.4	ICP-AES
NW	Arsenic, Total	EPA 3005A	PREP
NW	Arsenic, Total	EPA 6010C	ICP-AES
NW	Arsenic, Total	EPA 6020A	ICP-MS
NW	Arsenic, Total	EPA 200.8 Rev. 5.4	ICP-MS
NW	Beryllium, Total	EPA 200.7 Rev. 4.4	ICP-AES
NW	Beryllium, Total	EPA 3005A	PREP
NW	Beryllium, Total	EPA 6010C	ICP-AES
NW	Beryllium, Total	EPA 6020A	ICP-MS
NW	Beryllium, Total	EPA 200.8 Rev. 5.4	ICP-MS
NW	Chromium VI	EPA 7196A	COLOR
NW	Chromium VI	SM 3500-Cr B-09,-11	COLOR
NW	Mercury, Total	EPA 245.1 Rev. 3.0	CVAAS
NW	Mercury, Total	EPA 7470A	CVAAS
NW	Selenium, Total	EPA 200.7 Rev. 4.4	ICP-AES
NW	Selenium, Total	EPA 3005A	PREP
NW	Selenium, Total	EPA 6010C	ICP-AES
NW	Selenium, Total	EPA 6020A	ICP-MS
NW	Selenium, Total	EPA 200.8 Rev. 5.4	ICP-MS
NW	Vanadium, Total	EPA 200.7 Rev. 4.4	ICP-AES
NW	Vanadium, Total	EPA 3005A	PREP
NW	Vanadium, Total	EPA 6010C	ICP-AES
NW	Vanadium, Total	EPA 6020A	ICP-MS
NW	Vanadium, Total	EPA 200.8 Rev. 5.4	ICP-MS
NW	Zinc, Total	EPA 200.7 Rev. 4.4	ICP-AES
NW	Zinc, Total	EPA 3005A	PREP
NW	Zinc, Total	EPA 6010C	ICP-AES
NW	Zinc, Total	EPA 6020A	ICP-MS
NW	Zinc, Total	EPA 200.8 Rev. 5.4	ICP-MS
NW	Cobalt, Total	EPA 200.7 Rev. 4.4	ICP-AES
NW	Cobalt, Total	EPA 3005A	PREP
NW	Cobalt, Total	EPA 6010C	ICP-AES
NW	Cobalt, Total	EPA 6020A	ICP-MS
NW	Cobalt, Total	EPA 200.8 Rev. 5.4	ICP-MS
NW	Gold, Total	EPA 200.7 Rev. 4.4	ICP-AES
NW	Molybdenum, Total	EPA 200.7 Rev. 4.4	ICP-AES
NW	Molybdenum, Total	EPA 3005A	PREP
NW	Molybdenum, Total	EPA 6010C	ICP-AES
NW	Molybdenum, Total	EPA 6020A	ICP-MS
NW	Molybdenum, Total	EPA 200.8 Rev. 5.4	ICP-MS
NW	Thallium, Total	EPA 200.7 Rev. 4.4	ICP-AES
NW	Thallium, Total	EPA 3005A	PREP
NW	Thallium, Total	EPA 6010C	ICP-AES
NW	Thallium, Total	EPA 6020A	ICP-MS
NW	Thallium, Total	EPA 200.8 Rev. 5.4	ICP-MS
NW	Tin, Total	EPA 200.7 Rev. 4.4	ICP-AES
NW	Tin, Total	EPA 6010C	ICP-AES
NW	Titanium, Total	EPA 200.7 Rev. 4.4	ICP-AES
NW	Titanium, Total	EPA 6010C	ICP-AES
NW	Acrolein (Propenal)	EPA 5030C	PREP
NW	Acrolein (Propenal)	EPA 8260C	GC-MS
NW	Acrolein (Propenal)	EPA 624	GC-MS

Matrix	Analyte	Method	Technology
NW	Acrylonitrile	EPA 5030C	PREP
NW	Acrylonitrile	EPA 8260C	GC-MS
NW	Acrylonitrile	EPA 624	GC-MS
NW	Ethyl methacrylate	EPA 8260C	GC-MS
NW	Methyl acrylonitrile	EPA 8260C	GC-MS
NW	Methyl methacrylate	EPA 8260C	GC-MS
NW	Benzidine	EPA 3510C	PREP
NW	Benzidine	EPA 3520C	PREP
NW	Benzidine	EPA 625	GC-MS
NW	Benzidine	EPA 8270D	GC-MS
NW	3,3'-Dichlorobenzidine	EPA 3510C	PREP
NW	3,3'-Dichlorobenzidine	EPA 3520C	PREP
NW	3,3'-Dichlorobenzidine	EPA 625	GC-MS
NW	3,3'-Dichlorobenzidine	EPA 8270D	GC-MS
NW	3,3'-Dimethylbenzidine	EPA 8270D	GC-MS
NW	1-Chloronaphthalene	EPA 8270D	GC-MS
NW	2-Chloronaphthalene	EPA 3510C	PREP
NW	2-Chloronaphthalene	EPA 3520C	PREP
NW	2-Chloronaphthalene	EPA 625	GC-MS
NW	2-Chloronaphthalene	EPA 8270D	GC-MS
NW	Hexachlorobenzene	EPA 3510C	PREP
NW	Hexachlorobenzene	EPA 3520C	PREP
NW	Hexachlorobenzene	EPA 625	GC-MS
NW	Hexachlorobenzene	EPA 8270D	GC-MS
NW	Hexachlorobutadiene	EPA 3510C	PREP
NW	Hexachlorobutadiene	EPA 3520C	PREP
NW	Hexachlorobutadiene	EPA 625	GC-MS
NW	Hexachlorobutadiene	EPA 8270D	GC-MS
NW	Hexachloroethane	EPA 3510C	PREP
NW	Hexachloroethane	EPA 3520C	PREP
NW	Hexachloroethane	EPA 625	GC-MS
NW	Hexachloroethane	EPA 8270D	GC-MS
NW	Hexachlorocyclopentadiene	EPA 3510C	PREP
NW	Hexachlorocyclopentadiene	EPA 3520C	PREP
NW	Hexachlorocyclopentadiene	EPA 625	GC-MS
NW	Hexachlorocyclopentadiene	EPA 8270D	GC-MS
NW	Hexachloropropene	EPA 8270D	GC-MS
NW	Pentachlorobenzene	EPA 8270D	GC-MS
NW	1,2,3-Trichlorobenzene	EPA 8260C	GC-MS
NW	1,2,4-Trichlorobenzene	EPA 3510C	PREP
NW	1,2,4-Trichlorobenzene	EPA 3520C	PREP
NW	1,2,4-Trichlorobenzene	EPA 625	GC-MS
NW	1,2,4-Trichlorobenzene	EPA 8270D	GC-MS
NW	1,2,4,5-Tetrachlorobenzene	EPA 8270D	GC-MS
NW	Bis(2-chloroethyl)ether	EPA 3510C	PREP
NW	Bis(2-chloroethyl)ether	EPA 3520C	PREP
NW	Bis(2-chloroethyl)ether	EPA 625	GC-MS
NW	Bis(2-chloroethyl)ether	EPA 8270D	GC-MS
NW	Bis(2-chloroisopropyl) ether	EPA 3510C	PREP
NW	Bis(2-chloroisopropyl) ether	EPA 3520C	PREP
NW	Bis(2-chloroisopropyl) ether	EPA 625	GC-MS
NW	Bis(2-chloroisopropyl) ether	EPA 8270D	GC-MS
NW	Bis(2-chloroethoxy)methane	EPA 3510C	PREP
NW	Bis(2-chloroethoxy)methane	EPA 3520C	PREP

Matrix	Analyte	Method	Technology
NW	Bis(2-chloroethoxy)methane	EPA 625	GC-MS
NW	Bis(2-chloroethoxy)methane	EPA 8270D	GC-MS
NW	4-Chlorophenylphenyl ether	EPA 3510C	PREP
NW	4-Chlorophenylphenyl ether	EPA 3520C	PREP
NW	4-Chlorophenylphenyl ether	EPA 625	GC-MS
NW	4-Chlorophenylphenyl ether	EPA 8270D	GC-MS
NW	4-Bromophenylphenyl ether	EPA 3510C	PREP
NW	4-Bromophenylphenyl ether	EPA 3520C	PREP
NW	4-Bromophenylphenyl ether	EPA 625	GC-MS
NW	4-Bromophenylphenyl ether	EPA 8270D	GC-MS
NW	1,3-Dinitrobenzene	EPA 8270D	GC-MS
NW	1,3,5-Trinitrobenzene	EPA 8270D	GC-MS
NW	1,4-Naphthoquinone	EPA 8270D	GC-MS
NW	2,4-Dinitrotoluene	EPA 3510C	PREP
NW	2,4-Dinitrotoluene	EPA 3520C	PREP
NW	2,4-Dinitrotoluene	EPA 625	GC-MS
NW	2,4-Dinitrotoluene	EPA 8270D	GC-MS
NW	2,6-Dinitrotoluene	EPA 3510C	PREP
NW	2,6-Dinitrotoluene	EPA 3520C	PREP
NW	2,6-Dinitrotoluene	EPA 625	GC-MS
NW	2,6-Dinitrotoluene	EPA 8270D	GC-MS
NW	Isophorone	EPA 3510C	PREP
NW	Isophorone	EPA 3520C	PREP
NW	Isophorone	EPA 625	GC-MS
NW	Isophorone	EPA 8270D	GC-MS
NW	Nitrobenzene	EPA 3510C	PREP
NW	Nitrobenzene	EPA 3520C	PREP
NW	Nitrobenzene	EPA 625	GC-MS
NW	Nitrobenzene	EPA 8270D	GC-MS
NW	N-Nitrosodiethylamine	EPA 8270D	GC-MS
NW	N-Nitrosodimethylamine	EPA 3510C	PREP
NW	N-Nitrosodimethylamine	EPA 3520C	PREP
NW	N-Nitrosodimethylamine	EPA 625	GC-MS
NW	N-Nitrosodimethylamine	EPA 8270D	GC-MS
NW	N-Nitrosodiphenylamine	EPA 3510C	PREP
NW	N-Nitrosodiphenylamine	EPA 3520C	PREP
NW	N-Nitrosodiphenylamine	EPA 625	GC-MS
NW	N-Nitrosodiphenylamine	EPA 8270D	GC-MS
NW	N-Nitrosodi-n-butylamine	EPA 8270D	GC-MS
NW	N-nitrosomethylethylamine	EPA 8270D	GC-MS
NW	N-Nitrosodi-n-propylamine	EPA 3510C	PREP
NW	N-Nitrosodi-n-propylamine	EPA 3520C	PREP
NW	N-Nitrosodi-n-propylamine	EPA 625	GC-MS
NW	N-Nitrosodi-n-propylamine	EPA 8270D	GC-MS
NW	N-nitrosopiperidine	EPA 8270D	GC-MS
NW	N-Nitrosopyrrolidine	EPA 8270D	GC-MS
NW	Benzyl butyl phthalate	EPA 3510C	PREP
NW	Benzyl butyl phthalate	EPA 3520C	PREP
NW	Benzyl butyl phthalate	EPA 625	GC-MS
NW	Benzyl butyl phthalate	EPA 8270D	GC-MS
NW	Bis(2-ethylhexyl) phthalate	EPA 3510C	PREP
NW	Bis(2-ethylhexyl) phthalate	EPA 3520C	PREP
NW	Bis(2-ethylhexyl) phthalate	EPA 625	GC-MS
NW	Bis(2-ethylhexyl) phthalate	EPA 8270D	GC-MS

Matrix	Analyte	Method	Technology
NW	Diethyl phthalate	EPA 3510C	PREP
NW	Diethyl phthalate	EPA 3520C	PREP
NW	Diethyl phthalate	EPA 625	GC-MS
NW	Diethyl phthalate	EPA 8270D	GC-MS
NW	Dimethyl phthalate	EPA 3510C	PREP
NW	Dimethyl phthalate	EPA 3520C	PREP
NW	Dimethyl phthalate	EPA 625	GC-MS
NW	Dimethyl phthalate	EPA 8270D	GC-MS
NW	Di-n-butyl phthalate	EPA 3510C	PREP
NW	Di-n-butyl phthalate	EPA 3520C	PREP
NW	Di-n-butyl phthalate	EPA 625	GC-MS
NW	Di-n-butyl phthalate	EPA 8270D	GC-MS
NW	Di-n-octyl phthalate	EPA 3510C	PREP
NW	Di-n-octyl phthalate	EPA 3520C	PREP
NW	Di-n-octyl phthalate	EPA 625	GC-MS
NW	Di-n-octyl phthalate	EPA 8270D	GC-MS
NW	PCB-1016	EPA 3510C	PREP
NW	PCB-1016	EPA 8082A	GC-ECD
NW	PCB-1016	EPA 608	GC-ECD
NW	PCB-1221	EPA 3510C	PREP
NW	PCB-1221	EPA 8082A	GC-ECD
NW	PCB-1221	EPA 608	GC-ECD
NW	PCB-1232	EPA 3510C	PREP
NW	PCB-1232	EPA 8082A	GC-ECD
NW	PCB-1232	EPA 608	GC-ECD
NW	PCB-1242	EPA 3510C	PREP
NW	PCB-1242	EPA 8082A	GC-ECD
NW	PCB-1242	EPA 608	GC-ECD
NW	PCB-1248	EPA 3510C	PREP
NW	PCB-1248	EPA 8082A	GC-ECD
NW	PCB-1248	EPA 608	GC-ECD
NW	PCB-1254	EPA 3510C	PREP
NW	PCB-1254	EPA 8082A	GC-ECD
NW	PCB-1254	EPA 608	GC-ECD
NW	PCB-1260	EPA 3510C	PREP
NW	PCB-1260	EPA 8082A	GC-ECD
NW	PCB-1260	EPA 608	GC-ECD
NW	PCB-1262	EPA 8082A	GC-ECD
NW	PCB-1268	EPA 8082A	GC-ECD
NW	2-Acetylaminofluorene	EPA 8270D	GC-MS
NW	Acenaphthene	EPA 3510C	PREP
NW	Acenaphthene	EPA 3520C	PREP
NW	Acenaphthene	EPA 625	GC-MS
NW	Acenaphthene	EPA 8270D	GC-MS
NW	Anthracene	EPA 3510C	PREP
NW	Anthracene	EPA 3520C	PREP
NW	Anthracene	EPA 625	GC-MS
NW	Anthracene	EPA 8270D	GC-MS
NW	Acenaphthylene	EPA 3510C	PREP
NW	Acenaphthylene	EPA 3520C	PREP
NW	Acenaphthylene	EPA 625	GC-MS
NW	Acenaphthylene	EPA 8270D	GC-MS
NW	Benzo(a)anthracene	EPA 3510C	PREP
NW	Benzo(a)anthracene	EPA 3520C	PREP

Matrix	Analyte	Method	Technology
NW	Benzo(a)anthracene	EPA 625	GC-MS
NW	Benzo(a)anthracene	EPA 8270D	GC-MS
NW	Benzo(a)pyrene	EPA 3510C	PREP
NW	Benzo(a)pyrene	EPA 3520C	PREP
NW	Benzo(a)pyrene	EPA 625	GC-MS
NW	Benzo(a)pyrene	EPA 8270D	GC-MS
NW	Benzo(b)fluoranthene	EPA 3510C	PREP
NW	Benzo(b)fluoranthene	EPA 3520C	PREP
NW	Benzo(b)fluoranthene	EPA 625	GC-MS
NW	Benzo(b)fluoranthene	EPA 8270D	GC-MS
NW	Benzo(ghi)perylene	EPA 3510C	PREP
NW	Benzo(ghi)perylene	EPA 3520C	PREP
NW	Benzo(ghi)perylene	EPA 625	GC-MS
NW	Benzo(ghi)perylene	EPA 8270D	GC-MS
NW	Benzo(k)fluoranthene	EPA 3510C	PREP
NW	Benzo(k)fluoranthene	EPA 3520C	PREP
NW	Benzo(k)fluoranthene	EPA 625	GC-MS
NW	Benzo(k)fluoranthene	EPA 8270D	GC-MS
NW	Chrysene	EPA 3510C	PREP
NW	Chrysene	EPA 3520C	PREP
NW	Chrysene	EPA 625	GC-MS
NW	Chrysene	EPA 8270D	GC-MS
NW	Dibenzo(a,h)anthracene	EPA 3510C	PREP
NW	Dibenzo(a,h)anthracene	EPA 3520C	PREP
NW	Dibenzo(a,h)anthracene	EPA 625	GC-MS
NW	Dibenzo(a,h)anthracene	EPA 8270D	GC-MS
NW	7,12-Dimethylbenzyl (a) anthracene	EPA 8270D	GC-MS
NW	Fluoranthene	EPA 3510C	PREP
NW	Fluoranthene	EPA 3520C	PREP
NW	Fluoranthene	EPA 625	GC-MS
NW	Fluoranthene	EPA 8270D	GC-MS
NW	Fluorene	EPA 3510C	PREP
NW	Fluorene	EPA 3520C	PREP
NW	Fluorene	EPA 625	GC-MS
NW	Fluorene	EPA 8270D	GC-MS
NW	Indeno(1,2,3-cd)pyrene	EPA 3510C	PREP
NW	Indeno(1,2,3-cd)pyrene	EPA 3520C	PREP
NW	Indeno(1,2,3-cd)pyrene	EPA 625	GC-MS
NW	Indeno(1,2,3-cd)pyrene	EPA 8270D	GC-MS
NW	Naphthalene	EPA 3510C	PREP
NW	Naphthalene	EPA 3520C	PREP
NW	Naphthalene	EPA 625	GC-MS
NW	Naphthalene	EPA 8270D	GC-MS
NW	3-Methylcholanthrene	EPA 8270D	GC-MS
NW	Phenanthrene	EPA 3510C	PREP
NW	Phenanthrene	EPA 3520C	PREP
NW	Phenanthrene	EPA 625	GC-MS
NW	Phenanthrene	EPA 8270D	GC-MS
NW	Pyrene	EPA 3510C	PREP
NW	Pyrene	EPA 3520C	PREP
NW	Pyrene	EPA 625	GC-MS
NW	Pyrene	EPA 8270D	GC-MS
NW	Acenaphthene Low Level	EPA 3510C	PREP
NW	Acenaphthene Low Level	EPA 8270D SIM	GC-MS

Matrix	Analyte	Method	Technology
NW	Acenaphthylene Low Level	EPA 3510C	PREP
NW	Acenaphthylene Low Level	EPA 8270D SIM	GC-MS
NW	Anthracene Low Level	EPA 3510C	PREP
NW	Anthracene Low Level	EPA 8270D SIM	GC-MS
NW	Benzo(a)anthracene Low Level	EPA 3510C	PREP
NW	Benzo(a)anthracene Low Level	EPA 8270D SIM	GC-MS
NW	Benzo(b)fluoranthene Low Level	EPA 3510C	PREP
NW	Benzo(b)fluoranthene Low Level	EPA 8270D SIM	GC-MS
NW	Benzo(k)fluoranthene Low Level	EPA 3510C	PREP
NW	Benzo(k)fluoranthene Low Level	EPA 8270D SIM	GC-MS
NW	Benzo(g,h,i)perylene Low Level	EPA 3510C	PREP
NW	Benzo(g,h,i)perylene Low Level	EPA 8270D SIM	GC-MS
NW	Benzo(a)pyrene Low Level	EPA 3510C	PREP
NW	Benzo(a)pyrene Low Level	EPA 8270D SIM	GC-MS
NW	Chrysene Low Level	EPA 3510C	PREP
NW	Chrysene Low Level	EPA 8270D SIM	GC-MS
NW	Dibenzo(a,h)anthracene Low Level	EPA 3510C	PREP
NW	Dibenzo(a,h)anthracene Low Level	EPA 8270D SIM	GC-MS
NW	Fluoranthene Low Level	EPA 3510C	PREP
NW	Fluoranthene Low Level	EPA 8270D SIM	GC-MS
NW	Fluorene Low Level	EPA 3510C	PREP
NW	Fluorene Low Level	EPA 8270D SIM	GC-MS
NW	Indeno(1,2,3-cd)pyrene Low Level	EPA 3510C	PREP
NW	Indeno(1,2,3-cd)pyrene Low Level	EPA 8270D SIM	GC-MS
NW	Naphthalene Low Level	EPA 3510C	PREP
NW	Naphthalene Low Level	EPA 8270D SIM	GC-MS
NW	Phenanthrene Low Level	EPA 3510C	PREP
NW	Phenanthrene Low Level	EPA 8270D SIM	GC-MS
NW	Pyrene Low Level	EPA 3510C	PREP
NW	Pyrene Low Level	EPA 8270D SIM	GC-MS
NW	4-Chloro-3-methylphenol	EPA 3510C	PREP
NW	4-Chloro-3-methylphenol	EPA 3520C	PREP
NW	4-Chloro-3-methylphenol	EPA 625	GC-MS
NW	4-Chloro-3-methylphenol	EPA 8270D	GC-MS
NW	2-Chlorophenol	EPA 3510C	PREP
NW	2-Chlorophenol	EPA 3520C	PREP
NW	2-Chlorophenol	EPA 625	GC-MS
NW	2-Chlorophenol	EPA 8270D	GC-MS
NW	2,4-Dichlorophenol	EPA 3510C	PREP
NW	2,4-Dichlorophenol	EPA 3520C	PREP
NW	2,4-Dichlorophenol	EPA 625	GC-MS
NW	2,4-Dichlorophenol	EPA 8270D	GC-MS
NW	2,6-Dichlorophenol	EPA 8270D	GC-MS
NW	2,4-Dimethylphenol	EPA 3510C	PREP
NW	2,4-Dimethylphenol	EPA 3520C	PREP
NW	2,4-Dimethylphenol	EPA 625	GC-MS
NW	2,4-Dimethylphenol	EPA 8270D	GC-MS
NW	2,4-Dinitrophenol	EPA 3510C	PREP
NW	2,4-Dinitrophenol	EPA 3520C	PREP
NW	2,4-Dinitrophenol	EPA 625	GC-MS
NW	2,4-Dinitrophenol	EPA 8270D	GC-MS
NW	2-Methyl-4,6-dinitrophenol	EPA 3510C	PREP
NW	2-Methyl-4,6-dinitrophenol	EPA 3520C	PREP
NW	2-Methyl-4,6-dinitrophenol	EPA 625	GC-MS

