United States Environmental Protection Agency
Region 3

Sample Submission Procedures for the Office of Analytical Services and Quality Assurance (OASQA) Laboratory Branch

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Environmental Science Center
701 Mapes Road
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Sample Submission Procedures for OASQA Laboratory Branch	
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1.0 Introduction

This document specifies the procedures that are to be followed when submitting samples to the Office of Analytical Services and Quality Assurance (OASQA) Laboratory Branch located at Ft. Meade, Maryland. These procedures will help ensure that the field and laboratory aspects of the sampling event are linked in a way to produce reliable data of known quality.

2.0 Project Planning and Analytical Request Preparation and Scheduling

The Quality Assurance Project Plan (QAPP) and Sampling Analysis Plan (SAP) are documents that identify the purpose of a project along with the sampling and analytical requirements. **Approved plans** should be in place at least 2 weeks before project scheduling. For information, please contact a member of the Quality Assurance staff in OASQA's Technical Services Branch (TSB), listed below.

Mike Mahoney: 410-305-2631 (ph), 410-305-3095 (fax) mahoney.mike@epa.gov
Brandon McDonald: 410-305-2607 (ph), 410-305-3095 (fax) mcdonald.brandon@epa.gov
Jay Burman: 410-305-2743 (ph), 410-305-3095 (fax) burman.jarmael@epa.gov
Ed Messer: 410-305-2744 (ph), 410-305-3095 (fax) messer.ed@epa.gov

The Analytical Request Form (ARF) is a request for analytical work that is offered to the OASQA laboratory. All requests are scheduled through the OASQA Technical Services Branch using the contacts listed below.

John Kwedar: 410-305-3021 (ph), 410-305-3095 (fax) kwedar.john@epa.gov
Dan Slizys: 410-305-2734 (ph), 410-305-3095 (fax) slizys.dan@epa.gov

NOTE: Instructions on preparing and submitting Analytical Request Forms (ARF), accessing the paper versions of the Chain of Custody (COC) form, Sample tags, Custody Seals, and other documentation requirements are available by contacting the Technical Services Branch or at the following website:

http://www2.epa.gov/aboutepa/about-region-3s-laboratory-and-field-services-epas-environmental-science-center

3.0 Sampling

Proper collection, identification of samples, documentation of the collection event, and submittal of required paperwork are all essential parts of a successful sampling event. When samples are not properly collected, preserved, documented, or shipped, the quality of the data may be compromised. If this occurs, the requestor is notified and **(1)** given the opportunity to resample or **(2)** receives qualified data. Refer to the OASQA Sample Acceptance Policy. **(Appendix 10)**

NOTE: In some cases it may be possible for the laboratory to complete the analysis with some adjustments (i.e., if there is insufficient sample volume, the data may have to be reported with increased quantitation limits or the analyst may be asked to prioritize analyses).

3.1 Collection Types/Techniques

The two collection types/techniques, Grab and Composite, are normally used when collecting samples.

3.1.1 **Grab sample** - An individual sample collected over a period of time generally not exceeding 15 minutes. A grab sample is normally associated with water or wastewater sampling. However, liquid hazardous waste samples and non-aqueous samples (soil, solid, oil, and sediment) may also be considered grab samples.

3.1.2 **Composite sample** - A sample containing discrete aliquots **(1)** collected over a defined time period at equal time intervals (time composite), **(2)** collected in volumes proportional to the flow rate (flow proportional composite), or **(3)** composited from individual grab samples collected on an area or cross-sectional basis (area composite).

3.2 Sample Types

A sample is defined as a discrete portion of material to be analyzed that is contained in single or multiple containers, and identified by a unique sample number. A sample includes duplicates and QC samples.

3.2.1 **Duplicate sample** - It is a second aliquot of the same sample to determine the precision of the method, to check the accuracy and precision of analyses.

3.2.2 **QC sample** - An additional volume of an existing sample used to detect contamination or error.

i) **Matrix Spike (MS)** - It is an aliquot of a sample (water or soil) that is fortified (spiked) with known quantities of a specific compound and subjected to the entire analytical procedure.

ii) **Matrix Spike Duplicate (MSD)** - It is a second aliquot of the same matrix as the Matrix Spike (MS) that is spiked to determine the precision of the method.

3.3 Blanks

Blank samples are used to identify potential sources of contamination during sampling, shipping, storage and analysis. Blanks should be specified as part of every Quality Assurance Project Plan (QAPP) or Sampling Analysis Plan (SAP). It is highly recommended that field blanks accompany all sample sets. Each blank is assigned its own unique sample number. A blank includes trip blanks, rinse blanks, equipment blanks, etc.

NOTE: All water used for blanks must be deionized lab pure water, free of the parameter(s) of interest. The water may have to be tested prior to use. Commercially available HPLC water is not acceptable for most blank uses. HPLC water is not certified as “organic-free” and/or “metal-free”, and therefore, may contain compounds of interest. Blanks that are preserved must be prepared with the same stock and same volume of the preservative that was used with the samples.

3.3.1 **Sample Matrix ("Field") Blank** - The field blank is used to determine whether contamination has been introduced during sample collection, storage and shipment, as well as, sample handling in the analytical laboratory. Field blanks are prepared by transferring demonstrated analyte-free water to the appropriate sample containers during the time when site-specific samples are collected. These blanks are transported to the field and exposed to the same conditions as site-specific samples including removal of the container caps and addition of any appropriate preservatives. Field blanks should be collected whenever aqueous samples are collected and at a frequency of one per 20 samples. This sample should be analyzed for the same parameters as those associated with site-specific samples collected from potentially contaminated media.

