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REMEDIAL ACTION WORK PLAN
TRIPLE CITIES METAL FINISHING CORPORATION
4 NOWLAN ROAD
BINGHAMTON, NEW YORK
NYSDEC BCP ID C704045

Prepared For:

BINGHAMTON REALTY, INC.
AND
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Prepared By:

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HOMER, NEW YORK

JULY 2015
PROJECT NO. 99011A

GeoLogic

7/14/15

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).

7-14-15

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).

7-14-15

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

For:

REMEDIAL ACTION WORK PLAN
Triple Cities Metal Finishing Corporation
4 Nowlan Road
Binghamton, New York
NYSDEC Site #C704045
July 2015

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APPENDICES

1 INTRODUCTION

1.1 General

This Remedial Action Work Plan (RAWP) for the former Triple Cities Metal Finishing (TCMF) facility located at 4 Nowlan Road in the community of Hillcrest, Binghamton, New York was prepared by GeoLogic NY, Inc. (GeoLogic) on behalf of Binghamton Realty, Inc. This Site is being managed under the Brownfield Cleanup Program (BCP) in accordance with the Brownfield Cleanup Agreement (BCA) between Binghamton Realty, Inc. and New York State Department of Environmental Conservation (NYSDEC). The NYSDEC identification number for the Site is C704045. The location of TCMF is shown on Drawing No. 1.

This RAWP has been prepared in accordance with the general requirements of NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation, May 2010, (DER-10).

1.2 Purpose and Objective

The purpose of this RAWP is to incorporate the information collected during previous investigations, and develop guidelines for implementing the remedy proposed in the Alternative Analysis Report (AAR), dated November 2011, revised April 2012. The recommended remedy in the AAR is entitled, “Focused Excavation/Off-site Disposal & Containment with Institutional and Engineering Controls”. The NYSDEC requested that stabilization/immobilization techniques be used in conjunction with the excavation, since this approach combined the recommendations presented in the AAR, and in the Corrective Measure Study that was developed for this Site, dated May 2003. The State’s request for stabilization of metals in the subsurface is based on a recommendation made 10 years ago under Resource Conservation & Recovery Act (RCRA) Corrective Action process. The Corrective Action Study was never officially reviewed or commented on under RCRA. The recommendations made during this 2003 study were based on the information that was available in 2003. That is, that the location and conditions at Outfall 002 had not been evaluated (see Drawing No. 2). The Corrective Action Study stated, “The excavation of impacted soils at Outfall 002 is not feasible. The former outfall structures are under or partially under the building and may be as deep as 30 feet below

ground surface". The recommendation of immobilization of metals in soils using chemical fixing agents was recommended based on these assumptions. Since 2003, the two structures associated with Outfall 002 were located, and soil and sediment samples were collected for analysis (see Section 2.4.1 of the Remedial Investigation Report (RI)).

The recommendations in the AAR were to address, through excavation, the removal of soils/sediments within one of the two structures of Outfall 002, deeming it feasible with no anticipated impact to the building structure. The immobilization of metals in soils using chemical fixing agents will be a component to the RAWP.

2 BACKGROUND

2.1 Site Description

TCMF manufactured products with decorative, functional and corrosion-resistant finishes that included zinc, chrome and nickel at the Site from 1953 to 1999 for the military, aerospace and automotive industries. All facility processes were terminated at the Nowlan Road facility in 1999. The Site, consisting of two contiguous parcels, encompasses 0.88 acres and is bordered on the south by Beckwith Avenue, on the east by the B. W. Elliot Manufacturing Company (former CAE Link Electronics facility), on the west by two commercial properties and a residence, and on the north by Nowlan Road. North of Nowlan Road are residences and a gas station (Drawing No. 1, Appendix A).

The 27,000-square foot industrial building is located on a 0.62-acre parcel and the office building (former residential structure) is located on a 0.26-acre parcel. The industrial building was used primarily for production work with offices in the northern portion of the building and warehousing in the east and west additions. The former residential structure housed the corporate offices.

The majority of the industrial building is occupied by Square Deal Machining, Inc. The remainder of the Site is either unoccupied or used for miscellaneous storage by the property owner.

2.2 Site History

The Site has been used for commercial purposes since the 1930's. The first known commercial use of the 4 Nowlan Road property was by a metal plating shop. Several additions have been made to the original (circa 1930's) structure with the last additions constructed in the late 1980's.

TCMF submitted a Part A application for interim status when the hazardous waste regulations were first enacted, and although it did not utilize interim status, and operated as a generator, it had been subject to corrective action under the hazardous waste regulations.

The initial primary contaminants of concern at TCMF were cadmium, chromium, nickel and zinc. These were the primary metals used in the TCMF plating business. In the 1980's, 1,1,1-trichloroethane was a listed testing parameter on the TCMF NYSDEC SPDES permit for the facility's effluent stream. 1,1,1-trichloroethane was not used in the facility processing, but was used to clean off carbon build-up on direct current generators. The DC generators were phased out in the 1980's and replaced with rectifiers.

There are three outfalls located at TCMF, Outfalls 001, 002 and 003. Outfall 001 had a primary discharge structure (Drywell A) located under the TCMF building and an overflow structure located within the parking lot area of the adjacent BW Elliot property (former CAE Link). This overflow structure is a catch basin drain that is also part of the parking lot surface water drainage system. Outfall 002 has one primary discharge structure located off the northwest corner of the TCMF building (Drywell A-002) and a secondary discharge structure under the TCMF building (Drywell B-002). Outfall 003 was identified as a septic tank and is located on the north side of the TCMF building.

2.3 Geology and Hydrogeology

TCMF is located on a terrace approximately 50 feet above the current Chenango River channel. The topographic features in the vicinity of the Site include a hillside rising over 400 feet above the facility approximately 2,000 feet east of the Site, Phelps Creek flowing off the hillside in a southwesterly direction within 1,000 feet southeast of the Site and the Chenango River with its southerly flow located within 2,000 feet west of the Site.

TCMF and a large portion of the Hillcrest community are located on the terrace above the river channel and along the hillside east of the river. TCMF overlies the NYSDEC designated Endicott-Johnson City Area Aquifer. According to the Flood Insurance Rate Maps , TCMF is not located within the 100-year flood plain, but is mapped in an area of minimal flooding.

The ground surface, in the vicinity of the Site, is relatively flat. At the Site, the grade slopes up to the east with elevations ranging from 889 to 895 from west to east. Approximately 1,000 feet west of the Site is a terrace face sloping steeply down to the river channel.

The geology of the terrace consists of glacial meltwater (outwash) deposits of sand and gravel with variable silt content that range in thickness from approximately 30 to 55 feet. Lacustrine silt, sands and clay deposits underlie the outwash sand and gravel unit ranging in thickness from 130 to 160 feet. Underlying the lacustrine deposit is a sand and gravel deposit. The Town of Fenton Water Supply Wells are screened in this lower sand and gravel deposit. These wells are located approximately 2,400 feet north of the site. At Fenton Well #1, the top of the lacustrine deposit was encountered at elevation 835, and the top of the lower sand and gravel deposit at elevation 700 feet. Bedrock was encountered at elevation 645.

The soils at the Site consist of outwash sand and gravel underlain by lacustrine silt, sand and clay. The outwash sand and gravel deposits extend to elevation depths ranging from 868 to 870 (top of silt unit) on the east side of the TCMF property, to elevation depths ranging from 853 to 855 (top of silt unit) on the west side of the property, showing a defined downward dip from east to west in the silt unit at TCMF.

Groundwater elevation data collected at the wells installed by TCMF have reported fluctuations in groundwater levels of less than 4.0 feet (elevation 867 to 871) over the period between February 2000 and December 2008.

Direction of groundwater flow is to the west. Groundwater from within the outwash sand and gravel unit beneath the TCMF facility eventually discharges to the Chenango River.

3 COMPLETED INVESTIGATIONS

3.1 Evaluations under RCRA

Investigations and studies that have been completed at TCMF under RCRA prior to entering into the BCP have included:

- A facility assessment for the USEPA to gather information on, and evaluate the potential for, releases to the environment from solid and hazardous waste handling practices, "Preliminary RCRA Facility Assessment" (November 1993, TRC);
- Air emissions testing assessing the 1998 emissions levels at Triple Cities Metal, "Air Emission Study" (September 1999, ERM and NYSDEC);
- Surface soil sampling and catch basin sediment sampling at Triple Cities Metal and within the Hillcrest community, "RCRA Phase I Sampling" (August 1999, GeoLogic);
- Evaluation of subsurface soil and groundwater at the Site that included analyses of interior concrete flooring and underlying soils, "RCRA Phase II Subsurface Investigation" (May 2000, GeoLogic);
- Evaluation of groundwater and subsurface soils under the industrial building on the Site, at Site boundaries and off-site, “Continuing Phase II Subsurface Investigation” (May 2002, GeoLogic); and
- *Corrective Action Study*, TCMF, (May 2003, GeoLogic).

These investigations have included:

- Surface soil sampling at the facility and within the community (August 1999, GeoLogic);
- An evaluation of subsurface soil and groundwater at TCMF including the installation of permanent monitoring wells, and the chemical analysis of the

concrete flooring and underlying soil in the former plating area (May 2000, GeoLogic); and

- Additional investigative actions below the building footprint and off-site in a hydraulically downgradient direction from the facility (May 2002, GeoLogic).

The focus of these previous evaluations has been identifying potential sources of heavy metals, primarily, cadmium, chromium, zinc and nickel, and their impact on groundwater quality. The evaluation of volatile organic compounds in soils was performed at a few select locations on the TCMF Site (May 2000, GeoLogic).

3.2 Evaluations under the BCP

Investigations and studies that have been completed at TCMF under the BCP have included:

- Assessment both on-site and off-site of TCE impact to soil, groundwater and soil vapor and TCE source evaluations. *Remedial Investigation Report*, TCMF, (2009, GeoLogic);
- Annual report for the operation and monitoring of the soil vapor mitigation system at TCMF. *Annual System Reports,* TCMF, (2009-2012,Geologic); and
- *Alternative Analysis Report,* TCMF, (November 2010, revised April 2011, GeoLogic*)*.

4 SUMMARY OF REMEDIAL INVESTIGATION REPORT

4.1 Sub-Slab and Soil Vapor at TCMF

Soil vapor underlying the TCMF building has been impacted by TCE at levels that warranted vapor mitigation. TCE in sub-slab soil vapors range from 11 to 270 ug/m^3. The concentration of TCE at 13,000 ug/m^3 previously reported by others in sub-slab soil vapor has not been replicated. The contaminant results of the vertical soil vapor gradient underlying the TCMF building do not suggest the presence of deeper (8 foot or greater) source(s) for the contaminants observed in the sub-slab soil vapor samples. The results

do suggest that contaminated vapors collect and concentrate directly under the confining zones of the concrete floor.

A vapor mitigation system was installed in January 2006 within the portion of the TCMF building that was occupied during the workweek on a daily 8-hour basis. In May 2012, additional space inside the building was occupied and the system was expanded into these areas.

4.2 Summary of Metals in Soils

Soil samples were collected and analyzed for total metals both outside the TCMF industrial building footprint and from below the industrial building. Sixty-one samples were analyzed for metal content. The NYSDEC Soil Cleanup Objectives (SCOs) were exceeded for cadmium, chromium, copper, nickel and zinc content. The majority of the soils exhibiting metal concentration exceeding the SCOs are present under the TCMF industrial building. Of those that exceeded SCOs outside the building footprint, the highest concentrations were observed at Outfall 002, with one sediment sample exceeding both the SCO and Hazardous Waste level for toxicity for cadmium content. The following table summarizes metal concentrations in the soil analyzed:

Table 4-1
Summary of Metals of Concern in Soils

Analytes	No. of Samples Analyzed	Concentration Range mg/kg	6NYCRR Part 375 SCO Commercial mg/kg	No. of Samples Exceeding SCO
Metals				
Cadmium	61	<0.105 to 761	9.3	31
Chromium*	61	7.8 to 18,900	1,500	7
Chromium VI	2	<4.78 to 6.39	400	0
Copper	46	13.7 to 3,250	1,000	3
Nickel	46	11 to 1050	310	6
Zinc	48	37.9 to 22,100	10,000	1

4.3 Summary of TCE in Soils and Sediments

Borings were advanced hydraulically upgradient of the TCMF property on the former CAE Link property, along the TCMF's east and west property boundaries, through Outfall 001 and 002 structures, on the south side of the TCMF office building structure

and along the west side of Chenango Street to evaluate TCE content in soils and sediments. The concentrations of TCE in soils upgradient and downgradient of TCMF do not exceed the NYSDEC SCO of 470 ug/kg for the Protection of Groundwater. The table summarizes TCE concentrations reported in the soil samples analyzed.

Table 4-2
TCE Concentration Summary in Soils

Location	TCE Concentrations 6NYCRR Part 375 SCO, Protection of Groundwater		
	Silt Soils	Sand & Gravel Soils	Sediments
CAE Link Property	ND to 200 ug/kg	NS	NS
East Side TCMF	20 to 72 ug/kg	NS	NS
West Side TCMF	6 to 50 ug/kg	NS	NS
Outfall 001	5 to 15 ug/kg	ND to 5 ug/kg	ND to 6.2 ug/kg
Outfall 002	ND to 50 ug/kg	ND to 14 ug/kg	ND
South Side TCMF Office Bldg.	170 ug/kg	NS	NS
West Side Chenango Street	ND to 27 ug/kg	NS	NS

ND – Not detected above the method detection limit.

NS – Not sampled

4.4 Water Quality at Monitoring Wells

Six monitoring wells were installed as part of the RCRA investigations, three on the TCMF property, and three hydraulically downgradient of the TCMF property. These six wells and an upgradient CAE Link well were also sampled as part of the Remedial Investigation (RI).

Groundwater samples were analyzed for RCRA metal and TCE content during the investigations completed under RCRA as well as the RI work. Metals were detected at concentrations exceeding water quality standards at the seven wells. The highest concentrations of chromium and cadmium were detected at the wells on the TCMF property. Groundwater underlying the Site has TCE concentrations similar to the concentrations observed in groundwater both upgradient and downgradient of the Site. The following table summarizes these sampling events:

Table 4-3
Groundwater Contaminant Concentration Summary

On–Site Monitoring Wells: MW-1, MW-2, and MW-5

Contaminant On-Site	Range µg/l	NYSDEC Standard µg/l	No. of Excursions	No. Exceeding Standard
for MW-1				
Cadmium	47 to 200	5.0	5	5
Chromium	42 to 1,000	50	5	4
TCE	9 to 10	5.0	3	3
for MW-2				
Cadmium	55 to 246	5.0	5	5
Chromium	247 to 1,700	50	5	5
TCE	9 to 14	5.0	3	3
for MW-5				
Cadmium	34 to 480	5.0	3	3
Chromium	97 to 850	50	3	3
TCE	8 to 9	5.0	2	2

Upgradient Monitoring Well: MW-18

Contaminant Off-Site	Range µg/l	NYSDEC Standard µg/l	No. of Excursions	No. Exceeding Standard
for MW-18				
Cadmium	<1 to 3	5.0	5	0
Chromium	76 to 102	50	5	5
TCE	11 to 25	5.0	3	3

Cross and Downgradient Monitoring Wells: MW-3, MW-4, and MW-6

Contaminant Off-Site	Range µg/l	NYSDEC Standard µg/l	No. of Excursions	No. Exceeding Standard
for MW-3				
Cadmium	9 to 56	5.0	4	4
Chromium	99 to 120	50	4	4
TCE	10 to 12	5.0	2	2
for MW-4				
Cadmium	<1 to 7	5.0	4	1
Chromium	26 to 120	50	4	2
TCE	4 to 10	5.0	2	1
for MW-6				
Cadmium	17 to 120	5.0	3	3
Chromium	32 to 100	50	3	1
TCE	11	5.0	1	1

4.5 Metal Contaminant Source Evaluation – Outfall 002 and 003

During the remedial investigation, waste sediments were observed in the two drywell structures for Outfall 002. Waste sediments were not observed at Outfall 003. The concentration of cadmium and chromium within these waste sediments are above the SCO's. The concentrations of cadmium in the soils underlying the waste sediments also exceed the SCO. At Outfall 003, concentrations of cadmium and chromium were observed in soils collected at depths ranging from approximately 12 and 16 feet below ground surface that exceeded the SCO for cadmium.

Table 4-4
Subsurface Soils/Sediments Contaminant Concentration Summary
Outfall 002 and 003

Contaminants of Concern	Concentration Range Detected (ppm)[a]	6NYCRR Part 375 SCO Commercial (mg/kg)	6NYCRR Part 375 SCO Protection of Groundwater (mg/kg)
Outfall A-002 (primary structure)			
Cadmium	15 to 68	9.3	7.5
Chromium (total)	910 to 3,700	1,500	19
Outfall B-002 (secondary structure)			
Cadmium	340 to 650	9.3	7.5
Chromium (total)	180 to 7,100	1,500	19
Outfall 003			
Cadmium	8.4 to 410	9.3	7.5
Chromium (total)	16.4 to 1,310	1,500	19

ppm = parts per million, which is equivalent to milligrams per kilogram, mg/kg, in soil;

5 REMEDIAL ACTION OBJECTIVES

Based on the evaluation of the current environmental data, as described above, and taking into consideration current and potential land use, and identification of the actual or potential public health and/or environmental exposure, the Remedial Action Objective (RAO), for the Site are:

- Prevent inhalation of volatiles compounds from contaminated groundwater;
- Prevent ingestion/direct contact with contaminated surface and subsurface soils;
- Remove the sources of groundwater and soil contamination; and
- Prevent migration of contaminants that would result in additional impact to groundwater quality.

The applicable Standards, Criteria and Guidances (SCGs) for the Site are:

- Protection of Public Health, Soils – 6NYCRR Part 375, Environmental Remediation Programs, Table 375-6.8 (b) Restricted Use Soil Cleanup Objective, Commercial. December 2006.
- Protection of Public Health, Groundwater – 6NYCRR Part 700-706, Ambient Water Quality Standards and Guidance Values, T.O.G.S. 1.1.1. June 1998.
- Protection of Groundwater, Soils – 6NYCRR Part 375, Environmental Remediation Programs, Table 375-6.8 (b) Restricted Use Soil Cleanup Objective. December 2006.

The analytical parameters for determining whether the RAOs are met are as follows:

- EPA Method 8260, NYSDEC Target Compound List (TCL);
- EPA Method 6010 and 7471 for Total 8 RCRA Metals.

The laboratory Quality Assurance/Quality Control Manual is attached in Appendix C.

6 REMEDY IMPLEMENTATION PLAN

The proposed remedy identified in the Alternative Analysis Report (AAR), prepared by GeoLogic, dated November 2010 was a focused excavation of one structure associated with Outfall 002 that is located outside the Site building footprint, and Containment with Institutional and Engineering Controls.

NYSDEC has requested in conjunction with excavation of Outfall 002, that stabilization/immobilization of metals in soils be implemented, and that this combined remedy also be implemented at Outfall 003.