Matrix	Analyte	Method	Technology
NW	2-Methyl-4,6-dinitrophenol	EPA 8270D	GC-MS
NW	2-Nitrophenol	EPA 3520C	PREP
NW	2-Nitrophenol	EPA 625	GC-MS
NW	2-Nitrophenol	EPA 8270D	GC-MS
NW	4-Nitrophenol	EPA 3520C	PREP
NW	4-Nitrophenol	EPA 625	GC-MS
NW	4-Nitrophenol	EPA 8270D	GC-MS
NW	2-Methylphenol	EPA 3510C	PREP
NW	2-Methylphenol	EPA 3520C	PREP
NW	2-Methylphenol	EPA 625	GC-MS
NW	2-Methylphenol	EPA 8270D	GC-MS
NW	3-Methylphenol	EPA 8270D	GC-MS
NW	4-Methylphenol	EPA 3510C	PREP
NW	4-Methylphenol	EPA 3520C	PREP
NW	4-Methylphenol	EPA 625	GC-MS
NW	4-Methylphenol	EPA 8270D	GC-MS
NW	Cresols, Total	EPA 625	GC-MS
NW	Cresols, Total	EPA 8270D	GC-MS
NW	Pentachlorophenol	EPA 3510C	PREP
NW	Pentachlorophenol	EPA 3520C	PREP
NW	Pentachlorophenol	EPA 625	GC-MS
NW	Pentachlorophenol	EPA 8270D	GC-MS
NW	Phenol	EPA 3510C	PREP
NW	Phenol	EPA 3520C	PREP
NW	Phenol	EPA 625	GC-MS
NW	Phenol	EPA 8270D	GC-MS
NW	2,3,4,6 Tetrachlorophenol	EPA 8270D	GC-MS
NW	2,4,5-Trichlorophenol	EPA 3520C	PREP
NW	2,4,5-Trichlorophenol	EPA 625	GC-MS
NW	2,4,5-Trichlorophenol	EPA 8270D	GC-MS
NW	2,4,6-Trichlorophenol	EPA 3510C	PREP
NW	2,4,6-Trichlorophenol	EPA 3520C	PREP
NW	2,4,6-Trichlorophenol	EPA 625	GC-MS
NW	2,4,6-Trichlorophenol	EPA 8270D	GC-MS
NW	1,2,4-Trichlorobenzene, Volatile	EPA 5030C	PREP
NW	1,2,4-Trichlorobenzene, Volatile	EPA 8260C	GC-MS
NW	Benzene	EPA 5030C	PREP
NW	Benzene	EPA 8260C	GC-MS
NW	Benzene	EPA 624	GC-MS
NW	Bromobenzene	EPA 8260C	GC-MS
NW	Chlorobenzene	EPA 5030C	PREP
NW	Chlorobenzene	EPA 8260C	GC-MS
NW	Chlorobenzene	EPA 624	GC-MS
NW	1,2-Dichlorobenzene	EPA 5030C	PREP
NW	1,2-Dichlorobenzene	EPA 8260C	GC-MS
NW	1,2-Dichlorobenzene	EPA 624	GC-MS
NW	1,3-Dichlorobenzene	EPA 5030C	PREP
NW	1,3-Dichlorobenzene	EPA 8260C	GC-MS
NW	1,3-Dichlorobenzene	EPA 624	GC-MS
NW	1,4-Dichlorobenzene	EPA 5030C	PREP
NW	1,4-Dichlorobenzene	EPA 8260C	GC-MS
NW	1,4-Dichlorobenzene	EPA 624	GC-MS
NW	1,2,4-Trimethylbenzene	EPA 5030C	PREP
NW	1,2,4-Trimethylbenzene	EPA 8260C	GC-MS

Matrix	Analyte	Method	Technology
NW	1,3,5-Trimethylbenzene	EPA 5030C	PREP
NW	1,3,5-Trimethylbenzene	EPA 8260C	GC-MS
NW	2-Chlorotoluene	EPA 8260C	GC-MS
NW	4-Chlorotoluene	EPA 8260C	GC-MS
NW	Ethyl benzene	EPA 5030C	PREP
NW	Ethyl benzene	EPA 8260C	GC-MS
NW	Ethyl benzene	EPA 624	GC-MS
NW	Isopropylbenzene	EPA 8260C	GC-MS
NW	Naphthalene, Volatile	EPA 5030C	PREP
NW	Naphthalene, Volatile	EPA 8260C	GC-MS
NW	n-Butylbenzene	EPA 8260C	GC-MS
NW	n-Propylbenzene	EPA 8260C	GC-MS
NW	p-Isopropyltoluene (P-Cymene)	EPA 8260C	GC-MS
NW	Toluene	EPA 5030C	PREP
NW	Toluene	EPA 8260C	GC-MS
NW	Toluene	EPA 624	GC-MS
NW	Total Xylenes	EPA 5030C	PREP
NW	Total Xylenes	EPA 8260C	GC-MS
NW	Total Xylenes	EPA 624	GC-MS
NW	m/p-Xylenes	EPA 5030C	PREP
NW	m/p-Xylenes	EPA 8260C	GC-MS
NW	m/p-Xylenes	EPA 624	GC-MS
NW	o-Xylene	EPA 5030C	PREP
NW	o-Xylene	EPA 8260C	GC-MS
NW	o-Xylene	EPA 624	GC-MS
NW	sec-Butylbenzene	EPA 8260C	GC-MS
NW	tert-Butylbenzene	EPA 8260C	GC-MS
NW	Styrene	EPA 5030C	PREP
NW	Styrene	EPA 8260C	GC-MS
NW	Styrene	EPA 624	GC-MS
NW	Bromochloromethane	EPA 5030C	PREP
NW	Bromochloromethane	EPA 8260C	GC-MS
NW	Bromodichloromethane	EPA 5030C	PREP
NW	Bromodichloromethane	EPA 8260C	GC-MS
NW	Bromodichloromethane	EPA 624	GC-MS
NW	Bromoform	EPA 5030C	PREP
NW	Bromoform	EPA 8260C	GC-MS
NW	Bromoform	EPA 624	GC-MS
NW	Bromomethane	EPA 5030C	PREP
NW	Bromomethane	EPA 8260C	GC-MS
NW	Bromomethane	EPA 624	GC-MS
NW	Carbon tetrachloride	EPA 5030C	PREP
NW	Carbon tetrachloride	EPA 8260C	GC-MS
NW	Carbon tetrachloride	EPA 624	GC-MS
NW	Chloroethane	EPA 5030C	PREP
NW	Chloroethane	EPA 8260C	GC-MS
NW	Chloroethane	EPA 624	GC-MS
NW	2-Chloro-1,3-butadiene (Chloroprene)	EPA 5030C	PREP
NW	2-Chloro-1,3-butadiene (Chloroprene)	EPA 8260C	GC-MS
NW	2-Chloroethylvinyl ether	EPA 5030C	PREP
NW	2-Chloroethylvinyl ether	EPA 8260C	GC-MS
NW	2-Chloroethylvinyl ether	EPA 624	GC-MS
NW	Chloroform	EPA 5030C	PREP
NW	Chloroform	EPA 8260C	GC-MS

Matrix	Analyte	Method	Technology
NW	Chloroform	EPA 624	GC-MS
NW	Chloromethane	EPA 5030C	PREP
NW	Chloromethane	EPA 8260C	GC-MS
NW	Chloromethane	EPA 624	GC-MS
NW	3-Chloropropene (Allyl chloride)	EPA 5030C	PREP
NW	3-Chloropropene (Allyl chloride)	EPA 8260C	GC-MS
NW	Dibromochloromethane	EPA 5030C	PREP
NW	Dibromochloromethane	EPA 8260C	GC-MS
NW	Dibromochloromethane	EPA 624	GC-MS
NW	Dibromomethane	EPA 5030C	PREP
NW	Dibromomethane	EPA 8260C	GC-MS
NW	Dichlorodifluoromethane	EPA 5030C	PREP
NW	Dichlorodifluoromethane	EPA 8260C	GC-MS
NW	Dichlorodifluoromethane	EPA 624	GC-MS
NW	trans-1,4-Dichloro-2-butene	EPA 5030C	PREP
NW	trans-1,4-Dichloro-2-butene	EPA 8260C	GC-MS
NW	1,1-Dichloroethane	EPA 5030C	PREP
NW	1,1-Dichloroethane	EPA 8260C	GC-MS
NW	1,1-Dichloroethane	EPA 624	GC-MS
NW	1,2-Dichloroethane	EPA 5030C	PREP
NW	1,2-Dichloroethane	EPA 8260C	GC-MS
NW	1,2-Dichloroethane	EPA 624	GC-MS
NW	1,1-Dichloroethene	EPA 5030C	PREP
NW	1,1-Dichloroethene	EPA 8260C	GC-MS
NW	1,1-Dichloroethene	EPA 624	GC-MS
NW	cis-1,2-Dichloroethene	EPA 5030C	PREP
NW	cis-1,2-Dichloroethene	EPA 8260C	GC-MS
NW	cis-1,2-Dichloroethene	EPA 624	GC-MS
NW	trans-1,2-Dichloroethene	EPA 5030C	PREP
NW	trans-1,2-Dichloroethene	EPA 8260C	GC-MS
NW	trans-1,2-Dichloroethene	EPA 624	GC-MS
NW	1,1-Dichloropropene	EPA 5030C	PREP
NW	1,1-Dichloropropene	EPA 8260C	GC-MS
NW	1,2-Dichloropropane	EPA 5030C	PREP
NW	1,2-Dichloropropane	EPA 8260C	GC-MS
NW	1,2-Dichloropropane	EPA 624	GC-MS
NW	1,3-Dichloropropane	EPA 5030C	PREP
NW	1,3-Dichloropropane	EPA 8260C	GC-MS
NW	2,2-Dichloropropane	EPA 5030C	PREP
NW	2,2-Dichloropropane	EPA 8260C	GC-MS
NW	trans-1,3-Dichloropropene	EPA 5030C	PREP
NW	trans-1,3-Dichloropropene	EPA 8260C	GC-MS
NW	trans-1,3-Dichloropropene	EPA 624	GC-MS
NW	cis-1,3-Dichloropropene	EPA 5030C	PREP
NW	cis-1,3-Dichloropropene	EPA 8260C	GC-MS
NW	cis-1,3-Dichloropropene	EPA 624	GC-MS
NW	1,2-Dibromo-3-chloropropane	EPA 5030C	PREP
NW	1,2-Dibromo-3-chloropropane	EPA 8260C	GC-MS
NW	1,2-Dibromo-3-chloropropane	EPA 8011	GC-ECD
NW	1,2-Dibromoethane	EPA 5030C	PREP
NW	1,2-Dibromoethane	EPA 8260C	GC-MS
NW	1,2-Dibromoethane	EPA 8011	GC-ECD
NW	Hexachlorobutadiene, Volatile	EPA 5030C	PREP
NW	Hexachlorobutadiene, Volatile	EPA 8260C	GC-MS

Matrix	Analyte	Method	Technology
NW	Methylene chloride	EPA 5030C	PREP
NW	Methylene chloride	EPA 8260C	GC-MS
NW	Methylene chloride	EPA 624	GC-MS
NW	Methylene chloride	EPA 1624B	GC-MS
NW	Methyl iodide	EPA 8260C	GC-MS
NW	1,1,1,2-Tetrachloroethane	EPA 5030C	PREP
NW	1,1,1,2-Tetrachloroethane	EPA 8260C	GC-MS
NW	1,1,2,2-Tetrachloroethane	EPA 5030C	PREP
NW	1,1,2,2-Tetrachloroethane	EPA 8260C	GC-MS
NW	1,1,2,2-Tetrachloroethane	EPA 624	GC-MS
NW	Tetrachloroethene	EPA 5030C	PREP
NW	Tetrachloroethene	EPA 8260C	GC-MS
NW	Tetrachloroethene	EPA 624	GC-MS
NW	1,1,1-Trichloroethane	EPA 5030C	PREP
NW	1,1,1-Trichloroethane	EPA 8260C	GC-MS
NW	1,1,1-Trichloroethane	EPA 624	GC-MS
NW	1,1,2-Trichloroethane	EPA 5030C	PREP
NW	1,1,2-Trichloroethane	EPA 8260C	GC-MS
NW	1,1,2-Trichloroethane	EPA 624	GC-MS
NW	Trichloroethene	EPA 5030C	PREP
NW	Trichloroethene	EPA 8260C	GC-MS
NW	Trichloroethene	EPA 624	GC-MS
NW	Trichlorofluoromethane	EPA 5030C	PREP
NW	Trichlorofluoromethane	EPA 8260C	GC-MS
NW	Trichlorofluoromethane	EPA 624	GC-MS
NW	1,2,3-Trichloropropane	EPA 5030C	PREP
NW	1,2,3-Trichloropropane	EPA 8260C	GC-MS
NW	1,1,2-Trichloro-1,2,2-Trifluoroethane	EPA 8260C	GC-MS
NW	Vinyl chloride	EPA 5030C	PREP
NW	Vinyl chloride	EPA 8260C	GC-MS
NW	Vinyl chloride	EPA 624	GC-MS
NW	Aldrin	EPA 8081B	GC-ECD
NW	Aldrin	EPA 3510C	PREP
NW	Aldrin	EPA 3520C	PREP
NW	Aldrin	EPA 608	GC-ECD
NW	alpha-BHC	EPA 8081B	GC-ECD
NW	alpha-BHC	EPA 3510C	PREP
NW	alpha-BHC	EPA 3520C	PREP
NW	alpha-BHC	EPA 608	GC-ECD
NW	beta-BHC	EPA 8081B	GC-ECD
NW	beta-BHC	EPA 3510C	PREP
NW	beta-BHC	EPA 3520C	PREP
NW	beta-BHC	EPA 608	GC-ECD
NW	delta-BHC	EPA 8081B	GC-ECD
NW	delta-BHC	EPA 3510C	PREP
NW	delta-BHC	EPA 3520C	PREP
NW	delta-BHC	EPA 608	GC-ECD
NW	Lindane	EPA 8081B	GC-ECD
NW	Lindane	EPA 3510C	PREP
NW	Lindane	EPA 3520C	PREP
NW	Lindane	EPA 608	GC-ECD
NW	alpha-Chlordane	EPA 8081B	GC-ECD
NW	alpha-Chlordane	EPA 3510C	PREP
NW	alpha-Chlordane	EPA 3520C	PREP

Matrix	Analyte	Method	Technology
NW	gamma-Chlordane	EPA 8081B	GC-ECD
NW	gamma-Chlordane	EPA 3510C	PREP
NW	gamma-Chlordane	EPA 3520C	PREP
NW	Chlordane Total	EPA 8081B	GC-ECD
NW	Chlordane Total	EPA 3510C	PREP
NW	Chlordane Total	EPA 3520C	PREP
NW	Chlordane Total	EPA 608	GC-ECD
NW	Chlorobenzilate	EPA 8270D	GC-MS
NW	4,4'-DDD	EPA 8081B	GC-ECD
NW	4,4'-DDD	EPA 3510C	PREP
NW	4,4'-DDD	EPA 3520C	PREP
NW	4,4'-DDD	EPA 608	GC-ECD
NW	4,4'-DDE	EPA 8081B	GC-ECD
NW	4,4'-DDE	EPA 3510C	PREP
NW	4,4'-DDE	EPA 3520C	PREP
NW	4,4'-DDE	EPA 608	GC-ECD
NW	4,4'-DDT	EPA 8081B	GC-ECD
NW	4,4'-DDT	EPA 3510C	PREP
NW	4,4'-DDT	EPA 3520C	PREP
NW	4,4'-DDT	EPA 608	GC-ECD
NW	Diallate	EPA 8270D	GC-MS
NW	Dieldrin	EPA 8081B	GC-ECD
NW	Dieldrin	EPA 3510C	PREP
NW	Dieldrin	EPA 3520C	PREP
NW	Dieldrin	EPA 608	GC-ECD
NW	Endosulfan I	EPA 8081B	GC-ECD
NW	Endosulfan I	EPA 3510C	PREP
NW	Endosulfan I	EPA 3520C	PREP
NW	Endosulfan I	EPA 608	GC-ECD
NW	Endosulfan II	EPA 8081B	GC-ECD
NW	Endosulfan II	EPA 3510C	PREP
NW	Endosulfan II	EPA 3520C	PREP
NW	Endosulfan II	EPA 608	GC-ECD
NW	Endosulfan sulfate	EPA 8081B	GC-ECD
NW	Endosulfan sulfate	EPA 3510C	PREP
NW	Endosulfan sulfate	EPA 3520C	PREP
NW	Endosulfan sulfate	EPA 608	GC-ECD
NW	Endrin	EPA 8081B	GC-ECD
NW	Endrin	EPA 3510C	PREP
NW	Endrin	EPA 3520C	PREP
NW	Endrin	EPA 608	GC-ECD
NW	Endrin aldehyde	EPA 8081B	GC-ECD
NW	Endrin aldehyde	EPA 3510C	PREP
NW	Endrin aldehyde	EPA 3520C	PREP
NW	Endrin aldehyde	EPA 608	GC-ECD
NW	Endrin Ketone	EPA 8081B	GC-ECD
NW	Heptachlor	EPA 8081B	GC-ECD
NW	Heptachlor	EPA 3510C	PREP
NW	Heptachlor	EPA 3520C	PREP
NW	Heptachlor	EPA 608	GC-ECD
NW	Heptachlor epoxide	EPA 8081B	GC-ECD
NW	Heptachlor epoxide	EPA 3510C	PREP
NW	Heptachlor epoxide	EPA 3520C	PREP
NW	Heptachlor epoxide	EPA 608	GC-ECD

Matrix	Analyte	Method	Technology
NW	Isodrin	EPA 8081B	GC-ECD
NW	Isodrin	EPA 8270D	GC-MS
NW	Kepone	EPA 8270D	GC-MS
NW	Mirex	EPA 8081B	GC-ECD
NW	Methoxychlor	EPA 8081B	GC-ECD
NW	Methoxychlor	EPA 3510C	PREP
NW	Methoxychlor	EPA 3520C	PREP
NW	Methoxychlor	EPA 608	GC-ECD
NW	PCNB	EPA 8270D	GC-MS
NW	Toxaphene	EPA 8081B	GC-ECD
NW	Toxaphene	EPA 3510C	PREP
NW	Toxaphene	EPA 3520C	PREP
NW	Toxaphene	EPA 608	GC-ECD
NW	2,4-D	EPA 8151A	GC-ECD
NW	2,4-DB	EPA 8151A	GC-ECD
NW	Dalapon	EPA 8151A	GC-ECD
NW	Dicamba	EPA 8151A	GC-ECD
NW	Dinoseb	EPA 8151A	GC-ECD
NW	Dinoseb	EPA 8270D	GC-MS
NW	2,4,5-T	EPA 8151A	GC-ECD
NW	2,4,5-TP (Silvex)	EPA 8151A	GC-ECD
NW	Atrazine	EPA 8270D	GC-MS
NW	Azinphos methyl	EPA 8141B	GC-NPD
NW	Chlorpyriphos	EPA 8141B	GC-NPD
NW	Diazinon	EPA 8141B	GC-NPD
NW	Disulfoton	EPA 8141B	GC-NPD
NW	Demeton-O	EPA 8141B	GC-NPD
NW	Demeton-S	EPA 8141B	GC-NPD
NW	Dimethoate	EPA 8141B	GC-NPD
NW	Dimethoate	EPA 8270D	GC-MS
NW	Famphur	EPA 8141B	GC-NPD
NW	Famphur	EPA 8270D	GC-MS
NW	Malathion	EPA 8141B	GC-NPD
NW	Parathion ethyl	EPA 8141B	GC-NPD
NW	Parathion ethyl	EPA 8270D	GC-MS
NW	Parathion methyl	EPA 8141B	GC-NPD
NW	Phorate	EPA 8141B	GC-NPD
NW	Phorate	EPA 8270D	GC-MS
NW	Sulfotepp	EPA 8270D	GC-MS
NW	Thionazin	EPA 8141B	GC-NPD
NW	Thionazin	EPA 8270D	GC-MS
NW	Benzyl chloride	EPA 8260C	GC-MS
NW	Turbidity	EPA 180.1 Rev. 2.0	COLOR
NW	Boron, Total	EPA 200.7 Rev. 4.4	ICP-AES
NW	Boron, Total	EPA 3005A	PREP
NW	Boron, Total	EPA 6010C	ICP-AES
NW	Bromide	EPA 300.0 Rev. 2.1	IC-COND
NW	Bromide	EPA 9056A	IC-COND
NW	Color	SM 2120B-01,-11	COLOR
NW	Corrosivity	SM 2330	CALC
NW	Cyanide, Total	SM 4500-CN B or C-99,-11	PREP
NW	Cyanide, Total	EPA 9014	COLOR
NW	Cyanide, Total	SM 4500-CN E-99,-11	COLOR
NW	Cyanide, Total	EPA 9010C	PREP

Matrix	Analyte	Method	Technology
NW	Oil and Grease Total Recoverable (HEM)	EPA 1664A	GRAV
NW	Organic Carbon, Total	SM 5310B-00,-11	IR
NW	Organic Carbon, Total	EPA 9060A	IR
NW	Perchlorate	EPA 314.0	IC-COND
NW	Phenols	EPA 420.1 Rev. 1978	COLOR
NW	Phenols	EPA 9065	COLOR
NW	Silica, Dissolved	EPA 200.7 Rev. 4.4	ICP-AES
NW	Silica, Dissolved	EPA 6010C	ICP-AES
NW	Specific Conductance	EPA 120.1 Rev. 1982	COND
NW	Surfactant (MBAS)	SM 5540C-00,-11	COLOR
NW	Sulfide (as S)	SM 4500-S2- F-00,-11	TITR
NW	Sulfide (as S)	EPA 9030B	PREP
NW	Sulfide (as S)	EPA 9034	TITR
NW	Total Petroleum Hydrocarbons	EPA 1664A	GRAV
NW	Aniline	EPA 625	GC-MS
NW	Aniline	EPA 8270D	GC-MS
NW	4-Chloroaniline	EPA 8270D	GC-MS
NW	1-Naphthylamine	EPA 8270D	GC-MS
NW	1,2-Diphenylhydrazine	EPA 8270D	GC-MS
NW	2-Naphthylamine	EPA 8270D	GC-MS
NW	2-Nitroaniline	EPA 8270D	GC-MS
NW	3-Nitroaniline	EPA 8270D	GC-MS
NW	4-Nitroaniline	EPA 8270D	GC-MS
NW	5-Nitro-o-toluidine	EPA 8270D	GC-MS
NW	Carbazole	EPA 625	GC-MS
NW	Carbazole	EPA 8270D	GC-MS
NW	Diphenylamine	EPA 8270D	GC-MS
NW	Methapyrilene	EPA 8270D	GC-MS
NW	1,4-Phenylenediamine	EPA 8270D	GC-MS
NW	Pronamide	EPA 8270D	GC-MS
NW	Propionitrile	EPA 8260C	GC-MS
NW	Pyridine	EPA 625	GC-MS
NW	Pyridine	EPA 8270D	GC-MS
NW	Acetone	EPA 5030C	PREP
NW	Acetone	EPA 8260C	GC-MS
NW	Acetone	EPA 1624B	GC-MS
NW	Acetonitrile	EPA 8260C	GC-MS
NW	2-Butanone (Methylethyl ketone)	EPA 5030C	PREP
NW	2-Butanone (Methylethyl ketone)	EPA 8260C	GC-MS
NW	Carbon Disulfide	EPA 8260C	GC-MS
NW	Cyclohexane	EPA 8260C	GC-MS
NW	Di-ethyl ether	EPA 8260C	GC-MS
NW	1,4-Dioxane	EPA 8260C	GC-MS
NW	Ethyl Acetate	EPA 1666	GC-MS
NW	Ethyl Acetate	EPA 8260C	GC-MS
NW	2-Hexanone	EPA 5030C	PREP
NW	2-Hexanone	EPA 8260C	GC-MS
NW	Isobutyl alcohol	EPA 8260C	GC-MS
NW	Isopropanol	EPA 8260C	GC-MS
NW	Isopropyl Acetate	EPA 1666	GC-MS
NW	Methyl acetate	EPA 8260C	GC-MS
NW	Methyl cyclohexane	EPA 8260C	GC-MS
NW	4-Methyl-2-Pentanone	EPA 5030C	PREP
NW	4-Methyl-2-Pentanone	EPA 8260C	GC-MS