3.3.2 **Trip Blank** - The trip blank is only used for Volatile Organic Compounds (VOCs) to determine whether contamination has been introduced to aqueous samples through cross-contamination during shipment and storage of sample containers. Trip blanks should be prepared, and include preservatives prior to the sampling event, and are not exposed to field conditions. They may be furnished by the analytical laboratory and will consist of certified analyte-free water provided in the appropriate container (i.e., 40 ml teflon-lined glass vial). Trip blanks should be collected at a frequency of

i) One per each cooler used to store/transport site-specific samples designated for VOC analyses, or

ii) One for each day that VOCs are collected.

NOTE: Trip Blanks are not required for VOCs in Air.

3.3.3 **Rinsate or Equipment Blank** - The rinsate blank is used to determine whether the sampling equipment decontamination procedure has been adequately performed, thereby assuring that no “carryover” contamination has been introduced before (or during) sample collection. Rinsate blanks are prepared in the field by pouring demonstrated analyte-free water through/over the sampling equipment (including filters) and collecting rinsate in the appropriate sample containers and adding appropriate preservatives. Rinsate blanks should be collected at a frequency of one per 20 samples per matrix per sampling equipment type (or one per day per matrix per equipment type). This sample should be analyzed for the same parameters as those associated with site-specific samples collected from potentially contaminated media.

NOTE: The sampler will provide both the sample containers and sample preservation when sampling. The Field Blank and the Rinsate Blank should both use the same lot of sample containers and preservatives that are used for the samples.

3.3.4 **Temperature Blank** - The temperature blank is used only to determine whether site-specific samples have been adequately cooled during shipment and storage. Temperature blanks can be prepared any time before or during field sampling activities by adding water to an appropriate sample container such as a VOA vial. Temperature blanks should be collected at a frequency of one per each cooler used to

store/transport site-specific samples. The temperature blank will be measured upon receipt by the analytical laboratory.

NOTE: The Temperature blank is not analyzed and it will not be combined with a sample that is intended to be analyzed.

3.4 Dissolved Analysis

Samples collected for analysis of dissolved components must be filtered in the field. A filtered Field Blank must also be collected for each new lot of filters. These are considered separate samples from the unfiltered aliquot, so a separate sample number will be needed on the Chain of Custody form.

3.5 Dechlorination

Only those samples which actually contain chlorine should be dechlorinated. Chlorine presence may be determined using a color wheel or Hach kit.

NOTE: If the sampling requirements (for preservation, sample containers, etc.) are exactly the same, then one sample can be taken for several parameters in a single container if the volume will accommodate all analysis **(Section 10.0 Pollution Prevention (P2) and Environmental Management System EMS)**. It is especially important to consolidate parameters when collecting solid samples because of the difficulty in disposing of the excess sample. Solids should be collected in a single 8 oz. container for either the organic or inorganic parameters. If a parameter cannot be combined with other parameters, it is noted in the table.

4.0 Holding Time

Samplers must be aware of the holding times for all analyses requested and ship samples to the OASQA laboratory as quickly as possible. Holding time is the elapsed time from the date/time of collection of the sample until the date/time of its analysis. This is not the date/time of receipt at the lab. To ensure that OASQA can meet the required holding time, it may be necessary to ship samples at the end of each collection day.

Data from sample(s) analyzed past the holding time(s) must be carefully examined by the data user. These values may be biased low due to possible loss of the parameter(s) of interest, and they will be flagged by the laboratory. **(Tables 1, 2, and 3)**

NOTE: Planning should be done so that samples are collected, shipped and analyzed within holding times. Sample shipments will not be accepted before or after normal business hours (07:30 - 16:30 Eastern), on weekends or Federal Holidays. This excludes Emergency sampling events.

5.0 OASQA Laboratory Sampling Requirements

Tables 1, 2, and 3 lists Parameter/Analyte, Analysis Technique, Collection Technique, Container Type, Temperature/Preservation, Holding Time(s), Minimum Volumes/Weights, Analytical Method(s), and Quantitation (QLs) for Aqueous and Non-Aqueous samples submitted to OASQA laboratory.

IMPORTANT: Critical information is provided in the **Tables 1, 2, and 3 Footnotes**. It is essential to comply with these requirements so that reliable data meets the needs of the project are produced. The listed QLs are optimum levels and may be raised due to matrix interferences and necessary dilutions.

6.0 Laboratory Quality Control Requirements

In addition to the minimum volumes or weights needed to perform a single analysis for each parameter listed in **Tables 1, 2, and 3** it is essential that the sampler collect enough sample to allow the laboratory to analyze samples for Quality Control (QC) purposes. For every 10 inorganic parameter samples or for every 20 organic parameter samples, a QC sample is required for each batch of samples. If there are more than 10 (inorganic) or 20 (organic) samples per batch, another QC sample should be collected for each group. **(Appendix 1)**

NOTE: It is extremely important that sufficient volume be collected for quality control analysis. Please do not collect any more volume than necessary; it is expensive to properly dispose of excess volume and is inefficient for both the sampler and laboratory. **(Section 10.0 Pollution Prevention (P2) and Environmental Management System EMS)**

7.0 Paperwork Requirements

The following documents must accompany the sample shipment for accurate identification and safety information. Each document must be legibly written with indelible (waterproof) ink. No erasures or white outs are allowed. Any writing errors made on a document must be corrected by a single line through the error, initialed, dated, and rewritten.

7.1 **Chain of Custody (COC)** - The COC is a legal document that must be complete, accurate, and show an unbroken trail of accountability that insures the physical security of sample(s), data, and records. A COC must accompany each sample shipment. The COC must be sealed in a water proof zip-locked bag and taped on the inside of the ice chest lid with the samples. The original COC record must accompany the shipment and a copy retained by the sampler. Each distinct sample must appear on a separate line. It is NOT necessary to have a separate line for each container (or each sample tag/label). A sample shipment without a COC may be rejected by the laboratory. **(Appendix 8)**

NOTE: Samples collected for dissolved constituents are considered distinct from the unfiltered aliquot and should be placed on a separate line.