No additional remedy will be developed as part of this RAWP for the prevention of inhalation of volatile compounds via soil vapor migration. During the completion of the RI work, a Sub-Slab Vapor Mitigation (Depressurization) System was installed in response to concentrations of VOC's, primarily TCE, that were observed in the sub-slab soil vapor samples at TCMF. An Interim Maintenance and Monitoring Plan and Annual Interim Maintenance and Monitoring reports for the Sub-Slab Vapor Mitigation System have been submitted under the RI. Considerations for the expansion of the Vapor Mitigation System are components of the Plan. The Annual Interim Maintenance and Monitoring reports will eventually be incorporated into the Periodic Review Reports per DER-10.

6.1 Excavation of Outfall 002 and 003

Outfall 002, Drywell A is a concrete structure that is 6.5 feet in diameter and extends to a depth of 15.2 feet below grade. The concrete drywell structure, associated piping, waste sediments and underlying native soils will be removed from the Site via excavation. Outfall 002, Drywell B underlies the building. This structure is assumed to be similar in construction as Drywell A, except shallower. Drywell B extends to approximately 12 feet below the floor level.

Outfall 003 is identified in historical SPDES Permits as a septic tank. The configuration of the septic tank is not known. The location of Outfall 003 is depicted on Drawing No. 2.

6.1.1 Soil Screening Methods

A scientist or engineer with experience in environmental work will evaluate the excavation of Outfall 002 and Outfall 003 on behalf of the Site owner. The presence of utilities and easements on the Site will be investigated to determine whether a risk or impediment to the planned work under this RAWP is posed by utilities or easements on the Site.

Soil exhibiting contaminant characteristics (based on previous environmental data, odors, and visual staining) removed by the excavation operations will be direct-loaded to trucks, to the extent possible, to minimize the size of on-site staging areas and to minimize double-handling of the soil. It is not anticipated that excavation activities will require dewatering to remove free liquids, since the

depth to groundwater is in excess of 25 feet below ground surface. Excavated soils that exhibit no visible contamination, no staining, no obvious chemical odors, and no elevated PID readings - 5 ppm above background will be staged on-site for possible reuse as backfill. These soils will be characterized in accordance with DER-10, Section 5.4. A Sampling and Analysis Plan is attached in Appendix D.

6.1.2 Material Excavation and Load Out

The owner of the property and its contractors are solely responsible for the safe execution of all invasive work and other work performed under this Plan.

The asphalt pavement and sub-base material will be stripped and stockpiled for off-site disposal at an appropriate facility.

Excavated soils and the structures associated with Outfall 002 and Outfall 003 that are not directly off-loaded, will be placed on polyethylene sheeting and encircled with a clean soil berm. Stockpiles will be covered at the end of each workday with appropriately anchored tarps.

All transport of materials will be performed by licensed haulers in accordance with appropriate local, State, and Federal regulations, including 6 NYCRR Part 364. Haulers will be appropriately licensed and trucks properly placarded.

Locations where vehicles enter or exit the Site shall be inspected daily for evidence of off-Site soil tracking.

The qualified environmental professional will be responsible for ensuring that all egress points for truck and equipment transport from the Site are clean of dirt and other materials derived from the Site during intrusive excavation activities. Cleaning of the adjacent street will be performed, as needed, to maintain a clean condition with respect to Site-derived materials.

All dump trailers and/or dump truck boxes used to transport impacted materials for off-site disposal will be lined, when deemed necessary, with polyethylene sheeting prior to waste loading. The waste transport containers will be covered

with a tarp upon loading, prior to departing the Site. Each load will be transported to the designated facility by a licensed hauler.

6.1.3 Materials Disposal Off-site

All soil/fill/solid waste excavated and removed from the Site will be handled as regulated material and will need to be transported and disposed of in accordance with all local, State (including 6NYCRR Part 360) and Federal regulations. No excavated materials will be considered for unregulated off-Site disposal (i.e. clean soil removed for development purposes).

Off-Site disposal location(s) for excavated materials will be identified after waste characterization of the excavated materials is completed. Actual disposal quantities and associated documentation will be reported to the NYSDEC in the Remedial Action Report. This documentation will include waste profiles, test results, facility acceptance letters, manifests, bills of lading and facility receipts.

Non-hazardous historic fill and contaminated soils taken off-Site will be handled, at minimum, as a Municipal Solid Waste per 6NYCRR Part 360-1.2.

6.1.4 Materials Reuse On-Site

The qualified environmental professional will ensure that procedures defined for material reuse are followed and that unacceptable material does not remain on-Site. Excavated soil that is visibly stained, discolored, exhibit petroleum or solvent-like odors or produces elevated PID readings will not be considered for reuse on the Site. This excavated material will be disposed of at an applicable disposal facility.

Excavated soil that does not exhibit any of the above characteristics can be considered for on-Site reuse and placed in an excavation at a depth of 2 feet or greater.

Soil that is stockpiled for re-use, or other material determined to be appropriate by an engineer will be used as backfill. It is anticipated that the backfill material will be compacted using a roller, vibratory plate compactor, the excavator bucket,

and/or other appropriate equipment. Prior to using the excavated stockpiled soils and/or off-site material, samples will be collected to verify that proposed material meets the requirements of DER-10, Section 5.4.

The asphalt sub-base and asphalt pavement will be replaced meeting engineering requirements for the parking area.

6.1.5 Backfill from Off-Site Sources

All materials proposed for import onto the Site will be approved by the qualified environmental professional and will be in compliance with provisions set forth in DER-10, Section 5.4.

6.1.6 Confirmation Sampling

Soil samples will be collected from the limits of the excavation to verify that soils that have been impacted by metals have been removed, and remaining soils meet the SCO's for the Protection of Groundwater set forth in Table 375-6.8(b) of 6 NYCRR Part 375.

Soil samples will be collected from the bottom and sidewalls of the excavations for analyses for RCRA metals and volatiles TCL (see Appendix B, Analytical Matrix Table). Expediting the analytical results will assist in evaluating whether additional soils will need to be excavated. Should it be required for safety purposes to place backfill in the excavated area(s) prior to receiving the analytical results, a demarcation barrier of fabric will be placed between the backfill material and limits of the excavation to facilitate removal of additional impacted soils, to the extent feasible.

6.2 In-Situ Immobilization of Metals in Soil

After the completion of the excavation of Outfalls 002 and 003, *in-situ* immobilization of any remaining metal contamination in soil within the excavations that exceed SCOs for the Protection of Groundwater will be implemented. An *in-situ* immobilization plan will be submitted to NYSDEC, post excavation, for review that will include the vendor

information on the stabilization product, the anticipated quantity of stabilization product to be applied, and quality assurance/quality control (QA/QC) sampling and analysis.

Immobilization refers to the process of transforming aqueous phase, mobile metals to a solid, stable phase that becomes part of the soil. This phase transfer prevents continued migration of metals and can be a permanent solution depending on the metal and site-specific geochemistry. Two common mechanisms of *in-situ* metals immobilization are metals adsorption to soil particles or precipitation of metal solids that are chemically fixed to soil particles. Both of these mechanisms can permanently remove metals from the aqueous phase, restoring the aquifer.

Immobilization or stabilization processes typically involve cementaceous and clay mixtures with high viscosities. Another option may be the use of a proprietary *in-situ* immobilization process such as Metal Remediation Compounds (MRC®) for the in-situ stabilization of subsurface soils at Outfall 002 and 003, if warranted. The proprietary process involves an immobilization solution whose viscosity can be field modified from low viscosity (on the order of water) to higher viscosities. The application of the *in-situ* immobilization mixture will be either through direct injection techniques and/or by soil mixing within the excavation.

6.3 Pre and Post-Remediation Monitoring

Monitoring well MW-2 may be removed during excavation activities at Outfall 002. If so, well MW-2 will be replaced and installed adjacent to the excavation area. An additional monitoring well (MW-7) will be installed west of the excavation area at Outfall 003 to assist in evaluating post-remediation groundwater quality.

Water samples will be collected from monitoring wells MW-1 through MW-6 and NW-07 and submitted for analysis for RCRA metals and TCL volatile organic compounds prior to the initiation of the remediation.

Water samples will be collected from wells MW-1, MW-2 and MW-7 one month and three months after completing the remedy (see Appendix B, Analytical Matrix Table).

Semi-annual groundwater monitoring will be performed for one-year. Samples will be collected from monitoring wells MW-1 through MW-7 and NW-07 for both RCRA metal concentrations and for TCL volatile organic compounds.

6.4 Community Air Monitoring Plan

An air monitoring program will be implemented during the remedial activities to protect the health and safety of site workers and the surrounding community and to establish appropriate response protocols for potential emission source control. Details of the air monitoring program are presented in the site-specific HASP (see Appendix E) and are in general accordance with the NYSDOH Generic Community Air Monitoring Plan (CAMP) TAGM 4031, Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites. A brief summary of the monitoring program that is presented in the HASP includes both work area and perimeter air monitoring (vapor and particulate).

7.0 FINAL ENGINEERING REPORT

Once the Site remediation has been completed, a Final Engineering Report (FER) will be prepared and submitted to the NYSDEC. The purpose of the FER is to fully document the implementation of the Site remedy and to certify, by a registered professional engineer, that the remedial program activities were implemented in conformance with the Department-approved Remedial Work Plan. The FER will include a description of the selected remedy, details and supporting documentation of remedial actions performed, and required certifications. In addition, a NYSDEC-prepared FER Template will be used to prepare the FER to achieve consistency with NYSDEC expectations and to expedite NYSDEC review and approval of the FER.

8.0 SITE MANAGEMENT PLAN AND ENVIRONMENTAL EASEMENT

A Site Management Plan will be developed and an environmental easement will be implemented for the Site to enforce deed restrictions on land use and groundwater use, and to notify potential buyers of institutional and engineering controls associated with the property. The environmental easement will:

- Ensure that restrictions on land use and groundwater use are included on the deed;

- Reference the Site Management Plan (SMP), which will include an Institutional and Engineering Control Plan, Excavation Plan; the incorporation of the existing Interim Maintenance and Monitoring Plan and a Property Survey; and

- Set forth the requirements for the periodic certification that any institutional or engineering controls for the Site will remain in-place, are in the NYSDEC-approved form, and nothing has occurred that would impair the ability for the controls to protect public health and the environment.

9.0 SCHEDULE

A schedule outlining the major milestones for the remaining work is enclosed in Appendix F.

File: P:\..99011A\BCP Files\Report\Remedial Action Plan.doc

APPENDIX A

DRAWING

N

Project North

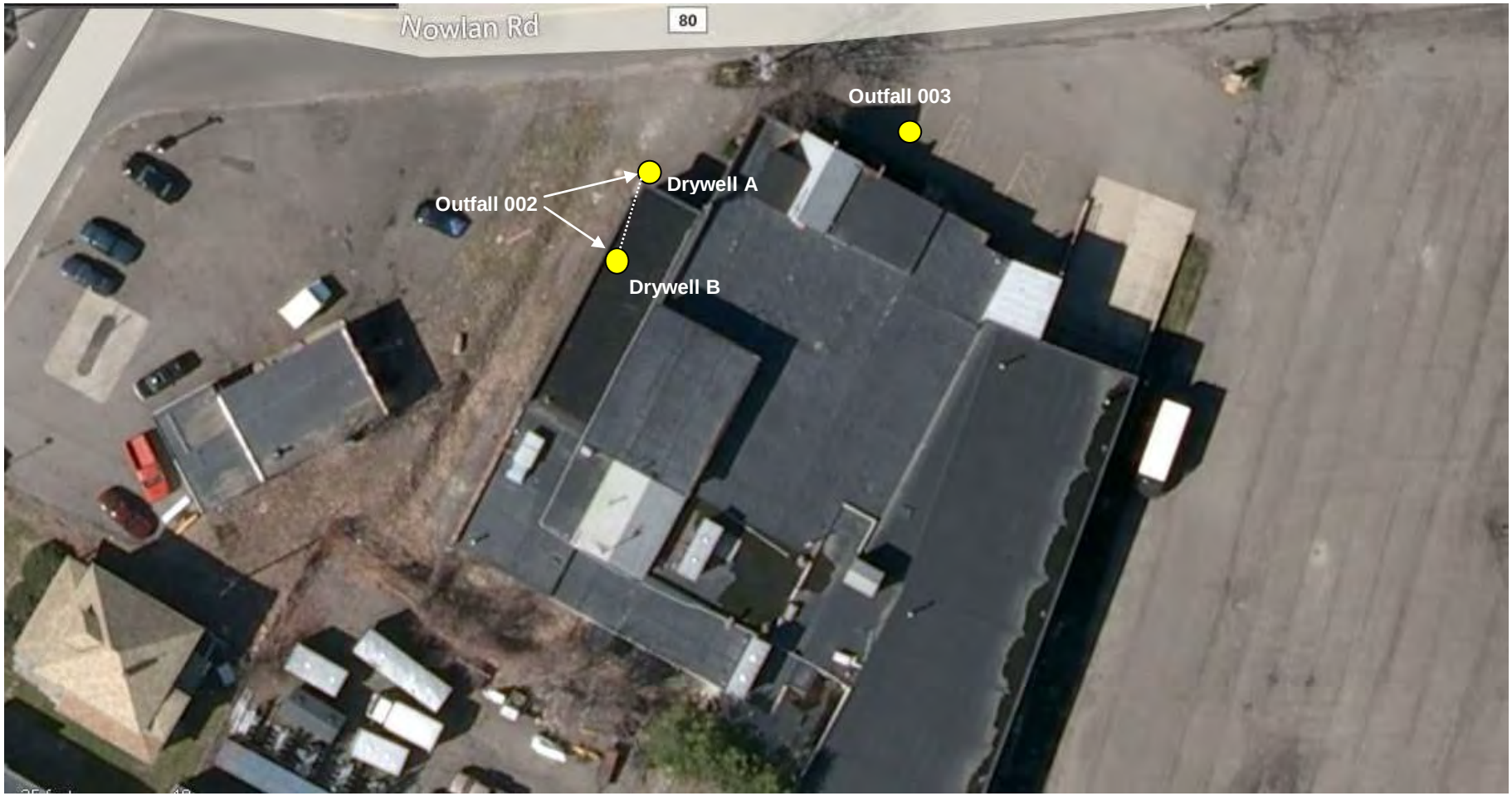
GeoLogic

GeoLogic NY, Inc.

SITE LOCATION PLAN
FORMER TRIPLE CITIES METAL FINISHING
4 NOWLAN ROAD
BINGHAMTON, NEW YORK
NYSDEC ID C704045

DRAWN BY:	SCALE:	PROJECT NO:
sc	Not To Scale	99011A
REVIEWED BY:	DATE:	DRAWING NO:
fce	Nov. 2013	1

FILE:\..\99011A/bcp/report/rawp/drawing no.1



N

Project North

GeoLogic

GeoLogic NY, Inc.

OUTFALL LOCATION PLAN
FORMER TRIPLE CITIES METAL FINISHING
4 NOWLAN ROAD
BINGHAMTON, NEW YORK
NYSDEC ID C704045

DRAWN BY:	SCALE:	PROJECT NO:
smc	Not To Scale	99011A
REVIEWED BY:	DATE:	DRAWING NO:
fce	Sept. 2013	2

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APPENDIX B

ANALYTICAL MATRIX TABLE

TABLE NO. 1

ANALYTICAL MATRIX
Pre- and Post-Remediation
Triple Cities Metal Finishing
Binghamton, New York
BCP Site C704032

Task	Location	Matrix	Field Screening[1]	Analytical Parameters		
				TCL 8260	RCRA Metals	SVOC/PCB Pesticides
Pre-Remediation	MW-1 thru MW-6, NW-07	Groundwater	DO-ORP- T-C-pH	X	X	
(One Event)	Field Duplicate	Groundwater		X	X	
Post-Remediation[2]	MW-1, MW-2, and MW-7	Groundwater	DO-ORP- T-C-pH	X	X	
				X	X	
Post-Remediation[3]	MW-1 thru MW-7, NW-07	Groundwater	DO-ORP- T-C-pH	X	X	
Post-Excavation	**Outfall 002** *(Per Structure)*					
	One Bottom	Soil	PID	X	X	
	One Sidewall	Soil	PID	X	X	
	Outfall 003					
	Two Bottom	Soil	PID	X	X	
	Two Sidewall	Soil	PID	X	X	
Backfill	Imported Fill	Soil		X	X	X
	Re-Use	Soil		X	X	X
Pre & Post-Immobilization	Former Outfalls	Soil	TBD[4]			

Notes:
1 - DO-ORP- T-C-pH: Dissolved Oxygen (DO), Redox Potential (ORP), Temperature (T), Conductivity (C), and pH;
PID – Photoionization Detector
2 - Groundwater sampling one month and three months post-remediation
3 – Groundwater sampling semi-annually for one year post-remediation
4 - To be determined based on immibilization product recommendations

APPENDIX C

LABORATORY QA/QC

Pace Analytical®
Long Island Laboratory

575 Broad Hollow Road
Melville, NY 11747
Tel: 631.694.3040
Fax: 631.420.8436

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
Signature	Title	Date
Signature	Title	Date
Signature	Title	Date
Signature	Title	Date
Signature	Title	Date
Signature	Title	Date

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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- 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.

3.5 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.