Matrix	Analyte	Method	Technology
NW	n-Amyl Acetate	EPA 1666	GC-MS
NW	2-Nitropropane	EPA 8260C	GC-MS
NW	o-Toluidine	EPA 8270D	GC-MS
NW	Vinyl acetate	EPA 5030C	PREP
NW	Vinyl acetate	EPA 8260C	GC-MS
NW	Acetophenone	EPA 625	GC-MS
NW	Acetophenone	EPA 8270D	GC-MS
NW	alpha-Terpineol	EPA 625	GC-MS
NW	4-Amino biphenyl	EPA 8270D	GC-MS
NW	Aramite	EPA 8270D	GC-MS
NW	Benzoic Acid	EPA 8270D	GC-MS
NW	Benzyl alcohol	EPA 8270D	GC-MS
NW	Benzaldehyde	EPA 8270D	GC-MS
NW	1,1'-Biphenyl	EPA 8270D	GC-MS
NW	Caprolactam	EPA 8270D	GC-MS
NW	1,2-Dichlorobenzene, Semi-volatile	EPA 3510C	PREP
NW	1,2-Dichlorobenzene, Semi-volatile	EPA 3520C	PREP
NW	1,2-Dichlorobenzene, Semi-volatile	EPA 8270D	GC-MS
NW	1,3-Dichlorobenzene, Semi-volatile	EPA 3510C	PREP
NW	1,3-Dichlorobenzene, Semi-volatile	EPA 3520C	PREP
NW	1,3-Dichlorobenzene, Semi-volatile	EPA 8270D	GC-MS
NW	1,4-Dichlorobenzene, Semi-volatile	EPA 3510C	PREP
NW	1,4-Dichlorobenzene, Semi-volatile	EPA 3520C	PREP
NW	1,4-Dichlorobenzene, Semi-volatile	EPA 8270D	GC-MS
NW	Dibenzofuran	EPA 3510C	PREP
NW	Dibenzofuran	EPA 3520C	PREP
NW	Dibenzofuran	EPA 8270D	GC-MS
NW	p-Dimethylaminoazobenzene	EPA 8270D	GC-MS
NW	Ethyl methanesulfonate	EPA 8270D	GC-MS
NW	Isosafrole	EPA 8270D	GC-MS
NW	Methyl methanesulfonate	EPA 8270D	GC-MS
NW	2-Methylnaphthalene	EPA 3510C	PREP
NW	2-Methylnaphthalene	EPA 3520C	PREP
NW	2-Methylnaphthalene	EPA 8270D	GC-MS
NW	n-Decane	EPA 625	GC-MS
NW	n-Octadecane	EPA 625	GC-MS
NW	2-Picoline	EPA 8270D	GC-MS
NW	Phenacetin	EPA 8270D	GC-MS
NW	Safrole	EPA 8270D	GC-MS
NW	O,O,O-Triethyl phosphorothioate	EPA 8270D	GC-MS
NW	Di-isopropyl ether	EPA 8260C	GC-MS
NW	Ethanol	EPA 8260C	GC-MS
NW	tert-butyl ethyl ether (ETBE)	EPA 8260C	GC-MS
NW	Methyl tert-butyl ether	EPA 5030C	PREP
NW	Methyl tert-butyl ether	EPA 8260C	GC-MS
NW	tert-amyl alcohol	EPA 8260C	GC-MS
NW	tert-amyl methyl ether (TAME)	EPA 8260C	GC-MS
NW	tert-butyl alcohol	EPA 8260C	GC-MS
NW	Acetylene	RSK-175	GC-FID
NW	Ethane	RSK-175	GC-FID
NW	Ethene (Ethylene)	RSK-175	GC-FID
NW	Methane	RSK-175	GC-FID
NW	Propane	RSK-175	GC-FID
NW	Diesel Range Organics	EPA 3510C	PREP

Matrix	Analyte	Method	Technology
NW	Diesel Range Organics	EPA 8270D	GC-MS
NW	Diesel Range Organics	EPA 8015D	GC-FID
NW	Gasoline Range Organics	EPA 5030C	PREP
NW	Gasoline Range Organics	EPA 8260C	GC-MS
NW	Gasoline Range Organics	EPA 8015D	GC-FID
PW	Coliform, Total / E. coli (Qualitative)	SM 18-22 9223B (-97) (Colilert)	CF-QL
PW	Standard Plate Count	SimPlate	F-HPC-QN
PW	Arsenic, Total	EPA 200.8 Rev. 5.4	ICP-MS
PW	Barium, Total	EPA 200.7 Rev. 4.4	ICP-AES
PW	Barium, Total	EPA 200.8 Rev. 5.4	ICP-MS
PW	Cadmium, Total	EPA 200.7 Rev. 4.4	ICP-AES
PW	Cadmium, Total	EPA 200.8 Rev. 5.4	ICP-MS
PW	Chromium, Total	EPA 200.7 Rev. 4.4	ICP-AES
PW	Chromium, Total	EPA 200.8 Rev. 5.4	ICP-MS
PW	Copper, Total	EPA 200.7 Rev. 4.4	ICP-AES
PW	Copper, Total	EPA 200.8 Rev. 5.4	ICP-MS
PW	Iron, Total	EPA 200.7 Rev. 4.4	ICP-AES
PW	Lead, Total	EPA 200.8 Rev. 5.4	ICP-MS
PW	Mercury, Total	EPA 245.1 Rev. 3.0	CVAAS
PW	Mercury, Total	EPA 200.8 Rev. 5.4	ICP-MS
PW	Manganese, Total	EPA 200.7 Rev. 4.4	ICP-AES
PW	Manganese, Total	EPA 200.8 Rev. 5.4	ICP-MS
PW	Selenium, Total	EPA 200.8 Rev. 5.4	ICP-MS
PW	Silver, Total	EPA 200.7 Rev. 4.4	ICP-AES
PW	Silver, Total	EPA 200.8 Rev. 5.4	ICP-MS
PW	Zinc, Total	EPA 200.7 Rev. 4.4	ICP-AES
PW	Zinc, Total	EPA 200.8 Rev. 5.4	ICP-MS
PW	Aluminum, Total	EPA 200.7 Rev. 4.4	ICP-AES
PW	Aluminum, Total	EPA 200.8 Rev. 5.4	ICP-MS
PW	Antimony, Total	EPA 200.8 Rev. 5.4	ICP-MS
PW	Beryllium, Total	EPA 200.7 Rev. 4.4	ICP-AES
PW	Beryllium, Total	EPA 200.8 Rev. 5.4	ICP-MS
PW	Molybdenum, Total	EPA 200.7 Rev. 4.4	ICP-AES
PW	Molybdenum, Total	EPA 200.8 Rev. 5.4	ICP-MS
PW	Nickel, Total	EPA 200.7 Rev. 4.4	ICP-AES
PW	Nickel, Total	EPA 200.8 Rev. 5.4	ICP-MS
PW	Thallium, Total	EPA 200.8 Rev. 5.4	ICP-MS
PW	Vanadium, Total	EPA 200.7 Rev. 4.4	ICP-AES
PW	Vanadium, Total	EPA 200.8 Rev. 5.4	ICP-MS
PW	Boron, Total	EPA 200.7 Rev. 4.4	ICP-AES
PW	Calcium, Total	EPA 200.7 Rev. 4.4	ICP-AES
PW	Magnesium, Total	EPA 200.7 Rev. 4.4	ICP-AES
PW	Potassium, Total	EPA 200.7 Rev. 4.4	ICP-AES
PW	Sodium, Total	EPA 200.7 Rev. 4.4	ICP-AES
PW	Alkalinity	SM 18-22 2320B (-97)	TITR
PW	Chloride	EPA 300.0 Rev. 2.1	IC-COND
PW	Chloride	SM 21-22 4500-Cl- E (-97)	COLOR
PW	Color	SM 18-22 2120B (-01)	COLOR
PW	Corrosivity	SM 18-22 2330	CALC
PW	Specific Conductance	EPA 120.1 Rev. 1982	COND
PW	Specific Conductance	SM 18-22 2510B (-97)	COND
PW	Cyanide	SM 18-20 4500-CN C	PREP
PW	Cyanide	SM 18-22 4500-CN E (-99)	COLOR
PW	Cyanide	SM 18-22 4500-CN G (-99)	PREP

Matrix	Analyte	Method	Technology
PW	Fluoride, Total	EPA 300.0 Rev. 2.1	IC-COND
PW	Calcium Hardness	EPA 200.7 Rev. 4.4	ICP-AES
PW	Nitrate (as N)	EPA 353.2 Rev. 2.0	AUTO
PW	Nitrite (as N)	EPA 353.2 Rev. 2.0	AUTO
PW	Orthophosphate (as P)	EPA 300.0 Rev. 2.1	IC-COND
PW	Orthophosphate (as P)	SM 18-22 4500-P E (-99)	COLOR
PW	Silica, Dissolved	EPA 200.7 Rev. 4.4	ICP-AES
PW	Solids, Total Dissolved	SM 18-22 2540C (-97)	GRAV
PW	Sulfate (as SO4)	EPA 300.0 Rev. 2.1	IC-COND
PW	2,4-D	EPA 515.1	GC-ECD
PW	Dalapon	EPA 515.1	GC-ECD
PW	Dicamba	EPA 515.1	GC-ECD
PW	Dinoseb	EPA 515.1	GC-ECD
PW	Pentachlorophenol	EPA 515.1	GC-ECD
PW	Pentachlorophenol	EPA 525.2	GC-MS
PW	Picloram	EPA 515.1	GC-ECD
PW	2,4,5-TP (Silvex)	EPA 515.1	GC-ECD
PW	Alachlor	EPA 505	GC-ECD
PW	Alachlor	EPA 508.1	GC-ECD
PW	Alachlor	EPA 525.2	GC-MS
PW	Aldrin	EPA 505	GC-ECD
PW	Aldrin	EPA 508.1	GC-ECD
PW	Aldrin	EPA 525.2	GC-MS
PW	Atrazine	EPA 505	GC-ECD
PW	Atrazine	EPA 525.2	GC-MS
PW	Butachlor	EPA 525.2	GC-MS
PW	Chlordane Total	EPA 505	GC-ECD
PW	Chlordane Total	EPA 508.1	GC-ECD
PW	Chlordane Total	EPA 525.2	GC-MS
PW	Dieldrin	EPA 505	GC-ECD
PW	Dieldrin	EPA 508.1	GC-ECD
PW	Dieldrin	EPA 525.2	GC-MS
PW	Endrin	EPA 505	GC-ECD
PW	Endrin	EPA 508.1	GC-ECD
PW	Endrin	EPA 525.2	GC-MS
PW	Heptachlor	EPA 505	GC-ECD
PW	Heptachlor	EPA 508.1	GC-ECD
PW	Heptachlor	EPA 525.2	GC-MS
PW	Heptachlor epoxide	EPA 505	GC-ECD
PW	Heptachlor epoxide	EPA 508.1	GC-ECD
PW	Heptachlor epoxide	EPA 525.2	GC-MS
PW	Lindane	EPA 505	GC-ECD
PW	Lindane	EPA 508.1	GC-ECD
PW	Lindane	EPA 525.2	GC-MS
PW	Methoxychlor	EPA 505	GC-ECD
PW	Methoxychlor	EPA 508.1	GC-ECD
PW	Methoxychlor	EPA 525.2	GC-MS
PW	Metolachlor	EPA 525.2	GC-MS
PW	Metribuzin	EPA 525.2	GC-MS
PW	Propachlor	EPA 525.2	GC-MS
PW	Simazine	EPA 505	GC-ECD
PW	Simazine	EPA 525.2	GC-MS
PW	Toxaphene	EPA 505	GC-ECD
PW	Toxaphene	EPA 508.1	GC-ECD

Matrix	Analyte	Method	Technology
PW	Trifluralin	EPA 525.2	GC-MS
PW	Aldicarb	EPA 531.1	HPLC-FLUOR
PW	Aldicarb Sulfone	EPA 531.1	HPLC-FLUOR
PW	Aldicarb Sulfoxide	EPA 531.1	HPLC-FLUOR
PW	Carbaryl	EPA 531.1	HPLC-FLUOR
PW	Carbofuran	EPA 531.1	HPLC-FLUOR
PW	3-Hydroxy Carbofuran	EPA 531.1	HPLC-FLUOR
PW	Methomyl	EPA 531.1	HPLC-FLUOR
PW	Oxamyl	EPA 531.1	HPLC-FLUOR
PW	Turbidity	EPA 180.1 Rev. 2.0	COLOR
PW	Benzo(a)pyrene	EPA 525.2	GC-MS
PW	Di (2-ethylhexyl) adipate	EPA 525.2	GC-MS
PW	Bis(2-ethylhexyl) phthalate	EPA 525.2	GC-MS
PW	Diquat	EPA 549.2	HPLC-UV
PW	Endothall	EPA 548.1	GC-MS
PW	Glyphosate	EPA 547	HPLC-UV
PW	Hexachlorobenzene	EPA 505	GC-ECD
PW	Hexachlorobenzene	EPA 525.2	GC-MS
PW	Hexachlorocyclopentadiene	EPA 505	GC-ECD
PW	Hexachlorocyclopentadiene	EPA 525.2	GC-MS
PW	Methyl iodide	EPA 524.2	GC-MS
PW	Odor	SM 18-22 2150B (-97)	99
PW	Organic Carbon, Total	SM 19-22 5310B (-00)	IR
PW	Perchlorate	EPA 314.0	IC-COND
PW	Surfactant (MBAS)	SM 18-22 5540C (-00)	COLOR
PW	UV 254	SM 19-22 5910B (-00)	COLOR
PW	PCB Screen	EPA 505	GC-ECD
PW	PCB Screen	EPA 508.1	GC-ECD
PW	PCB,Total (as decachlorobiphenyl)	EPA 508A	GC-ECD
PW	Bromodichloromethane	EPA 524.2	GC-MS
PW	Bromoform	EPA 524.2	GC-MS
PW	Dibromochloromethane	EPA 524.2	GC-MS
PW	Chloroform	EPA 524.2	GC-MS
PW	Total Trihalomethanes	EPA 524.2	GC-MS
PW	Bromochloromethane	EPA 524.2	GC-MS
PW	Bromomethane	EPA 524.2	GC-MS
PW	Carbon tetrachloride	EPA 524.2	GC-MS
PW	Chloroethane	EPA 524.2	GC-MS
PW	Chloromethane	EPA 524.2	GC-MS
PW	Dibromomethane	EPA 524.2	GC-MS
PW	Dichlorodifluoromethane	EPA 524.2	GC-MS
PW	1,1-Dichloroethane	EPA 524.2	GC-MS
PW	1,2-Dichloroethane	EPA 524.2	GC-MS
PW	1,1-Dichloroethene	EPA 524.2	GC-MS
PW	cis-1,2-Dichloroethene	EPA 524.2	GC-MS
PW	trans-1,2-Dichloroethene	EPA 524.2	GC-MS
PW	1,2-Dichloropropane	EPA 524.2	GC-MS
PW	1,3-Dichloropropane	EPA 524.2	GC-MS
PW	2,2-Dichloropropane	EPA 524.2	GC-MS
PW	1,1-Dichloropropene	EPA 524.2	GC-MS
PW	cis-1,3-Dichloropropene	EPA 524.2	GC-MS
PW	trans-1,3-Dichloropropene	EPA 524.2	GC-MS
PW	Methylene chloride	EPA 524.2	GC-MS
PW	1,1,1,2-Tetrachloroethane	EPA 524.2	GC-MS

Matrix	Analyte	Method	Technology
PW	1,1,2,2-Tetrachloroethane	EPA 524.2	GC-MS
PW	Tetrachloroethene	EPA 524.2	GC-MS
PW	1,1,1-Trichloroethane	EPA 524.2	GC-MS
PW	1,1,2-Trichloroethane	EPA 524.2	GC-MS
PW	Trichloroethene	EPA 524.2	GC-MS
PW	Trichlorofluoromethane	EPA 524.2	GC-MS
PW	1,2,3-Trichloropropane	EPA 524.2	GC-MS
PW	Vinyl chloride	EPA 524.2	GC-MS
PW	Benzene	EPA 524.2	GC-MS
PW	Bromobenzene	EPA 524.2	GC-MS
PW	n-Butylbenzene	EPA 524.2	GC-MS
PW	sec-Butylbenzene	EPA 524.2	GC-MS
PW	tert-Butylbenzene	EPA 524.2	GC-MS
PW	Chlorobenzene	EPA 524.2	GC-MS
PW	2-Chlorotoluene	EPA 524.2	GC-MS
PW	4-Chlorotoluene	EPA 524.2	GC-MS
PW	1,2-Dichlorobenzene	EPA 524.2	GC-MS
PW	1,3-Dichlorobenzene	EPA 524.2	GC-MS
PW	1,4-Dichlorobenzene	EPA 524.2	GC-MS
PW	Ethyl benzene	EPA 524.2	GC-MS
PW	Hexachlorobutadiene	EPA 524.2	GC-MS
PW	Isopropylbenzene	EPA 524.2	GC-MS
PW	p-Isopropyltoluene (P-Cymene)	EPA 524.2	GC-MS
PW	n-Propylbenzene	EPA 524.2	GC-MS
PW	Styrene	EPA 524.2	GC-MS
PW	Toluene	EPA 524.2	GC-MS
PW	1,2,3-Trichlorobenzene	EPA 524.2	GC-MS
PW	1,2,4-Trichlorobenzene	EPA 524.2	GC-MS
PW	1,2,4-Trimethylbenzene	EPA 524.2	GC-MS
PW	1,3,5-Trimethylbenzene	EPA 524.2	GC-MS
PW	Total Xylenes	EPA 524.2	GC-MS
PW	1,2-Dibromoethane	EPA 504.1	GC-ECD
PW	1,2-Dibromo-3-chloropropane	EPA 504.1	GC-ECD
PW	Bromide	EPA 300.0 Rev. 2.1	IC-COND
PW	Chlorate	EPA 300.1 Rev. 1.0	IC-COND
PW	Dibromoacetic acid	EPA 552.2	GC-ECD
PW	Dichloroacetic acid	EPA 552.2	GC-ECD
PW	Monobromoacetic acid	EPA 552.2	GC-ECD
PW	Monochloroacetic acid	EPA 552.2	GC-ECD
PW	Trichloroacetic acid	EPA 552.2	GC-ECD
PW	Bromochloroacetic acid	EPA 552.2	GC-ECD
PW	Naphthalene	EPA 524.2	GC-MS
PW	Methyl tert-butyl ether	EPA 524.2	GC-MS
PW	Acetylene	RSK-175	GC-FID
PW	Ethane	RSK-175	GC-FID
PW	Ethene (Ethylene)	RSK-175	GC-FID
PW	Methane	RSK-175	GC-FID
PW	Propane	RSK-175	GC-FID
AI	Hexachlorobutadiene	EPA TO-17	GC-MS
AI	Hexachlorobutadiene	EPA TO-15	GC-MS
AI	Hexachloroethane	EPA TO-15	GC-MS
AI	1,2,4-Trichlorobenzene	EPA TO-17	GC-MS
AI	1,2,4-Trichlorobenzene	EPA TO-15	GC-MS
AI	Bromodichloromethane	EPA TO-15	GC-MS

Matrix	Analyte	Method	Technology
AI	Bromoform	EPA TO-17	GC-MS
AI	Bromoform	EPA TO-15	GC-MS
AI	Bromomethane	EPA TO-15	GC-MS
AI	Carbon tetrachloride	EPA TO-17	GC-MS
AI	Carbon tetrachloride	EPA TO-15	GC-MS
AI	Chloroform	EPA TO-17	GC-MS
AI	Chloroform	EPA TO-15	GC-MS
AI	Chloroethane	EPA TO-15	GC-MS
AI	Chloromethane	EPA TO-15	GC-MS
AI	Dibromochloromethane	EPA TO-15	GC-MS
AI	Dichlorodifluoromethane	EPA TO-15	GC-MS
AI	1,2-Dibromoethane	EPA TO-17	GC-MS
AI	1,2-Dibromoethane	EPA TO-15	GC-MS
AI	1,1-Dichloroethane	EPA TO-17	GC-MS
AI	1,1-Dichloroethane	EPA TO-15	GC-MS
AI	1,2-Dichloroethane	EPA TO-17	GC-MS
AI	1,2-Dichloroethane	EPA TO-15	GC-MS
AI	cis-1,2-Dichloroethene	EPA TO-17	GC-MS
AI	cis-1,2-Dichloroethene	EPA TO-15	GC-MS
AI	trans-1,2-Dichloroethene	EPA TO-15	GC-MS
AI	1,1-Dichloroethene	EPA TO-17	GC-MS
AI	1,1-Dichloroethene	EPA TO-15	GC-MS
AI	1,2-Dichloropropane	EPA TO-17	GC-MS
AI	1,2-Dichloropropane	EPA TO-15	GC-MS
AI	cis-1,3-Dichloropropene	EPA TO-17	GC-MS
AI	cis-1,3-Dichloropropene	EPA TO-15	GC-MS
AI	trans-1,3-Dichloropropene	EPA TO-17	GC-MS
AI	trans-1,3-Dichloropropene	EPA TO-15	GC-MS
AI	Methylene chloride	EPA TO-17	GC-MS
AI	Methylene chloride	EPA TO-15	GC-MS
AI	1,1,2,2-Tetrachloroethane	EPA TO-17	GC-MS
AI	1,1,2,2-Tetrachloroethane	EPA TO-15	GC-MS
AI	Tetrachloroethene	EPA TO-17	GC-MS
AI	Tetrachloroethene	EPA TO-15	GC-MS
AI	1,1,1-Trichloroethane	EPA TO-17	GC-MS
AI	1,1,1-Trichloroethane	EPA TO-15	GC-MS
AI	1,1,2-Trichloroethane	EPA TO-17	GC-MS
AI	1,1,2-Trichloroethane	EPA TO-15	GC-MS
AI	Trichloroethene	EPA TO-17	GC-MS
AI	Trichloroethene	EPA TO-15	GC-MS
AI	Trichlorofluoromethane	EPA TO-15	GC-MS
AI	1,1,2-Trichloro-1,2,2-Trifluoroethane	EPA TO-15	GC-MS
AI	Vinyl bromide	EPA TO-17	GC-MS
AI	Vinyl bromide	EPA TO-15	GC-MS
AI	Vinyl chloride	EPA TO-17	GC-MS
AI	Vinyl chloride	EPA TO-15	GC-MS
AI	Benzyl chloride	EPA TO-15	GC-MS
AI	Naphthalene	EPA TO-15	GC-MS
AI	Benzene	EPA TO-17	GC-MS
AI	Benzene	EPA TO-15	GC-MS
AI	Chlorobenzene	EPA TO-17	GC-MS
AI	Chlorobenzene	EPA TO-15	GC-MS
AI	2-Chlorotoluene	EPA TO-15	GC-MS
AI	1,2-Dichlorobenzene	EPA TO-17	GC-MS