Chain of Custody documentation must include:

a) Site name that is recorded on the Analytical Request Form (Project Name)
b) Analytical Request number (Project Number)
c) Sampler's name/signature
d) Sample ID (Station Number)
e) Date and Time of collection (recorded in 24 hour clock time)
f) Type of sample (grab or composite)
g) Sample description (Station Location)
h) Accurate number of containers
i) Parameters requested
j) Preservation of sample
k) Sample tag/label numbers
l) Sample remarks (i.e. filtered for dissolved components, or if it is a field duplicate)
m) Date, Time and Signatures for sample receipt and transfer

7.2 **Sample Tag** - Each sample must have a sample tag tied to the container or some type of adhesive label with identifying information. The information that is written on the sample label must match the information on the COC. **(Appendix 7)**

NOTE: Ensure each sample tag/label is secured to each container since they might loosen and fall off if the containers get cold or wet. For the safety of lab staff, indicate on each sample tag/label any preservative used for the samples.

7.3 **Exposure Data Sheet** - Each time samples are collected, the sampler must complete a Hazard and Risk Exposure Data Sheet. This information helps ensure the safety of the lab staff receiving the samples so that proper precautions are taken whenever potentially hazardous samples are encountered. This sheet is a vital part of the OASQA safety program and must be attached to the OUTSIDE of at least one shipping container so that it is available for review by the sample managers before opening any coolers or chests. **(Attachment 9)**

7.4 **Letter to File** - The Letter to File is an official document (hard copy with an original signature of the Remedial Project Manager (RPM) or the sampler, that provides corrective actions for incorrect, unclear, incomplete, or inconsistent information found with any of the sample documentation or problems were detected with the physical condition of the sample(s) upon arrival at the laboratory.

8.0 Shipping Requirements

Prior to shipment, samples collected during field investigations or in response to a hazardous materials incident must be classified as either environmental or hazardous materials samples. In general, environmental samples include drinking water, most groundwater and ambient surface water, soil, sediment, treated municipal and industrial wastewater effluent, biological specimens, or any samples not expected to be contaminated with high levels of hazardous materials.

Samplers are expected to be aware of all State, Federal, Department of Transportation (DOT), and International Air Transport Association (IATA) regulations governing environmental and

hazardous sample packaging. The sample shipping personnel is responsible for being in compliance with applicable packaging, labeling, and shipping requirements.

Samples collected from process wastewater streams, drums, bulk storage tanks, soil, sediment, or aqueous samples from areas suspected of being highly contaminated may require shipment as dangerous goods. Regulations for packing, marking, labeling, and shipping of dangerous goods by air transport are promulgated by the IATA, which is equivalent to United Nations International Civil Aviation Organization (UN/ICAO). Transportation of hazardous materials (dangerous goods) by EPA personnel is covered by EPA Order 1000. 18.

8.1 **Shipment of Dangerous Goods**

8.1.1 The project manager and/or sampler is responsible for determining if samples collected during a specific field investigation meet the definitions for dangerous goods. If a sample is collected of a material that is listed in the Dangerous Goods List (Section 4.2, IATA), that sample must be identified, packaged, marked, labeled, and shipped according to the instructions given for that material.

NOTE: The loaded cooler must not be heavier than 50 pounds to allow for safe handling. Only certified personnel are allowed to ship the containers, according to the Dangerous Goods Regulations promulgated by the International Air Transport Authority (IATA). At least one member of the sampling team should be aware of the Department of Transportation (DOT) and IATA legal requirements for shipping these types of materials.

8.1.2 The sample may not be shipped by air transport if the composition of the collected sample(s) is unknown, and the project leader knows or suspects that it is a regulated material (dangerous goods). If the composition and properties of the collected sample is suspected of being highly contaminated, the sample may not be shipped by air transport. Contact DOT and the IATA for shipping requirements and restrictions.

8.1.3 In addition, the shipment of pre-preserved sample containers or bottles of preservatives (e.g., NaOH pellets, HCL, etc.) which are designated as dangerous goods by IATA is regulated. Shipment of nitric acid is forbidden on all aircraft. Dangerous goods must not be shipped by air transport without contacting the Division's dangerous goods shipment designee. The preservation for the metals analysis may be added at the lab if safety precautions warrant.

8.2 **Shipment of Environmental Laboratory Samples**

8.2.1 The OASQA laboratory will not accept any samples shipped with any particulate (dusty) type packing material, especially vermiculite.

8.2.2 Guidance for the shipment of environmental laboratory samples by personnel is provided in a memorandum dated March 6, 1981, subject "Final National Guidance Package for Compliance with Department of Transportation Regulations in the Shipment of Laboratory Samples" (3). By this memorandum, the shipment of the following unpreserved samples is not regulated:

a) Drinking water
b) Treated effluent
c) Biological specimens
d) Sediment
e) Water treatment plant sludge

8.2.3 In addition, the shipment of the following preserved samples is not regulated, provided the amount of preservative used does not exceed the amounts found in 40 CFR 136.3. It is the shippers' (individual signing the airway bill) responsibility to ensure that proper amounts of preservative are used:

a) Drinking water
b) Ambient water
c) Treated effluent
d) Biological specimens
e) Sediment
f) Wastewater treatment plant sludge

8.2.4 Samples determined by the project manager to be in these categories are to be shipped using the following protocol, developed jointly between EPA, OSHA, and DOT. This procedure is documented in the "Final National Guidance Package for Compliance with Department of Transportation Regulations in the Shipment of Environmental Laboratory Samples".