♦

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)

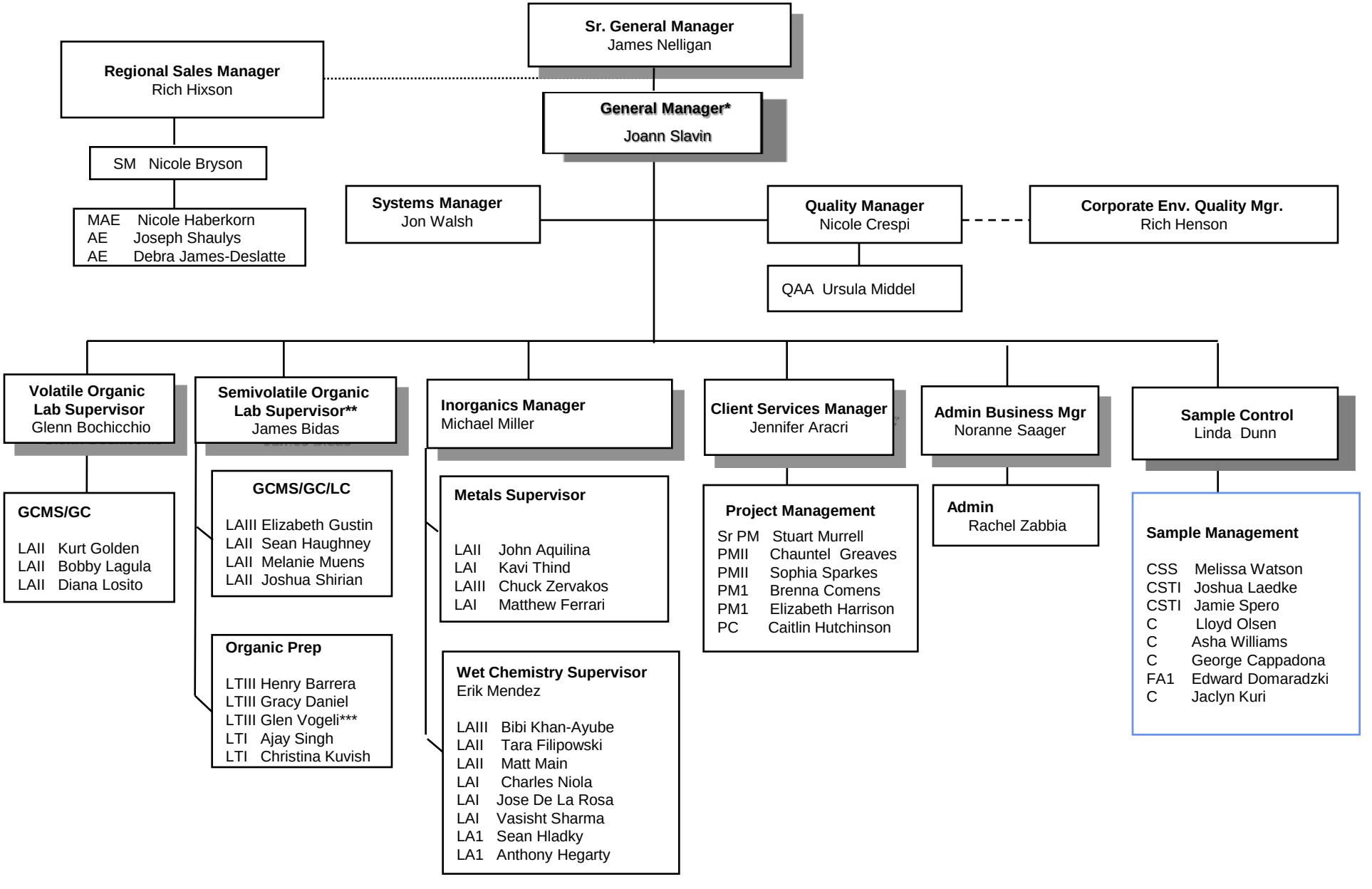
41. 2009 TNI Laboratory Accreditation Standards

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

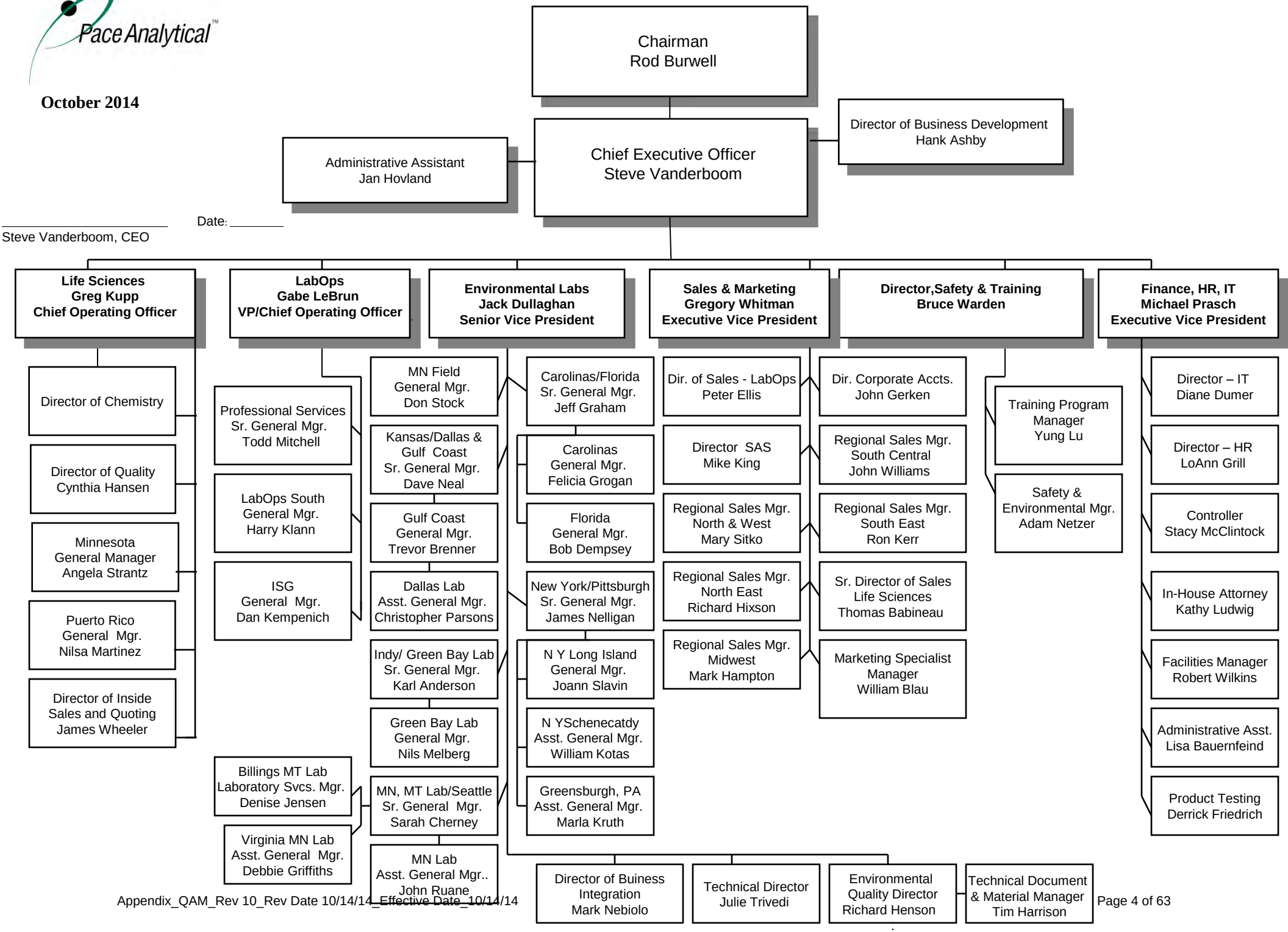
***Safety Officer

Last Revised: September 11, 2014

Last Reviewed: September 11, 2014

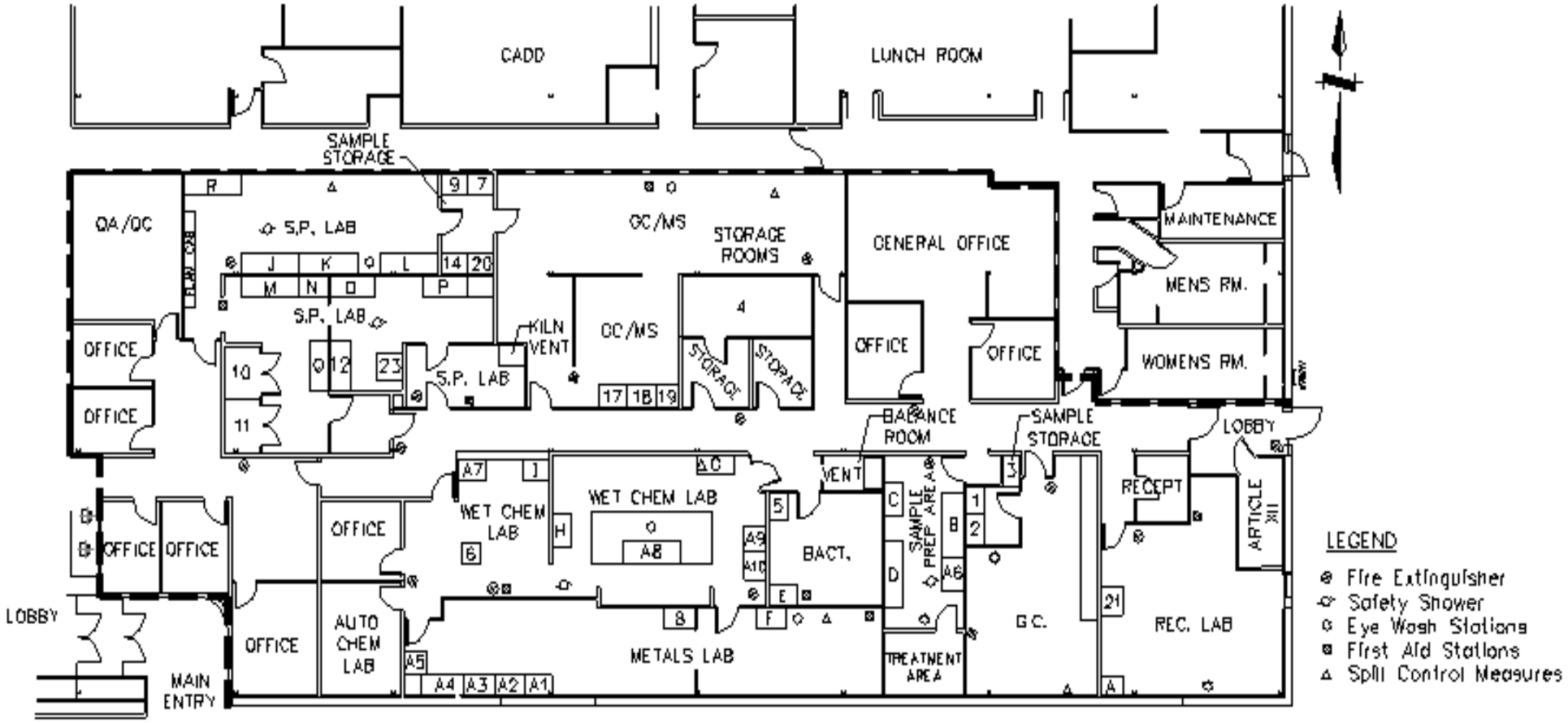
CORPORATE/MANAGEMENT STRUCTURE

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 & ANALYSES PLAN

GeoLogic

SAMPLING AND ANALYSES PLAN

FOR THE

REMEDIAL ACTION WORK PLAN

Triple Cities Metal Finishing Corporation
4 Nowlan Road
Binghamton, New York

Prepared By:

GeoLogic NY, Inc.

June 2015

INTRODUCTION

This Sampling and Analysis Plan is for the Triple Cities Metal Finishing Brownfield Project in the Binghamton, Broome County, New York. The phase of the project involves additional Remedial Action to further reduce contamination at the Site through the removal of drywells and stabilization of remaining metal contaminates in subsurface soils, if warranted.

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 are soil and 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 in this Sampling and Analysis Plan. Items include field measurement techniques, general field decontamination procedures, and sample acquisition and management.

Analytical Methodologies

Samples will be collected from soil and groundwater for various purposes. The analytical requirements for re-use of on-site material or imported material will be in compliance with provisions set forth in NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation, May 2012, Section 5.4 (e) 5 through 10.

Post-remediation soil sample and pre- and post- remediation groundwater samples will be analyzed for the Superfund Target Compound List (TCL) parameters for volatile organic compounds by EPA Method 8260 and for RCRA Metals (arsenic, barium, cadmium, chromium, lead, selenium, silver and mercury by EPA Methods 200.7 and 7471. 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.

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.

Soil samples will also be collected from excavated material for waste characterization. The analytical requirements will be dictated by the disposal facility.

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 and RCRA Metals, 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 Triple Cities Metal Finishing 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 and soil. Table No. 1 summarizes the groundwater and soil sampling protocols.

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 attached single-use disposable tubing to the whale 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 whale 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 purging, 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 logbook (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 Geopropbe.

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, ORP, DO, specific conductance, color, etc. will be recorded in the field book.

Sample Designation – Each sample will have a unique sample code that will include, where appropriate, the sample media, and the sample location.

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

HASP

HEALTH AND SAFETY PLAN (HASP)

The HASP takes into account the specific hazards inherent to this project and presents procedures for the exclusive use of GeoLogic NY, Inc., and its employees. Due to the potential hazards of this Site and the activities occurring thereon, it is not possible to discover, evaluate, and provide protection for all possible hazards, which may be encountered. Strict adherence to the health and safety guidelines set forth herein, will reduce, but may not eliminate, the potential for injury at this Site.

PROJECT NAME:	Former Triple Cities Metals Finishing	**CLIENT ORGANIZATION:**	Binghamton Realty, Inc.
SITE ADDRESS:	4 Nowlan Road, Binghamton, New York	**CLIENT ADDRESS:**	349 Industrial Park Drive Binghamton, NY 13904
NYSDEC REGION:	7	**CLIENT CONTACT:**	Joseph and Charles Morgan
PROJECT NUMBER:	NYSDEC ID #C704045	**CLIENT PHONE:**	607-722-3431
ORIGINAL HASP DATE:	1-31-15	**CONTACT:**	Charles Morgan
REVISED DATE:	-	**CONTACT PHONE:**	607-722-3431
REVISION NUMBER:	-		

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1. SITE DESCRIPTION AND FEATURES:

The 27,000-square foot industrial building is located on a 0.62-acre parcel and the office building (former residential structure) is located on a 0.26-acre parcel. The industrial building was used primarily for production work with offices in the northern portion of the building and warehousing in the east and west additions. The former residential structure housed the corporate offices.

Nature and Extent of Contamination: The primary contaminants of concern at TCMF are cadmium, chromium, nickel, zinc, and trichloroethene.

These contaminants have impacted groundwater and soil quality at the site. The metals are present in soils and sediments at the two areas to be excavated. The maximum concentrations of contaminants in soils and sediments are: cadmium (650 mg/kg) chromium (7,100 mg/kg), zinc (7,300 mg/kg), TCE (0.023 mg/kg)

Groundwater is in excess of 25 feet below ground surface. Maximum concentrations of contaminants in groundwater are: cadmium (480 ug/L), chromium (850 ug/L) zinc (4,220 ug/L), TCE (22 ug/L).

2. SITE HISTORY:

The site is an industrially-zoned parcel with residential properties to the north and south, and an industrial facility to the east, a automotive service station, a residence, an electrical contractor and restaurant to the west. The site is partially occupied by Square Deal Machining, Inc. and Parts Channel Inc. The remainder of the site is either unoccupied or used for miscellaneous storage by the property owner.

Historical Use: The site was formerly an industrial metal plating business.

Site Geology and Hydrogeology: TCMF is located on the terrace above the Chenango River channel. The geology of the terrace consists of glacial meltwater (outwash) deposits of sand and gravel with variable silt content that range in thickness from approximately 30 to 55 feet. Lacustrine silt, sands and clay deposits underlie the outwash sand and gravel unit ranging in thickness from 130 to 160 feet. Underlying the lacustrine deposit is a sand and gravel deposit. The Town of Fenton Water Supply Wells are screened in this lower sand and gravel deposit.

3. HASP-SPECIFIC TASKS:

Excavation oversight, Geoprobe operation with injection of chemical fixing reagents, decontamination of equipment, and drum handling will be performed by GeoLogic personnel.

4. SITE TYPE:

STATUS		TYPE	
Active	X	Monitoring wells	
Inactive		Landfill	
Secure (Building)	X	Industrial	X
Unsecure	X	Petroleum	
Enclosed space		Unknown	
Remediation	X	Military	
Other		Other	

5. POTENTIAL HAZARDOUS MATERIAL SUMMARY: [Potential hazard –Shaded]

CHEMICALS	SOLIDS	SLUDGES	SOLVENTS	OILS	OTHER
Acids	Fly ash	Paints	Ketones	Oily wastes	Laboratory
Pickling Liquors	Mill or mine tailings	Pigments	Aromatics	Gasoline	Pharmaceutical
Caustics	Asbestos	Heavy Metal	Hydrocarbons	Diesel fuel	Hospital
Pesticides	Ferrous smelter	Aluminum	Alcohols	Lubricants	Radiological
Dyes / Inks	Non-ferrous smelter	Other-*specify*	Halogenated (chloroethenes)	Polynuclear aromatics	Municipal
Cyanides	Metals		Esters	PCB's	Construction
Phenols	Dioxins		Ethers	Heating oil	Munitions
Halogens	Other-semi-volatile coal ash related compounds		Other-*specify*	Other-*specify*	Other-Industrial Solid Waste
Other-*specify*					

WASTE TYPES:

	Liquid (groundwater)		**Solid** (soils)		**Sludge**		**Gas**		**Unknown**		**Other-*specify*** **None**

WASTE CHARACTERISTICS:

	Corrosive		**Toxic**		**Inert Gas**		**Flammable**		**Volatile**		**Reactive**		**Other-** Unknown

MATERIALS TO BE BROUGHT ON SITE FOR THE IDENTIFIED SPECIFIC TASKS: See attached MSDS

Preservatives		Decontamination		Calibration		Remediation		Others	
	HCL		Liquinox™		100ppm isobutylene		Sodium permanganate		Bentonite/Cement Grout
	Other-*specify*		Alconox™		pH standards		Hydrogen peroxide		
			Other-*specify*		Conductivity standards		Metal Fixing Reagent		Diesel Fuel (equipment)
					Other-*Specify*				Gasoline (equipment)

KNOWN CONTAMINANTS: No location-specific information was provided to GeoLogic

CONTAMINANT	HIGHEST KNOWN CONCENTRATION / MEDIA	PEL / TLV	IDLH	EXPOSURE ROUTES	PHYSICAL CHARACTERISTICS SYMPTOMS
Cadmium	Groundwater: 480 ug/L Soil: 650 mg/kg	PEL: 0.005 mg/m^3 ACGIH/TLV: 0.01 mg/m^3	9 mg/m^3	Inhalation, Ingestion, Absorption	Odorless, silver white powder in pure form, irritant to eyes, mouth and throat, dermatitis, headache, nausea
Chromium	Groundwater: 850 ug/L Soil: 7,100 mg/kg	PEL:1 mg/m^3 ACGIH/TLV: 0.5 mg/m^3	250 mg/m^3	Inhalation, Ingestion, Absorption	Odorless, silver grey solid in pure form, irritant to eyes, mouth and throat, dermatitis, headache, nausea
Zinc	Groundwater: 4,220 ug/L Soil: 7,300 mg/kg	PEL: 15 mg/m^3 (total)	Not Determined	Inhalation, Ingestion, Absorption	Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation
Trichloroethene	Groundwater: 22 ppb Soil: 23 ppb	PEL: 100 ppm – TWA 300 ppm – 5 min. peak/2 hrs. TWA 50 ppm – TWA	1000 ppm	Inhalation, Ingestion, Absorption	Colorless liquid; chloroform odor, / irritant to mucous membranes, skin irritant; headache, nausea, visual disturbance