Matrix	Analyte	Method	Technology
AI	1,2-Dichlorobenzene	EPA TO-15	GC-MS
AI	1,4-Dichlorobenzene	EPA TO-17	GC-MS
AI	1,4-Dichlorobenzene	EPA TO-15	GC-MS
AI	1,3-Dichlorobenzene	EPA TO-17	GC-MS
AI	1,3-Dichlorobenzene	EPA TO-15	GC-MS
AI	Ethyl benzene	EPA TO-17	GC-MS
AI	Ethyl benzene	EPA TO-15	GC-MS
AI	Isopropylbenzene	EPA TO-17	GC-MS
AI	Isopropylbenzene	EPA TO-15	GC-MS
AI	Toluene	EPA TO-17	GC-MS
AI	Toluene	EPA TO-15	GC-MS
AI	Total Xylenes	EPA TO-17	GC-MS
AI	Total Xylenes	EPA TO-15	GC-MS
AI	o-Xylene	EPA TO-17	GC-MS
AI	o-Xylene	EPA TO-15	GC-MS
AI	m/p-Xylenes	EPA TO-17	GC-MS
AI	m/p-Xylenes	EPA TO-15	GC-MS
AI	1,2,4-Trimethylbenzene	EPA TO-15	GC-MS
AI	1,3,5-Trimethylbenzene	EPA TO-15	GC-MS
AI	Styrene	EPA TO-17	GC-MS
AI	Styrene	EPA TO-15	GC-MS
AI	Acetone	EPA TO-17	GC-MS
AI	Acetone	EPA TO-15	GC-MS
AI	1,3-Butadiene	EPA TO-15	GC-MS
AI	2-Butanone (Methylethyl ketone)	EPA TO-17	GC-MS
AI	2-Butanone (Methylethyl ketone)	EPA TO-15	GC-MS
AI	Carbon Disulfide	EPA TO-17	GC-MS
AI	Carbon Disulfide	EPA TO-15	GC-MS
AI	Cyclohexane	EPA TO-15	GC-MS
AI	1,2-Dichlorotetrafluoroethane	EPA TO-15	GC-MS
AI	1,4-Dioxane	EPA TO-17	GC-MS
AI	1,4-Dioxane	EPA TO-15	GC-MS
AI	Hexane	EPA TO-15	GC-MS
AI	n-Heptane	EPA TO-15	GC-MS
AI	Isopropanol	EPA TO-15	GC-MS
AI	4-Methyl-2-Pentanone	EPA TO-17	GC-MS
AI	4-Methyl-2-Pentanone	EPA TO-15	GC-MS
AI	Methyl tert-butyl ether	EPA TO-17	GC-MS
AI	Methyl tert-butyl ether	EPA TO-15	GC-MS
AI	tert-butyl alcohol	EPA TO-15	GC-MS
AI	2,2,4-Trimethylpentane	EPA TO-15	GC-MS
AI	Vinyl acetate	EPA TO-15	GC-MS
AI	Acrylonitrile	EPA TO-15	GC-MS
AI	Methyl methacrylate	EPA TO-15	GC-MS
SW	Ignitability	EPA 1010A	99
SW	Corrosivity	EPA 9040C	POT
SW	Corrosivity	EPA 9045D	POT
SW	Corrosivity	EPA 1110A	GRAV
SW	TCLP	EPA 1311	99
SW	Synthetic Precipitation Leaching Proc.	EPA 1312	99
SW	Free Liquids	EPA 9095B	PA
SW	Barium, Total	EPA 3005A	PREP
SW	Barium, Total	EPA 3050B	PREP
SW	Barium, Total	EPA 6010C	ICP-AES

Matrix	Analyte	Method	Technology
SW	Barium, Total	EPA 6020A	ICP-MS
SW	Cadmium, Total	EPA 3005A	PREP
SW	Cadmium, Total	EPA 3050B	PREP
SW	Cadmium, Total	EPA 6010C	ICP-AES
SW	Cadmium, Total	EPA 6020A	ICP-MS
SW	Calcium, Total	EPA 3005A	PREP
SW	Calcium, Total	EPA 3050B	PREP
SW	Calcium, Total	EPA 6010C	ICP-AES
SW	Chromium, Total	EPA 3005A	PREP
SW	Chromium, Total	EPA 3050B	PREP
SW	Chromium, Total	EPA 6010C	ICP-AES
SW	Chromium, Total	EPA 6020A	ICP-MS
SW	Copper, Total	EPA 3005A	PREP
SW	Copper, Total	EPA 3050B	PREP
SW	Copper, Total	EPA 6010C	ICP-AES
SW	Copper, Total	EPA 6020A	ICP-MS
SW	Iron, Total	EPA 6010C	ICP-AES
SW	Lead, Total	EPA 3005A	PREP
SW	Lead, Total	EPA 3050B	PREP
SW	Lead, Total	EPA 6010C	ICP-AES
SW	Lead, Total	EPA 6020A	ICP-MS
SW	Nickel, Total	EPA 3005A	PREP
SW	Nickel, Total	EPA 3050B	PREP
SW	Nickel, Total	EPA 6010C	ICP-AES
SW	Nickel, Total	EPA 6020A	ICP-MS
SW	Magnesium, Total	EPA 3005A	PREP
SW	Magnesium, Total	EPA 3050B	PREP
SW	Magnesium, Total	EPA 6010C	ICP-AES
SW	Manganese, Total	EPA 3005A	PREP
SW	Manganese, Total	EPA 3050B	PREP
SW	Manganese, Total	EPA 6010C	ICP-AES
SW	Manganese, Total	EPA 6020A	ICP-MS
SW	Potassium, Total	EPA 3005A	PREP
SW	Potassium, Total	EPA 3050B	PREP
SW	Potassium, Total	EPA 6010C	ICP-AES
SW	Silver, Total	EPA 3005A	PREP
SW	Silver, Total	EPA 3050B	PREP
SW	Silver, Total	EPA 6010C	ICP-AES
SW	Silver, Total	EPA 6020A	ICP-MS
SW	Sodium, Total	EPA 3050B	PREP
SW	Sodium, Total	EPA 6010C	ICP-AES
SW	Strontium, Total	EPA 3005A	PREP
SW	Strontium, Total	EPA 3050B	PREP
SW	Strontium, Total	EPA 6010C	ICP-AES
SW	Aluminum, Total	EPA 3005A	PREP
SW	Aluminum, Total	EPA 3050B	PREP
SW	Aluminum, Total	EPA 6010C	ICP-AES
SW	Aluminum, Total	EPA 6020A	ICP-MS
SW	Antimony, Total	EPA 3005A	PREP
SW	Antimony, Total	EPA 3050B	PREP
SW	Antimony, Total	EPA 6010C	ICP-AES
SW	Antimony, Total	EPA 6020A	ICP-MS
SW	Arsenic, Total	EPA 3005A	PREP
SW	Arsenic, Total	EPA 3050B	PREP

Matrix	Analyte	Method	Technology
SW	Arsenic, Total	EPA 6010C	ICP-AES
SW	Arsenic, Total	EPA 6020A	ICP-MS
SW	Beryllium, Total	EPA 3005A	PREP
SW	Beryllium, Total	EPA 3050B	PREP
SW	Beryllium, Total	EPA 6010C	ICP-AES
SW	Beryllium, Total	EPA 6020A	ICP-MS
SW	Chromium VI	EPA 7196A	COLOR
SW	Chromium VI	EPA 3060A	PREP
SW	Mercury, Total	EPA 7471B	CVAAS
SW	Selenium, Total	EPA 3005A	PREP
SW	Selenium, Total	EPA 3050B	PREP
SW	Selenium, Total	EPA 6010C	ICP-AES
SW	Selenium, Total	EPA 6020A	ICP-MS
SW	Vanadium, Total	EPA 3005A	PREP
SW	Vanadium, Total	EPA 3050B	PREP
SW	Vanadium, Total	EPA 6010C	ICP-AES
SW	Vanadium, Total	EPA 6020A	ICP-MS
SW	Zinc, Total	EPA 3005A	PREP
SW	Zinc, Total	EPA 3050B	PREP
SW	Zinc, Total	EPA 6010C	ICP-AES
SW	Zinc, Total	EPA 6020A	ICP-MS
SW	Cobalt, Total	EPA 3005A	PREP
SW	Cobalt, Total	EPA 3050B	PREP
SW	Cobalt, Total	EPA 6010C	ICP-AES
SW	Cobalt, Total	EPA 6020A	ICP-MS
SW	Molybdenum, Total	EPA 3005A	PREP
SW	Molybdenum, Total	EPA 3050B	PREP
SW	Molybdenum, Total	EPA 6010C	ICP-AES
SW	Molybdenum, Total	EPA 6020A	ICP-MS
SW	Thallium, Total	EPA 3005A	PREP
SW	Thallium, Total	EPA 3050B	PREP
SW	Thallium, Total	EPA 6010C	ICP-AES
SW	Thallium, Total	EPA 6020A	ICP-MS
SW	Tin, Total	EPA 3005A	PREP
SW	Tin, Total	EPA 3050B	PREP
SW	Tin, Total	EPA 6010C	ICP-AES
SW	Acrolein (Propenal)	EPA 5035A-L	PREP
SW	Acrolein (Propenal)	EPA 5035A-H	PREP
SW	Acrolein (Propenal)	EPA 8260C	GC-MS
SW	Acrylonitrile	EPA 5035A-L	PREP
SW	Acrylonitrile	EPA 5035A-H	PREP
SW	Acrylonitrile	EPA 8260C	GC-MS
SW	Ethyl methacrylate	EPA 8260C	GC-MS
SW	Methyl acrylonitrile	EPA 8260C	GC-MS
SW	Methyl methacrylate	EPA 8260C	GC-MS
SW	1-Chloronaphthalene	EPA 8270D	GC-MS
SW	2-Chloronaphthalene	EPA 3545A	PREP
SW	2-Chloronaphthalene	EPA 8270D	GC-MS
SW	Hexachlorobenzene	EPA 3545A	PREP
SW	Hexachlorobenzene	EPA 8270D	GC-MS
SW	Hexachlorobutadiene	EPA 3545A	PREP
SW	Hexachlorobutadiene	EPA 8270D	GC-MS
SW	Hexachlorocyclopentadiene	EPA 3545A	PREP
SW	Hexachlorocyclopentadiene	EPA 8270D	GC-MS

Matrix	Analyte	Method	Technology
SW	Hexachloroethane	EPA 3545A	PREP
SW	Hexachloroethane	EPA 8270D	GC-MS
SW	Hexachloropropene	EPA 8270D	GC-MS
SW	Pentachlorobenzene	EPA 3545A	PREP
SW	Pentachlorobenzene	EPA 8270D	GC-MS
SW	1,2,3-Trichlorobenzene	EPA 5035A-L	PREP
SW	1,2,3-Trichlorobenzene	EPA 5035A-H	PREP
SW	1,2,3-Trichlorobenzene	EPA 8260C	GC-MS
SW	1,2,4-Trichlorobenzene	EPA 3545A	PREP
SW	1,2,4-Trichlorobenzene	EPA 8270D	GC-MS
SW	1,2,4,5-Tetrachlorobenzene	EPA 8270D	GC-MS
SW	Bis(2-chloroethyl)ether	EPA 3545A	PREP
SW	Bis(2-chloroethyl)ether	EPA 8270D	GC-MS
SW	Bis(2-chloroethoxy)methane	EPA 3545A	PREP
SW	Bis(2-chloroethoxy)methane	EPA 8270D	GC-MS
SW	Bis(2-chloroisopropyl) ether	EPA 3545A	PREP
SW	Bis(2-chloroisopropyl) ether	EPA 8270D	GC-MS
SW	4-Bromophenylphenyl ether	EPA 3545A	PREP
SW	4-Bromophenylphenyl ether	EPA 8270D	GC-MS
SW	4-Chlorophenylphenyl ether	EPA 3545A	PREP
SW	4-Chlorophenylphenyl ether	EPA 8270D	GC-MS
SW	2,4-Dinitrotoluene	EPA 3545A	PREP
SW	2,4-Dinitrotoluene	EPA 8270D	GC-MS
SW	2,6-Dinitrotoluene	EPA 3545A	PREP
SW	2,6-Dinitrotoluene	EPA 8270D	GC-MS
SW	1,3-Dinitrobenzene	EPA 8270D	GC-MS
SW	Isophorone	EPA 3545A	PREP
SW	Isophorone	EPA 8270D	GC-MS
SW	1,4-Naphthoquinone	EPA 8270D	GC-MS
SW	Nitrobenzene	EPA 3545A	PREP
SW	Nitrobenzene	EPA 8270D	GC-MS
SW	Pyridine	EPA 8270D	GC-MS
SW	1,3,5-Trinitrobenzene	EPA 8270D	GC-MS
SW	Benzyl butyl phthalate	EPA 3545A	PREP
SW	Benzyl butyl phthalate	EPA 8270D	GC-MS
SW	Bis(2-ethylhexyl) phthalate	EPA 3545A	PREP
SW	Bis(2-ethylhexyl) phthalate	EPA 8270D	GC-MS
SW	Diethyl phthalate	EPA 3545A	PREP
SW	Diethyl phthalate	EPA 8270D	GC-MS
SW	Dimethyl phthalate	EPA 3545A	PREP
SW	Dimethyl phthalate	EPA 8270D	GC-MS
SW	Di-n-butyl phthalate	EPA 3545A	PREP
SW	Di-n-butyl phthalate	EPA 8270D	GC-MS
SW	Di-n-octyl phthalate	EPA 3545A	PREP
SW	Di-n-octyl phthalate	EPA 8270D	GC-MS
SW	PCB-1016	EPA 3580A	PREP
SW	PCB-1016	EPA 3545A	PREP
SW	PCB-1016	EPA 8082A	GC-ECD
SW	PCB-1221	EPA 3580A	PREP
SW	PCB-1221	EPA 3545A	PREP
SW	PCB-1221	EPA 8082A	GC-ECD
SW	PCB-1232	EPA 3580A	PREP
SW	PCB-1232	EPA 3545A	PREP
SW	PCB-1232	EPA 8082A	GC-ECD

Matrix	Analyte	Method	Technology
SW	PCB-1242	EPA 3580A	PREP
SW	PCB-1242	EPA 3545A	PREP
SW	PCB-1242	EPA 8082A	GC-ECD
SW	PCB-1248	EPA 3580A	PREP
SW	PCB-1248	EPA 3545A	PREP
SW	PCB-1248	EPA 8082A	GC-ECD
SW	PCB-1254	EPA 3580A	PREP
SW	PCB-1254	EPA 3545A	PREP
SW	PCB-1254	EPA 8082A	GC-ECD
SW	PCB-1260	EPA 3580A	PREP
SW	PCB-1260	EPA 3545A	PREP
SW	PCB-1260	EPA 8082A	GC-ECD
SW	PCB-1262	EPA 8082A	GC-ECD
SW	PCB-1268	EPA 8082A	GC-ECD
SW	PCBs in Oil	EPA 3580A	PREP
SW	PCBs in Oil	EPA 8082A	GC-ECD
SW	2-Acetylaminofluorene	EPA 8270D	GC-MS
SW	Acenaphthene	EPA 3545A	PREP
SW	Acenaphthene	EPA 8270D	GC-MS
SW	Anthracene	EPA 3545A	PREP
SW	Anthracene	EPA 8270D	GC-MS
SW	Acenaphthylene	EPA 3545A	PREP
SW	Acenaphthylene	EPA 8270D	GC-MS
SW	Benzo(a)anthracene	EPA 3545A	PREP
SW	Benzo(a)anthracene	EPA 8270D	GC-MS
SW	Benzo(a)pyrene	EPA 3545A	PREP
SW	Benzo(a)pyrene	EPA 8270D	GC-MS
SW	Benzo(b)fluoranthene	EPA 3545A	PREP
SW	Benzo(b)fluoranthene	EPA 8270D	GC-MS
SW	Benzo(ghi)perylene	EPA 3545A	PREP
SW	Benzo(ghi)perylene	EPA 8270D	GC-MS
SW	Benzo(k)fluoranthene	EPA 3545A	PREP
SW	Benzo(k)fluoranthene	EPA 8270D	GC-MS
SW	Chrysene	EPA 3545A	PREP
SW	Chrysene	EPA 8270D	GC-MS
SW	Dibenzo(a,h)anthracene	EPA 3545A	PREP
SW	Dibenzo(a,h)anthracene	EPA 8270D	GC-MS
SW	7,12-Dimethylbenzyl (a) anthracene	EPA 8270D	GC-MS
SW	Fluoranthene	EPA 3545A	PREP
SW	Fluoranthene	EPA 8270D	GC-MS
SW	Fluorene	EPA 3545A	PREP
SW	Fluorene	EPA 8270D	GC-MS
SW	Indeno(1,2,3-cd)pyrene	EPA 3545A	PREP
SW	Indeno(1,2,3-cd)pyrene	EPA 8270D	GC-MS
SW	3-Methylcholanthrene	EPA 8270D	GC-MS
SW	Naphthalene	EPA 3545A	PREP
SW	Naphthalene	EPA 8270D	GC-MS
SW	Phenanthrene	EPA 3545A	PREP
SW	Phenanthrene	EPA 8270D	GC-MS
SW	Pyrene	EPA 3545A	PREP
SW	Pyrene	EPA 8270D	GC-MS
SW	Acenaphthylene Low Level	EPA 3545A	PREP
SW	Acenaphthylene Low Level	EPA 8270D SIM	GC-MS
SW	Acenaphthene Low Level	EPA 3545A	PREP

Matrix	Analyte	Method	Technology
SW	Acenaphthene Low Level	EPA 8270D SIM	GC-MS
SW	Anthracene Low Level	EPA 3545A	PREP
SW	Anthracene Low Level	EPA 8270D SIM	GC-MS
SW	Benzo(a)anthracene Low Level	EPA 3545A	PREP
SW	Benzo(a)anthracene Low Level	EPA 8270D SIM	GC-MS
SW	Benzo(b)fluoranthene Low Level	EPA 3545A	PREP
SW	Benzo(b)fluoranthene Low Level	EPA 8270D SIM	GC-MS
SW	Benzo(k)fluoranthene Low Level	EPA 3545A	PREP
SW	Benzo(k)fluoranthene Low Level	EPA 8270D SIM	GC-MS
SW	Benzo(g,h,i)perylene Low Level	EPA 3545A	PREP
SW	Benzo(g,h,i)perylene Low Level	EPA 8270D SIM	GC-MS
SW	Benzo(a)pyrene Low Level	EPA 3545A	PREP
SW	Benzo(a)pyrene Low Level	EPA 8270D SIM	GC-MS
SW	Chrysene Low Level	EPA 3545A	PREP
SW	Chrysene Low Level	EPA 8270D SIM	GC-MS
SW	Dibenzo(a,h)anthracene Low Level	EPA 3545A	PREP
SW	Dibenzo(a,h)anthracene Low Level	EPA 8270D SIM	GC-MS
SW	Fluoranthene Low Level	EPA 3545A	PREP
SW	Fluoranthene Low Level	EPA 8270D SIM	GC-MS
SW	Fluorene Low Level	EPA 3545A	PREP
SW	Fluorene Low Level	EPA 8270D SIM	GC-MS
SW	Indeno(1,2,3-cd)pyrene Low Level	EPA 3545A	PREP
SW	Indeno(1,2,3-cd)pyrene Low Level	EPA 8270D SIM	GC-MS
SW	Naphthalene Low Level	EPA 3545A	PREP
SW	Naphthalene Low Level	EPA 8270D SIM	GC-MS
SW	Phenanthrene Low Level	EPA 3545A	PREP
SW	Phenanthrene Low Level	EPA 8270D SIM	GC-MS
SW	Pyrene Low Level	EPA 3545A	PREP
SW	Pyrene Low Level	EPA 8270D SIM	GC-MS
SW	4-Chloro-3-methylphenol	EPA 3545A	PREP
SW	4-Chloro-3-methylphenol	EPA 8270D	GC-MS
SW	2-Chlorophenol	EPA 3545A	PREP
SW	2-Chlorophenol	EPA 8270D	GC-MS
SW	2,4-Dichlorophenol	EPA 3545A	PREP
SW	2,4-Dichlorophenol	EPA 8270D	GC-MS
SW	2,6-Dichlorophenol	EPA 8270D	GC-MS
SW	2,4-Dimethylphenol	EPA 3545A	PREP
SW	2,4-Dimethylphenol	EPA 8270D	GC-MS
SW	2,4-Dinitrophenol	EPA 3545A	PREP
SW	2,4-Dinitrophenol	EPA 8270D	GC-MS
SW	2-Methylphenol	EPA 3545A	PREP
SW	2-Methylphenol	EPA 8270D	GC-MS
SW	3-Methylphenol	EPA 8270D	GC-MS
SW	4-Methylphenol	EPA 3545A	PREP
SW	4-Methylphenol	EPA 8270D	GC-MS
SW	2-Methyl-4,6-dinitrophenol	EPA 3545A	PREP
SW	2-Methyl-4,6-dinitrophenol	EPA 8270D	GC-MS
SW	2-Nitrophenol	EPA 3545A	PREP
SW	2-Nitrophenol	EPA 8270D	GC-MS
SW	4-Nitrophenol	EPA 3545A	PREP
SW	4-Nitrophenol	EPA 8270D	GC-MS
SW	Pentachlorophenol	EPA 3545A	PREP
SW	Pentachlorophenol	EPA 8270D	GC-MS
SW	Phenol	EPA 3545A	PREP