Environmental samples should be packed prior to shipment by air using the following procedures:

a) Allow sufficient headspace in all bottles (except VOC containers with a septum seal) to compensate for any pressure and temperature changes (approximately 10 percent of the volume of the container).
b) Be sure the lids on all bottles are tight (will not leak).
c) Place bottles in separate and appropriately sized polyethylene bags and seal the bags with tape (preferably plastic electrical tape). Up to three VOC bottles may be packed in one Whirl-Pak container. (We recommend using plastic bags to double-bag glass containers to prevent leakage, then wrapping each container in bubble wrap to prevent breakage).
d) Select a sturdy cooler in good condition. Secure and tape the drain plug with fiber or duct tape. Department of Transportation (DOT) and/or Federal Express/UPS approved shipping containers must be used. To further assure that any leakage will be contained, the cooler should be lined with a large heavy duty plastic bag.
e) Put ice (that has been "double bagged" in heavy duty polyethylene bags and properly sealed to contain the melted water) on top of and/or between the samples. This will ensure uniform cooling of the samples.
f) Samples preserved by chilling must be shipped with sufficient ice to remain cool, $\leq 6°C$ (without allowing the sample to become frozen), while in transit. A temperature blank must be included in the shipment to allow the laboratory to verify the temperature upon receipt.

NOTE: The loaded cooler must not be heavier than 50 pounds to allow for safe handling.

g) Securely fasten the top of the large garbage bag with tape.
h) Place the Chain-of-Custody Record and all other applicable documents into a plastic bag, and tape the bag to the inner side of the cooler lid.
i) Close the cooler and securely tape, with strapping tape, the top of the cooler shut. Custody seals should be affixed to the top and sides of the cooler within the securing tape so that the cooler cannot be opened without breaking the seal.
j) Shipping containers must be marked "THIS END UP", and arrow labels which indicate the proper upward position of the container should be affixed to the container.
k) A label containing the name and address of the shipper should be placed on the outside of the container. Labels used in the shipment of hazardous materials (e.g., Cargo Only Air Craft, Flammable Solids, etc.) are not permitted to be on the outside of containers used to transport environmental samples.

IMPORTANT: Return of the cooler(s) should be scheduled by the sampler, prior to sending the samples in for analysis. All return shipping documentation should be sealed in a water proof zip-locked bag and taped on the inside of the cooler(s) lid with the samples.

9.0 Shipment Notification

The OASQA Sample Scheduling Coordinator should be notified as soon as possible when **(1)** samples have been shipped, **(2)** a scheduled shipment has been changed/canceled, or **(3)** there are changes in the number or types of samples. Notification should be via e-mailed and/or faxed, and followed up by a phone call **BEFORE** the expected shipping date.

Sample Scheduling Coordinator (SSC)
Kevin Martin: 410-305-3032 (ph), 410-305-3095 (fax), martin.kevin@epa.gov

Secondary Contacts
John Curry: 410-305-2608 (ph), 410-305-3093 (fax), curry.john@epa.gov

Mailing Address
U.S. EPA, Region III, OASQA
Environmental Science Center
701 Mapes Road
Fort Meade, Maryland 20755-5350

10.0 Pollution Prevention (P2) and Environmental Management System (EMS)

It is the Environmental Science Center's policy to integrate environmental stewardship into our operations and we have therefore instituted an Environmental Management System (EMS). This means that we manage our organizations and our programs in a manner that protects the environment, the safety of our employees, and the public health. In support of this policy, the

OASQA lab is committed to the promotion of Pollution Prevention (P2) awareness and the Agency's waste reduction strategies. To support our Pollution Prevention (P2) goals, the lab requests that samplers take a common sense approach to the collection of samples with respect to how much volume is collected. Of course, the most important consideration must be the need for enough volume to constitute a representative sample, and to accommodate the analysis requested. **Many parameters can be combined together to avoid excess volumes**. Since the laboratory must pay to dispose of the material after analyses, if at all possible, please combine samples for all analytes requiring the same container and preservative in a minimum number of containers.

Examples of parameters for aqueous samples which are commonly combined are:

(A) Metals + Mercury + Hardness → 250 mL container; or
(B) Ammonia + TOC + TP + TKN → 200 mL container.

Parameters for solid samples have few preservative requirements; therefore, most inorganic or organic parameters can be combined in one container. It is especially important to consolidate parameters when collecting solid samples because of the difficulty in disposing of the excess sample. Solids should be collected in a single 8 oz. container for either the organic or inorganic parameters. For additional guidance on combining samples, please contact the Sample Scheduling Coordinator (SSC).

IMPORTANT: If any of part of this document is unclear or if you want to verify the requirements, please contact the Sample Scheduling Coordinator (SSC) for clarification.

11.0 References

The current versions of the following guidance documents are referenced.

11.1 EPA Region 3, Users' Guide for Acquiring Analytical Services.
http://www.epa.gov/region3/esc/pdf/6users_guide_rev.pdf

11.2 EPA Region 3, Analytical Request Form Instructions.
http://www.epa.gov/region3/esc/instruct.htm

11.3 EPA Region 3, Laboratory Quality Manual, revision 9.

11.4 International Air Transport Authority (IATA), Dangerous Goods Regulations.
http://www.iata.org

11.5 US Environmental Protection Agency (US EPA) Order 1000.18-Transportation of Hazardous Materials, February 16, 1979.

11.6 Contract Laboratory Program (CLP) Guidance for Field Samplers, OSWER 9240.0-47, EPA540-R-09-003, January 2011.

11.7 National Environmental Laboratory Accreditation Conference (NELAC) Standards.
http://www.nelac-institute.org

11.8 Federal Register/Vol. 72, No. 47/Monday, March 12, 2007/Rules and Regulations.

11.9 40 Code of Federal Regulations (CFR), Part 136 - Guidelines Establishing Test Procedures for the Analysis of Pollutants, Section 136.3 Identification of test procedures, Table IA— ID and Table II.