6. SITE HAZARD ASSESSMENT:

#	HAZARD	SITE-SPECIFIC CONDITIONS	MITIGATION METHODS	WARNINGS/SYMPTOMS	RESPONSE TO EXPOSURE
A	Heat Stress	-Vigorous physical work associated with excavation and soil staging activities -Warm temperatures -Confining personal protective equipment (PPE) such as tyvek.	-Regulate pace of work -Take regular breaks -Use shade when possible -Regular intake of cool fluids -Dress for task & conditions -Buddy system monitoring	Heat stress/heat stoke -Heavy perspiration -Dizziness -Nausea -Headache -Vertigo -Weakness and thirst -Heat stroke may include hot dry skin and confusion	-Rest in a cool place -Drink cool fluids -Seek immediate medical attention for heat stroke symptoms
B	Cold Stress	-Freezing temperatures during excavation activities -Exposure and wet clothing and gloves from working below the water table and during/ decontamination activities.	-Dress accordingly for task and conditions -Regulate clothing layers to keep body temp comfortable, avoid perspiration -Take breaks in warm areas -Buddy system monitoring	Hypothermia and frostbite -Shivering, tingling, numbness -Apathy or sleepiness, blanching or whitening of skin -Unconsciousness, tissue becomes pale and hard, frozen extremities	-Get out of the cold during the first stages of hypothermia or frostbite -Seek immediate medical attention if frostbite or advanced hypothermia is suspected
C	Explosive Flammable	N/A			
D	Oxygen Deficient	N/A			
E	Noise	-Excavator, Geoprobe	-Keep a reasonable distance from noisy equipment -Hearing protection PPE -Buddy system monitoring	-Difficulty hearing normal conversation 2-3 feet away -Increased heart rate -Muscle fatigue	-Move away from noise -Use hearing protection PPE
F	Inorganic Chemicals	Cadmium, chromium, zinc	Avoid physical contact/ exposure when possible -Stay up-wind of work zone -Review work plans and MSDS -Use proper PPE -Monitor for exposure -Remove potentially exposed PPE and wash hands whenever leaving the work zone -Buddy system monitoring		
G	Chemical Exposure	Chlorinated	-Avoid physical contact / exposure when possible -Stay up-wind of work zone -Review work plans and MSDS -Use proper PPE -Monitor for exposure -Remove potentially exposed PPE and wash hands whenever leaving the work zone -Buddy system monitoring	-Monitoring indicates unprotected exposure above exposure limit occurred -There is physical evidence of exposure (visual or odors) -Exposure symptoms occur (see Hazardous Material Summary above)	-Stop work and leave the work zone if possible exposure is suspected. -Reevaluate exposure mitigation methods (PPE level, Methodologies, etc.) -If exposure symptoms have occurred seek medical attention immediately

SITE HAZARD ASSESSMENT CONT'D:

#	HAZARD	SITE-SPECIFIC CONDITIONS	MITIGATION METHODS	WARNINGS/SYMPTOMS	RESPONSE TO EXPOSURE
H	Motorized Traffic	Not anticipated			
I	Heavy Equipment	Excavator: -Crush points -Entrapment in the machinery -Hitting overhead or underground utilities	-Only operators of the equipment are allowed in the work zone unless the operator is aware of another person and is maintaining eye contact -Operators must be familiar with equipment procedures for safe operation/ emergency stop features and test daily -Equipment not attended by the operator should be shut down and locked out from operation -Proper PPE must be used	-If mitigation methods are not followed -Close calls	-Review safety procedures with all job site personnel -Seek first aid or immediate medical attention as appropriate
J	Slips & Falls	-Uneven ground surface -Drill rig tools	-Keep known walking areas free of obstructions / hazards -Identify potential hazards (cones, signage, paint, etc.) -Walk slowly, surveying the ground ahead -Wear appropriate PPE	-If mitigation methods are not followed -Close calls	-Review safety procedures with all job site personnel -Seek first aid or immediate medical attention as appropriate
K	Power and hand tools	-Electric shocks - high pressure water stream (steam cleaner) -Burns (steam cleaner) -Cuts from blades	-Only operators of the tool are allowed in the work zone unless the operator is aware of another person and is maintaining eye contact -Operators must be familiar with equipment procedures for safe operation and inspect tool, cords and GFI operation before use -Equipment not attended by the operator should be unplugged and locked out from operation -Proper PPE must be used, including safety glasses, hearing protection and appropriate gloves	-If mitigation methods are not followed -Close calls	-Review safety procedures with all job site personnel -Seek first aid or immediate medical attention as appropriate
L	Waste Handling	-Drum moving and lifting -Pinch-point -Spillage	-Use of appropriate equipment/hand carts for the moving and staging of drums -Follow proper lifting procedures -Proper PPE must be used for the handling and staging of waste		-Review safety procedures with all job site personnel -Seek first aid or immediate medical attention as appropriate

7. LEVELS OF PROTECTION: *Shade minimum PPE for each level of protection used*

*See section 10 for a summary of levels of protection for each activity. If monitoring in Section 8 dictates **C-level** of protection, a respirator use review meeting and inspection will be conducted by the Site Health & Safety coordinator prior to work in level C to review respirator equipment, use, care, and storage for all level C workers.*

D-level		***D modified-level (D-M)***		***C-level***		***B-level***	
■	*Steel Toe Boots*	■	*All D Items Selected*		*All D Modified Selected*		*Not Used*
■	*Work Gloves*	■	*Rubber Boots*		*Rubber Boots*		
■	*Hard Hat*	■	*Latex/Vinyl Disposable Gloves*		*Half-face APR*		
■	*Safety Glasses*		*Nitrile Gloves*		*Full-Face APR*		
■	*Hearing Protection*	■	*Tyvek Coverall*		*Tyvek Coverall*		
			Splash Suit		*Splash Suit*		
		■	*Safety Glasses*		*Face shield*		
		■	*Face Shield*		*Other*		
			Hearing Protection				
			Other				

8. SITE WORKER & COMMUNITY AIR MONITORING PLAN (CAMP):

This air monitoring plan provides minimum information to comply with NYSDOH requirements identified in Appendix 1A of DER-10.

Real-time fugitive dust monitoring will be conducted during excavation activities at the site, upwind and downwind of the workzone. The atmosphere (background and breathing zones) will be monitoring for volatile compounds.

WORK ZONE:	For the purpose of this HASP, the Work Zones (WZ) will be defined as the area within a 10-foot radius of ongoing excavation work. All Work Zones are mobile, should be established in consideration of prevailing wind direction and will be moved as the work crew advances to new locations within the Project Site.		
SUPPORT ZONE:	Support Zones will be all areas outside of current Work Zones.		
INTRUSIVE:	For the purpose of this HASP, intrusive activities will be those that have the ability to unearth identified impacted soils.		
NON-INTRUSIVE:	Any activity, which is not defined as intrusive.		
PERIODIC MONITORING:	Monitoring at regular intervals with periods of time in between where no monitoring takes place (recording a PID reading at half-hour intervals).		
CONTINUOUS MONITORING:	Non-stop real time monitoring with equipment capable of calculating a running average over no less than 15-minute intervals and log monitoring data over no less than an 8-hour work day, which can be downloaded or printed.		
MONITORING REQUIREMENTS:	**VOC MONITORING**		**FUGITIVE DUST & PARTICULATE MONITORING**
INTRUSIVE	Photoionization detector (10.6 ev lamp)		Reasonable fugitive dust suppression techniques must be employed during all site activities, which may generate fugitive dust. Dust suppression techniques may include covering soil piles, wetting of haul pathways, and the use of potable water spray during intrusive activities. Particulate concentrations will be measured continuously at the upwind and downwind perimeters of the Work Zone at temporary particulate monitoring stations. Real time monitoring equipment will be utilized, capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating a 15-minute period for comparison to the particulate action level. The action level is 150 micrograms-per-cubic-meter (ug/m^3) (15 minutes average). If the downwind PM-10 level is 100 ug/m^3 greater than background (upwind perimeter) for the 15-minute period or if air-borne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mg/m^3 above background. Should the action level of 150 ug/m^3 continue to be exceeded, work must stop until dust suppression techniques prove adequate or weather conditions change.
	CONDITION	**RESPONSE**	
	<5ppm over background	-PPE Level D-M -Continuous monitoring, downwind perimeter of WZ -Continue working	
	>5 to 25ppm for less than 15 minutes	-PPE Level D-M -Continuous monitoring, downwind perimeter of WZ -Stop work, move upwind of WZ and monitor downwind concentrations	
	>5 to 25ppm for 15 minutes or more	-PPE Level C -Continuous monitoring, downwind perimeter of WZ -Respirator use review meeting -Resume work in level C	
	>25ppm	-PPE Level C -Continuous monitoring, downwind perimeter of WZ -Stop work, move upwind of WZ and monitor downwind concentrations	
NON-INTRUSIVE	<5ppm over background	-PPE Level D or D-M (see Work Task Summary) -Periodic monitoring, downwind perimeter of WZ (not required for survey work) -Continue working	Not required.
	>5ppm over background	Revert to intrusive conditions and responses	

9. DECONTAMINATION:

TYPE	METHOD	CONTAINMENT & DISPOSAL
HEAVY EQUIPMENT	Steam clean	If deemed necessary, construction of equipment decontamination pad(s) for the excavator and Geoprobe equipment that comes into contact with impacted materials during excavation activities will be the same design as soil staging area(s). All water must be collected in secondary containment and containerized for classification and disposal. Soil from steam cleaned equipment will be containerized if there is evidence of contamination. If there is no apparent evidence of contamination (PID>5ppm over background, odor, sheen) then soil will be stockpiled on and covered with 10 mil polyethylene plastic for characterization and disposal.
SAMPLING EQUIPMENT	Liquinox solution and tap water rinse	All decontamination water from sampling equipment will be containerized on-site and classified for disposal. All purge water from sampling equipment will be containerized on-site and classified for disposal. Auger cuttings and all soil from sampling will be containerized for characterization and disposal.
PERSONNEL	-Remove PPE avoiding contact with skin -Wash hands first and then face with soap and warm water	Wash water for personnel will be directed to the sanitary sewer. All one-time use PPE will be discarded into disposable garbage bags for disposal in the Site dumpster. Multiple use PPE will be inspected daily and decontaminated prior to starting work each day using disposable bio-degradable wipes.

10. WORK TASK SUMMARY:

This Section summarizes information from Sections 6-9 for each site specific Task.

TASK	PPE LEVEL See section 7	MONITORING	HAZARDS See Section 6	DECONTAMINATION See Section 9
1. Excavation Oversight	D	**See Section 8**	E, I, J	Heavy Equipment, Personnel
2. Geoprobe	D	**See Section 8**	E, G, I, J, K	Heavy Equipment, Personnel
3. Waste Handling	D	**See Section 8**	E, G, J, L	Personnel
4. Metal Stabilization	D-M	**See Section 8**	F, G, I	Heavy Equipment, Personnel

11. SITE EMERGENCY / CONTINGENCY PLAN:

The following Site Emergency / Contingency Plan provide responses and contact information if an accident or injury should occur. All accidents or injuries must be reported within a 24-hour period to the Health and Safety Officer. This includes even minor cuts and abrasions. Failure to immediately report accidents and injuries sustained on the job may result in the loss of workers compensation and disability benefits. All employees reporting an accident or injury will be required to fill out an accident report form.

All on-site workers must become familiar with the provisions of this HASP and sign the attached Training and Acknowledgement section.

Should any worker observe hazards that are not addressed in this plan or that they are unprepared for, they should withdraw immediately and consult with the Health & Safety Officer before resuming work.

SITE EMERGENCY / CONTINGENCY PLAN CONT'D:

FIRST AID:

The safety of employees working around construction/sampling equipment should be maintained at all times. In the event that an injury or accident occurs, a first aid kit must be kept on the site within a reasonable distance of personnel at all times. GeoLogic employees will have basic first aid and basic CPR training.

Seek emergency medical attention as soon as possible when appropriate. Directions to the nearest emergency medical facility and emergency phone numbers are provided below.

FIRE:

Fire extinguishers are located on GeoLogic's trucks and drill rigs. GeoLogic personnel will be familiar with their location and operation. Emergency contact information for fire response is provided below.

SITE SECURITY:

None

EMERGENCY CONTACT	DESCRIPTION	PHONE
Police		911
Fire Department		911
Ambulance		911
Hospital	UHS/Binghamton General Hospital	607-762-2200
Poison Control Center	Nationwide	800-222-1222
NYSDEC Spill Hotline	Spills must be reported within 2 hours of their discovery	800-457-7362
Medical Consultant	Industrial Medical Associates	315-478-1977

MEDICAL EMERGENCY:

UHS/Binghamton General Hospital, 10-42 Mitchell Avenue, Binghamton, NY the closest acute care facility to the site. Directions are provided below and a map is provided in Section 12.

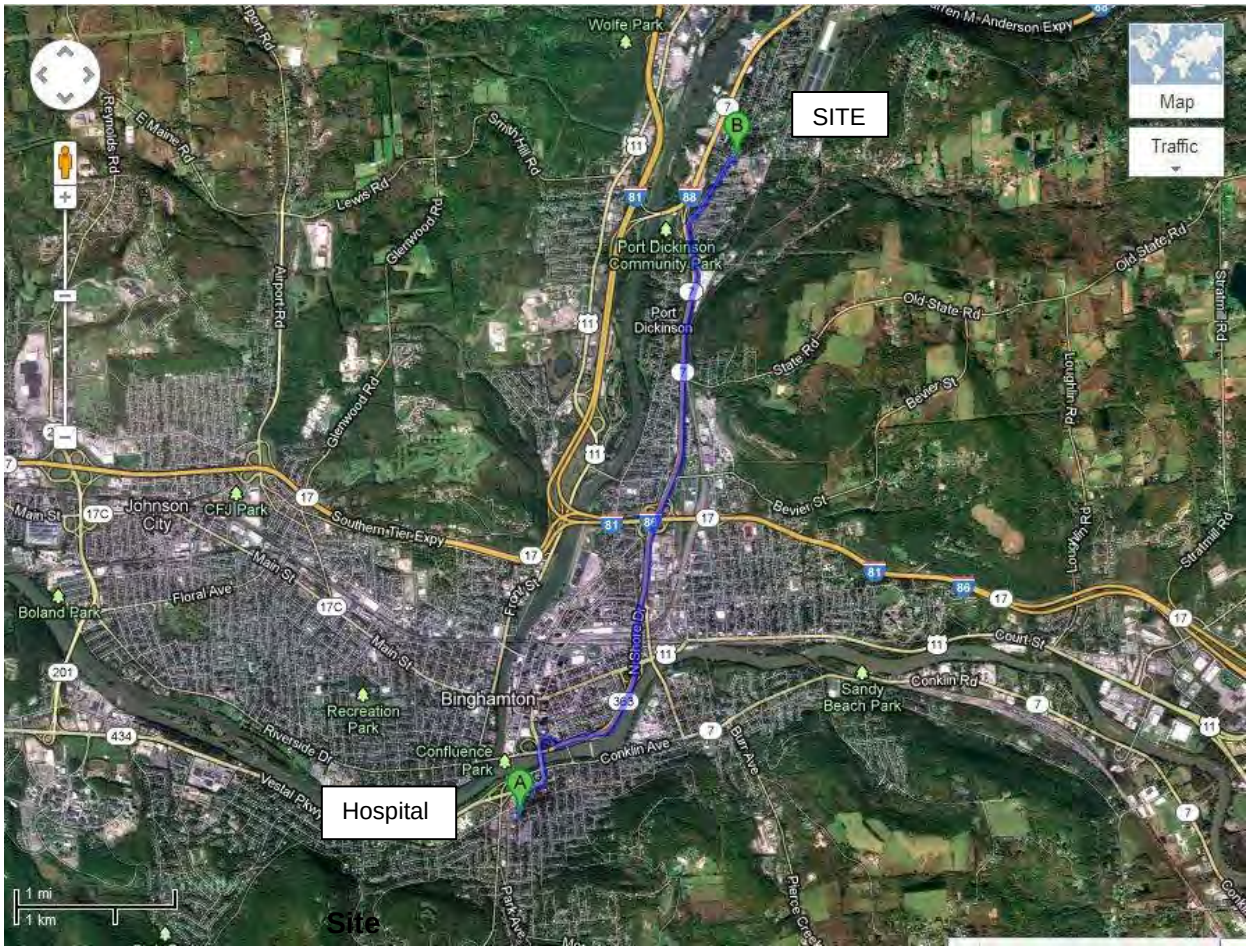
1. Direction to Hospital:
2. Exit Site on to Nowlan Road, heading west
3. Turn left on to Chenango Street at stop sign, proceeding about 0.6 mile to traffic signal.
4. Proceed straight through traffic signal taking first left hand turn onto West Service Road.
5. Stay straight on W. Service Road through intersection with stop sign
6. Enter onto NYS Route 7, heading south.
7. Merge left onto Route 363
8. Merge left on to Route 434W toward Vestal
9. Take a left onto S. Washington Street
10. Take first right onto Vestal Avenue
11. Take first left onto Mitchell Avenue
12. Follow signage into emergency care unit of hospital.

EVACUATION:

In the event of a situation requiring emergency evacuation of the site such as a contaminant release above the highest action levels or an underground gas line break, the following procedures should be followed:

1. Activate emergency stop feature on operating equipment
2. Notify all personnel of the need to leave the site immediately
3. Immediately walk up wind, if a contaminate release has occurred.
4. Contact emergency services / personnel

12. MAP TO HOSPITAL: UHS/Wilson General Hospital
10-42 Mitchell Avenue
Binghamton, New York



13. TRAINING AND PLAN ACKNOWLEDGEMENT:

Any GeoLogic personnel working at this Site, that is involved in the identified tasks must have completed the basic 40-hour OSHA health and safety training course with respirator fit testing and, if applicable, the supplemental yearly 8-hour refresher courses.

GeoLogic personnel authorized to work at this Site include:

CREW MEMBER	RESPONSIBILITIES	SIGNATURE
Steven Laramee	Driller	
Scott Breeds	Driller	
David Lyons	Driller	
John Winks	Driller Helper	
Susan Cummins	Oversight	
Joseph Menzel	Geologist	
Ken Teter, P.E.	Engineer	

14. SITE MAP:

Safety Data Sheet

Material Name: Diesel Fuel, All Types

SDS No. 9909
US GHS

Synonyms: Ultra Low Sulfur Diesel; Low Sulfur Diesel; No. 2 Diesel; Motor Vehicle Diesel Fuel; Non-Road Diesel Fuel; Locomotive/Marine Diesel Fuel

* * * Section 1 - Product and Company Identification * * *

Manufacturer Information

Hess Corporation
1 Hess Plaza
Woodbridge, NJ 07095-0961

Phone: 732-750-6000 Corporate EHS
Emergency # 800-424-9300 CHEMTREC
www.hess.com (Environment, Health, Safety Internet Website)

* * * Section 2 - Hazards Identification * * *

GHS Classification:

Flammable Liquids - Category 3
Skin Corrosion/Irritation – Category 2
Germ Cell Mutagenicity – Category 2
Carcinogenicity - Category 2
Specific Target Organ Toxicity (Single Exposure) - Category 3 (respiratory irritation, narcosis)
Aspiration Hazard – Category 1
Hazardous to the Aquatic Environment, Acute Hazard – Category 3

GHS LABEL ELEMENTS

Symbol(s)

Signal Word

DANGER

Hazard Statements

Flammable liquid and vapor.
Causes skin irritation.
Suspected of causing genetic defects.
Suspected of causing cancer.
May cause respiratory irritation.
May cause drowsiness or dizziness.
May be fatal if swallowed and enters airways.
Harmful to aquatic life.