Matrix	Analyte	Method	Technology
SW	Phenol	EPA 8270D	GC-MS
SW	2,3,4,6 Tetrachlorophenol	EPA 8270D	GC-MS
SW	2,4,6-Trichlorophenol	EPA 3545A	PREP
SW	2,4,6-Trichlorophenol	EPA 8270D	GC-MS
SW	2,4,5-Trichlorophenol	EPA 3545A	PREP
SW	2,4,5-Trichlorophenol	EPA 8270D	GC-MS
SW	1,2,4-Trichlorobenzene, Volatile	EPA 5035A-L	PREP
SW	1,2,4-Trichlorobenzene, Volatile	EPA 5035A-H	PREP
SW	1,2,4-Trichlorobenzene, Volatile	EPA 8260C	GC-MS
SW	Benzene	EPA 5035A-L	PREP
SW	Benzene	EPA 5035A-H	PREP
SW	Benzene	EPA 8260C	GC-MS
SW	n-Butylbenzene	EPA 5035A-L	PREP
SW	n-Butylbenzene	EPA 5035A-H	PREP
SW	n-Butylbenzene	EPA 8260C	GC-MS
SW	sec-Butylbenzene	EPA 5035A-L	PREP
SW	sec-Butylbenzene	EPA 5035A-H	PREP
SW	sec-Butylbenzene	EPA 8260C	GC-MS
SW	tert-Butylbenzene	EPA 5035A-L	PREP
SW	tert-Butylbenzene	EPA 5035A-H	PREP
SW	tert-Butylbenzene	EPA 8260C	GC-MS
SW	Bromobenzene	EPA 5035A-L	PREP
SW	Bromobenzene	EPA 5035A-H	PREP
SW	Bromobenzene	EPA 8260C	GC-MS
SW	Chlorobenzene	EPA 5035A-L	PREP
SW	Chlorobenzene	EPA 5035A-H	PREP
SW	Chlorobenzene	EPA 8260C	GC-MS
SW	2-Chlorotoluene	EPA 8260C	GC-MS
SW	4-Chlorotoluene	EPA 8260C	GC-MS
SW	1,2-Dichlorobenzene	EPA 5035A-L	PREP
SW	1,2-Dichlorobenzene	EPA 5035A-H	PREP
SW	1,2-Dichlorobenzene	EPA 8260C	GC-MS
SW	1,3-Dichlorobenzene	EPA 5035A-L	PREP
SW	1,3-Dichlorobenzene	EPA 5035A-H	PREP
SW	1,3-Dichlorobenzene	EPA 8260C	GC-MS
SW	1,4-Dichlorobenzene	EPA 5035A-L	PREP
SW	1,4-Dichlorobenzene	EPA 5035A-H	PREP
SW	1,4-Dichlorobenzene	EPA 8260C	GC-MS
SW	Ethyl benzene	EPA 5035A-L	PREP
SW	Ethyl benzene	EPA 5035A-H	PREP
SW	Ethyl benzene	EPA 8260C	GC-MS
SW	Isopropylbenzene	EPA 5035A-L	PREP
SW	Isopropylbenzene	EPA 5035A-H	PREP
SW	Isopropylbenzene	EPA 8260C	GC-MS
SW	p-Isopropyltoluene (P-Cymene)	EPA 5035A-L	PREP
SW	p-Isopropyltoluene (P-Cymene)	EPA 5035A-H	PREP
SW	p-Isopropyltoluene (P-Cymene)	EPA 8260C	GC-MS
SW	Naphthalene, Volatile	EPA 5035A-L	PREP
SW	Naphthalene, Volatile	EPA 5035A-H	PREP
SW	Naphthalene, Volatile	EPA 8260C	GC-MS
SW	n-Propylbenzene	EPA 5035A-L	PREP
SW	n-Propylbenzene	EPA 5035A-H	PREP
SW	n-Propylbenzene	EPA 8260C	GC-MS
SW	Toluene	EPA 5035A-L	PREP

Matrix	Analyte	Method	Technology
SW	Toluene	EPA 5035A-H	PREP
SW	Toluene	EPA 8260C	GC-MS
SW	Total Xylenes	EPA 5035A-L	PREP
SW	Total Xylenes	EPA 5035A-H	PREP
SW	Total Xylenes	EPA 8260C	GC-MS
SW	m/p-Xylenes	EPA 5035A-L	PREP
SW	m/p-Xylenes	EPA 5035A-H	PREP
SW	m/p-Xylenes	EPA 8260C	GC-MS
SW	o-Xylene	EPA 5035A-L	PREP
SW	o-Xylene	EPA 5035A-H	PREP
SW	o-Xylene	EPA 8260C	GC-MS
SW	1,2,4-Trimethylbenzene	EPA 8260C	GC-MS
SW	1,3,5-Trimethylbenzene	EPA 8260C	GC-MS
SW	Styrene	EPA 5035A-L	PREP
SW	Styrene	EPA 5035A-H	PREP
SW	Styrene	EPA 8260C	GC-MS
SW	Bromochloromethane	EPA 5035A-L	PREP
SW	Bromochloromethane	EPA 5035A-H	PREP
SW	Bromochloromethane	EPA 8260C	GC-MS
SW	Bromodichloromethane	EPA 5035A-L	PREP
SW	Bromodichloromethane	EPA 5035A-H	PREP
SW	Bromodichloromethane	EPA 8260C	GC-MS
SW	Bromoform	EPA 5035A-L	PREP
SW	Bromoform	EPA 5035A-H	PREP
SW	Bromoform	EPA 8260C	GC-MS
SW	Bromomethane	EPA 5035A-L	PREP
SW	Bromomethane	EPA 5035A-H	PREP
SW	Bromomethane	EPA 8260C	GC-MS
SW	Carbon tetrachloride	EPA 5035A-L	PREP
SW	Carbon tetrachloride	EPA 5035A-H	PREP
SW	Carbon tetrachloride	EPA 8260C	GC-MS
SW	Chloroethane	EPA 5035A-L	PREP
SW	Chloroethane	EPA 5035A-H	PREP
SW	Chloroethane	EPA 8260C	GC-MS
SW	2-Chloro-1,3-butadiene (Chloroprene)	EPA 5035A-L	PREP
SW	2-Chloro-1,3-butadiene (Chloroprene)	EPA 5035A-H	PREP
SW	2-Chloro-1,3-butadiene (Chloroprene)	EPA 8260C	GC-MS
SW	2-Chloroethylvinyl ether	EPA 5035A-L	PREP
SW	2-Chloroethylvinyl ether	EPA 5035A-H	PREP
SW	2-Chloroethylvinyl ether	EPA 8260C	GC-MS
SW	Chloroform	EPA 5035A-L	PREP
SW	Chloroform	EPA 5035A-H	PREP
SW	Chloroform	EPA 8260C	GC-MS
SW	Chloromethane	EPA 5035A-L	PREP
SW	Chloromethane	EPA 5035A-H	PREP
SW	Chloromethane	EPA 8260C	GC-MS
SW	trans-1,4-Dichloro-2-butene	EPA 5035A-L	PREP
SW	trans-1,4-Dichloro-2-butene	EPA 5035A-H	PREP
SW	trans-1,4-Dichloro-2-butene	EPA 8260C	GC-MS
SW	1,2-Dibromo-3-chloropropane	EPA 5035A-L	PREP
SW	1,2-Dibromo-3-chloropropane	EPA 5035A-H	PREP
SW	1,2-Dibromo-3-chloropropane	EPA 8260C	GC-MS
SW	1,2-Dibromoethane	EPA 5035A-L	PREP
SW	1,2-Dibromoethane	EPA 5035A-H	PREP

Matrix	Analyte	Method	Technology
SW	1,2-Dibromoethane	EPA 8260C	GC-MS
SW	3-Chloropropene (Allyl chloride)	EPA 5035A-L	PREP
SW	3-Chloropropene (Allyl chloride)	EPA 5035A-H	PREP
SW	3-Chloropropene (Allyl chloride)	EPA 8260C	GC-MS
SW	cis-1,3-Dichloropropene	EPA 5035A-L	PREP
SW	cis-1,3-Dichloropropene	EPA 5035A-H	PREP
SW	cis-1,3-Dichloropropene	EPA 8260C	GC-MS
SW	trans-1,3-Dichloropropene	EPA 5035A-L	PREP
SW	trans-1,3-Dichloropropene	EPA 5035A-H	PREP
SW	trans-1,3-Dichloropropene	EPA 8260C	GC-MS
SW	Dibromochloromethane	EPA 5035A-L	PREP
SW	Dibromochloromethane	EPA 5035A-H	PREP
SW	Dibromochloromethane	EPA 8260C	GC-MS
SW	Dibromomethane	EPA 5035A-L	PREP
SW	Dibromomethane	EPA 5035A-H	PREP
SW	Dibromomethane	EPA 8260C	GC-MS
SW	Dichlorodifluoromethane	EPA 5035A-L	PREP
SW	Dichlorodifluoromethane	EPA 5035A-H	PREP
SW	Dichlorodifluoromethane	EPA 8260C	GC-MS
SW	1,1-Dichloroethane	EPA 5035A-L	PREP
SW	1,1-Dichloroethane	EPA 5035A-H	PREP
SW	1,1-Dichloroethane	EPA 8260C	GC-MS
SW	1,2-Dichloroethane	EPA 5035A-L	PREP
SW	1,2-Dichloroethane	EPA 5035A-H	PREP
SW	1,2-Dichloroethane	EPA 8260C	GC-MS
SW	1,1-Dichloroethene	EPA 5035A-L	PREP
SW	1,1-Dichloroethene	EPA 5035A-H	PREP
SW	1,1-Dichloroethene	EPA 8260C	GC-MS
SW	cis-1,2-Dichloroethene	EPA 5035A-L	PREP
SW	cis-1,2-Dichloroethene	EPA 5035A-H	PREP
SW	cis-1,2-Dichloroethene	EPA 8260C	GC-MS
SW	trans-1,2-Dichloroethene	EPA 5035A-L	PREP
SW	trans-1,2-Dichloroethene	EPA 5035A-H	PREP
SW	trans-1,2-Dichloroethene	EPA 8260C	GC-MS
SW	1,1-Dichloropropene	EPA 5035A-L	PREP
SW	1,1-Dichloropropene	EPA 5035A-H	PREP
SW	1,1-Dichloropropene	EPA 8260C	GC-MS
SW	1,2-Dichloropropane	EPA 5035A-L	PREP
SW	1,2-Dichloropropane	EPA 5035A-H	PREP
SW	1,2-Dichloropropane	EPA 8260C	GC-MS
SW	1,3-Dichloropropane	EPA 5035A-L	PREP
SW	1,3-Dichloropropane	EPA 5035A-H	PREP
SW	1,3-Dichloropropane	EPA 8260C	GC-MS
SW	2,2-Dichloropropane	EPA 5035A-L	PREP
SW	2,2-Dichloropropane	EPA 5035A-H	PREP
SW	2,2-Dichloropropane	EPA 8260C	GC-MS
SW	Hexachlorobutadiene, Volatile	EPA 5035A-L	PREP
SW	Hexachlorobutadiene, Volatile	EPA 5035A-H	PREP
SW	Hexachlorobutadiene, Volatile	EPA 8260C	GC-MS
SW	Methylene chloride	EPA 5035A-L	PREP
SW	Methylene chloride	EPA 5035A-H	PREP
SW	Methylene chloride	EPA 8260C	GC-MS
SW	Methyl iodide	EPA 8260C	GC-MS
SW	1,1,1,2-Tetrachloroethane	EPA 5035A-L	PREP

Matrix	Analyte	Method	Technology
SW	1,1,1,2-Tetrachloroethane	EPA 5035A-H	PREP
SW	1,1,1,2-Tetrachloroethane	EPA 8260C	GC-MS
SW	1,1,2,2-Tetrachloroethane	EPA 5035A-L	PREP
SW	1,1,2,2-Tetrachloroethane	EPA 5035A-H	PREP
SW	1,1,2,2-Tetrachloroethane	EPA 8260C	GC-MS
SW	Tetrachloroethene	EPA 5035A-L	PREP
SW	Tetrachloroethene	EPA 5035A-H	PREP
SW	Tetrachloroethene	EPA 8260C	GC-MS
SW	1,1,1-Trichloroethane	EPA 5035A-L	PREP
SW	1,1,1-Trichloroethane	EPA 5035A-H	PREP
SW	1,1,1-Trichloroethane	EPA 8260C	GC-MS
SW	1,1,2-Trichloroethane	EPA 5035A-L	PREP
SW	1,1,2-Trichloroethane	EPA 5035A-H	PREP
SW	1,1,2-Trichloroethane	EPA 8260C	GC-MS
SW	Trichloroethene	EPA 5035A-L	PREP
SW	Trichloroethene	EPA 5035A-H	PREP
SW	Trichloroethene	EPA 8260C	GC-MS
SW	Trichlorofluoromethane	EPA 5035A-L	PREP
SW	Trichlorofluoromethane	EPA 5035A-H	PREP
SW	Trichlorofluoromethane	EPA 8260C	GC-MS
SW	1,2,3-Trichloropropane	EPA 5035A-L	PREP
SW	1,2,3-Trichloropropane	EPA 5035A-H	PREP
SW	1,2,3-Trichloropropane	EPA 8260C	GC-MS
SW	1,1,2-Trichloro-1,2,2-Trifluoroethane	EPA 8260C	GC-MS
SW	Vinyl chloride	EPA 5035A-L	PREP
SW	Vinyl chloride	EPA 5035A-H	PREP
SW	Vinyl chloride	EPA 8260C	GC-MS
SW	Aldrin	EPA 8081B	GC-ECD
SW	Aldrin	EPA 3545A	PREP
SW	Atrazine	EPA 8270D	GC-MS
SW	alpha-BHC	EPA 8081B	GC-ECD
SW	alpha-BHC	EPA 3545A	PREP
SW	beta-BHC	EPA 8081B	GC-ECD
SW	beta-BHC	EPA 3545A	PREP
SW	delta-BHC	EPA 8081B	GC-ECD
SW	delta-BHC	EPA 3545A	PREP
SW	Lindane	EPA 8081B	GC-ECD
SW	Lindane	EPA 3545A	PREP
SW	alpha-Chlordane	EPA 8081B	GC-ECD
SW	alpha-Chlordane	EPA 3545A	PREP
SW	gamma-Chlordane	EPA 8081B	GC-ECD
SW	gamma-Chlordane	EPA 3545A	PREP
SW	Chlordane Total	EPA 8081B	GC-ECD
SW	Chlordane Total	EPA 3545A	PREP
SW	Chlorobenzilate	EPA 8270D	GC-MS
SW	4,4'-DDD	EPA 8081B	GC-ECD
SW	4,4'-DDD	EPA 3545A	PREP
SW	4,4'-DDE	EPA 8081B	GC-ECD
SW	4,4'-DDE	EPA 3545A	PREP
SW	4,4'-DDT	EPA 8081B	GC-ECD
SW	4,4'-DDT	EPA 3545A	PREP
SW	Diallate	EPA 8270D	GC-MS
SW	Dieldrin	EPA 8081B	GC-ECD
SW	Dieldrin	EPA 3545A	PREP

Matrix	Analyte	Method	Technology
SW	Endosulfan I	EPA 8081B	GC-ECD
SW	Endosulfan I	EPA 3545A	PREP
SW	Endosulfan II	EPA 8081B	GC-ECD
SW	Endosulfan II	EPA 3545A	PREP
SW	Endosulfan sulfate	EPA 8081B	GC-ECD
SW	Endosulfan sulfate	EPA 3545A	PREP
SW	Endrin	EPA 8081B	GC-ECD
SW	Endrin	EPA 3545A	PREP
SW	Endrin aldehyde	EPA 8081B	GC-ECD
SW	Endrin aldehyde	EPA 3545A	PREP
SW	Endrin Ketone	EPA 8081B	GC-ECD
SW	Endrin Ketone	EPA 3545A	PREP
SW	Heptachlor	EPA 8081B	GC-ECD
SW	Heptachlor	EPA 3545A	PREP
SW	Heptachlor epoxide	EPA 8081B	GC-ECD
SW	Heptachlor epoxide	EPA 3545A	PREP
SW	Isodrin	EPA 8270D	GC-MS
SW	Mirex	EPA 8081B	GC-ECD
SW	Methoxychlor	EPA 8081B	GC-ECD
SW	Methoxychlor	EPA 3545A	PREP
SW	Toxaphene	EPA 8081B	GC-ECD
SW	Toxaphene	EPA 3545A	PREP
SW	Pentachloronitrobenzene	EPA 8270D	GC-MS
SW	2,4-DB	EPA 8151A	GC-ECD
SW	2,4-D	EPA 8151A	GC-ECD
SW	2,4,5-T	EPA 8151A	GC-ECD
SW	2,4,5-TP (Silvex)	EPA 8151A	GC-ECD
SW	Dicamba	EPA 8151A	GC-ECD
SW	Dinoseb	EPA 8151A	GC-ECD
SW	Dalapon	EPA 8151A	GC-ECD
SW	Azinphos methyl	EPA 8141B	GC-NPD
SW	Demeton-O	EPA 8141B	GC-NPD
SW	Demeton-S	EPA 8141B	GC-NPD
SW	Diazinon	EPA 8141B	GC-NPD
SW	Dimethoate	EPA 8141B	GC-NPD
SW	Dimethoate	EPA 8270D	GC-MS
SW	Disulfoton	EPA 3545A	PREP
SW	Disulfoton	EPA 8141B	GC-NPD
SW	Ethion	EPA 8141B	GC-NPD
SW	Famphur	EPA 8141B	GC-NPD
SW	Malathion	EPA 8141B	GC-NPD
SW	Parathion ethyl	EPA 8141B	GC-NPD
SW	Parathion ethyl	EPA 8270D	GC-MS
SW	Parathion methyl	EPA 8141B	GC-NPD
SW	Phorate	EPA 8141B	GC-NPD
SW	Phorate	EPA 8270D	GC-MS
SW	Sulfotepp	EPA 8141B	GC-NPD
SW	Thionazin	EPA 8141B	GC-NPD
SW	Thionazin	EPA 8270D	GC-MS
SW	Benzyl chloride	EPA 8260C	GC-MS
SW	Boron, Total	EPA 3005A	PREP
SW	Boron, Total	EPA 3050B	PREP
SW	Boron, Total	EPA 6010C	ICP-AES
SW	Cyanide, Total	EPA 9014	COLOR

Matrix	Analyte	Method	Technology
SW	Cyanide, Total	EPA 9010C	PREP
SW	Lead in Paint	EPA 3050B	PREP
SW	Lead in Paint	EPA 6010C	ICP-AES
SW	Lead in Dust Wipes	EPA 3050B	PREP
SW	Lead in Dust Wipes	EPA 6010C	ICP-AES
SW	Phenols	EPA 9065	COLOR
SW	Sulfide (as S)	EPA 9030B	PREP
SW	Sulfide (as S)	EPA 9034	TITR
SW	Benzidine	EPA 8270D	GC-MS
SW	3,3'-Dichlorobenzidine	EPA 8270D	GC-MS
SW	3,3'-Dimethylbenzidine	EPA 8270D	GC-MS
SW	Acetone	EPA 5035A-L	PREP
SW	Acetone	EPA 5035A-H	PREP
SW	Acetone	EPA 8260C	GC-MS
SW	Acetonitrile	EPA 8260C	GC-MS
SW	Carbon Disulfide	EPA 8260C	GC-MS
SW	Cyclohexane	EPA 8260C	GC-MS
SW	Di-ethyl ether	EPA 8260C	GC-MS
SW	1,4-Dioxane	EPA 8260C	GC-MS
SW	Isobutyl alcohol	EPA 8260C	GC-MS
SW	Isopropanol	EPA 8260C	GC-MS
SW	2-Hexanone	EPA 5035A-L	PREP
SW	2-Hexanone	EPA 5035A-H	PREP
SW	2-Hexanone	EPA 8260C	GC-MS
SW	2-Butanone (Methylethyl ketone)	EPA 5035A-L	PREP
SW	2-Butanone (Methylethyl ketone)	EPA 5035A-H	PREP
SW	2-Butanone (Methylethyl ketone)	EPA 8260C	GC-MS
SW	Methyl acetate	EPA 8260C	GC-MS
SW	Methyl cyclohexane	EPA 8260C	GC-MS
SW	Methyl tert-butyl ether	EPA 5035A-L	PREP
SW	Methyl tert-butyl ether	EPA 5035A-H	PREP
SW	Methyl tert-butyl ether	EPA 8260C	GC-MS
SW	4-Methyl-2-Pentanone	EPA 5035A-L	PREP
SW	4-Methyl-2-Pentanone	EPA 5035A-H	PREP
SW	4-Methyl-2-Pentanone	EPA 8260C	GC-MS
SW	2-Nitropropane	EPA 8260C	GC-MS
SW	Propionitrile	EPA 8260C	GC-MS
SW	o-Toluidine	EPA 8270D	GC-MS
SW	tert-butyl alcohol	EPA 8260C	GC-MS
SW	Vinyl acetate	EPA 5035A-L	PREP
SW	Vinyl acetate	EPA 5035A-H	PREP
SW	Vinyl acetate	EPA 8260C	GC-MS
SW	Acetophenone	EPA 8270D	GC-MS
SW	4-Amino biphenyl	EPA 8270D	GC-MS
SW	Aramite	EPA 8270D	GC-MS
SW	Benzoic Acid	EPA 8270D	GC-MS
SW	Benzyl alcohol	EPA 8270D	GC-MS
SW	Benzaldehyde	EPA 8270D	GC-MS
SW	1,1'-Biphenyl	EPA 8270D	GC-MS
SW	Caprolactam	EPA 8270D	GC-MS
SW	1,2-Dichlorobenzene, Semi-volatile	EPA 3545A	PREP
SW	1,2-Dichlorobenzene, Semi-volatile	EPA 8270D	GC-MS
SW	1,3-Dichlorobenzene, Semi-volatile	EPA 3545A	PREP
SW	1,3-Dichlorobenzene, Semi-volatile	EPA 8270D	GC-MS