11.10 40 Code of Federal Regulations (CFR), Part 141 - National Primary Drinking Water Regulations.

11.11 49 Code of Federal Regulations (CFR), Subtitle B - Other Regulations Relating to Transportation, Pt. 171 – 180.

11.12 Manual for the Certification of Laboratories Analyzing Drinking Water, EPA 815-R-05-004, January 2005.

11.13 Supplement 1 to the Fifth Edition of the Manual for the Certification of Laboratories Analyzing Drinking Water, EPA 815-F-08-006, June 2008.

11.14 EPA Region 3 Analytical Request Form, Revision 11.09.
http://www.epa.gov/region3/esc/doc/analytical_request_form.doc

Table 1 Aqueous Sample Requirements

Parameter (Analyte)	Analysis Technique	Collection Technique [1]	Container Type [2]	Temperature and Preservation	Holding Time(s)	Sample Volume (min)	Method(s) [3]	Optimum Quantitation Limits (QLs)
Alcohols Ethanol Methanol 1-Propanol 1-Butanol Sec-Butanol	GC-FID	G, C	V	cool, ≤ 6 °C [5]	7 days	10 mL	SW 8015D	 10 mg/L 10 mg/L 10 mg/L 10 mg/L 10 mg/L
Alkalinity (Total) Bicarbonate Carbonate P-Alkalinity	Titration	G, C	P	cool, ≤ 6 °C [5]	14 days	500 mL	SM 2320B	20 mg/L 20 mg/L 20 mg/L 20 mg/L
Anions Bromide Chloride Fluoride Sulfate Nitrite [9] Nitrate [9] Orthophosphate [9, 36]	Ion Chromatography	G, C	GL, P	cool, ≤ 6 °C [5]	28 days 48 hrs [9]	200 mL	EPA 300.0	 0.50 mg/L 0.25 mg/L 0.10 mg/L 0.50 mg/L 0.05 mg/L 0.15 mg/L 0.5 mg/L
Ammonia (not distilled) (Total)	Automated Colorimetric	G, C	GL, P	cool, ≤ 6 °C [5] H_2SO_4 to pH<2	28 days	200 mL	SM 4500-NH_3 BG	0.04 mg/L
Biochemical Oxygen Demand (BOD5) Carbonaceous (CBOD)	DO probe	G, C	GL, P	cool, ≤ 6 °C [5]	48 hrs	500 mL	SM 5210B	4 mg/L
Chemical Oxygen Demand (COD)	Spectrophotometric	G, C	GL, P	cool, ≤ 6 °C [5] H_2SO_4 to pH<2	28 days	200 mL	HACH 8000	10 mg/L
Corrosivity (pH for ≥ 20% water)	Electrometric	G, C	P	None	ASAP	500 mL	SW 9040C	NA

Table 1 Aqueous Sample Requirements (cont.)

Parameter (Analyte)	Analysis Technique	Collection Technique [1]	Container Type [2]	Temperature and Preservation	Holding Time(s)	Sample Volume (min)	Method(s) [3]	Optimum Quantitation Limits (QLs)
Cyanide (Total)	Distillation, Automated	G	GL, P	cool, ≤ 6 °C [5] Dechlorinate [30k] then NaOH to pH>10	14 days	200 mL	EPA 335.4	0.02 mg/L
Glycols 2-Butoxyethanol Diethylene Glycol Triethylene Glycol Tetraethylene Glycol	HPLC/MS/MS	G, C	V	cool, < 6 °C [5]	14 days	40 mL	SW 8321 mod ASTM D7731-11 mod	 25 µg/L 25 µg/L 25 µg/L 25 µg/L
Hardness (calculation)	ICP + calculation	G, C	GL, P	HNO_3 to pH<2 [8]	6 months	200 mL	Both EPA 200.7 and SM 2340B	3300 µg/L
Hexavalent Chromium	Ion Chromatography	G	P	cool, ≤ 6 °C [5] pH of 9.3 - 9.7 with $(NH_4)_2SO_4$	28 days	200 mL [14]	EPA 218.6	10 µg/L [26] or 1.0 µg/L [27]
Ignitability	Pensky-Martens, closed cup	G	SWJ	None	ASAP	250 mL	SW 1010A	NA
Infrared (IR) screen	FTIR, GC-FTIR, GC/MS	G, C	GL, P	cool, ≤ 6 °C [5]	ASAP	100 mL	IR identification scan	NA
Lab pH (for ≥ 20% water)	Electronic	G	P	None	ASAP	500 mL	SW 9040C	NA
Mercury (Dissolved [14] and Total)	Cold Vapor Spectrometry	G, C	GL, P	HNO_3 to pH<2 [8]	28 days	250 mL	EPA 245.1, SW 7470A, CLP Equivalent	0.2 µg/L
Mercury - TCLP	TCLP; Cold Vapor Spectrometry	G, C	GL, P	cool, ≤ 6 °C [7]	28 days	1000 mL	SW 1311, SW 7470A	0.2 mg/L

Table 1 Aqueous Sample Requirements (cont.)