Precautionary Statements

Prevention

Keep away from heat/sparks/open flames/hot surfaces. No smoking
Keep container tightly closed.
Ground/bond container and receiving equipment.

Use explosion-proof electrical/ventilating/lighting/equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Wear protective gloves/protective clothing/eye protection/face protection.
Wash hands and forearms thoroughly after handling.
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Avoid breathing fume/mist/vapours/spray.

Response
In case of fire: Use water spray, fog or foam to extinguish.
IF ON SKIN (or hair): Wash with plenty of soap and water. Remove/Take off immediately all contaminated clothing and wash it before reuse. If skin irritation occurs: Get medical advice/attention.
IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a poison center/doctor if you feel unwell.
If swallowed: Immediately call a poison center or doctor. Do NOT induce vomiting.
IF exposed or concerned: Get medical advice/attention.

Storage
Store in a well-ventilated place. Keep cool.
Keep container tightly closed.
Store locked up.

Disposal
Dispose of contents/container in accordance with local/regional/national/international regulations.

* * * Section 3 - Composition / Information on Ingredients * * *

CAS #	Component	Percent
68476-34-6	Fuels, diesel, no. 2	100
91-20-3	Naphthalene	<0.1

A complex mixture of hydrocarbons with carbon numbers in the range C9 and higher.

* * * Section 4 - First Aid Measures * * *

First Aid: Eyes
In case of contact with eyes, immediately flush with clean, low-pressure water for at least 15 min. Hold eyelids open to ensure adequate flushing. Seek medical attention.

First Aid: Skin
Remove contaminated clothing. Wash contaminated areas thoroughly with soap and water or with waterless hand cleanser. Obtain medical attention if irritation or redness develops. Thermal burns require immediate medical attention depending on the severity and the area of the body burned.

First Aid: Ingestion
DO NOT INDUCE VOMITING. Do not give liquids. Obtain immediate medical attention. If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration. Monitor for breathing difficulties. Small amounts of material which enter the mouth should be rinsed out until the taste is dissipated.

First Aid: Inhalation

Remove person to fresh air. If person is not breathing, provide artificial respiration. If necessary, provide additional oxygen once breathing is restored if trained to do so. Seek medical attention immediately.

* * * Section 5 - Fire Fighting Measures * * *

General Fire Hazards

See Section 9 for Flammability Properties.

Vapors may be ignited rapidly when exposed to heat, spark, open flame or other source of ignition. When mixed with air and exposed to an ignition source, flammable vapors can burn in the open or explode in confined spaces. Being heavier than air, vapors may travel long distances to an ignition source and flash back. Runoff to sewer may cause fire or explosion hazard.

Hazardous Combustion Products

Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke).

Extinguishing Media

SMALL FIRES: Any extinguisher suitable for Class B fires, dry chemical, CO2, water spray, fire fighting foam, and other gaseous agents.

LARGE FIRES: Water spray, fog or fire fighting foam. Water may be ineffective for fighting the fire, but may be used to cool fire-exposed containers.

Unsuitable Extinguishing Media

None

Fire Fighting Equipment/Instructions

Small fires in the incipient (beginning) stage may typically be extinguished using handheld portable fire extinguishers and other fire fighting equipment. Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH/MSHA- approved pressure-demand self-contained breathing apparatus with full facepiece and full protective clothing. Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water. For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied fire fighting foam.

* * * Section 6 - Accidental Release Measures * * *

Recovery and Neutralization

Carefully contain and stop the source of the spill, if safe to do so.

Materials and Methods for Clean-Up

Take up with sand or other oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal. Caution, flammable vapors may accumulate in closed containers.

Emergency Measures

Evacuate nonessential personnel and remove or secure all ignition sources. Consider wind direction; stay upwind and uphill, if possible. Evaluate the direction of product travel, diking, sewers, etc. to confirm spill areas. Spills may infiltrate subsurface soil and groundwater; professional assistance may be necessary to determine the extent of subsurface impact.

Personal Precautions and Protective Equipment

Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section 8).

Environmental Precautions

Protect bodies of water by diking, absorbents, or absorbent boom, if possible. Do not flush down sewer or drainage systems, unless system is designed and permitted to handle such material. The use of fire fighting foam may be useful in certain situations to reduce vapors. The proper use of water spray may effectively disperse product vapors or the liquid itself, preventing contact with ignition sources or areas/equipment that require protection.

Prevention of Secondary Hazards

None

* * * Section 7 - Handling and Storage * * *

Handling Procedures

Handle as a combustible liquid. Keep away from heat, sparks, excessive temperatures and open flame! No smoking or open flame in storage, use or handling areas. Bond and ground containers during product transfer to reduce the possibility of static-initiated fire or explosion.

Special slow load procedures for "switch loading" must be followed to avoid the static ignition hazard that can exist when higher flash point material (such as fuel oil) is loaded into tanks previously containing low flash point products (such as this product) - see API Publication 2003, "Protection Against Ignitions Arising Out Of Static, Lightning and Stray Currents."

Storage Procedures

Keep away from flame, sparks, excessive temperatures and open flame. Use approved vented containers. Keep containers closed and clearly labeled. Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition.

Store in a well-ventilated area. This storage area should comply with NFPA 30 "Flammable and Combustible Liquid Code". Avoid storage near incompatible materials. The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning Petroleum Storage Tanks."

Incompatibilities

Keep away from strong oxidizers.

* * * Section 8 - Exposure Controls / Personal Protection * * *

Component Exposure Limits

Fuels, diesel, no. 2 (68476-34-6)

ACGIH: 100 mg/m3 TWA (inhalable fraction and vapor, as total hydrocarbons, listed under Diesel fuel)
Skin - potential significant contribution to overall exposure by the cutaneous route (listed under Diesel fuel)

Naphthalene (91-20-3)

ACGIH: 10 ppm TWA
15 ppm STEL
Skin - potential significant contribution to overall exposure by the cutaneous route
OSHA: 10 ppm TWA; 50 mg/m3 TWA
NIOSH: 10 ppm TWA; 50 mg/m3 TWA
15 ppm STEL; 75 mg/m3 STEL

Engineering Measures

Use adequate ventilation to keep vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces.

Personal Protective Equipment: Respiratory

A NIOSH/MSHA-approved air-purifying respirator with organic vapor cartridges or canister may be permissible under certain circumstances where airborne concentrations are or may be expected to exceed exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited.

Use a positive pressure, air-supplied respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection.

Personal Protective Equipment: Hands

Gloves constructed of nitrile, neoprene, or PVC are recommended.

Personal Protective Equipment: Eyes

Safety glasses or goggles are recommended where there is a possibility of splashing or spraying.

Personal Protective Equipment: Skin and Body

Chemical protective clothing such as of E.I. DuPont TyChem®, Saranex® or equivalent recommended based on degree of exposure. Note: The resistance of specific material may vary from product to product as well as with degree of exposure. Consult manufacturer specifications for further information.

* * * Section 9 - Physical & Chemical Properties * * *

Appearance:	Clear, straw-yellow.	**Odor:**	Mild, petroleum distillate odor
Physical State:	Liquid	**pH:**	ND
Vapor Pressure:	0.009 psia @ 70 °F (21 °C)	**Vapor Density:**	>1.0
Boiling Point:	320 to 690 °F (160 to 366 °C)	**Melting Point:**	ND
Solubility (H2O):	Negligible	**Specific Gravity:**	0.83-0.876 @ 60°F (16°C)
Evaporation Rate:	Slow; varies with conditions	**VOC:**	ND
Percent Volatile:	100%	**Octanol/H2O Coeff.:**	ND
Flash Point:	>125 °F (>52 °C) minimum	**Flash Point Method:**	PMCC
Upper Flammability Limit (UFL):	7.5	**Lower Flammability Limit (LFL):**	0.6
Burning Rate:	ND	**Auto Ignition:**	494°F (257°C)

* * * Section 10 - Chemical Stability & Reactivity Information * * *

Chemical Stability

This is a stable material.

Hazardous Reaction Potential

Will not occur.

Conditions to Avoid

Avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources.

Incompatible Products

Keep away from strong oxidizers.

Hazardous Decomposition Products

Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke).

* * * Section 11 - Toxicological Information * * *

Acute Toxicity

A: General Product Information

Harmful if swallowed.

B: Component Analysis - LD50/LC50

Naphthalene (91-20-3)

Inhalation LC50 Rat >340 mg/m3 1 h; Oral LD50 Rat 490 mg/kg; Dermal LD50 Rat >2500 mg/kg; Dermal LD50 Rabbit >20 g/kg

Potential Health Effects: Skin Corrosion Property/Stimulativeness

Practically non-toxic if absorbed following acute (single) exposure. May cause skin irritation with prolonged or repeated contact. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are repeatedly exposed.

Potential Health Effects: Eye Critical Damage/ Stimulativeness

Contact with eyes may cause mild irritation.

Potential Health Effects: Ingestion

Ingestion may cause gastrointestinal disturbances, including irritation, nausea, vomiting and diarrhea, and central nervous system (brain) effects similar to alcohol intoxication. In severe cases, tremors, convulsions, loss of consciousness, coma, respiratory arrest, and death may occur.

Potential Health Effects: Inhalation

Excessive exposure may cause irritations to the nose, throat, lungs and respiratory tract. Central nervous system (brain) effects may include headache, dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure, and death.

WARNING: the burning of any hydrocarbon as a fuel in an area without adequate ventilation may result in hazardous levels of combustion products, including carbon monoxide, and inadequate oxygen levels, which may cause unconsciousness, suffocation, and death.

Respiratory Organs Sensitization/Skin Sensitization

This product is not reported to have any skin sensitization effects.

Generative Cell Mutagenicity

This material has been positive in a mutagenicity study.

Carcinogenicity

A: General Product Information

Suspected of causing cancer.

Studies have shown that similar products produce skin tumors in laboratory animals following repeated applications without washing or removal. The significance of this finding to human exposure has not been determined. Other studies with active skin carcinogens have shown that washing the animal's skin with soap and water between applications reduced tumor formation.

B: Component Carcinogenicity

Fuels, diesel, no. 2 (68476-34-6)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans (listed under Diesel fuel)

Naphthalene (91-20-3)

ACGIH: A4 - Not Classifiable as a Human Carcinogen
NTP: Reasonably Anticipated To Be A Human Carcinogen (Possible Select Carcinogen)
IARC: Monograph 82 [2002] (Group 2B (possibly carcinogenic to humans))

Reproductive Toxicity

This product is not reported to have any reproductive toxicity effects.

Specified Target Organ General Toxicity: Single Exposure

This product is not reported to have any specific target organ general toxicity single exposure effects.

Specified Target Organ General Toxicity: Repeated Exposure

This product is not reported to have any specific target organ general toxicity repeat exposure effects.

Aspiration Respiratory Organs Hazard

The major health threat of ingestion occurs from the danger of aspiration (breathing) of liquid drops into the lungs, particularly from vomiting. Aspiration may result in chemical pneumonia (fluid in the lungs), severe lung damage, respiratory failure and even death.

* * * Section 12 - Ecological Information * * *

Ecotoxicity

A: General Product Information

Keep out of sewers, drainage areas and waterways. Report spills and releases, as applicable, under Federal and State regulations.

B: Component Analysis - Ecotoxicity - Aquatic Toxicity

Fuels, diesel, no. 2 (68476-34-6)

Test & Species		Conditions
96 Hr LC50 Pimephales promelas	35 mg/L [flow-through]	

Naphthalene (91-20-3)

Test & Species		Conditions
96 Hr LC50 Pimephales promelas	5.74-6.44 mg/L [flow-through]	
96 Hr LC50 Oncorhynchus mykiss	1.6 mg/L [flow-through]	
96 Hr LC50 Oncorhynchus mykiss	0.91-2.82 mg/L [static]	
96 Hr LC50 Pimephales promelas	1.99 mg/L [static]	

96 Hr LC50 Lepomis macrochirus	31.0265 mg/L [static]
72 Hr EC50 Skeletonema costatum	0.4 mg/L
48 Hr LC50 Daphnia magna	2.16 mg/L
48 Hr EC50 Daphnia magna	1.96 mg/L [Flow through]
48 Hr EC50 Daphnia magna	1.09 - 3.4 mg/L [Static]

Persistence/Degradability
No information available.

Bioaccumulation
No information available.

Mobility in Soil
No information available.

* * * Section 13 - Disposal Considerations * * *

Waste Disposal Instructions
See Section 7 for Handling Procedures. See Section 8 for Personal Protective Equipment recommendations.

Disposal of Contaminated Containers or Packaging
Dispose of contents/container in accordance with local/regional/national/international regulations.

* * * Section 14 - Transportation Information * * *

DOT Information
Shipping Name: Diesel Fuel
NA #: 1993 **Hazard Class:** 3 **Packing Group:** III
Placard:

* * * Section 15 - Regulatory Information * * *

Regulatory Information

Component Analysis

This material contains one or more of the following chemicals required to be identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65) and/or CERCLA (40 CFR 302.4).

Naphthalene (91-20-3)

CERCLA: 100 lb final RQ; 45.4 kg final RQ

SARA Section 311/312 – Hazard Classes

Acute Health	Chronic Health	Fire	Sudden Release of Pressure	Reactive
X	X	X	--	--

SARA SECTION 313 - SUPPLIER NOTIFICATION

This product may contain listed chemicals below the de minimis levels which therefore are not subject to the supplier notification requirements of Section 313 of the Emergency Planning and Community Right- To-Know Act (EPCRA) of 1986 and of 40 CFR 372. If you may be required to report releases of chemicals listed in 40 CFR 372.28, you may contact Hess Corporate Safety if you require additional information regarding this product.

State Regulations

Component Analysis - State

The following components appear on one or more of the following state hazardous substances lists:

Component	CAS	CA	MA	MN	NJ	PA	RI
Fuels, diesel, no. 2	68476-34-6	No	No	No	Yes	No	No
Naphthalene	91-20-3	Yes	Yes	Yes	Yes	Yes	No

The following statement(s) are provided under the California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65):

WARNING! This product contains a chemical known to the state of California to cause cancer.

Component Analysis - WHMIS IDL

No components are listed in the WHMIS IDL.

Additional Regulatory Information

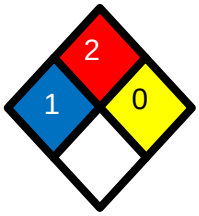
Component Analysis - Inventory

Component	CAS #	TSCA	CAN	EEC
Fuels, diesel, no. 2	68476-34-6	Yes	DSL	EINECS
Naphthalene	91-20-3	Yes	DSL	EINECS

* * * Section 16 - Other Information * * *

NFPA® Hazard Rating

Health	1
Fire	2
Reactivity	0



HMIS® Hazard Rating

Health	1*	Slight
Fire	2	Moderate
Physical	0	Minimal
		*Chronic

Key/Legend

ACGIH = American Conference of Governmental Industrial Hygienists; ADG = Australian Code for the Transport of Dangerous Goods by Road and Rail; ADR/RID = European Agreement of Dangerous Goods by Road/Rail; AS = Standards Australia; DFG = Deutsche Forschungsgemeinschaft; DOT = Department of Transportation; DSL = Domestic Substances List; EEC = European Economic Community; EINECS = European Inventory of Existing Commercial Chemical Substances; ELINCS = European List of Notified Chemical Substances; EU = European Union; HMIS = Hazardous Materials Identification System; IARC = International Agency for Research on Cancer; IMO = International Maritime Organization; IATA = International Air Transport Association; MAK = Maximum Concentration Value in the Workplace; NDSL = Non-Domestic Substances List; NFPA = National Fire Protection Association; NOHSC = National Occupational Health & Safety Commission; NTP = National Toxicology Program; STEL = Short-term Exposure Limit; TDG = Transportation of Dangerous Goods; TLV = Threshold Limit Value; TSCA = Toxic Substances Control Act; TWA = Time Weighted Average

Literature References

None

Other Information

Information presented herein has been compiled from sources considered to be dependable, and is accurate and reliable to the best of our knowledge and belief, but is not guaranteed to be so. Since conditions of use are beyond our control, we make no warranties, expressed or implied, except those that may be contained in our written contract of sale or acknowledgment.

Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, vendor assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material, even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in their use of the material.

End of Sheet

MATERIAL SAFETY DATA SHEET

Gasoline, All Grades **MSDS No. 9950**

EMERGENCY OVERVIEW
DANGER!
EXTREMELY FLAMMABLE - EYE AND MUCOUS MEMBRANE IRRITANT - EFFECTS CENTRAL NERVOUS SYSTEM - HARMFUL OR FATAL IF SWALLOWED - ASPIRATION HAZARD

NFPA 704 (Section 16)

High fire hazard. Keep away from heat, spark, open flame, and other ignition sources.

If ingested, do NOT induce vomiting, as this may cause chemical pneumonia (fluid in the lungs). Contact may cause eye, skin and mucous membrane irritation. Harmful if absorbed through the skin. Avoid prolonged breathing of vapors or mists. Inhalation may cause irritation, anesthetic effects (dizziness, nausea, headache, intoxication), and respiratory system effects.

Long-term exposure may cause effects to specific organs, such as to the liver, kidneys, blood, nervous system, and skin. Contains benzene, which can cause blood disease, including anemia and leukemia.

1. CHEMICAL PRODUCT and COMPANY INFORMATION

Hess Corporation
1 Hess Plaza
Woodbridge, NJ 07095-0961

EMERGENCY TELEPHONE NUMBER (24 hrs): **CHEMTREC (800)424-9300**
COMPANY CONTACT (business hours): Corporate Safety (732)750-6000
MSDS (Environment, Health, Safety) Internet Website www.hess.com

SYNONYMS: Hess Conventional (Oxygenated and Non-oxygenated) Gasoline; Reformulated Gasoline (RFG); Reformulated Gasoline Blendstock for Oxygenate Blending (RBOB); Unleaded Motor or Automotive Gasoline

See Section 16 for abbreviations and acronyms.

2. COMPOSITION and INFORMATION ON INGREDIENTS *

INGREDIENT NAME (CAS No.)	CONCENTRATION PERCENT BY WEIGHT
Gasoline (86290-81-5)	100
Benzene (71-43-2)	0.1 - 4.9 (0.1 - 1.3 reformulated gasoline)
n-Butane (106-97-8)	< 10
Ethyl Alcohol (Ethanol) (64-17-5)	0 - 10
Ethyl benzene (100-41-4)	< 3
n-Hexane (110-54-3)	0.5 to 4
Methyl-tertiary butyl ether (MTBE) (1634-04-4)	0 to 15.0
Tertiary-amyl methyl ether (TAME) (994-05-8)	0 to 17.2
Toluene (108-88-3)	1 - 25
1,2,4- Trimethylbenzene (95-63-6)	< 6
Xylene, mixed isomers (1330-20-7)	1 - 15

A complex blend of petroleum-derived normal and branched-chain alkane, cycloalkane, alkene, and aromatic hydrocarbons. May contain antioxidant and multifunctional additives. Non-oxygenated Conventional Gasoline and RBOB do not have oxygenates (Ethanol or MTBE and/or TAME).