Matrix	Analyte	Method	Technology
SW	1,4-Dichlorobenzene, Semi-volatile	EPA 3545A	PREP
SW	1,4-Dichlorobenzene, Semi-volatile	EPA 8270D	GC-MS
SW	Dibenzofuran	EPA 3545A	PREP
SW	Dibenzofuran	EPA 8270D	GC-MS
SW	Ethyl methanesulfonate	EPA 8270D	GC-MS
SW	Isosafrole	EPA 8270D	GC-MS
SW	2-Methylnaphthalene	EPA 3545A	PREP
SW	2-Methylnaphthalene	EPA 8270D	GC-MS
SW	Methyl methanesulfonate	EPA 8270D	GC-MS
SW	Phenacetin	EPA 8270D	GC-MS
SW	2-Picoline	EPA 8270D	GC-MS
SW	Safrole	EPA 8270D	GC-MS
SW	O,O,O-Triethyl phosphorothioate	EPA 8270D	GC-MS
SW	Aniline	EPA 8270D	GC-MS
SW	Carbazole	EPA 8270D	GC-MS
SW	4-Chloroaniline	EPA 8270D	GC-MS
SW	Diphenylamine	EPA 8270D	GC-MS
SW	1-Naphthylamine	EPA 8270D	GC-MS
SW	2-Naphthylamine	EPA 8270D	GC-MS
SW	2-Nitroaniline	EPA 8270D	GC-MS
SW	3-Nitroaniline	EPA 8270D	GC-MS
SW	4-Nitroaniline	EPA 8270D	GC-MS
SW	5-Nitro-o-toluidine	EPA 8270D	GC-MS
SW	Methapyrilene	EPA 8270D	GC-MS
SW	1,4-Phenylenediamine	EPA 8270D	GC-MS
SW	1,2-Diphenylhydrazine	EPA 8270D	GC-MS
SW	Pronamide	EPA 8270D	GC-MS
SW	N-Nitrosodiphenylamine	EPA 3545A	PREP
SW	N-Nitrosodiphenylamine	EPA 8270D	GC-MS
SW	N-Nitrosodimethylamine	EPA 3545A	PREP
SW	N-Nitrosodimethylamine	EPA 8270D	GC-MS
SW	N-Nitrosodiethylamine	EPA 8270D	GC-MS
SW	N-nitrosomethylethylamine	EPA 8270D	GC-MS
SW	N-Nitrosodi-n-butylamine	EPA 8270D	GC-MS
SW	N-Nitrosodi-n-propylamine	EPA 3545A	PREP
SW	N-Nitrosodi-n-propylamine	EPA 8270D	GC-MS
SW	N-nitrosopiperidine	EPA 8270D	GC-MS
SW	N-Nitrosopyrrolidine	EPA 8270D	GC-MS
SW	Bromide	EPA 9056A	IC-COND
SW	Chloride	EPA 9250	COLOR
SW	Chloride	EPA 9056A	IC-COND
SW	Fluoride, Total	EPA 9056A	IC-COND
SW	Sulfate (as SO4)	EPA 9056A	IC-COND
SW	Nitrate (as N)	EPA 9056A	IC-COND
SW	Nitrite (as N)	EPA 9056A	IC-COND
SW	Orthophosphate (as P)	EPA 9056A	IC-COND
SW	Diesel Range Organics	EPA 3545A	PREP
SW	Diesel Range Organics	EPA 8270D	GC-MS
SW	Diesel Range Organics	EPA 8015D	GC-FID
SW	Gasoline Range Organics	EPA 5035A-L	PREP
SW	Gasoline Range Organics	EPA 5035A-H	PREP
SW	Gasoline Range Organics	EPA 8260C	GC-MS
SW	Gasoline Range Organics	EPA 8015D	GC-FID

Section 4.0 Vendors

VendorID	Company	VendorType
Absolute Standard	Absolute Standard	Lab Supplies
Adirondack Environmental Service, Inc	Adirondack Environmental Service, Inc	Subcontractor
ALS Group	ALS Group	Subcontractor
Analytical Chemists	Analytical Chemists	Subcontractor
APPLE	Apple Environmental Services	Sampling Services
bioMerieux, Inc.	bioMerieux, Inc.	Lab Supplies
Brooks Rand LLC	Brooks Rand LLC	Subcontractor
Bulbtronics	Bulbtronics	Lab Supplies
Carnell Engineers	Carnell Engineers	Sampling Services
Certified	CERTIFIED ANALYTICAL GROUP INC.	Subcontractor
Chemical Research Supplies	Chemical Research Supplies	Lab Supplies
Delta Well & Pump Co., Inc.	Delta Well & Pump Co., Inc.	Sampling Services
Dionex	Dionex Corporation	Lab Supplies
EMSL	E.M.S.L.	Subcontractor
EMSL-NJ	E.M.S.L.	Subcontractor
Environmental Assessment & Remediation	Environmental Assessment & Remediation	Sampling Services
Environmental Express	Environmental Express LTD	Lab Supplies
Environmental Resource Associates	Environmental Resource Associates	Lab Supplies
Environmental Sample Technology	Environmental Sample Technology	Lab Supplies
EnviroTest	EnviroTest Laboratories Inc.	Subcontractor
Eurofins	Eurofins Eaton Analytical	Subcontractor
Eurofins-Air	Eurofins	Lab Supplies
Frontier	Frontier Geosciences Inc.	Sampling Services
Global Computers	Global Computers	Office Supplies
Grainger	Grainger	Other
Grasby Nutech	Grasby Nutech	Lab Supplies
H2MPC	H2M, P.C.	Sampling Services
Hach Co.	Hach Company	Lab Supplies
Harry Goldman Water Testing	Harry Goldman Water Testing	Sampling Services
HGO	Harry Goldman Water Testing	Sampling Services
High Purity Stds	High Purity Standards	Lab Supplies
Horizon Technologies	Horizon Technologies	Lab Supplies
Idexx Laboratories	Idexx Laboratories	Lab Supplies
Inorganic Ventures	Inorganic Ventures	Lab Supplies
Inorganics Standards Service	Inorganic Standards Service	Lab Supplies
Intertek	Intertek	Subcontractor
JE Meinhard Associates, Inc.		Lab Supplies
Judy Harry	Data Validation Services	Data Validation
LaMotte Company	Lamotte Company	Lab Supplies
Leeman Labs, Inc.	Leeman Labs, Inc.	Lab Supplies
M & M (Marsid) Printing	Marsid-M & M Group	Office Supplies
MBE- G&G Advertising Inc	G&G Advertising Inc	Office Supplies
MBE- kemron Environmental Services Inc.	Kemron Environmental Services Inc.	Sampling Services
MBE- Mitkem Corporation	Mitkem Corporation	Sampling Services
MBE- Yec Inc	Yec Inc	Sampling Services
META Environmental	META Environmental Inc.	Subcontractor
Microbac	Microbac Laboratories, Inc. - Camp Hill Division	Subcontractor
Millipore Corp	Millipore Corp.	Lab Supplies
MV Labs	MV Laboratories, Inc.	Lab Supplies
Nancy Potak	Nancy Potak	Data Validation
NE LABS	Northeast Laboratories, Inc.	Subcontractor

VendorID	Company	VendorType
Nova Lisa Messengers	Nova Lisa Messengers	Courier
NSI	NSI Solutions Inc.	Lab Supplies
PACE-Minnesota	Pace Analytical Services, Inc.	Subcontractor
PACE-Pennsylvania	Pace Analytical Service, Inc.	Subcontractor
Phenomenex	Phenomenex	Lab Supplies
Pickering Labs	Pickering Laboratories	Lab Supplies
Remel	Remel, Inc.	Lab Supplies
Restek	Restek Corporation	Lab Supplies
Ronco	Ronco Paper Products	Other
Seal Analytical	Seal Analytical	Lab Supplies
Sigma-Aldrich	Sigma-Aldrich	Lab Supplies
SUMMIT	Summit Environmental Technologies, Inc.	Subcontractor
TA - Pittsburgh	Test America - Pittsburgh	Subcontractor
TerraSense, LLC	TerraSense, LLC	Subcontractor
Texas Oil Tech Laboratories, Inc.	Texas Oil Tech Laboratories, Inc.	Subcontractor
Thermo Fisher Scientific	Thermo Fisher Scientific	Lab Supplies
ULTRA	Ultra Scientific	Lab Supplies
Underwriters Labs LLC	UL	Subcontractor
Veolia	Veolia ES Technical Solutions, LLC	Disposal
VWR	VWR International	Lab Supplies
Walsh Messenger	Walsh Messenger	Courier
WBE- Data Validation Services	Data Validation Services	Data Validation
WBE- Hampton-Clarke Inc	Hampton-Clarke Inc	Disposal
WBE- Nancy J Potak	Nancy J Potak	Data Validation
WBE- S&A Scientific Inc	S&A Scientific Inc	Lab Supplies
WBE- Smith Environmental Laboratory Inc	Smith Environmental Laboratory Inc	Other
WBE- Taylor Environmental Group Inc	Taylor Environmental Group Inc	Disposal
WBE-Chemworld	Chemworld Environmental Inc.	Disposal
WBE-Con-Test	Con-Test Analytical Lab Filli LLC	Sampling Services
WBE-Crescent Chemical CO Inc.	Crescent Chemical CO Inc	Lab Supplies
WBE-Cresent Chemical	Cresent Chemical	Lab Supplies
WBE-Freudenthal& Elkowitz	Freudenthal& Elkowitz Consulting group	Sampling Services
WBE-JLC Environmental Consulttants Inc	JLC Environmental Consulttants Inc	Sampling Services
WESTCHESTER	Westchester County Department of Labs and Research	Subcontractor

Section 5.0 Equipment and Maintenance

Equipment

Section	Instrument Type	Manufacturer	Model #	Preventative Maintenance	Manual location	Serial #	Date Rec'd.	Condition when rec'd.
GCMS	Gas Chromatograph	Hewlett Packard	5890		GCMS MANUAL FILE CABINET	2908A-21584	1987	Retired
GCMS	Gas Chromatograph	Hewlett Packard	5890 Series II		GCMS MANUAL FILE CABINET	3310A-47249	1995	New
GCMS	Gas Chromatograph	Hewlett Packard	5890 Series II		GCMS MANUAL FILE CABINET	3310A-48125	2007	Refurb
GCMS	Gas Chromatograph	Hewlett Packard	5890 Series II		GCMS MANUAL FILE CABINET	3336A-59615	2008	
GCMS	Gas Chromatograph	Hewlett Packard	6890N		GCMS MANUAL FILE CABINET	US10147039	2001	New
GCMS	Gas Chromatograph	Hewlett Packard	6890N			CN1054046	1998	New
GCMS	Gas Chromatograph	Hewlett Packard	6890N			CN1039012	2005	
GCMS	Gas Chromatograph	Hewlett Packard	6890N			US00039116	2009	
GCMS				As needed: Clean source, clip column, swab injection port liner Daily: change insert, replace septa, check mass calibration Annually: change vacuum pump oil	GCMS MANUAL FILE CABINET	2217A-00303	1984	Retired
GCMS	GC/MS	Hewlett Packard	5971		GCMS MANUAL FILE CABINET	3304A-04413	1993	New
GCMS	GC/MS	Hewlett Packard	5972		GCMS MANUAL FILE CABINET	3501A-02544	1995	New
GCMS	GC/MS	Hewlett Packard	5972			3201A05262	2007	Refurb.
GCMS	GC/MS	Hewlett Packard	5972			3507A7565	2008	Remove
GCMS	GC/MS	Hewlett Packard	5972			3356A00846	2009	
GCMS	GC/MS	Hewlett Packard	5973			U5638-10174	1998	New
GCMS	GC/MS	Hewlett Packard	5973N		GCMS MANUAL FILE CABINET	U5104-51830	2001	New
GCMS	GC/MS	Hewlett Packard	5973i			U5446-21373	2005	New
GCMS	Auto- injector	Hewlett Packard	7673A	Daily: check needles and lines	GCMS MANUAL FILE CABINET	3042A-23605	1989	Retired
GCMS	Auto- injector	Hewlett Packard	7673A		GCMS MANUAL FILE CABINET	3048A-24502	1990	New
GCMS	Auto- injector	Hewlett Packard	7683			CN13822158	2001	New
GCMS	Injector Modules	Hewlett Packard	18593A			2843A-12464		New
GCMS	Injector Modules	Hewlett Packard	18593A			2843A-12474		New
GCMS	Liquid Samplers	Tekmar	ALS2016		GCMS MANUAL FILE CABINET	90052025	1989	New
GCMS	Liquid Samplers	Env. Sample Tech. Inc.	Archon		GCMS MANUAL FILE CABINET	12578	1998	New
GCMS	Liquid Samplers	Env. Sample Tech. Inc.	Archon			MS0811W067	2009	
GCMS	Liquid Samplers	Varian	Archon		GCMS MANUAL FILE CABINET	12565	1998	New

Equipment

Section	Instrument Type	Manufacturer	Model #	Preventative Maintenance	Manual location	Serial #	Date Rec'd.	Condition when rec'd.
GCMS	Liquid Samplers	Varian	Archon		GCMS MANUAL FILE CABINET	15046	2007	
GCMS	Liquid Samplers	Teledyne Tekmar	SOLA Tek 72			U50515-1007	2005	New
GCMS	Auto- sampler	Custom	Custom		GCMS MANUAL FILE CABINET		1995	New
GCMS	Cryogenic Cap. Interface	Tekmar	M2000			H2M-40099	1987	New
GCMS	Liquid Sample Concentrators	Tekmar	LCS2000		GCMS MANUAL FILE CABINET	88041019	1988	New
GCMS	Liquid Sample Concentrators	Tekmar	LCS2000		GCMS MANUAL FILE CABINET	92086007	1989	
GCMS	Liquid Sample Concentrators	Tekmar	LCS2000		GCMS MANUAL FILE CABINET	90088002		New
GCMS	Liquid Sample Concentrators	Tekmar	LCS2000			97203002		Remove
GCMS	Liquid Sample Concentrators	Tekmar	LCS3000		GCMS MANUAL FILE CABINET	94238021	2007	Refurb
GCMS	Liquid Sample Concentrators	Tekmar	LCS3000		GCMS MANUAL FILE CABINET	97203002	2007	Refurb
GCMS	Liquid Sample Concentrators	Tekmar	LCS3000		GCMS MANUAL FILE CABINET	3631A105564	2008	
GCMS	Liquid Sample Concentrators	Tekmar	LCS3000			334009	2009	
GCMS	LIQUID SAMPLER	EST	CENTRION		GCMS MANUAL FILE CABINET	ECENTS140022210	2009	NEW
GCMS	Liquid Sample Concentrators	Tekmar	Velocity XP			3631a-10564	2005	Refurb
GCMS	Moisture Control Module	Tekmar	14-4700				1990	New
GCMS	Tube Desorber	Envirochem	8916		GCMS MANUAL FILE CABINET	142-1015	1992	New
GCMS	Concentrator	Entech	7100A		Network		2005	New
GCMS	Tube Assembly	Entech	7100		Network	1255	2005	New
GCMS	Autosampler	Entech	7032-L		Network	1051	2005	New
GCMS	Oven Can Cleaning System	Entech	31000A		Network	1154	2005	New
GCMS	L-C Oven (used with Oven Can Cleaning System)	Barnstead International	3513ENT	Calibrate thermometer (quarterly)		1.48205E+12	2005	New
GCMS	Dynamic Diluter	Entech	4601A		Network	1105	2005	New
GCMS	Mass Spectral Library NIST 2008	Hewlett Packard	G1033A		GCMS MANUAL FILE CABINET	(reg.#) 88XA-222L9-ZK577-362S2	2008	New

Equipment

Section	Instrument Type	Manufacturer	Model #	Preventative Maintenance	Manual location	Serial #	Date Rec'd.	Condition when rec'd.
GCMS	Gas Chromatograph	Hewlett Packard	5890 Series II Plus			3336A53662	2009	Refurb
GCMS	Gas Chromatograph	Hewlett Packard	6890			US00006051	1998	Refurb
GCMS	Gas Chromatograph	Hewlett Packard	6890			US00021803	2009	Refurb
GCMS	GC/MS	Hewlett Packard	5973			US81211085	2009	Refurb
GCMS	GC/MS	Hewlett Packard	5973			US82322040	2005	Refurb
GCMS	GC/MS	Hewlett Packard	5973			US82321965	2009	Refurb
GCMS	Auto Injector	Hewlett Packard	7683			US04516101		
INORG	TOC Analyzer	Teledyne Tekmar	Torch	Monthly:, clean injection port, Semi-annually: Inspect combustion tube	WC MANUAL FILE CABINET	US11019001	2011	New
INORG	DO Meter	YSI	52	Daily:Check solution and membrane	WC MANUAL FILE CABINET	602377	2006	New
INORG	COD Apparatus	Hach	Micro Block		WC File Cabinet	87120-9870	1988	New
INORG	Chlorine Meter	LaMotte	1200				2006	
INORG	Chlorine Meter	LaMotte	1200				2008	
INORG	pH Meter	Orion	420A	Electronics Checked Daily			2000	
INORG	pH Meter	VWR	8000		File cabinet	1370	2005	New
INORG	pH Meter	VWR	Symphony SP70P				2009	
INORG	pH Meter	Corning	Scholar 425		File cabinet	6999	2002	New
INORG	pH Meter	WTW Measurement Systems	Scholar 425				2006	
INORG	Spectrophotometer	Milton Roy	Genesys 5		WC File cabinet	3V062-77019	1995	
INORG	Spectrophotometer	Thermo Spectronic	Spectronic20DX		WC File cabinet	3DV103-51004	2002	New
INORG	Spectrophotometer	Thermo Spectronic	Spectronic20DX		WC File cabinet	3DUG3-35015	2005	New
INORG	Ion Chromatograph	Dionex	ICS 2000		WC File cabinet	0605-0717	2005	New
INORG	Analytical Nephelometer	Hach	2424			351	1977	
INORG	Distillation Systems	Westco	East Dist		WC File cabinet	1130	1996	New
INORG	Distillation Systems	Westco	East Dist		WC File cabinet	1130	2005	New
INORG	Conductivity Meter	VWR Scientific	2052	Daily: check probe and cable	WC File cabinet	103009	2000	New
INORG	Conductivity Meter	HACH	44600			880801122		
INORG	Solid Phase Extractor and Controller for Oil and Grease	Horizon	3000XL		WC File cabinet	210166	2010	New
INORG	Solid Phase Extractor and Controller for Oil and Grease	Horizon	3000XL		WC File cabinet	13-1918	2013	New
INORG	Microscope	Nikon	Labobot 104	Monthly: Clean optics	WC File cabinet	214700	1983	New

Equipment

Section	Instrument Type	Manufacturer	Model #	Preventative Maintenance	Manual location	Serial #	Date Rec'd.	Condition when rec'd.
INORG	COD Apparatus #2	Hach	DRB200		WC File cabinet	1122349	2004	New
INORG	TALK Instrument	Schott	Titroline Alphaplus		WC File cabinet	65719	2004	New
INORG	Flow Injection Analysis System with Automated Ion Analyzer	Lachat	QuickChem 8500		WC File cabinet	051100-000231	2006	New
INORG	Flow Injection Analysis System with Automated Ion Analyzer	Lachat	QuickChem 8500		WC File cabinet	8120001038	2009	New
INORG	BLOCK DIGESTOR	LACHAT	BD-46		WC File Cabinet	1800-900		
INORG	PCBOD	Man-Tech	VERSION3.0.0.53		WC File Cabinet	BY INSTRU	2006	New
BAC	Coliform Incubator Bath	Thermoscientific	2862			211766-591	2010	
INORG	BOD Incubator	Thermoscientific (Precision)	30mr*2		WC File Cabinet	BOD2A375656-716 BOD1A314003-159	2011	
HPLC	HPLC System for Carbamate 531 and Post Column Derivatizer for 547	Pickering	PCX-5200			401212	2001	
HPLC	System Controller	Shimadzu	SCL-10AVP			C21013502013SA	2001	
HPLC	Liquid Chromatograph	Shimadzu	LC-10ADVP			C20963502299KG	2001	
HPLC	Mixer	Shimadzu	FCV-10ALVP			C21083601369KG	2001	
HPLC	Degasser	Shimadzu	DGU-14A			SS111311	2001	
HPLC	Auto Injector	Shimadzu	SIL-10ADVP			C21053750408US	2001	
HPLC	Fluorescence Detector	Shimadzu	RF-10AXL			C20953850296US	2001	
HPLC	HPLC System for 549	Agilent	HP1100		GC File cabinet		2011	
HPLC	Degasser	Agilent	G1322A			JP63203191	2011	
HPLC	Binary LC Pump	Agilent	G1312A			DE91605129	2011	
HPLC	Autosampler	Agilent	G1313A			DE14917148	2011	
HPLC	Column Com.	Agilent	G1316A			DE91615431	2011	
HPLC	Detector	Agilent	G1315A			DE91605880	2011	
GC	Gas Chromatograph	Hewlett Packard	6890	ECD Detectors: Annually: Wipe test	GC File cabinet	US00033562	1998	

Equipment

Section	Instrument Type	Manufacturer	Model #	Preventative Maintenance	Manual location	Serial #	Date Rec'd.	Condition when rec'd.
GC	Gas Chromatograph	Hewlett Packard	6890	If needed: Return to factory to refoil.	GC File cabinet	US0023151	2000	
GC	Gas Chromatograph	Hewlett Packard	6890			US0032129	2002	Used
GC	Gas Chromatograph	Hewlett Packard	6890		GC File cabinet	US10221098	2008	Used
GC	Gas Chromatograph	Perkin Elmer	Autosystem		GC File cabinet	610N2120204	1992	New
GC	Flame Ionization Detectors	Perkin Elmer	N611		GC File cabinet		1993	New
GC	Flame Ionization Detectors	Agilent	G1530N		GC File cabinet		2011	
GC	Micro Electron Capture Detector	Hewlett Packard			GC File cabinet	U1789/414239	2000	New
GC	Micro Electron Capture Detector	Hewlett Packard			GC File cabinet	U1790/U0744	2002	New
GC	Micro Electron Capture Detector	Hewlett Packard			GC File cabinet	U2256/U3366	2008	New
GC	Nitrogen Phosphorus Detector	Perkin Elmer			GC File cabinet		1992	New
GC	Autoinjector	Hewlett Packard	7683		GC File cabinet	US94910497	1998	New
GC	Autoinjector	Hewlett Packard	7683		GC File cabinet	US02013524	2000	New
GC	Autoinjector	Hewlett Packard	7683		GC File cabinet	US95110902	2002	New
GC	Autoinjector	Perkin Elmer	Autosystem		GC File cabinet		1992	New
GC	Autoinjector	Hewlett Packard	6890			3533A43695	2008	NEW
GC	Thermal Conductivity Detector	Agilent			GC File cabinet		2010	
METAL	Automated Mercury System	Leeman	Hydra AA	Daily: Check for leaks Monthly: Clean Autosampler and check tubing for wear and discoloration	METALS File cabinet	HA4001	2004	New
METAL	Inductively Coupled Plasma (ICP)	Thermo-Fisher ICAP	6300 Duo MFC		METALS File cabinet	20081811	2008	New
METAL	Inductively Coupled Plasma (ICP)	Thermo-Fisher ICAP	6300 Duo MFC			20095008	2009	New
METAL	Autosampler for 6300 Duo ICAP	Cetac Techologies	ASX-520			050773A520	2008	New
METAL	ICP-MS	Thermal Elemental	X7		METALS File cabinet	X0129	2002	New
METAL	Autosampler for ICP-MS	Cetac Technologies	ASX-510		METALS File cabinet	020201ASX	2002	New
METAL	Turbidity Meter	Hach	2424		METALS File cabinet	351	2009	New