Parameter (Analyte)	Analysis Technique	Collection Technique [1]	Container Type [2]	Temperature and Preservation	Holding Time(s)	Sample Volume (min)	Method(s) [3]	Optimum Quantitation Limits (QLs)
Metals (Dissolved [14] and Total)	ICP, ICP/MS	G, C	GL, P [24]	HNO_3 to pH<2 [8]	6 months	250 mL	EPA 200.7, EPA 200.8, SW 6010B, SW 6020A, CLP Equivalent	Refer to Appendix 2
Metals - TCLP	TCLP; ICP	G, C	GL, P	cool, ≤ 6 °C [7]	180 days	1000 mL	SW 1311, SW 6010B	Refer to Appendix 2
Total Kjeldahl Nitrogen (TKN)	Automated colorimetric	G, C	GL, P	cool, ≤ 6 °C [5] H_2SO_4 to pH<2	28 days	200 mL	EPA 351.2	0.1 mg/L
Nitrite + Nitrate	Automated colorimetric	G, C	GL, P	cool, ≤ 6 °C [5] H_2SO_4 to pH<2	28 days	250 mL	EPA 353.2 (Use if EPA 300 isn't an option)	0.05 mg/L
Nitrogen (TN) - digested (Total)	Automated colorimetric	G, C	GL, P	cool, ≤ 6 °C [5] H_2SO_4 to pH<2	28 days	250 mL	EPA 353.2	1 mg/L
Nitroaromatics, Nitramines, and Explosives	HPLC/PDA	G, C	AGL	cool, ≤ 6 °C [5, 30h]	7 days	1000 mL [4]	SW 8330	Refer to Appendix 6
Oil & Grease	Solid phase extraction	G	WGL	cool, ≤ 6 °C [5] HCl to pH<2	28 days	2x1000 mL per sample [4]	EPA 1664A	5 mg/L
Perchlorate	IC Conductivity or LC/MS	G, C	GL, P	cool, ≤ 6 °C [6] with headspace	28 days	100 mL	EPA 314.0 (IC) or SW 6850 (LC/MS)	1 µg/L (IC) or 0.5 µg/L (LC/MS)

Table 1 Aqueous Sample Requirements (cont.)

Parameter (Analyte)	Analysis Technique	Collection Technique [1]	Container Type [2]	Temperature and Preservation	Holding Time(s)	Sample Volume (min)	Method(s) [3]	Optimum Quantitation Limits (QLs)
Percent water	Wet Chemistry	G, C	P	None	ASAP	200 mL	SW 9001	NA
PCB Congeners	Cont L/L extraction; GC/MS	G	AGL	cool, ≤ 6 °C [5, 30h]	1 year	1000 mL [4]	EPA 1668C	20 pg/L
Pesticides	Cont L/L extraction; GC/MS	G	AGL	cool, ≤ 6 °C [5, 30h]	7 days	1000 mL [4]	EPA 608, SW 8081B, SW 3520C	Refer to Appendix 3
PCBs	Cont L/L extraction; GC/MS	G	AGL	cool, ≤ 6 °C [5, 30h]	7 days	1000 mL [4]	EPA 608, SW 8082A, SW 3520C	Refer to Appendix 3
Pesticides - TCLP	Cont L/L extraction; GC/MS	G	AGL	cool, ≤ 6 °C [7]	14 days	1000 mL	EPA 608, SW 8081B, SW 3520C	Refer to Appendix 3
Phenol (Total)	Colorimetric - automated	G	AGL	cool, ≤ 6 °C [5] Dechlorinate [30j] then H_2SO_4 to pH<2	28 days	1000 mL	EPA 420.1/420.4	20 µg/L
Phosphorus (TP) (Total)	Colorimetric - automated	G, C	GL, P	cool, ≤ 6 °C [5] HCl to pH<2	28 days	200 mL	EPA 365.4	0.05 mg/L
Polyaromatic Hydrocarbons (PAH-SIM)	Cont L/L extraction; GC/MS	G	AGL	cool, ≤ 6 ° C [5, 30h]	7 days	1000 mL [4]	SW 3520C, SW 8270D	Refer to Appendix 4
Semivolatiles (SVOCs) [12]	Cont L/L extraction; GC/MS	G	AGL	cool, ≤ 6 °C [5, 30h]	7 days	1000 mL [4]	EPA 625, SW 8270D, SW 3520C, CLP Equivalent	Refer to Appendix 4

Table 1 Aqueous Sample Requirements (cont.)

Parameter (Analyte)	Analysis Technique	Collection Technique [1]	Container Type [2]	Temperature and Preservation	Holding Time(s)	Sample Volume (min)	Method(s) [3]	Optimum Quantitation Limits (QLs)
Semivolatiles (SVOCs) [12] - TCLP	TCLP; GC/MS	G	AGL	cool, ≤ 6 °C [5, 7]	14 days	1000 mL	SW 1311, SW 8270D	Refer to Appendix 4
Total Solids (TS)	Gravimetric	G, C	GL, P	cool, ≤ 6 °C [5]	7 days	500 mL	SM 2540B	10 mg/L [11]
Total Dissolved Solids (TDS)	Gravimetric	G, C	GL, P	cool, ≤ 6 °C [5]	7 days	500 mL	SM 2540C	10 mg/L [11]
Total Organic Carbon (TOC) Dissolved Organic Carbon (DOC) [14]	Combustion, Oxidation	G, C	GL, P	cool, ≤ 6 °C [5] H_2SO_4 to pH<2	28 days	100 mL	SM 5310B	3 mg/L
Total Suspended Solids (TSS)	Gravimetric	G, C	GL, P	cool, ≤ 6 °C [5]	7 days	500 mL	SM 2540D	10 mg/L [11]
Total Toxic Organics (TTO)	Follow the same requirements for PCB/Pesticides, SVOCs, and VOCs							Refer to Appendix 3, 4, 5
Volatiles (VOCs) [12]	Purge & Trap extraction, GC/MS	G	V	cool, ≤ 6 °C [5] Dechlorinate [30h] then 1:1 HCl to pH<2 [31]	7 days [20] 14 days [21]	120 mL [33]	EPA 624, SW 5030C, SW 8260C, CLP Equivalent	Refer to Appendix 5
Volatiles (VOCs) - TCLP/ZHE	Purge & Trap extraction, GC/MS	G	V	cool, ≤ 6 °C [5]	14 days	160 mL [32]	SW 1311, SW 5030C, SW 8260C	Refer to Appendix 5