Oxygenated Conventional and Reformulated Gasoline will have oxygenates for octane enhancement or as legally required.

3. HAZARDS IDENTIFICATION

EYES
Moderate irritant. Contact with liquid or vapor may cause irritation.

SKIN
Practically non-toxic if absorbed following acute (single) exposure. May cause skin irritation with prolonged or repeated contact. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are exposed repeatedly.

INGESTION
The major health threat of ingestion occurs from the danger of aspiration (breathing) of liquid drops into the lungs, particularly from vomiting. Aspiration may result in chemical pneumonia (fluid in the lungs), severe lung damage, respiratory failure and even death.

Ingestion may cause gastrointestinal disturbances, including irritation, nausea, vomiting and diarrhea, and central nervous system (brain) effects similar to alcohol intoxication. In severe cases, tremors, convulsions, loss of consciousness, coma, respiratory arrest, and death may occur.

INHALATION
Excessive exposure may cause irritations to the nose, throat, lungs and respiratory tract. Central nervous system (brain) effects may include headache, dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure, and death.

WARNING: the burning of any hydrocarbon as a fuel in an area without adequate ventilation may result in hazardous levels of combustion products, including carbon monoxide, and inadequate oxygen levels, which may cause unconsciousness, suffocation, and death.

CHRONIC EFFECTS and CARCINOGENICITY
Contains benzene, a regulated human carcinogen. Benzene has the potential to cause anemia and other blood diseases, including leukemia, after repeated and prolonged exposure. Exposure to light hydrocarbons in the same boiling range as this product has been associated in animal studies with systemic toxicity. See also Section 11 - Toxicological Information.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE
Irritation from skin exposure may aggravate existing open wounds, skin disorders, and dermatitis (rash). Chronic respiratory disease, liver or kidney dysfunction, or pre-existing central nervous system disorders may be aggravated by exposure.

4. FIRST AID MEASURES

EYES
In case of contact with eyes, immediately flush with clean, low-pressure water for at least 15 min. Hold eyelids open to ensure adequate flushing. Seek medical attention.

SKIN
Remove contaminated clothing. Wash contaminated areas thoroughly with soap and water or waterless hand cleanser. Obtain medical attention if irritation or redness develops.

INGESTION

DO NOT INDUCE VOMITING. Do not give liquids. Obtain immediate medical attention. If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration. Small amounts of material which enter the mouth should be rinsed out until the taste is dissipated.

INHALATION
Remove person to fresh air. If person is not breathing, ensure an open airway and provide artificial respiration. If necessary, provide additional oxygen once breathing is restored if trained to do so. Seek medical attention immediately.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES:

FLASH POINT:	-45 ^{o}F (-43^{o}C)
AUTOIGNITION TEMPERATURE:	highly variable; > 530 ^{o}F (>280 ^{o}C)
OSHA/NFPA FLAMMABILITY CLASS:	1A (flammable liquid)
LOWER EXPLOSIVE LIMIT (%):	1.4%
UPPER EXPLOSIVE LIMIT (%):	7.6%

FIRE AND EXPLOSION HAZARDS
Vapors may be ignited rapidly when exposed to heat, spark, open flame or other source of ignition. Flowing product may be ignited by self-generated static electricity. When mixed with air and exposed to an ignition source, flammable vapors can burn in the open or explode in confined spaces. Being heavier than air, vapors may travel long distances to an ignition source and flash back. Runoff to sewer may cause fire or explosion hazard.

EXTINGUISHING MEDIA
SMALL FIRES: Any extinguisher suitable for Class B fires, dry chemical, CO2, water spray, fire fighting foam, or Halon.

LARGE FIRES: Water spray, fog or fire fighting foam. Water may be ineffective for fighting the fire, but may be used to cool fire-exposed containers.

During certain times of the year and/or in certain geographical locations, gasoline may contain MTBE and/or TAME. Firefighting foam suitable for polar solvents is recommended for fuel with greater than 10% oxygenate concentration - refer to NFPA 11 “Low Expansion Foam - 1994 Edition.”

FIRE FIGHTING INSTRUCTIONS
Small fires in the incipient (beginning) stage may typically be extinguished using handheld portable fire extinguishers and other fire fighting equipment.

Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH/MSHA- approved pressure-demand self-contained breathing apparatus with full facepiece and full protective clothing.

Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water. For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied fire fighting foam.

See Section 16 for the NFPA 704 Hazard Rating.

6. ACCIDENTAL RELEASE MEASURES

ACTIVATE FACILITY SPILL CONTINGENCY or EMERGENCY PLAN.

Evacuate nonessential personnel and remove or secure all ignition sources. Consider wind direction; stay upwind and uphill, if possible. Evaluate the direction of product travel, diking, sewers, etc. to confirm spill areas. Spills may infiltrate subsurface soil and groundwater; professional assistance may be necessary to determine the extent of subsurface impact.

Carefully contain and stop the source of the spill, if safe to do so. Protect bodies of water by diking, absorbents, or absorbent boom, if possible. Do not flush down sewer or drainage systems, unless system is designed and permitted to handle such material. The use of fire fighting foam may be useful in certain situations to reduce vapors. The proper use of water spray may effectively disperse product vapors or the liquid itself, preventing contact with ignition sources or areas/equipment that require protection.

Take up with sand or other oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal - caution, flammable vapors may accumulate in closed containers. Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section 8).

7. HANDLING and STORAGE

HANDLING PRECAUTIONS

******USE ONLY AS A MOTOR FUEL******
******DO NOT SIPHON BY MOUTH******

Handle as a flammable liquid. Keep away from heat, sparks, and open flame! Electrical equipment should be approved for classified area. Bond and ground containers during product transfer to reduce the possibility of static-initiated fire or explosion.

Special slow load procedures for "switch loading" must be followed to avoid the static ignition hazard that can exist when higher flash point material (such as fuel oil) is loaded into tanks previously containing low flash point products (such as this product) - see API Publication 2003, "Protection Against Ignitions Arising Out Of Static, Lightning and Stray Currents.

STORAGE PRECAUTIONS

Keep away from flame, sparks, excessive temperatures and open flame. Use approved vented containers. Keep containers closed and clearly labeled. Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition.

Store in a well-ventilated area. This storage area should comply with NFPA 30 "Flammable and Combustible Liquid Code". Avoid storage near incompatible materials. The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning Petroleum Storage Tanks".

WORK/HYGIENIC PRACTICES

Emergency eye wash capability should be available in the near proximity to operations presenting a potential splash exposure. Use good personal hygiene practices. Avoid repeated and/or prolonged skin exposure. Wash hands before eating, drinking, smoking, or using toilet facilities. Do not use as a cleaning solvent on the skin. Do not use solvents or harsh abrasive skin cleaners for washing this product from exposed skin areas. Waterless hand cleaners are effective. Promptly remove contaminated clothing and launder before reuse. Use care when laundering to prevent the formation of flammable vapors which could ignite via washer or dryer. Consider the need to discard contaminated leather shoes and gloves.

8. EXPOSURE CONTROLS and PERSONAL PROTECTION

EXPOSURE LIMITS

Component (CAS No.)	Source	TWA (ppm)	STEL (ppm)	Exposure Limits Note
Gasoline (86290-81-5)	ACGIH	300	500	A3
Benzene (71-43-2)	OSHA	1	5	Carcinogen
	ACGIH	0.5	2.5	A1, skin
	USCG	1	5	
n-Butane (106-97-8)	ACGIH	1000	--	Aliphatic Hydrocarbon Gases Alkane (C1-C4)
Ethyl Alcohol (ethanol) (64-17-5)	OSHA	1000	--	
	ACGIH	1000	--	A4
Ethyl benzene (100-41-4)	OSHA	100	--	
	ACGIH	100	125	A3
n-Hexane (110-54-3)	OSHA	500	--	
	ACGIH	50	--	Skin
Methyl-tertiary butyl ether [MTBE] (1634-04-4)	ACGIH	50		A3
Tertiary-amyl methyl ether [TAME] (994-05-8)				None established
Toluene (108-88-3)	OSHA	200		Ceiling: 300 ppm; Peak: 500 ppm (10 min.)
	ACGIH	20	--	A4
1,2,4- Trimethylbenzene (95-63-6)	ACGIH	25	--	
Xylene, mixed isomers (1330-20-7)	OSHA	100	--	
	ACGIH	100	150	A4

ENGINEERING CONTROLS

Use adequate ventilation to keep vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces.

EYE/FACE PROTECTION

Safety glasses or goggles are recommended where there is a possibility of splashing or spraying.

SKIN PROTECTION

Gloves constructed of nitrile or neoprene are recommended. Chemical protective clothing such as that made of of E.I. DuPont Tychem ®, products or equivalent is recommended based on degree of exposure.

Note: The resistance of specific material may vary from product to product as well as with degree of exposure. Consult manufacturer specifications for further information.

RESPIRATORY PROTECTION

A NIOSH-approved air-purifying respirator with organic vapor cartridges or canister may be permissible under certain circumstances where airborne concentrations are or may be expected to exceed exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited. Refer to OSHA 29 CFR 1910.134, NIOSH Respirator Decision Logic, and the manufacturer for additional guidance on respiratory protection selection and limitations.

Use a positive pressure, air-supplied respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection.

9. PHYSICAL and CHEMICAL PROPERTIES

APPEARANCE

A translucent, straw-colored or light yellow liquid

ODOR
A strong, characteristic aromatic hydrocarbon odor. Oxygenated gasoline with MTBE and/or TAME may have a sweet, ether-like odor and is detectable at a lower concentration than non-oxygenated gasoline.

ODOR THRESHOLD

	Odor Detection	Odor Recognition
Non-oxygenated gasoline:	0.5 - 0.6 ppm	0.8 - 1.1 ppm
Gasoline with 15% MTBE:	0.2 - 0.3 ppm	0.4 - 0.7 ppm
Gasoline with 15% TAME:	0.1 ppm	0.2 ppm

BASIC PHYSICAL PROPERTIES

BOILING RANGE:	85 to 437 ^{o}F (39 to 200 ^{o}C)
VAPOR PRESSURE:	6.4 - 15 RVP @ 100 ^{o}F (38 ^{o}C) (275-475 mm Hg @ 68 ^{o}F (20 ^{o}C)
VAPOR DENSITY (air = 1):	AP 3 to 4
SPECIFIC GRAVITY (H_2O = 1):	0.70 – 0.78
EVAPORATION RATE:	10-11 (n-butyl acetate = 1)
PERCENT VOLATILES:	100 %
SOLUBILITY (H_2O):	Non-oxygenated gasoline - negligible (< 0.1% @ 77 ^{o}F). Gasoline with 15% MTBE - slight (0.1 - 3% @ 77 ^{o}F); ethanol is readily soluble in water

10. STABILITY and REACTIVITY)

STABILITY: Stable. Hazardous polymerization will not occur.

CONDITIONS TO AVOID
Avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources

INCOMPATIBLE MATERIALS
Keep away from strong oxidizers.

HAZARDOUS DECOMPOSITION PRODUCTS
Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke). Contact with nitric and sulfuric acids will form nitrocresols that can decompose violently.

11. TOXICOLOGICAL PROPERTIES

ACUTE TOXICITY
Acute Dermal LD50 (rabbits): > 5 ml/kg
Acute Oral LD50 (rat): 18.75 ml/kg
Primary dermal irritation (rabbits): slightly irritating
Draize eye irritation (rabbits): non-irritating
Guinea pig sensitization: negative

CHRONIC EFFECTS AND CARCINOGENICITY
Carcinogenicity: OSHA: NO IARC: YES - 2B NTP: NO ACGIH: YES (A3)

IARC has determined that gasoline and gasoline exhaust are possibly carcinogenic in humans. Inhalation exposure to completely vaporized unleaded gasoline caused kidney cancers in male rats and liver tumors in female mice. The U.S. EPA has determined that the male kidney tumors are species-specific and are irrelevant for human health risk assessment. The significance of the tumors seen in female mice is not known. Exposure to light hydrocarbons in the same boiling range as this product has been associated in animal studies with effects to the central and peripheral nervous systems, liver, and kidneys. The significance of these animal models to predict similar human response to gasoline is uncertain.

This product contains benzene. Human health studies indicate that prolonged and/or repeated overexposure to benzene may cause damage to the blood-forming system (particularly bone marrow), and serious blood disorders such as aplastic anemia and leukemia. Benzene is listed as a human carcinogen by the NTP, IARC, OSHA and ACGIH.

This product may contain methyl tertiary butyl ether (MTBE): animal and human health effects studies indicate that MTBE may cause eye, skin, and respiratory tract irritation, central nervous system depression and neurotoxicity. MTBE is classified as an animal carcinogen (A3) by the ACGIH.

12. ECOLOGICAL INFORMATION

Keep out of sewers, drainage areas and waterways. Report spills and releases, as applicable, under Federal and State regulations. If released, oxygenates such as ethers and alcohols will be expected to exhibit fairly high mobility in soil, and therefore may leach into groundwater. The API (www.api.org) provides a number of useful references addressing petroleum and oxygenate contamination of groundwater.

13. DISPOSAL CONSIDERATIONS

Consult federal, state and local waste regulations to determine appropriate disposal options.

14. TRANSPORTATION INFORMATION

DOT PROPER SHIPPING NAME:	Gasoline
DOT HAZARD CLASS and PACKING GROUP:	3, PG II
DOT IDENTIFICATION NUMBER:	UN 1203
DOT SHIPPING LABEL:	FLAMMABLE LIQUID

PLACARD:

15. REGULATORY INFORMATION

U.S. FEDERAL, STATE, and LOCAL REGULATORY INFORMATION

This product and its constituents listed herein are on the EPA TSCA Inventory. Any spill or uncontrolled release of this product, including any substantial threat of release, may be subject to federal, state and/or local reporting requirements. This product and/or its constituents may also be subject to other federal, state, or local regulations; consult those regulations applicable to your facility/operation.

CLEAN WATER ACT (OIL SPILLS)

Any spill or release of this product to "navigable waters" (essentially any surface water, including certain wetlands) or adjoining shorelines sufficient to cause a visible sheen or deposit of a sludge or emulsion must be reported immediately to the National Response Center (1-800-424-8802) as required by U.S. Federal Law. Also contact appropriate state and local regulatory agencies as required.

CERCLA SECTION 103 and SARA SECTION 304 (RELEASE TO THE ENVIRONMENT)

The CERCLA definition of hazardous substances contains a “petroleum exclusion” clause which exempts crude oil, refined, and unrefined petroleum products and any indigenous components of such. However, other federal reporting requirements (e.g., SARA Section 304 as well as the Clean Water Act if the spill occurs on navigable waters) may still apply.

SARA SECTION 311/312 - HAZARD CLASSES

ACUTE HEALTH	CHRONIC HEALTH	FIRE	SUDDEN RELEASE OF PRESSURE	REACTIVE
X	X	X	--	--

SARA SECTION 313 - SUPPLIER NOTIFICATION

This product contains the following toxic chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 and of 40 CFR 372:

INGREDIENT NAME (CAS NUMBER)	CONCENTRATION WT. PERCENT
Benzene (71-43-2)	0.1 to 4.9 (0.1 to 1.3 for reformulated gasoline)
Ethyl benzene (100-41-4)	< 3

n-Hexane (110-54-3)	0.5 to 4
Methyl-tertiary butyl ether (MTBE) (1634-04-4)	0 to 15.0
Toluene (108-88-3)	1 to 15
1,2,4- Trimethylbenzene (95-63-6)	< 6
Xylene, mixed isomers (1330-20-7)	1 to 15

US EPA guidance documents (www.epa.gov/tri) for reporting Persistent Bioaccumulating Toxics (PBTs) indicate this product may contain the following deminimis levels of toxic chemicals subject to Section 313 reporting:

INGREDIENT NAME (CAS NUMBER)	CONCENTRATION - Parts per million (ppm) by weight
Polycyclic aromatic compounds (PACs)	17
Benzo (g,h,i) perylene (191-24-2)	2.55
Lead (7439-92-1)	0.079

CALIFORNIA PROPOSITION 65 LIST OF CHEMICALS

This product contains the following chemicals that are included on the Proposition 65 "List of Chemicals" required by the California Safe Drinking Water and Toxic Enforcement Act of 1986:

INGREDIENT NAME (CAS NUMBER)	Date Listed
Benzene	2/27/1987
Ethyl benzene	6/11/2004
Toluene	1/1/1991

CANADIAN REGULATORY INFORMATION (WHMIS)

Class B, Division 2 (Flammable Liquid)
Class D, Division 2A (Very toxic by other means) and Class D, Division 2B (Toxic by other means)

16. OTHER INFORMATION

NFPA® HAZARD RATING	HEALTH:	1	Slight
	FIRE:	3	Serious
	REACTIVITY:	0	Minimal
HMIS® HAZARD RATING	HEALTH:	1 *	Slight
	FIRE:	3	Serious
	PHYSICAL:	0	Minimal
			* CHRONIC

SUPERSEDES MSDS DATED: 07/01/06

ABBREVIATIONS:

AP = Approximately	< = Less than	> = Greater than
N/A = Not Applicable	N/D = Not Determined	ppm = parts per million

ACRONYMS:

ACGIH	American Conference of Governmental Industrial Hygienists	CERCLA	Comprehensive Emergency Response, Compensation, and Liability Act
AIHA	American Industrial Hygiene Association	DOT	U.S. Department of Transportation [General Info: (800)467-4922]
ANSI	American National Standards Institute (212)642-4900	EPA	U.S. Environmental Protection Agency
API	American Petroleum Institute (202)682-8000	HMIS	Hazardous Materials Information System

IARC	International Agency For Research On Cancer	REL	Recommended Exposure Limit (NIOSH)
MSHA	Mine Safety and Health Administration	SARA	Superfund Amendments and Reauthorization Act of 1986 Title III
NFPA	National Fire Protection Association (617)770-3000	SCBA	Self-Contained Breathing Apparatus
NIOSH	National Institute of Occupational Safety and Health	SPCC	Spill Prevention, Control, and Countermeasures
NOIC	Notice of Intended Change (proposed change to ACGIH TLV)	STEL	Short-Term Exposure Limit (generally 15 minutes)
NTP	National Toxicology Program	TLV	Threshold Limit Value (ACGIH)
OPA	Oil Pollution Act of 1990	TSCA	Toxic Substances Control Act
OSHA	U.S. Occupational Safety & Health Administration	TWA	Time Weighted Average (8 hr.)
PEL	Permissible Exposure Limit (OSHA)	WEEL	Workplace Environmental Exposure Level (AIHA)
RCRA	Resource Conservation and Recovery Act	WHMIS	Workplace Hazardous Materials Information System (Canada)

DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES

Information presented herein has been compiled from sources considered to be dependable, and is accurate and reliable to the best of our knowledge and belief, but is not guaranteed to be so. Since conditions of use are beyond our control, we make no warranties, expressed or implied, except those that may be contained in our written contract of sale or acknowledgment.

Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, vendor assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material, even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in their use of the material.

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **HOLEPLUG® 3/8**

Revision Date: 06-Jan-2005

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: HOLEPLUG® 3/8
Synonyms: None
Chemical Family: Mineral
Application: Fluid Loss Additive

Manufacturer/Supplier
Baroid Drilling Fluids
a Product Service Line of Halliburton Energy Services, Inc.
P.O. Box 1675
Houston, TX 77251
Telephone: (281) 871-4000
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Crystalline silica, cristobalite	14464-46-1	0 - 1%	0.05 mg/m^3	1/2 x $\frac{10 \text{ mg/m}^3}{\%SiO2 + 2}$
Crystalline silica, tridymite	15468-32-3	0 - 1%	0.05 mg/m^3	1/2 x $\frac{10 \text{ mg/m}^3}{\%SiO2 + 2}$
Crystalline silica, quartz	14808-60-7	0 - 5%	0.05 mg/m^3	$\frac{10 \text{ mg/m}^3}{\%SiO2 + 2}$
Bentonite	1302-78-9	60 - 100%	Not applicable	Not applicable

More restrictive exposure limits may be enforced by some states, agencies, or other authorities.

3. HAZARDS IDENTIFICATION

Hazard Overview

CAUTION! - ACUTE HEALTH HAZARD
May cause eye and respiratory irritation.

DANGER! - CHRONIC HEALTH HAZARD
Breathing crystalline silica can cause lung disease, including silicosis and lung cancer. Crystalline silica has also been associated with scleroderma and kidney disease.

This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposures below recommended exposure limits. Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product. Review the Material Safety Data Sheet (MSDS) for this product, which has been provided to your employer.

4. FIRST AID MEASURES

Inhalation If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

Skin Wash with soap and water. Get medical attention if irritation persists.

Eyes In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

Ingestion Under normal conditions, first aid procedures are not required.

Notes to Physician Treat symptomatically.

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media All standard firefighting media.

Special Exposure Hazards Not applicable.

Special Protective Equipment for Fire-Fighters Not applicable.

NFPA Ratings: Health 0, Flammability 0, Reactivity 0
HMIS Ratings: Flammability 0, Reactivity 0, Health 0*

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures Use appropriate protective equipment. Avoid creating and breathing dust.

Environmental Precautionary Measures None known.

Procedure for Cleaning / Absorption Collect using dustless method and hold for appropriate disposal. Consider possible toxic or fire hazards associated with contaminating substances and use appropriate methods for collection, storage and disposal.

7. HANDLING AND STORAGE

Handling Precautions This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposure below recommended exposure limits. Wear a NIOSH certified, European Standard En 149, or equivalent respirator when using this product. Material is slippery when wet.

Storage Information Use good housekeeping in storage and work areas to prevent accumulation of dust. Close container when not in use. Do not reuse empty container. Product has a shelf life of 12 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls Use approved industrial ventilation and local exhaust as required to maintain exposures below applicable exposure limits listed in Section 2.

Respiratory Protection Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product.

Hand Protection Normal work gloves.

Skin Protection Wear clothing appropriate for the work environment. Dusty clothing should be laundered before reuse. Use precautionary measures to avoid creating dust when removing or laundering clothing.

Eye Protection Wear safety glasses or goggles to protect against exposure.

Other Precautions None known.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid
Color:	Various
Odor:	Odorless
pH:	7.5
Specific Gravity @ 20 C (Water=1):	2.12
Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	51
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Insoluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data: Stable

Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	Hydrofluoric acid.
Hazardous Decomposition Products	Amorphous silica may transform at elevated temperatures to tridymite (870 C) or cristobalite (1470 C).
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	Inhaled crystalline silica in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (IARC, Group 1). There is sufficient evidence in experimental animals for the carcinogenicity of tridymite (IARC, Group 2A). Breathing silica dust may cause irritation of the nose, throat, and respiratory passages. Breathing silica dust may not cause noticeable injury or illness even though permanent lung damage may be occurring. Inhalation of dust may also have serious chronic health effects (See "Chronic Effects/Carcinogenicity" subsection below).
Skin Contact	May cause mechanical skin irritation.
Eye Contact	May cause eye irritation.
Ingestion	None known
Aggravated Medical Conditions	Individuals with respiratory disease, including but not limited to asthma and bronchitis, or subject to eye irritation, should not be exposed to quartz dust.
Chronic Effects/Carcinogenicity	Silicosis: Excessive inhalation of respirable crystalline silica dust may cause a progressive, disabling, and sometimes-fatal lung disease called silicosis. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness, and reduced pulmonary function. This disease is exacerbated by smoking. Individuals with silicosis are predisposed to develop tuberculosis. Cancer Status: The International Agency for Research on Cancer (IARC) has determined that crystalline silica inhaled in the form of quartz or cristobalite from occupational sources can cause lung cancer in humans (Group 1 - carcinogenic to humans) and has determined that there is sufficient evidence in experimental animals for the carcinogenicity of tridymite (Group 2A - possible carcinogen to humans). Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997) in conjunction with the use of these minerals. The National Toxicology Program classifies respirable crystalline silica as "Known to be a human carcinogen". Refer to the 9th Report on Carcinogens (2000). The American Conference of Governmental Industrial Hygienists (ACGIH) classifies crystalline silica, quartz, as a suspected human carcinogen (A2). There is some evidence that breathing respirable crystalline silica or the disease silicosis is associated with an increased incidence of significant disease endpoints such as scleroderma (an immune system disorder manifested by scarring of the lungs, skin, and other internal organs) and kidney disease.

Other Information For further information consult "Adverse Effects of Crystalline Silica Exposure" published by the American Thoracic Society Medical Section of the American Lung Association, American Journal of Respiratory and Critical Care Medicine, Volume 155, pages 761-768 (1997).

Toxicity Tests

Oral Toxicity: Not determined

Dermal Toxicity: Not determined

Inhalation Toxicity: Not determined

Primary Irritation Effect: Not determined

Carcinogenicity Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997).

Genotoxicity: Not determined

Reproductive / Developmental Toxicity: Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air) Not determined

Persistence/Degradability Not determined

Bio-accumulation Not Determined

Ecotoxicological Information

Acute Fish Toxicity: Not determined
Acute Crustaceans Toxicity: Not determined
Acute Algae Toxicity: Not determined

Chemical Fate Information Not determined

Other Information Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method Bury in a licensed landfill according to federal, state, and local regulations.

Contaminated Packaging Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG
Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard Chronic Health Hazard
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity For This Product	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	The California Proposition 65 regulations apply to this product.
MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	D2A Very Toxic Materials Crystalline silica

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.

Disclaimer Statement

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

U.S. SILICA COMPANY

Material Safety Data Sheet

Product Name: Silica Sand and Ground Silica
Product Description: Crystalline Silica

1. Identification of the substance/preparation and of the company/undertaking

1.1. Identification of the substance or preparation

Product Name/Trade Names:
Sand and Ground Silica Sand (sold under various names: ASTM TESTING SANDS • GLASS SAND • FILPRO® · FLINT SILICA • DM-SERIES • F-SERIES • FOUNDRY SANDS • FJ-SERIES H-SERIES • L-SERIES • N-SERIES • NJ SERIES • OK-SERIES • P-SERIES • T-SERIES • hydraulic fracturing sand, all sizes • frac sand, all sizes • MIN-U-SIL® Fine Ground Silica • MYSTIC WHITE® • #1 DRY • #1 SPECIAL • PENN SAND® • PRO WHITE® · SILURIAN® · Q-ROK® • SIL-CO-SIL® Ground Silica • MICROSIL® • SUPERSIL® • MASON SAND • GS SERIES • PER-SPEC • proppant, all sizes • SHALE FRAC® - SERIES • KOSSE WHITE® • OTTAWA WHITE® • OPTIJUMP®.

Chemical Name or Synonym:
Crystalline Silica (Quartz), Sand, Silica Sand, Flint, Ground Silica, Silica Flour.
White or tan sand or ground silica with no odor.

1.2. Use of the Substance/Preparation

Main Applications (non-exhaustive list): brick, ceramics, foundry castings, glass, grout, hydraulic fracturing sand, frac sand, proppant, mortar, paint and coatings, silicate chemistry, silicone rubber, thermoset plastics.

DO NOT USE U.S. SILICA COMPANY SAND OR GROUND SILICA FOR SAND BLASTING.

1.3. Company / Producer

U.S. Silica Company
8490 Progress Drive, Suite 300
Frederick, MD 21701
U.S.A.

Phone: 800-243-7500
Emergency Phone: 301-682-0600
Fax: 301-682-0690

2. Hazards Identification

2.1. EMERGENCY OVERVIEW:

The material is white or tan sand, or ground sand; the ground sand looks like white powder. It has no odor and is not flammable, combustible or explosive. It does not cause burns or severe skin or eye irritation. A single exposure will not result in serious adverse health effects. Crystalline silica is not known to be an environmental hazard.

Personal protective equipment – respirator -- is not required unless the concentration of respirable silica dust exceeds applicable occupational exposure levels.

Crystalline silica (quartz) is incompatible with hydrofluoric acid, fluorine, chlorine trifluoride or oxygen difluoride.

2.2. OSHA REGULATORY STATUS
This material is considered hazardous under the OSHA Hazard Communications Standard (29 CFR 1910.1200).

2.3. POTENTIAL HEALTH EFFECTS: The potential health effects are CHRONIC; the route of exposure is INHALATION; the hazards described are associated with respirable crystalline silica dust – respirable dust particles are less than 10 microns in aerodynamic diameter.
.

2.3.1. Inhalation:
a. Silicosis: The prolonged repeated inhalation of respirable crystalline silica can cause silicosis, a fibrosis (scarring) of the lungs.

Silicosis may be progressive; it may lead to disability and death.

b. Lung Cancer: Crystalline silica is classified as carcinogenic to humans.

c. Tuberculosis: Silicosis increases the risk of tuberculosis.

d. Autoimmune and Chronic Kidney Diseases: Some studies show excess numbers of cases of scleroderma, connective tissue disorders, lupus, rheumatoid arthritis, chronic kidney diseases and end-stage kidney disease in workers exposed to respirable crystalline silica.

e. Non-Malignant Respiratory Diseases (other than silicosis): Some studies show an increased incidence in chronic bronchitis and emphysema in workers exposed to respirable crystalline silica.

2.3.2. Eye Contact:
Crystalline silica (sand or ground silica) may cause abrasion of the cornea.

2.3.3. Skin Contact:
Not applicable.

2.3.4. Ingestion:
Not applicable.

2.3.5. Chronic Effects:
The adverse health effects -- silicosis, lung cancer, autoimmune and chronic kidney diseases, tuberculosis, and non-malignant respiratory diseases -- are chronic effects.

2.3.6. Signs and Symptoms of Exposure:
Generally, there are no signs or symptoms of exposure to crystalline silica; silicosis may result in shortness of breath, especially upon exertion. See Section 11 for additional information.

2.3.7. Medical Conditions Generally Aggravated by Exposure:
The condition of individuals with lung disease (e.g., bronchitis, emphysema, chronic obstructive pulmonary disease) can be aggravated by exposure.

2.3.8 **Potential Environmental Effects**
None known.

See Section 11, Toxicological Information, for additional detail on potential adverse health effects.

3. Composition / Information on Ingredients

Component / CAS #		%	Hazardous under OSHA Haz Comm Standard?
Crystalline Silica (quartz)	14808-60-7	99.0 – 99.9	Yes
Aluminum Oxide	1344-28-1	<1.0	No
Iron Oxide	1309-37-1	<0.1	No
Titanium Oxide	13463-67-7	<0.1	No

4. First Aid Measures

4.1. Eye Exposure:
Wash immediately with plenty of water. If irritation persists, seek medical attention.

4.2. Skin Exposure:
Not applicable

4.3. Inhalation:
No specific first-aid is necessary since the adverse health effects associated with inhalation of respirable crystalline silica result from chronic exposures. If there is a gross inhalation of crystalline silica, remove the person immediately to fresh air, give artificial respiration as needed, seek medical attention as needed.

4.4. Ingestion:
Not applicable

5. Fire Fighting Measures

5.1. Fire Hazard Data:

Auto ignition: Not Applicable

Flash Point: Not Applicable

Flammability Limits (vol/vol%): **Lower:** Not Applicable **Upper:** Not Applicable

Extinguishing Media:
Product is not flammable, combustible or explosive. Use extinguishing media appropriate for surrounding fire.

Special Fire Fighting Procedures:
Not applicable.

Unusual Fire and Explosion Hazards:
None

6. Accidental Release Measures

6.1. Personal precautions:

Avoid generating dust. If the concentration of respirable silica dust exceeds the OSHA PEL or other applicable limit (if lower than the PEL), wear respirator specified in Section 8 of this Safety Data Sheet.

Environmental precautions: No specific precautions. Discard any product, residue, disposable container or liner in compliance with regulatory requirements.

Methods for cleaning up: Avoid dry sweeping. Do not use compressed air to clean spilled sand or ground silica. Use water spraying/flushing or ventilated or HEPA filtered vacuum cleaning system. Dispose of in closed containers.

7. Handling and Storage

7.1. Handling:

Avoid generating dust. Do not breathe dust. Do not rely on your sight to determine if dust is in the air. Respirable crystalline silica dust may be in the air without a visible dust cloud.

Use adequate exhaust ventilation and dust collection. Maintain and test ventilation and dust collection equipment. Use all available work practices to control dust exposures, such as water sprays. Practice good housekeeping. Do not permit dust to collect on walls, floors, sills, ledges, machinery, or equipment. Keep airborne dust concentrations below permissible exposure limits.

Where necessary to reduce exposures below the PEL or other applicable limit (if lower than the PEL), wear a respirator approved for silica containing dust when using, handling, storing or disposing of this product or bag. See Section 8, for further information on respirators.. Do not alter the respirator. Do not wear a tight-fitting respirator with facial hair such as a beard or mustache that prevents a good face to face piece seal between the respirator and face. Maintain, clean, and fit test respirators in accordance with applicable standards. Wash or vacuum clothing that has become dusty.

Participate in training, exposure monitoring, and health surveillance programs to monitor any potential adverse health effects that may be caused by breathing respirable crystalline silica.

The OSHA Hazard Communication Standard, 29 CFR Sections 1910.1200, 1915.1200, 1917.28, 1918.90, 1926.59 and 1928.21, and state and local worker or community "right-to-know" laws and regulations should be strictly followed.

DO NOT USE U.S. SILICA COMPANY SAND OR GROUND SILICA FOR SAND BLASTING.

7.2. Storage

Use dust collection to trap dust produced during loading and unloading. Keep containers closed and store bags to avoid accidental tearing, breaking, or bursting.

7.3. Specific uses

Apply safe handling recommendations in Section 7.1.

8. Exposure Controls / Personal Protection

8.1. Local Exhaust Ventilation:
Use sufficient local exhaust ventilation to reduce the level of respirable crystalline silica to below the OSHA PEL or other applicable limit (if lower than PEL). See ACGIH "Industrial Ventilation, A Manual of Recommended Practice" (latest edition).

8.2. Respiratory Protection:
If it is not possible to reduce airborne exposure levels to below the OSHA PEL or other applicable limit with ventilation, use the table below to assist you in selecting respirators that will reduce personal exposures to below the OSHA PEL. This table is part of the NIOSH Respirator Selection Logic, 2004, Chapter III, Table 1, "Particulate Respirators". The full document can be found at www.cdc.gov/niosh/npptl/topics/respirators; the user of this MSDS is directed to that site for information concerning respirator selection and use. The assigned protection factor (APF) is the minimum anticipated level of protection provided by each type of respirator worn in accordance with an adequate respiratory protection program. For example, an APF of 10 means that the respirator should reduce the airborne concentration of a particulate by a factor of 10, so that if the workplace concentration of a particulate was 150 ug/m^3, then a respirator with an APF of 10 should reduce the concentration of particulate to 15 ug/m^3.

Assigned protection factor [1]	Type of Respirator (Use only NIOSH-certified respirators)
10	Any air-purifying elastomeric half-mask respirator equipped with appropriate type of particulate filter. [2] Appropriate filtering facepiece respirator. [2,3] Any air-purifying full facepiece respirator equipped with appropriate type of particulate filter. [2] Any negative pressure (demand) supplied-air respirator equipped with a half-mask.
25	Any powered air-purifying respirator equipped with a hood or helmet and a high efficiency (HEPA) filter. Any continuous flow supplied-air respirator equipped with a hood or helmet.
50	Any air-purifying full facepiece respirator equipped with N-100, R-100, or P-100 filter(s). Any powered air-purifying respirator equipped with a tight-fitting facepiece (half or full facepiece) and a high-efficiency filter. Any negative pressure (demand) supplied-air respirator equipped with a full facepiece. Any continuous flow supplied-air respirator equipped with a tight-fitting facepiece (half or full facepiece). Any negative pressure (demand) self-contained respirator equipped with a full facepiece.
1,000	Any pressure-demand supplied-air respirator equipped with a half-mask.

1. The protection offered by a given respirator is contingent upon (1) the respirator user adhering to complete program requirements (such as the ones required by OSHA in 29CFR1910.134), (2) the use of NIOSH-certified respirators in their approved configuration, and (3) individual fit testing to rule out those respirators that cannot achieve a good fit on individual workers.
2. Appropriate means that the filter medium will provide protection against the particulate in question.
3. An APF of 10 can only be achieved if the respirator is qualitatively or quantitatively fit tested on individual workers.

8.3. Exposure controls

8.3.1. Occupational exposure controls / guidelines

Component	CAS No.	OSHA PEL		ACGHI TLV		NISOSH REL		
		TWA	STEL	TWA	STEL	TWA	STEL	Unit
Crystalline Silica (quartz)	14808-60-7	$\frac{10}{\%\ SiO_2 + 2}$	None	0.025	None	0.05	None	mg / m^3

If crystalline silica (quartz) is heated to more than 870°C, quartz can change to a form of crystalline silica known as tridymite; if crystalline silica (quartz) is heated to more than1470°C, quartz can change to a form of crystalline silica known as cristobalite. It OSHA PEL for crystalline silica as tridymite or cristobalite is one-half of the OSHA PEL for crystalline silica (quartz).

Engineering Controls:
Ventilation must be adequate to maintain the crystalline silica concentrations in the workplace air below the exposure limit(s) outlined in Section 8.3.1 of this Safety Data Sheet.

Respiratory Protection
In case of exposure to dust, and in any case if such exposure is above regulatory limits (see above), wear a personal respirator as outlined in Section 8.2 above.