Equipment

Section	Instrument Type	Manufacturer	Model #	Preventative Maintenance	Manual location	Serial #	Date Rec'd.	Condition when rec'd.
METAL	Hotblock	Environmental Express	SC154		METALS File cabinet	1423C3C1144	2002	New
METAL	Hotblock	Environmental Express	SC154		METALS File cabinet	4298CEC2052	2002	New
METAL	Autosampler for 6300 DJO 1cap	Cetac	ASX-520		METALS File cabinet	060941-A520	2009	New
METAL	Automated Hg System	Teledyne Leeman	Hydra II A		METALS File Cabinet	63641	2013	New
PREP	Dishwasher	Lab Conco	Flask Scrubber		SP File cabinet	41027886	2004	New
PREP	AccuPrep GPC System	J2 Scientific	04A-1094-3.1				2004	OFF LINE
PREP	TCLP Tumbler	Environmental Express	10-Position				1990	
PREP	TCLP Tumbler	Environmental Express	Item#LE1002 12-position			4187-12-503	2006	
PREP	Zero Headspace Extractor	Environmental Express					1990	
PREP	Zero Headspace Extractor	Analytical Testing	C-102				1987	Out of Service
PREP	Zero Headspace Extractor	Analytical Testing	C-102				1989	Out of Service
PREP	Continuous Liquid/Liquid Extractor	Organomation	Rot-X-Tracth 13302		SP File cabinet	22309	2009	New
PREP	Continuous Liquid/Liquid Extractor	Organomation	Rot-X-Tracth		SP File cabinet	9878	1997	New
PREP	Agitator	Glas-col	DC-18		SP File cabinet	252392	1987	New
PREP	Concentrator	Zymark	Turbo-vap		SP File cabinet	TV0639-R7075	1996	New
PREP	Evaporators	Organomation	PN-Evap, 12 position		SP File cabinet	14430	1992	New
PREP	Automated Solvent Extractor	Dionex	ASE2000			3010457	2003	New
PREP	Pensky-Martens Flash Point Tester	Petrotest	12-1624		SP	726021501	2002	Out of Service
PREP	Heating block	Barnstead International	DB28125		SP File cabinet	823040-705627	2004	New
PREP	Sonicator	Branson	1210					Out of Service
PREP	Evaporators	Organomation	PN EVAP-12 Position		SP File cabinet	20638	2009	New
PREP	Vacuum Pump	Welch	1405B-01			21100000459	2011	New
PREP	Flashpoint	Koehler	K16200		SP File Cabinet	R070021171-B	2013	New

Equipment

Section	Instrument Type	Manufacturer	Model #	Preventative Maintenance	Manual location	Serial #	Date Rec'd.	Condition when rec'd.
PREP	Automated Solvent Extractor	Dionex	ASE350		SP File Cabinet	10120776		New
PREP	GPC	Gilson	GX-271		SP File Cabinet	261A3N052	2013	New
PREP	Hot Plate	IKA	RT15PS1		SP File Cabinet	3380112	2013	New
PREP	Cont. Liq./Liq. Extrctr	Organomation	14169			57957		
RECV	pH Meter (benchtop)	Orion (#1)	420A	Electronics checked daily	Receiving counter	14100		New
RECV	pH meter (portable)	VWR	SympHony (#2)	Electronics checked daily	Receiving counter	C02090		New
RECV	pH meter (portable)	VWR	SympHony (#4)	Electronics checked daily	Receiving counter	C02059		New
RECV	pH meter (portable)	Hach (#5)	SensION+ pH1	Electronics checked daily	Receiving counter	120016		New
RECV	Chlorine residual (portable)	Hach #2	Pocket Colorimeter II	Electronics checked daily	Receiving counter	11040E171996		New
RECV	Chlorine residual (portable)	Hach #5	Pocket Colorimeter II	Electronics checked daily	Receiving counter	11090E182270		New
RECV	Chlorine residual (portable)	Hach #6	Pocket Colorimeter II	Electronics checked daily	Receiving counter	12070E203517		New

Section	Instrument Type	Manufacturer	Model #	Preventative Maintenance	Manual location	Serial #	Date Rec'd.	Condi-tion when rec'd.
GCMS	Printer	Hewlett Packard	LaserJet 4		GCMS File cabinet		1995	
GCMS	Printer	Hewlett Packard	LaserJet 4		GCMS File cabinet		1995	
GCMS	Printer	Hewlett Packard	LaserJet 4				1995	
GCMS	Printer	Hewlett Packard	LaserJet 4				1995	
GCMS	Printer	Hewlett Packard	LaserJet 4				1995	
GCMS	Chemstation/ Enviroquant	Hewlett Packard	1701AA		GCMS File cabinet		1998	
GCMS	Chemstation/ Enviroquant	Hewlett Packard	1701AA		GCMS File cabinet		1998	
GCMS	Chemstation/ Enviroquant	Hewlett Packard	1701AA		GCMS File cabinet		1998	
GCMS	Chemstation/ Enviroquant	Hewlett Packard	1701AA		GCMS File cabinet		1998	
GCMS	Chemstation/ Enviroquant	Hewlett Packard	1701AA		GCMS File cabinet		1998	
GCMS	Chemstation/ Enviroquant	Hewlett Packard	1701CA, BA		GCMS File cabinet		2001	
GCMS	Printer	Hewlett Packard	LaserJet 5				1998	
GCMS	Printer	Hewlett Packard	LaserJet 4100				2001	
GCMS	Printer	Hewlett Packard	LaserJet 4250				2005	
GCMS	Printer	Hewlett Packard	LaserJet 4250				2005	
GCMS	Printer	Hewlett Packard	LaserJet 4250				2005	
INORG	Balance	Mettler Toledo	AX304		WC File cabinet	1125121429	2004	New
INORG	Balance	METTLER TELEDO	X510035		WC File cabinet	1130021418		
INORG	Balance	Ohaus	CS200				2004	
INORG	Balance	Ohaus	GT4100	Out of service			1999	
INORG	Balance	Westco	40/20				2004	
INORG	Balance	Lachat	BD_46				2007	
INORG	Refrigerator-Walk-in			Daily: Record and Verify temperature setting.	WC File cabinet		1998	

Section	Instrument Type	Manufacturer	Model #	Preventative Maintenance	Manual location	Serial #	Date Rec'd.	Condi-tion when rec'd.
INORG	Refrigerator Locking (no spark interior)	Fisher Scientific		Monthly: Clean interior	WC File cabinet		1984	
INORG	Refrigerator Locking	Fisher Scientific		Annually-glass, quarterly-digital: check thermometer against NIST certified thermometer	WC File cabinet		1989	
INORG	Centrifuge	Fisher Scientific			WC File cabinet		1957	
INORG	Drying Ovens	Fisher Scientific	CL ISOTEMP500	Daily: Record and Verify temperature setting. Monthly: clean interior Annually-glass, quarterly-digital: check thermometer against NIST certified thermometer	WC File cabinet	40132	1980	
INORG	Dessicator	Boekel					1997	
INORG	Muffle Furnace	Thermoline			WC File cabinet		1997	
BAC	Autoclave	Market Forge	STM-E Type C	Daily: Sterilization indicator tape Monthly: Clean interior	WC File cabinet	150790	1987	New
BAC	Autoclave	Market Forge	STM-E Type C		WC File cabinet	213371	2003	New
BAC	Automatic Pipetting Machine	Brewer	40		WC File cabinet	2064	1983	New
BAC	Automatic Pipetting Machine	Scientific Equip. Prod.	40	Not in service			1984	
INORG	Auto Titrator	Visco	Titroline Alpha		WC File cabinet		1998	
INORG	Coliform Incubator Bath	Labline	Aquabat	e setting.	WC File cabinet	1-Oct	2001	New

Section	Instrument Type	Manufacturer	Model #	Preventative Maintenance	Manual location	Serial #	Date Rec'd.	Condi-tion when rec'd.
				Monthly: clean interior				
INORG	BOD Incubators	VWR-Sheldon Manufacturing, Inc.	2030	Annually-glass, quarterly-digital: check thermometer against NIST certified thermometer	WC File cabinet	7045306	2007	New
INORG	Dishwasher	WHIRLPOOL	U		WC File cabinet	8575635	2000	New
INORG	DISHWASHER	FRIGIDAIRE			WC FILE CABINET	JH70879413		
BAC	Quant-Tray Sealer	IDEXX	2X		WC File cabinet	3177	2004	New
INORG	Incubator	Labline	100	Daily: Record and Verify temperature setting.		0493-0002	1993	New
BAC		Precision	815	Monthly: clean interior	WC File cabinet	604011627		New
BAC		Precision	815	Annually-glass, quarterly-digital: check thermometer against NIST certified thermometer	WC File cabinet	602041661	2004	New
INORG		Precision				600101596	2005	Used
INORG	Infrared Thermometer	VWR	12777-846				2004	
BAC	UV Light	Spectroline	EA-160			1831229		New
RECV	Refrigerator	Welbilt	W8/210G					
INORG	Boat Sampling Module		183		WC File cabinet	504149001	1991	
METAL	CLP Reporting Software	Khemia	Omega				2000	
METAL	Balance	Sartorius	TE153S		METALS File cabinet		2007	New
PREP	Data System	Omega					2000	

Section	Instrument Type	Manufacturer	Model #	Preventative Maintenance	Manual location	Serial #	Date Rec'd.	Condi-tion when rec'd.
PREP	ICC Clinical Centrifuge	Int'l. Equipment Co.	ICC Clinical				1985	
PREP	Balance	Ohaus	CS-2000				2000	
INORG	Balance	Ohaus	Scout Pro SP202		WC File cabinet	7132191406	2011	New
INORG	ULTRA PURE WATER SYSTEM	THERMO SCIENTIFIC	D11941		WC File cabinet	1.3711E+11	2009	NEW
INORG	OVEN1 STAINLESS STEEL	VWR	1350		WC File cabinet		2010	NEW
INORG	Ph meter	VWR SYMPHONY	114200		WC FILE CABINET	D05772	7/12/2011	NEW
BAC	CIRCULATING HOT WATER BATH	THERMO SCIENTIFIC	2862		WC FILE CABINET	211766-591	11/12/2010	NEW
PREP	Blue M Oven	General Signal		Daily: Record and Verify temperature setting. Monthly: Clean interior Annually-glass, quarterly-digital: check thermometer against NIST certified thermometer			1986	
PREP	Water Bath	VWR	1245-PC		SP File cabinet		2003	
PREP	Kiln	Cress	Firemate FE27		SP File cabinet		1989	
PREP	Kiln	Cress	Firemate FE27		SP File cabinet		2002	
PREP	Water Bath	Boekel	PB-2800			50100025		New
PREP	Water Bath	Thermo	2845			240329-661		New
HPLC	Water Purification System	Aries	414R		GC File cabinet		2008	New
GC	CLP Reporting Software	Khemia	Omega				1994	

Support Equipment/Computers

Section	Instrument Type	Manufacturer	Model #	Preventative Maintenance	Manual location	Serial #	Date Rec'd.	Condi-tion when rec'd.
GC	Computing Integrators/Data System	Perkin Elmer/Nelson	Total Chrom 6.3X		GC File cabinet		2005	
GC	Computing Integrators/Data System	Perkin Elmer/Nelson	Total Chrom 6.3X		GC File cabinet		2005	
GC	Computing Integrators/Data System	Perkin Elmer/Nelson	Total Chrom 6.3X		GC File cabinet		2005	
GC	Computing Integrators/Data System	Perkin Elmer/Nelson	Total Chrom 6.3X		GC File cabinet		2005	
GC	Computing Integrators/Data System	Perkin Elmer/Nelson	Total Chrom 6.3X		GC File cabinet		2005	
GC	Computing Integrators/Data System	Perkin Elmer/Nelson	Total Chrom 6.3X		GC File cabinet		2005	
GC	Balance	Ohaus	CS 200		GC File cabinet		2002	
GC	Balance	Ohaus	CS 2000		GC File cabinet		2007	

Section 6.0 Documents

Document Number	Method or Rev	Document Name	Effective Date
NJDEPLLTO-15	rev.04	Analysis of Volatile Organics in Ambient Air Using Summa or Other Specially Prepared Canisters by GCMS	11/1/11
5041	rev.02	Analysis of Volatile Organics on Sorbent Cartridges from Volatile Organic Sampling Train (VOST)	10/21/09
TO-17	rev.02	Analysis of Volatile Organics on Sorbent Tubes by EPA Method TO-17	2/26/13
TO-15	rev.07	EPA Method TO-15 Analysis of Volatile Organics in Ambient Air Using Summa or Other Specially Prepared Canisters by GCMS/SCAN/SIM	10/13/13
ADMIN002	rev.04	Computers and Programs	7/11/2013
7471B	rev.4	Sample Preparation and Analysis of Mercury in Soil/Sediment by Manual Vapor Technique- Method 7471B	10/1/13
245.1	rev.8	Sample Preparation and Analysis of Mercury in Water by Manual Cold Vapor Technique - Method 245.1	10/1/13
7470A	rev.8	Sample Preparation and Analysis of Mercury in Water by Manual Cold Vapor Technique - Method 7470A	10/1/13
6010C	rev.6	Sample Preparation and Analysis of the Determination of Trace Metals by Inductively Coupled Plasma Atomic Emission Spectroscopy - Method 6010C and Prep. Methods 3005A and 3050B	2/5/14
200.7	rev.10	Sample Preparation and Analysis of the Determination of Trace Metals by Inductively Coupled Plasma Atomic Emission Spectroscopy with Hardness Calculation - Method 200.7	12/30/13
6020A	rev.3	Sample Preparation and Analysis of the Determination of Trace Metals by Inductively Coupled Plasma Atomic Emission Spectroscopy/Mass Spectrometry - Method 6020A and Prep. Methods 3005A and 3050B	8/26/13
200.8	rev.5	Sample Preparation and Analysis of the Determination of Trace Metals by Inductively Coupled Plasma Atomic/ Emission Spectroscopy /Mass Spectroscopy- Method 200.8	10/1/13
S-LI-MB-008-rev.00	ASTM D6503-99 Enterolert	Analysis of Enterococci in Water Using Enterolert ASTM D6503-99	5/14/14
S-LI-MB-007-rev.00	SM 9223B (Colilert 18)	Colilert 18 Method for the Analysis of Total Coliform and E.Coli in Water SM 9223B	5/13/14
S-LI-MB-006-rev.00	SM 9223B (Colilert)	Colilert Method for the Analysis of Total Coliform and E.Coli in Water SM 9223B	5/13/14
S-LI-MB-004-rev.00	SimPlate/SM 9215B	HETEROTROPHIC PLATE COUNT SimPlate™IDEXX,SM 9215B	5/9/14
S-LI-MB-005-rev.00	SM 9221B, C and E	Multiple Tube Fermentation Technique for Members of the Coliform Group SM 9221B, C AND E	5/13/14
Qcult	rev.00	Prep of Bacterial Cultures for QC Testing	7/15/09
1010A	rev.5	Pensky-Martens Closed-Cup method for Determining Ignitability - EPA Method 1010A	10/13/13
S-LI-O-010-rev.00	1312	Synthetic Precipitation Leaching Procedue SPLP	5/23/14
Corr1110A	rev.1	EPA SW846 Method 1110A Corrosivity Towards Steel	7/25/12
S-LI-O-009-rev.00	1311	Toxicity Character Leaching Procedure TCLP	5/21/14
S-LI-Q-002-rev.00	rev.00	Document Control and Management	6/9/2014
S-ALL-Q-003-rev.09	rev. 09	Document Numbering	6/10/2014

Document Number	Method or Rev	Document Name	Effective Date
S-LI-Q-003-rev.01	rev.01	Manual Integration	8/25/2014
S-ALL-Q-029-rev.03	rev.03	Mintminer Data File Review for Data Integrity Monitoring	9/29/2014
S-LI-Q-001-rev.00	rev.00	Preparation of SOPs	6/9/2014
Materials	rev. 3	Preparation of Standards and Reagents, Cleaning of Containers	8/9/2013
UNCERT	rev.01	Procedure for the Measurement of Uncertainty	7/11/2013
TCV001	rev.03	Procedure for Thermometer Calibration Verification	7/10/2013
QCSelect	rev.00	Procedure to Select Samples for use as MS/MSD/MD Analysis	8/13/2013
QAM016	rev.16	Quality Assurance Quality Control Manual	2/14/14
S-ALL-Q-015-rev.01	rev. 15	Review of Lab Management System	6/13/2014
SUBS	rev.00	Subsampling	8/9/2013
pH 4500-H B	rev.02	pH Analysis in Water by Electrometric Technique SM4500-H B	7/11/2011
Cl2 4500Cl G	rev.04	Sample Prep and Analysis Chlorine Residual DPD Method	6/22/2011
RECV	rev.03	Sample Receiving Handbook	7/15/2013
QUICKTAT	rev.02	Standard Operating Procedure for Receipt/Distribution of Quick Turn-around Tests	8/9/2013
Safety Manual/CHP	rev.10	Chemical Hygiene Plan/Safety Manual	5/23/2014
S-LI-S-001-rev.00	rev.00	Rescue Alert System Operation	9/30/2014
522	rev.02	1,4-Dioxane by GCMS- 522	4/15/13
8100mod	rev.1	Analysis of Dielectric Fluids and Petroleum Products by GCMS	8/10/10
549.2	rev.8	Analysis of Diquat in Drinking Water by HPLC	10/10/13
531.1	rev.4	Determination of N-Methylcarbamoyloximes and N-Methylcarbamates in Drinking Water by HPLC	1/12/09
548.1	rev.03	Endothall- 548.1	9/17/13
EPH_r1	rev.01	Extractable TPH (EPH)	3/6/12
GCMS_GRO_DRO	rev.3	Gasoline Range Organics (GRO) by EPA 8260B and Diesel Range Organics (DRO) by EPA Method 8270C	1/28/14
547	rev.4	Glyphosate	5/21/09
552.2	rev.05	Haloacetic Acids- 552.2	10/4/13
625	rev.9	Method 625 - Sample Preparation and Analysis of Base/Neutral Acid Extractable in Water	10/13/13
515.1	rev.09	Prep and Analysis of Chlorinated Herbicides- 515.1	9/20/11
8151A	rev.09	Prep and Analysis of Chlorinated Herbicides- 8151A	10/13/13
608	rev.10	Prep and Analysis of Chlorinated Pesticides- 608	10/13/13
8081B	rev.02	Prep and Analysis of Chlorinated Pesticides- 8081B	10/13/13
508.1	rev.03	Prep and Analysis of Chlorinated Pesticides and PCBs- 508.1	5/27/09
ASP 95-3	rev.07	Prep and Analysis of Chlorinated Pesticides and PCBs- ASP 95-3	1/24/06
OLMO4.2 PEST/PCB	rev.02	Prep and Analysis of Chlorinated Pesticides and PCBs- OLM04.02	2/28/03
504.1	rev.07	Prep and Analysis of EDB and DCBP	9/21/11
8011	rev.01	Prep and Analysis of EDB and DCBP	5/27/09
505	rev.07	Prep and Analysis of Organohalide Pests and PCBs- 505	5/25/09
8141B	rev.01	Prep and Analysis of Organophosphorus Pesticides- 8141B	8/28/13
S-LI-O-001-rev.00	rev.00	Prep and Analysis of PCBs- 8082A	7/17/14

Document Number	Method or Rev	Document Name	Effective Date
508A	rev.04	Prep and Analysis of PCBs as Decachlorobiphenyl- 508A	5/27/09
OLM04.3S	rev.3	Preparation and Analysis of Semi-Volatile Organics by GC/MS - EPA CLP (Combined with 4.2)	4/26/06
8270D	rev.3	Sample Preparation and Analysis of Semivolatile Organics by GC/MS - Method 8270D	12/11/13
8270D_SIM	rev.2	Sample Preparation and Analysis of Semivolatile Organics by GC/MS - Method 8270D-SIM	10/13/13
ASP 95-2	rev.6	Sample Preparation and Analysis of Semivolatile Organics by GC/MS: Method 95-2	5/3/06
525.2	rev.06	Semivolatile Organics- 525.2	7/10/13
8015D	rev.02	TPH by GC/FID- 8015D	10/13/13
OLM04.3V	rev.2	Analysis of Volatile Organics by GC/MS - EPA CLP (Combined with 4.2)	6/12/06
S-LI-O-003-rev.00	524.2	Determination of Drinking Water Volatiles by GCMS Method 524.2	10/14/14
GCMS_GRO_DRO	rev.3	Gasoline Range Organics (GRO) by EPA 8260B and Diesel Range Organics (DRO) by EPA Method 8270C	1/28/14
624	rev.11	Method 624 Sample Preparation and Analysis of Purgeables in Wastewater by GC/MS	10/13/13
S-LI-O-002-rev.00	rev.3	Method RSK-175 Analysis of Dissolved Gases in Water by FID	10/1/14
1624	rev.1	Sample Preparation and Analysis of Volatile Organic Compounds by Isotopic Dilution GCMS	1/7/14
1666	rev.1	Sample Preparation and Analysis of Volatile Organic Compounds Specific to the Pharmaceutical Manufacturing Industry by Isotopic Dilution GCMS	1/7/14
8260C	rev.2	Sample Preparation and Analysis of Volatile Organics by GC/MS - Method 5030C/5035A/8260B	10/13/13
ASP 95-1	rev.4	Sample Preparation and Analysis of Volatile Organics by GC/MS: Method 95-1	4/17/02
S-LI-W-001-rev.01	rev.01	Waste Handling and Management	10/6/2014
MBAS SM5540C	rev.3	Analysis of MBAS: Standard Method 5540C	7/14/13
COD 410.4	rev.11	Chemical Oxygen Demand Analysis by Manual Colorimetric Technique: Method 410.4	10/1/13
COND 120.1	rev.8	Conductivity Analysis in Water by Electrometric Technique EPA Method - 120.1	10/1/13
COND 2510B	rev.3	Conductivity Analysis in Water by Electrometric Technique SM18.2510B	9/19/11
CorrSM2330B	rev.2	Corrosivity SM2330B Langlelier Saturation Index	8/12/13
314.0	rev.6	Determination and Analysis of Perchlorate by Ion Chromatography EPA Method 314.0	10/1/13
NH3 SM4500-B H	rev.5	Determination of Ammonia by Continuous Flow Phenate Analysis: SM4500-NH3 B H	7/14/13
NH3 350.1	rev.8	Determination of Ammonia by Lachat Continuous Flow Phenate Analysis : Method 350.1	10/1/13
Cl 9250	rev.0	Determination of Chloride by Continuous Flow Injection Analysis Low Flow Method 9250	3/6/07
4500-Cl E	rev.2	Determination of Chloride by Continuous Flow Injection Analysis SM4500-Cl E	7/14/13
353.2 Lachat	rev.7	Determination of Nitrate/Nitrite by Lachat Continuous Flow Cadmium Reduction Analysis EPA Method 353.2	7/10/13
300.0 Lachat	rev.5	EPA Method 300.0 The Determination of Inorganic Anions by Ion Chromatography Lachat QuickChem Method 19-510-00-1-A	10/11/13
S-LI-I-008-rev.00	SM 2540 E - 97,-11	Fixed and Volatile Solids	5/20/14
S-LI-I-001-rev.00	SM 3500-Cr B	Hexavalent Chromium Analysis in Water by Colorimetric Technique SM 3500-Cr B	3/14/14
7196A/3060A	rev.6	Hexavalent Chromium Analysis with Alkaline Digestion by Colorimetric Technique: Method 7196A/3060A	10/10/13