Table 2 Non-Aqueous Sample Requirements

Parameter (Analyte)	Analysis Technique	Collection Technique [1]	Container Type [2]	Temperature and Preservation	Holding Time(s)	Sample Weight (min)	Method(s) [3]	Optimum Quantitation Limits (QLs)
Anions Bromide Chloride Fluoride Sulfate Nitrite Nitrate Orthophosphate	Ion Chromatography	G, C	GL	cool, ≤ 6 °C	None	50 g	EPA 300.0	0.1 mg/kg 0.1 mg/kg 0.1 mg/kg 0.1 mg/kg 0.1 mg/kg 0.1 mg/kg 0.1 mg/kg
Benthic Invertebrate Taxonomy	Micro	G	GL	70% Ethanol	None	NA	Benthic	NA
Chemical Oxygen Demand (COD)	Spectrophotometric	G, C	GL	cool, ≤ 6 °C	28 days	50 g	HACH 8000	10 mg/L
Cyanide (Total)	Distillation, Automated	G	GL	cool, ≤ 6 °C	28 days	100 g	EPA 335.4	1 mg/kg
Grainsize	Gravimetric	G	SWJ	cool, ≤ 6 °C	None	50 g	EMAP Estuaries, Plumb 1981	Report as %silt, %sand, and %clay
Hexavalent Chromium	Ion Chromatography	G	GL	cool, ≤ 6 °C pH of 9 ± 0.5 with NH_4OH	30 days	50 g	EPA 218.6	10 mg/L
Ignitability	Pensky-Martens, closed cup	G	SWJ	cool, ≤ 6 °C	ASAP	50 g	SW 1030	NA
Infrared (IR) screen	FTIR, GC-FTIR, GC/MS	G, C	GL	cool, ≤ 6 °C	ASAP	50 g	IR identification scan	NA

Table 2 Non-Aqueous Sample Requirements (cont.)

Parameter (Analyte)	Analysis Technique	Collection Technique [1]	Container Type [2]	Temperature and Preservation	Holding Time(s)	Sample Weight (min)	Method(s) [3]	Optimum Quantitation Limits (QLs)
Lab pH	Electronic	G	GL	None	ASAP	200 g	SW 9045D	NA
Mercury (Solids)	Cold Vapor Spectrometry	G, C	GL	cool, ≤ 6 °C	28 days	50 g	EPA 245.5, SW 7471A, CLP Equivalent	0.1 µg/g
Mercury – TCLP (Solids)	TCLP; Cold Vapor Spectrometry	G, C	SWJ	cool, ≤ 6 °C	28 days	200 g	SW 1311, SW 7470A	0.2 mg/L
Metals (Solids)	ICP, ICP/MS	G, C	GL	cool, ≤ 6 °C	6 months	50 g	EPA 200.7, EPA 200.8, SW 6010B, SW 6020A, CLP Equivalent	Refer to Appendix 2
Metals – TCLP (Solids)	TCLP; ICP	G, C	SWJ	cool, ≤ 6 °C	180 days	200 g	SW 1311, SW 6010B	Refer to Appendix 2
Nitroaromatics, Nitramines, and Explosives	HPLC/PDA	G, C	AWJ	cool, ≤ 6 °C	14 days	50 g	SW 8330	Refer to Appendix 6
Perchlorate	IC Conductivity, LC/MS	G, C	GL	cool, ≤ 6 °C	28 days	50 g	EPA 314.0 (IC) or SW 6850 (LC/MS)	0.005 mg/kg
Percent Dry Weight	Gravimetric	G, C	GL	None	None	100 g	USGS-PD105	NA
Percent Moisture	Gravimetric	G, C	AWJ	cool, ≤ 6 °C	None	50 g	ASTM D2216-98	NA

Table 2 Non-Aqueous Sample Requirements (cont.)

Parameter (Analyte)	Analysis Technique	Collection Technique [1]	Container Type [2]	Temperature and Preservation	Holding Time(s)	Sample Weight (min)	Method(s) [3]	Optimum Quantitation Limits (QLs)
PCB Congeners	Soxhlet extraction; GC/MS	G, C	AWJ	cool, ≤ 6 °C	1 year	100 g	EPA 1668C	10 pg/g
PCB (Solids/Tissue/Petroleum/Wipes)	ASE, Waste dilution; GC/ECD	G, C	AWJ	cool, ≤ 6 °C	1 year	100 g 10 g [15]	SW 8082A, SW 3545A, SW 3580A	Refer to Appendix 3
Pesticides (Solids/Tissue)	ASE; GC/ECD	G, C	AWJ	cool, ≤ 6 °C	14 days	100 g	SW 8081B, SW 3545A	Refer to Appendix 3
Pesticides - TCLP	Cont L/L extraction; GC/ECD	G, C	AWJ	cool, ≤ 6 °C	7 days	250 g	SW 8081B, SW 3520C	Refer to Appendix 3
Phenol (Total)	Colorimetric - automated	G, C	GL	cool, ≤ 6 °C	28 days	50 g	EPA 420.1/420.4	10 mg/kg
Phosphorus (TP) (Total)	Colorimetric - automated	G, C	GL	cool, ≤ 6 °C	28 days	50 g	EPA 365.4	0.050 mg/L
Polyaromatic Hydrocarbons (PAH-SIM)	Soxhlet extraction; GC/MS	G, C	AWJ	cool, ≤ 6 °C	14 days	50 g	SW 8270D, SW 3520C	Refer to Appendix 4
Semivolatiles (SVOCs) [12] (Solids/Petroleum)	Soxhlet extraction; GC/MS	G, C	AWJ	cool, ≤ 6 °C	10 days [17] 14 days [16]	100 g	SW 8270D, SW 3540C (solids), SW 3580A (petroleum)	Refer to Appendix 4
Semivolatiles (SVOCs) [12] - TCLP	TCLP; GC/MS	G, C	AWJ	cool, ≤ 6 °C	14 days	200 g	SW 1311, SW 8270D	Refer to Appendix 4

Table 2 Non-Aqueous Sample Requirements (cont.)