Eye / Face Protection:
If eye contact while using product may be anticipated, wear appropriate safety glasses with side shields or chemical goggles [as described by European Standard EN 166].

Skin Protection
Maintain good industrial hygiene. Protection recommended for workers suffering from dermatitis or sensitive skin.

8.3.2. Environmental Exposure Controls

No special requirements. There is no reported ecotoxicity for silica, a naturally occurring substance abundantly present in nature.

9. Physical and Chemical Properties

9.1. General Information

Physical State:	White or tan sand: granular, crushed or ground to a powder.
Odor:	None

9.2. Important Health, Safety and Environmental Information

pH:	6 - 8
Specific Gravity:	2.65 g/cc
Melting Point:	3110°F/1710°C
Freezing Point	Not Applicable
Boiling Point:	4046°F/2230°C
Flashpoint:	Not Applicable
Flammability:	Not Applicable
Explosive properties:	Not Applicable
Oxidizing properties:	contact with powerful oxidizing agents such as fluorine, chlorine trifluoride, and oxygen difluoride may cause fires.
Vapor Pressure:	None
Relative Density:	Not Applicable
Solubility*:*	Silica will dissolve in hydrofluoric acid and produce a corrosive gas, silicon tetrafluoride
Water Solubility:	Insoluble
Percent Volatiles by Volume:	Not Applicable
Viscosity:	Not Applicable

Vapor density:	Not Applicable
Molecular Weight:	60.08
Evaporation rate:	Not Applicable

10. Stability and Reactivity

10.1. Chemical Stability:
Stable

10.2. Conditions to Avoid:
Contact with powerful oxidizing agents such as fluorine, chlorine trifluoride, and oxygen difluoride may cause fires.

10.3. Materials / Chemicals to Be Avoided:
Contact with powerful oxidizing agents, such as fluorine, chlorine trifluoride and oxygen difluoride, may cause fires.

10.4. Hazardous Decomposition Products:
Will not occur.

10.5. Hazardous Polymerization:
Will not occur.

11. Toxicological Information

The method of exposure that can lead to the adverse health effects described below is inhalation.

A. SILICOSIS

The major concern is silicosis, caused by the inhalation of respirable crystalline silica dust. Silicosis can exist in several forms, chronic (or ordinary), accelerated, or acute.

Chronic or Ordinary Silicosis is the most common form of silicosis, and can occur after many years (15 to 20 or more) of prolonged repeated inhalation of relatively low levels of airborne respirable crystalline silica dust. It is further defined as either simple or complicated silicosis. Simple silicosis is characterized by lung lesions (shown as radiographic opacities) less than 1 centimeter in diameter, primarily in the upper lung zones. Often, simple silicosis is not associated with symptoms, detectable changes in lung function or disability. Simple silicosis may be progressive and may develop into complicated silicosis or progressive massive fibrosis (PMF). Complicated silicosis or PMF is characterized by lung lesions (shown as radiographic opacities) greater than 1 centimeter in diameter. Although there may be no symptoms associated with complicated silicosis or PMF, the symptoms, if present, are shortness of breath and cough. Complicated silicosis or PMF may be associated with decreased lung function and may be disabling. Advanced complicated silicosis or PMF may lead to death. Advanced complicated silicosis or PMF can result in heart disease secondary to the lung disease (cor pumonale).

Accelerated Silicosis can occur with prolonged repeated inhalation of high concentrations of respirable crystalline silica over a relatively short period; the lung lesions can appear within five (5) years of initial exposure. Progression can be rapid. Accelerated silicosis is similar to chronic or ordinary silicosis, except that lung lesions appear earlier and progression is more rapid.

Acute Silicosis can occur after the repeated inhalation of very high concentrations of respirable crystalline silica over a short time period, sometimes as short as a few months. The symptoms of acute silicosis include progressive shortness of breath, fever, cough, weakness and weight loss. Acute silicosis is fatal.

B. CANCER

IARC - The International Agency for Research on Cancer ("IARC") concluded that "crystalline silica in the form of quartz or cristobalite dust is carcinogenic to humans (Group 1)". For further information on the IARC evaluation, see IARC Monographs on the Evaluation of Carcinogenic Risks to Humans, Volume 100C,"A Review of Human Carcinogens: Arsenic, Metals, Fibres and Dusts " (2011).

The American College of Occupational and Environmental Medicine ("ACOEM") notes: "In 1996, [IARC] re-classified silica as a Class I human lung carcinogen, based on sufficient animal and human data. Although the degree of increased risk varies (with relative risks ranging from 1.3 to 6.9), the risk appears to be greatest in workers with silicosis who smoke. The cancer risk to silica-exposed workers without silicosis (especially if they are not smokers) is less clear despite continuing research, some of which has yielded disparate results." ACOEM, "Medical Surveillance of Workers Exposed to Crystalline Silica", June 2005.

The EU Scientific Committee for Occupational Exposure Limits (SCOEL) concluded in June 2002 (SCOEL Sum Doc. 94-final): "The main effect in humans of inhalation of respirable silica dust is silicosis. There is sufficient information to conclude that the relative risk of lung cancer is increased in persons with silicosis (and apparently, not in employees without silicosis exposed to silica dust in quarries and in the ceramic industry). Therefore preventing the onset of silicosis will also reduce the cancer risk."

C. AUTOIMMUNE DISEASES

Several studies have reported excess cases of several autoimmune disorders, -- scleroderma, systemic lupus erythematosus, rheumatoid arthritis -- among silica-exposed workers.).

D. TUBERCULOSIS

Individuals with silicosis are at increased risk to develop pulmonary tuberculosis, if exposed to tuberculosis bacteria. Individuals with chronic silicosis have a three-fold higher risk of contracting tuberculosis than similar individuals without silicosis.

E. KIDNEY DISEASE

Several studies have reported excess cases of kidney diseases, including end stage renal disease, among silica-exposed workers. For additional information on the subject, the following may be consulted: "Kidney Disease and Silicosis", Nephron, Volume 85, pp. 14-19 (2000).

F. NON-MALIGNANT RESPIRATORY DISEASES

The reader is referred to Section 3.5 of the NIOSH Special Hazard Review cited below, for information concerning the association between exposure to crystalline silica and chronic bronchitis, emphysema and small airways disease. There are studies that disclose an association between dusts found in various mining occupations and non-malignant respiratory diseases, particularly among smokers. It is unclear whether the observed associations exist only with underlying silicosis, only among smokers, or result from exposure to mineral dusts generally (independent of the presence or absence of crystalline silica, or the level of crystalline silica in the dust).

Sources of information:

The ***NIOSH Hazard Review - Occupational Effects of Occupational Exposure to Respirable Crystalline Silica*** published in April 2002 summarizes and discusses the medical and epidemiological literature on the health risks and diseases associated with occupational exposures to respirable crystalline silica. The *NIOSH Hazard Review* should be consulted for additional information, and citations to published studies on health risks and diseases associated with occupational exposure to respirable crystalline silica. The *NIOSH Hazard Review* is available from NIOSH - Publications Dissemination, 4676 Columbia Parkway, Cincinnati, OH 45226, or through the NIOSH web site, www.cdc.gov/niosh/topics/silica, then click on the link "NIOSH Hazard Review: Health Effects of Occupational Exposure to Respirable Crystalline Silica".

For a more recent review of the health effects of respirable crystalline silica, the reader may consult *Fishman's Pulmonary Diseases and Disorders*, Fourth Edition, Chapter 57. "Coal Workers' Lung Diseases and Silicosis".

12. Ecological Information

12.1. Ecotoxicological Information:
Crystalline silica (quartz) is not known to be ecotoxic; i.e., no data suggests that crystalline silica (quartz) is toxic to birds, fish, invertebrates, microorganisms or plants.

13. Disposal Considerations

13.1. Waste Disposal Method:
Discard any product, residue, disposable container or liner in full compliance with national regulations.

13.2. Container Handling and Disposal:
Dispose of container and unused contents in accordance with national regulations.

14. Transportation Information

Shipping Name:

ADR/RID/IMO/ICAO /US DOT	**Proper Shipping Name**	Not Regulated
	Hazard Class	Not Regulated
	ID Number	Not Regulated
	Packaging Group	Not Regulated

Crystalline silica (quartz) is not a hazardous material for purposes of transportation under the U. S. Department of Transportation Table of Hazardous Materials, 49 CFR §172.101.

15. Regulatory Information

Silica sand has no harmonized classification & labeling under Directives 67/548/EEC and 1999/45/EC. Because the respirable fraction is high (10% and more) in ground silica (flour), the preparation is self-classified as Xn (harmful). In such case, the following risk and safety phrases are applicable.

Risk Phrases:
R 48/20: Harmful: danger of serious damage to health by prolonged exposure through inhalation.
Safety Phrases:
S 22: Do not breathe dust.
S 38: In case of insufficient ventilation, wear suitable respiratory equipment.

UNITED STATES (FEDERAL AND STATE)

TSCA No.: Crystalline silica (quartz) appears on the EPA TSCA inventory under the CAS No. 14808-60-7.

RCRA: Crystalline silica (quartz) is not classified as a hazardous waste under the Resource Conservation and Recovery Act, or its regulations, 40 CFR §261 et seq.

CERCLA: Crystalline silica (quartz) is not classified as a hazardous substance under regulations of the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), 40 CFR §302.

Emergency Planning and Community Right to Know Act (SARA Title III): Crystalline silica (quartz) is not an extremely hazardous substance under Section 302 and is not a toxic chemical subject to the requirements of Section 313.

Clean Air Act: Crystalline silica (quartz) mined and processed by U.S. Silica Company is not processed with or does not contain any Class I or Class II ozone depleting substances.

FDA: Silica is included in the list of substances that may be included in coatings used in food contact surfaces, 21 CFR §175.300(b)(3)(xxvi).

NTP: Silica, crystalline (respirable size) is classified as Known to be a Human Carcinogen.

OSHA Carcinogen: Crystalline silica (quartz) is not listed.

California Proposition 65: Crystalline silica (airborne particles of respirable size) is classified as a substance known to the State of California to be a carcinogen.

California Inhalation Reference Exposure Level (REL): California established a chronic REL of 3 µg for silica (crystalline, respirable). A chronic REL is an airborne level of a substance at or below which no adverse health effects are anticipated in individuals indefinitely exposed to the substance at that level.

Massachusetts Toxic Use Reduction Act: Silica, crystalline (respirable size, <10 microns) is “toxic” for purposes of the Massachusetts Toxic Use Reduction Act.

Pennsylvania Worker and Community Right to Know Act: Quartz is a hazardous substance under the Act, but it is not a special hazardous substance or an environmental hazardous substance.

CANADA

Domestic Substances List: U. S. Silica Company products, as naturally occurring substances, are on the Canadian DSL.

WHMIS Classification: D2A

OTHER

EINECS No.: 238-878-4

EEC Label (Risk/Safety Phrases): R 48/20, S22, S38

CLP Label (Hazard Class/Hazard Statement/Precaution Statements):
STOT RE 1/ H372/ P260, P285, P501

IARC: Crystalline silica (quartz) is classified in IARC Group 1.

Australian Inventory of Chemical Substances (AICS): All of the components of this product are listed on the AICS inventory or exempt from notification requirements.

Japan Ministry of International Trade and Industry (MITI): All of the components of this product are existing chemical substances as defined in the Chemical Substance Control Law Registry Number 1-548.

Korea Existing Chemicals Inventory (KECI) (set up under the Toxic Chemical Control Law): Listed on the ECL with registry number 9212-5667.

Philippines Inventory of Chemicals and Chemical Substances (PICCS): Listed for PICCS.

National, state, provincial or local emergency planning, community right-to-know or other laws, regulations or ordinances may be applicable--consult applicable national, state, provincial or local laws.

16. Other Information

16.1 Hazardous Material Information System (HMIS):

Health	*
Flammability	0
Reactivity	0
Protective Equipment	E

* For further information on health effects, see Sections 2, 8 and 11 of this MSDS.

16.2 National Fire Protection Association (NFPA):

Health	0
Flammability	0
Reactivity	0

16.3 Web Sites with Information about Effects of Crystalline Silica Exposure:

The U. S. Silica Company web site will provide updated links to OSHA and NIOSH web sites addressing crystalline silica issues: www.ussilica.com, click on “Info Center”, then click on “Health & Safety”.

The U.S. National Institute for Occupational Safety and Health (NIOSH) and Occupational Safety and Health Administration (OSHA) maintain sites with information about crystalline silica and its potential health effects. For NIOSH, http://www.cdc.gov/niosh/topics/silica; for OSHA, http://www.osha.gov/dsg/topics/silicacrystalline/index.

The IARC Monograph concerning crystalline silica, Volume 100C, can be accessed in PDF form at the IARC web site, http://monographs.iarc.fr/ENG/Monographs/PDFs/index.php.

U. S. Silica Company Disclaimer

The information and recommendations contained herein are based upon data believed to be up-to-date and correct. However, no guarantee or warranty of any kind, express or implied, is made with respect to the information contained herein. We accept no responsibility and disclaim all liability for any harmful effects that may be caused by purchase, resale, use or exposure to our silica. Customers and users of silica must comply with all applicable health and safety laws, regulations, and orders. In particular, they are under an obligation to carry out a risk assessment for the particular work places and to take adequate risk management measures in accordance with the national implementation legislation of EU Directives 89/391 and 98/24.

Date: March 2012

LIQUINOX MSDS

Section 1 : MANUFACTURER INFORMATION

Supplier: Same as manufacturer.

Manufacturer: Alconox, Inc.
30 Glenn St.
Suite 309
White Plains, NY 10603.

Manufacturer emergency phone number: 800-255-3924.
813-248-0585 (outside of the United States).

Manufacturer: Alconox, Inc.
30 Glenn St.
Suite 309
White Plains, NY 10603.

Supplier MSDS date: 2005/02/24

D.O.T. Classification: Not regulated.

Section 2 : HAZARDOUS INGREDIENTS

C.A.S.	CONCENTRATION %	Ingredient Name	T.L.V.	LD/50	LC/50
25155-30-0	10-30	SODIUM DODECYLBENZENESULFONATE	NOT AVAILABLE	438 MG/KG RAT ORAL 1330 MG/KG MOUSE ORAL	NOT AVAILABLE

Section 3 : PHYSICAL / CHEMICAL CHARACTERISTICS

Physical state: Liquid.

Appearance & odor: Odourless.
Pale yellow.

Odor threshold (ppm): Not available.

Vapour pressure (mmHg): @ 20°C (68°F).
17

Vapour density (air=1): >1

Volatiles (%)

By volume: Not available.

Evaporation rate (butyl acetate = 1): < 1.

Boiling point (°C):	100 (212F)
Freezing point (°C):	Not available.
pH:	8.5
Specific gravity @ 20 °C:	(water = 1). 1.083
Solubility in water (%):	Complete.
Coefficient of water\oil dist.:	Not available.
VOC:	None

Section 4 : FIRE AND EXPLOSION HAZARD DATA

Flammability:	Not flammable.
Conditions of flammability:	Surrounding fire.
Extinguishing media:	Carbon dioxide, dry chemical, foam. Water Water fog.
Special procedures:	Self-contained breathing apparatus required. Firefighters should wear the usual protective gear. Use water spray to cool fire exposed containers.
Auto-ignition temperature:	Not available.
Flash point (°C), method:	None
Lower flammability limit (% vol):	Not applicable.
Upper flammability limit (% vol):	Not applicable.

Not available.

Sensitivity to mechanical impact:	Not available.
Hazardous combustion products:	Oxides of carbon (COx). Hydrocarbons.
Rate of burning:	Not available.
Explosive power:	Containers may rupture if exposed to heat or fire.

Section 5 : REACTIVITY DATA

Chemical stability:	Product is stable under normal handling and storage conditions.
Conditions of instability:	Extreme temperatures.
Hazardous polymerization:	Will not occur.
Incompatible substances:	Strong acids. Strong oxidizing agents.
Hazardous decomposition products:	See hazardous combustion products.

Section 6 : HEALTH HAZARD DATA

Route of entry:	Skin contact, eye contact, inhalation and ingestion.
Effects of Acute Exposure	
Eye contact:	May cause irritation.
Skin contact:	Prolonged and repeated contact may cause irritation.
Inhalation:	May cause headache and nausea.
Ingestion:	May cause vomiting and diarrhea. May cause gastric distress.
Effects of chronic exposure:	See effects of acute exposure.
LD50 of product, species & route:	> 5000 mg/kg rat oral.
LC50 of product, species & route:	Not available.
Exposure limit of material:	Not available.
Sensitization to product:	Not available.
Carcinogenic effects:	Not listed as a carcinogen.
Reproductive effects:	Not available.
Teratogenicity:	Not available.
Mutagenicity:	Not available.
Synergistic materials:	Not available.
Medical conditions aggravated by exposure:	Not available.
First Aid	
Skin contact:	Remove contaminated clothing. Wash thoroughly with soap and water. Seek medical attention if irritation persists.
Eye contact:	Check for and remove contact lenses. Flush eyes with clear, running water for 15 minutes while holding eyelids open: if irritation persists, consult a physician.
Inhalation:	Remove victim to fresh air. If irritation persists, seek medical attention.
Ingestion:	Do not induce vomiting, seek medical attention. Dilute with two glasses of water. Never give anything by mouth to an unconscious person.

Section 7 : PRECAUTIONS FOR SAFE HANDLING AND USE

Leak / Spill:	Contain the spill. Prevent entry into drains, sewers, and other waterways. Wear appropriate protective equipment. Small amounts may be flushed to sewer with water. Soak up with an absorbent material. Place in appropriate container for disposal. Notify the appropriate authorities as required.
Waste disposal:	In accordance with local and federal regulations.
Handling procedures and equipment:	Protect against physical damage. Avoid breathing vapors/mists. Wear personal protective equipment appropriate to task.

Wash thoroughly after handling.
Keep out of reach of children.
Avoid contact with skin, eyes and clothing.
Avoid extreme temperatures.
Launder contaminated clothing prior to reuse.

Storage requirements: Store away from incompatible materials.
Keep containers closed when not in use.

Section 8 : CONTROL MEASURES

Precautionary Measures

Gloves / Type:

Wear appropriate gloves.

Respiratory / Type: None required under normal use.

Eye / Type:

Safety glasses recommended.

Footwear / Type: Safety shoes per local regulations.

Clothing / Type: As required to prevent skin contact.

Other / Type: Eye wash facility should be in close proximity.
Emergency shower should be in close proximity.

Ventilation requirements: Local exhaust at points of emission.

APPENDIX F

SCHEDULE

REMEDIAL ACTION WORK PLAN

SCHEDULE

Triple Cities Metal Finishing Corporation
Binghamton, New York
BCP Site C704045

	2015-2017																			
TASK	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**	**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**	**JAN**	**FEB**
Submittal of Remedial Action Work Plan	■																			
Pre-Remediation Sampling		■																		
Implementation of Remedial Action		■	■	■	■	■														
Post-Remediation Monitoring								■						■						■
Initiate EE, SMP, ER										■	■	■	■	■	■	■	■			