Document Number	Method or Rev	Document Name	Effective Date
O&G1664	rev.8	Method 1664A Total Recoverable Oil and Grease and Petroleum Hydrocarbon Analysis in Waters N-Hexane Extractable Material(SGT_HEM) by Extraction and Gravimetry	10/1/13
FL EPA9095B	rev.1	Paint Filter Liquids Test	10/11/13
pH 9045D	rev.2	pH Analysis in Soils, Sediments and Sludges by Electrometric TechniqueEPA Method 9045C	10/10/13
S-LI-I-003-rev.00	SM 4500-P E	Sample Preparation and Analysis Phosphorous All Forms Colorimetric Ascorbic Acid	5/1/14
S-LI-I-002-rev.00	SM 4500-S2-F	Sample Preparation and Analysis of Sulfide Iodometric/Titrimetric	3/14/14
S-LI-I-005-rev.00	rev.00	Sample Preparation and Analysis of Acidity, Titration SM2310B	9/9/14
BOD/CBOD SM 5210	rev.11	Sample Preparation and Analysis of Biological Oxygen Demand (BOD) SM 5210B	10/13/13
2120B	rev.1	Sample Preparation and Analysis of Color Method SM 2120B	7/17/13
Odor SM2150B	rev.2	Sample Preparation and Analysis of Odor	12/14/13
pH 9040C	rev.1	Sample Preparation and Analysis of pH Electrometric Measurement - Method 9040B	8/12/13
SS 2540F	rev.3	Sample Preparation and Analysis of Settleable Solids: SM 2540 F	10/13/13
S 9034/9030B	rev.5	Sample Preparation and Analysis of Sulfide (Titrimetric, Iodine) - Method 9034/9030B	10/10/13
TDS 2540C	rev.7	Sample Preparation and Analysis of Total Dissolved Solids - Method 2540C	10/13/13
TS 2540B	rev.4	Sample Preparation and Analysis of Total Solids - Method 2540B	10/13/13
S-LI-I-004-rev.00	TSS	Sample Preparation and Analysis of Total Suspended Solids (Nonfilterable Residue - Gravimetric): SM2540D	8/5/14
180.1	rev.9	Sample Preparation and Analysis of Turbidity: Method 180.1 (Nephelometric)	10/1/13
UV254 5910B	rev.2	Sample Preparation and Analysis UV254	9/20/11
REACTIVITY	rev.4	Sample Preparation of Cyanide and Sulfide Reactivity	6/21/13
TEMP 2550B	rev.0	Temperature (Thermometric) SM2550B	9/20/07
Chlorate 300.1 Lachat	rev.2	The Determination of Chlorate in Water by Automated Ion Chromatography Lachat QuickChem Method 10-540-00-1 -C	2/14/13
9056A Lachat	rev.5	The Determination of Inorganic Anions in Water by Ion Chromatography EPA Method 9056A	10/11/13
TALK2320B	rev.8	Total Alkalinity Analysis in Water by Titrimetric technique (pH4.5) - Method 2320B	10/13/13
N_Calcs	rev.2	Total and Organic Nitrogen by Calculation	9/10/13
CN9014/9010C	rev.11	Total Cyanide Analysis in Water and Soils by Manual Spectrophotometric Technique with Midi-Distillation - Method 9014 with 9010 Distillation	10/10/13
CNA4500CEG	rev.4	Total Cyanide and Cyanide Amenable to Chlorination in Water and Soils by Manual Spectrophotometric Technique with Midi-Distillation - SM4500-C E,G	7/14/13
Hard 2340C	rev.3	Total Hardness Analysis in Waters by Manual Titrimetric (EDTA) Technique SM 18-20 2340C	7/14/13
TKN 351.2	rev.16	Total Kjeldahl Nitrogen (TKN) Analysis by Semi-Automated Colorimetric Technique: Method 351.2	10/1/13
TOC 9060A	rev.4	Total Organic Carbon Analysis in Water by Combustion Infrared Technique -Method 9060	10/13/13
TOC 5310B	rev.5	Total Organic Carbon Analysis in Water by Combustion Infrared Technique: SM5310B	10/13/13
420.1	rev.6	Total Recoverable Phenol Analysis by Manual Colorimetric Technique with Mini-Distillation: Method 420.1	9/13/06
Phenols 9065	rev.5	Total Recoverable Phenol Analysis by Manual Colorimetric Technique with Mini-Distillation: Method 9065	10/11/13

Document Number	Method or Rev	Document Name	Effective Date
70 Packages	rev.01	BO-70/C5-70/RT-70 Package Instructions	5/12/2009
AECOM	rev.02	AECOM Electronic Data Deliverable	6/5/2012
Attaching External Files to Omega	rev.02	Attaching External Files to Omega	5/3/13
BNLS EDD	rev.03	Brookhaven National Laboratory (BNLS) Electronic Data Deliverable	5/3/2013
Bookmarking	rev.02	Bookmarking Data Packages	9/7/2011
Con Edison Login Review	rev.03	Con Edison Login Review	3/1/2013
CRA	rev.02	Conestoga-Rovers and Associates (CRA) Electronic Data Deliverable	6/4/2012
DEC	rev.02	Department of Environmental Conservation (DEC) Electronic Data Deliverable	9/7/2011
DECO	rev.02	DECO Electronic Data Deliverable	5/3/2013
DECO Package	rev.01	DECO (BO5-10) Package Instructions	5/12/2009
Freshkills	rev.03	Freshkills Landfill Electronic Data Deliverable	6/20/2013
GEI	rev.06	National Grid (GEI) Electronic Data Deliverable	6/17/2013
GEI Routine	rev.04	National Grid (GEI) Routine Electronic Data Deliverable	6/17/2013
Generic Excel	rev.03	Generic Excel Electronic Data Deliverable	5/7/2013
Key Login Review	rev.01	Key Login Review	1/19/2011
KEY/CON	rev.02	Keyspan & Con Ed Routine EDD	10/4/2011
KEY-URS	rev.03	KEY-URS Corporation Electronic Data Deliverable	1/6/2013
Loading FK Field Data	rev.02	Freshkills Field Parameters	2/13/2012
NJ EDD	rev.03	New Jersey Electronic Data Deliverable	5/7/2013
NJ-60 Package	rev.03	NJ-60 & NJ-70 Package Instructions	6/20/2013
RT-20 Package	rev.02	RT-20 Data Package Instructions	5/9/2013
RT-25 Package	rev.02	RT-25 Data Package Instructions	5/9/2013
SDG Data Archiving	rev.00	SDG Data Archiving	5/14/2012
SDG Narratives	rev.02	Typing SDG Narratives	5/7/2013
SDG Summaries	rev.01	SDG Summary Breakdown Instructions	7/6/2010
SPCB	rev.01	Paginating/Inserting/Replacing Pages in Data Packages	3/9/2009
SUB Data	rev.01	Entering Sub-Contract Data into Omega	1/26/2013
TCR Results	rev.01	Sending Trans Canada Results	1/26/2011

APPENDIX D

SAMPLING & ANALYSIS PLAN

SAMPLING AND ANALYSIS PLAN

FOR THE

REMEDIAL ACTION WORK PLAN

Ash Road Properties
221 Sycamore Road
Town of Vestal, New York

Prepared By:

GeoLogic NY, Inc.

May 2015

INTRODUCTION

This Sampling and Analysis Plan is for the Ash Road Properties Brownfield Project in the Town of Vestal, Broome County, New York. This phase of the project involves additional Remedial Action to further reduce contamination at the Site through the injection of a biostimulant into the subsurface through a series of injection points.

The Remedial Action Work Plan (RAWP) dated March 2015 and the Addendum to the RAWP details the specific sampling and analyses for the Ash Road Properties Brownfield project.

QUALITY ASSURANCE PROJECT PLAN (QAPP)

Project Description

This Sampling and Analysis Plan includes identification of sampling locations and media; methods for collection, handling, and preservation; and the protocols to be used for sample analysis. Environmental media to be sampled is groundwater. The data will be utilized to form conclusions as to the presence, transport, and fate of site specific contaminants.

Field Sampling Procedures

All sampling objectives, locations and procedures have been included as the Field Sampling Plan and described in this Sampling and Analysis Plan. Items include field measurement techniques, general field decontamination procedures, and sample acquisition and management.

Analytical Methodologies

Sampling and analysis will be performed for the Superfund Target Compound List (TCL) parameters for volatile organic compounds by EPA Method 8260. Analysis of these samples will be consistent with the NYSDEC ASP 2005, Category B requirements. Trip blanks will accompany each shipment of aqueous samples for volatile organic compounds (VOC) analysis. If several samples are collected for VOC analysis on any one day, all VOC samples will be packed in the same cooler with the trip blank. All trip blanks will be analyzed according to

NYSDEC ASP (2005) protocol for volatile organics. All data will be presented in modified Category B reportables / deliverables format. Duplicate groundwater samples will be obtained

Additional groundwater analyses will be conducted to evaluate the state of the biogeochemical system pre-injection and post-injection of the biostimulant. Analysis of these samples will not be consistent with the NYSDEC ASP 2005, Category B requirements.

Laboratory Certification and Coordination

All chemical analyses for samples collected will be completed by Pace Analytical, a CLP laboratory capable of performing project-specific analysis indicated in the attached QA/QC requirements. The project manager will be responsible for all project-related laboratory coordination.

Analytical Quality Control

Analytical quality control will be consistent with the methodologies and quality assurance/quality control requirements in the NYSDEC ASP 2005 for EPA Method 8260, TCL analysis, only. This analytical data will be subject to data usability reviews in general accordance with NYSDEC ASP Category B reportable and deliverable formats. Data Usability Summary Reports (DUSR) will be prepared in a manner consistent with NYSDEC's Guidance for Data Deliverables and Development of Data Usability Summary Reports, NYSDEC DER-10, May 2010. The main objective of a DUSR is to determine whether the data presented meets the project-specific needs for data quality and data use.

FIELD SAMPLING PLAN

Sampling Objectives

Field sampling at the Ash Road Properties has been designed to obtain representative samples of environmental media to further assess the impact that the site may have upon human health and the environment, as well as analyzed for parameters that influence the biodegradation of the contaminant. The field sampling plan includes sampling for groundwater.

Groundwater

Monitoring wells MW-01, MW-02S, MW-09S and MW-10S are the wells that will be sampled. Table No. 1 provides the groundwater monitoring well analysis protocol.

Sampling Procedures

The following sections provide procedures for collecting soil and groundwater samples.

Preparation for Sampling

The sample collection technique is of prime importance to assure the integrity of the collected sample. The following techniques include provisions so that:

- A representative sample is obtained;
- Contamination of the sample is minimized;
- The sample is properly preserved; and
- An acceptable Chain-of-Custody record is maintained.

The QA/QC Sampling Component of the Plan includes:

- Incorporation of accepted sampling techniques referenced in the sampling plan;
- Procedures for documenting any field actions contrary to the QA/QC Plan;
- Documentation of all preliminary activities such as equipment check-out, calibrations, and container storage and preparation;
- Documentation of field measurement quality control data (quality control procedures for such measurements shall be equivalent to corresponding QC procedures);
- Documentation of field activities;
- Documentation of post-field activities including sample shipment and receipt, field team debriefing, and equipment check-in;
- Generation of quality control samples including duplicate samples and trip blanks; and
- The use of these samples in the context of data evaluation with details of the methods employed (including statistical methods) and of the criteria upon which the information generated will be judged.

The personnel responsible for collection of groundwater samples will be familiar with standard sampling procedures and follow the appropriate protocol. Field records will be maintained in bound notebooks with numbered pages to document daily instrument calibration, locations sampled, field observations, and weather conditions. Each page will be dated and signed by the

sampler. Each notebook will be numbered and a log of notebooks will be maintained by the project manager.

Prior to sampling, all equipment must be procured and accommodations for sample container delivery, and sample shipment must be made. The following is a list of general equipment that would be on hand for sampling events. Special equipment for each sampling event is presented in the section describing that specific sampling event.

General Field Sampling Equipment

- Project Data Information/Plans
- Chain-of-Custody forms
- Nitrile/Vinyl gloves
- Photoionization detector (PID)
- Bio-degradable phosphate free detergent
- Coolers (with ice)
- Sample bottles
- Tap water/Distilled water

Groundwater Sample Collection

Groundwater samples will be collected using dedicated, disposable HDPE bailers following evacuation of three borehole volumes or complete purging of the well using low-flow purging techniques. All other related sampling equipment will be properly decontaminated in the field. The following equipment will be available for sampling of monitoring wells in addition to the general sampling equipment list:

- Well Data Information/Plans
- Dedicated disposable bailers/Peristaltic pump with disposable tubing
- Electronic water level indicator
- YSI Multimeter (or comparable)
- Preserved sample containers
- Nitrile/Vinyl gloves

The following steps describe the sample preparation and collection of groundwater:

1. Obtain the sampling parameters for each well to be sampled.
2. Select the appropriate sample containers for the day's sampling.
3. Unlock and remove the well cap.
4. In order to obtain a representative sample of the formation water, the well must be purged of the static water within the well. Prior to purging, the static water level within the well must be measured and the measurement recorded in the field book. To determine the amount of water necessary to purge, find the liquid column height in the well to determine the total volume (three liquid column borehole volumes) of liquid to be purged.
5. Attach the single-use disposable nylon/polypropylene rope to the sample bailer OR attach single-use disposable tubing to the peristaltic pump.
6. Purge the well; lower bailer slowly into the well until it is below the water surface OR lower the tubing attached to the peristaltic pump and purge. Consistent with NYSDEC Guidance, purge waters will be containerized or passed through a granulated carbon filter prior to discharge to the ground surface.
7. Record the amount of water purged and the field parameter (pH, temperature, specific conductance, ORP, DO) in the field book.
8. If the well goes dry during bailing, allow for recovery and then sample.
9. Fill the appropriate sample bottles according to the sampling schedule for each well. While filling the sample bottles, record the well number, type, volume of container, and the preservatives used.
10. Volatile organic analyses samples must be free of air bubbles. When a bubble-free sample has been obtained, it must be immediately chilled.
11. Collect the duplicates. Take samples according to sampling schedule presented in the Work Plan.
12. Record all pertinent information in the field book (include color, odor, sediment content of sample, etc.). Any situations at the site that have the potential to interfere with the analytical results should also be recorded here.
13. Lock well, inspect well site, and note any maintenance required.
14. Dispose of potentially contaminated materials in designated containers for contaminated solids.

Duplicate samples shall be collected at least once with each field batch with a minimum of one for each twenty samples.

Field Measurement Techniques

Water Level Measurement – Water elevations will be taken on all wells prior to purging and sampling. The procedure for measuring water levels in the monitoring wells is:

- Unlock and remove well cap;

- Measure water level to nearest 0.01 foot with a water level indicator (electronic);
- Water level indicators will be decontaminated before moving to next well. The tape and cable are decontaminated by washing in a bucket of potable water-biodegradable phosphate-free detergent solution, followed by a rinse with distilled water.

Field Parameter - Multimeter – The meters will be field calibrated daily and operated in accordance with the manufacturer's instructions.

Photoionization Detector (PID) – The PID will be calibrated daily (and more often as required by the manufacturer's data) prior to use in the field, using calibration test gases.

General Decontamination

The following procedures will be performed for the decontamination of exploration equipment, sampling equipment, and personnel after each drilling/sampling event:

Injection Equipment – To avoid cross contamination, use of a PID meter and cleaning between each sampling site will be employed on down-hole tools associated with the Geoprobe®.

Reusable Equipment – The following steps will be employed to decontaminate reusable equipment:

- Rinse equipment of soil or foreign material with potable water;
- Immerse and scrub equipment with bio-degradable phosphate-free detergent and potable water;
- Immerse and scrub in a potable water rinse without detergent; and
- The decontamination wash and rinse water will not be considered hazardous unless visual inspection or monitoring by the PID and other equipment indicate that contaminants may be present. The rinse waters can be discharged on-site if they are not contaminated. If contaminants are expected to be present, the rinsate waters will be passed through granulated carbon filter before discharging to the ground surface.

Sample Containers – Upon filling and capping sample bottles, the outside of the bottle will be wiped off with a clean paper towel. These towels will be disposed of in a dedicated container for contaminated solids.

Personnel Decontamination – The following procedures will be used to decontaminate sampling personnel:

- After each sampling event chemical-resistant gloves will be disposed of in a dedicated container for contaminated solids;
- At the end of each sampling day, Tyvek™ coveralls, if used, will be disposed of in a dedicated container for contaminated solids;
- Boots will be bagged and removed from the site for cleaning; and
- Personnel will be required to follow procedures outlined in the Health and Safety Plan.

Sample Management Plan

The Sample Management Plan provides procedures to document and track samples and results obtained during this work effort. A series of pre-printed forms with the appropriate information serves as a vehicle for documentation and tracking. In order to accomplish this task, the documentation materials will include sample labels, sample characterization and Chain-of-Custody sheets, daily field reports, and a sample log.

Sample Label – A sample label will be completed for each sample obtained and will be affixed to the sample container. The label is configured in a way to address various types of mediums. Information on the label includes, at a minimum, client name, location, sample description, sample number, date, time, grab sample, composite sample, notes, and sampler's name.

Sample Characterization & Chain-of-Custody Sheet – All pertinent field information will be entered into the field book and chain-of-custody (COC) sheets. The COC sheets will include client name, sample ID, sample description, location of sample, number of containers, container type, analysis required, and preservation. The Chain-of-Custody section of the form will document the sample's pathway of sample shipment, which will include names of persons delivering/receiving, dates, and times. Copies of the completed forms will be retained by the Engineer and the analytical laboratory. Chain-of-Custody sheets will be included in the laboratory data package submittal. Information regarding the well including depth to water, well volume, sample pH, temperature, turbidity, specific conductance, color, etc. will be recorded in the field book.

Sample Designation – Each sample will have a unique sample code.

Sample Handling – Each collected sample will be dispensed into the appropriate sample containers for the type of analysis to be performed. Appropriate sample preservatives will be

added to the sample containers by the contracted analytical laboratory prior to the delivery into the field, except in cases where the sample preservative must be added after sample collection. All samples that require cool storage will be immediately placed in coolers with appropriate packaging materials so as to protect the breakage of sample containers during shipment. The sample coolers will be filled with cubed ice prior to leaving the sample collection location. Careful packaging techniques will be used to prevent sample containers from breakage during shipment. Materials such as cardboard, foam wrap, or Styrofoam may be used as packaging materials. All samples will be either hand-delivered to the contracted analytical laboratory or arrangement for pick-up by the laboratory will be made.

APPENDIX E

SCHEDULE

REMEDIAL ACTION WORK PLAN

SCHEDULE

ASH ROAD PROPERTIES
Town of Vestal, New York
BCP Site C704032

	2015-2016																			
TASK	**MAY**		**JUN**		**JUL**		**AUG**		**SEP**		**OCT**		**NOV**		**DEC**		**JAN**		**FEB**	
Submittal of Injection Work Plan																				
Pre-Injection Sampling & Injection Event																				
Post-Injection Sampling																				
Final Engineering Report (Submittal to NYSDEC)																				
Site Management Plan (Submittal to NYSDEC)																				

APPENDIX F

NYSDEC LETTER

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Remediation, Region 7
1679 NYS Route 11, Kirkwood, NY 13795
P: (607) 775-2545 | F: (607) 775-2019
www.dec.ny.gov

April 29, 2015

Susan M. Cummins
GeoLogic NY, Inc.
P.O. Box 350
Homer, New York 13077

Re: Ash Road Properties, C704032
Town of Vestal, Broome County

Dear Ms. Cummins:

The New York Department of Environmental Conservation and the New York State Department of Health (NYSDEC and NYSDOH, respectively; collectively referred to the Departments) have completed our review of the work plan titled, "Remedial Action Work Plan, Ash Road Properties, 221 Sycamore Road, Town of Vestal, New York" (RWP) dated March 2015. Based on our review, the Departments hereby approve the RWP with the following conditions:

1. A projected schedule for the remedial action phase of the project will be submitted to the Departments as part of the pre-injection plan. The remedial action schedule should be developed in accordance to DER-10 Section 5.7.
2. A post-injection monitoring and sampling plan including specific details (e.g., number of wells, well locations, sampling depths) will be submitted with the pre-injection plan for review by the Departments.
3. A quality assurance and quality controls plan for sampling, analysis and construction will be submitted with the pre-injection plan for review by the Departments.

If you have any questions, please do not hesitate to contact me by electronic mail at gary.priscott@dec.ny.gov or by telephone at 607-775-2545 extension 116.

Respectfully,

Gary Priscott
Project Manager

ec: H. Warner, NYSDEC
B. McGinn, Esq., NYSDEC
M. Doroski, NYSDOH
J. Baran, West Covina Royale
K. Fitzgerald, Esq., HHK