Parameter (Analyte)	Analysis Technique	Collection Technique [1]	Container Type [2]	Temperature and Preservation	Holding Time(s)	Sample Weight (min)	Method(s) [3]	Optimum Quantitation Limits (QLs)
Total Organic Carbon (TOC)	Combustion, Oxidation	G	SWJ	cool, ≤ 6 °C	None	50 g	SM 5310B	100 mg/kg
Volatiles (VOCs) [12] (Solids/Petroleum)	Purge & Trap extraction, GC/MS	G	Refer to Appendix 11	Refer to Appendix 11	14 days [15] 48 hrs [29]	Refer to Appendix 11	SW 5035A, SW 5030C, SW 8260C	Refer to Appendix 5
Volatiles (VOCs) [12] (Air/Vapor)	Purge & Trap extraction, GC/MS	G, C	S	None	30 days	6 L	TO-15	Refer to Appendix 5
Volatiles (VOCs) - TCLP/ZHE	Purge & Trap extraction, GC/MS	G	V	cool, ≤ 6 °C	14 days	160 g [32]	SW 1311, SW 5030C, SW 8260C	Refer to Appendix 5

Table 3 SDWA Program Special Requirements

Parameter (Analyte)	Analysis Technique	Collection Technique [1]	Container Type [2]	Temperature and Preservation	Holding Time(s)	Sample Volume (min)	Method(s) [3]	Optimum Quantitation Limits (QLs)
Coliforms (Total and Fecal)	Micro	G	GL[23], PL[23]	cool, < 10 °C [5, 30k]	8 hrs, 30 hrs [18]	120 mL [22]	SM 9221 B (Total) SM 9221B,E (Fecal)	2 MPN/100 mLs
E. coli	Enzyme Substrate	G	PL[23]	cool, < 10 °C [5, 30k]	8 hrs, 30 hrs [18]	120 mL [22]	SM 9223 Colilert QT	1 MPN/100 mL
E. Coli and Total Coliforms	Micro	G	PL[23]	cool, < 10 °C [5, 30k]	30 hrs	120 mL [22]	SM 9223 Colisure	Report only Presence/Absence
Heterotrophic Bacteria	Heterotrophic Plate Count	G	GL[23], PL[23]	cool, < 10 °C [5, 30k]	8 hrs	120 mL [22]	SM 9215B	1 cfu/1 mL
Nitrate (NO_3-N)	Automated colorimetric	G	GL, P	cool, ≤ 6 °C [5]	14 days [34] 48 hrs [35]	200 mL	EPA 300.0	0.15 mg/L
Pesticides (Chlorinated) Endrin gamma-BHC (Lindane) Heptachlor epoxide	Solid phase extraction	G	AGL	cool, ≤ 6 °C [5] Dechlorinate [30j] then 6N HCl to pH<2	14 days	2000 mL [4]	EPA 508.1	0.02 µg/L 0.02 µg/L 0.02 µg/L
Total Trihalomethanes (TTHMs)	Purge & Trap extraction, GC/MS	G	V	cool, ≤ 6 °C [5] Dechlorinate [30h] then 1:1 HCl to pH<2	14 days	120 mL [33]	EPA 524.2	0.5 µg/L
Regulated Volatiles (VOCs)	Purge & Trap extraction, GC/MS	G	V	cool, ≤ 6 °C [5] Dechlorinate [30h] then 1:1 HCl to pH<2	14 days 24 hrs [18]	120 mL [33]	EPA 524.2	Refer to Appendix 5

Table 1, 2 and 3 Footnotes

1	**C**	Composite **only** (sampling period must have a Start and Ending time)
	G, C	Grab or Composite
	G	Grab **only** for: i) Volatile (i.e. VOCs, Cyanide and Sulfide – may vary in volatility with pH changes) **or** ii) Highly biodegradable (i.e. Total Phenols) **or** iii) Tend to adhere to surfaces (i.e. Oil&Grease, PCBs/Pesticides and SVOCs) **or** iv) Reactive (i.e. Hexavalent Chromium)
2	The analytical procedure(s) to be used for sample analysis often requires the use of a particular type of sample container. The type of container also may depend on the sample matrix and analysis. It is recommended that samplers use borosilicate glass containers, which are inert to most materials, when sampling for pesticides and/or other organics. Conventional polyethylene is recommended when sampling for metals because of the lower cost and absorption rate of metal ions.	
	GL	Glass
	P	Polyethylene
	PL	Plastic container(s) has been autoclaved prior to sampling
	AGL	1 L amber glass bottle with Teflon lined cap
	ASJ	Amber, straight-sided, glass jar with Teflon lined screw cap
	WGL	1 L clear, wide mouth, straight-sided, glass bottle with 89 mm Teflon lined screw cap
	SWJ	8 oz short, wide mouth, straight-sided, glass jar with Teflon lined cap
	AWJ	8 oz short, wide mouth, straight-sided, amber glass jar with Teflon lined cap
	V	40 mL clear glass VOA vial
	TGL	4 oz (120 mL) tall, wide mouth, straight-sided, glass jar
	PB	Heavy plastic bag
	S	Summa canisters (supplied by lab)
3	**SM**	Standard Methods
	SW	SW 846 Method
	EPA	EPA Method
4	Cannot combine with other parameters.	
5	Do not allow the sample(s) to become frozen.	
6	Avoid extreme temperatures.	
7	Unless cooling causes precipitation of the waste.	
8	The acid may be added at the Lab if safety precautions warrant.	
9	Maximum holding time is 48 hrs for Nitrite, Nitrate and Orthophosphate.	
10	Dechlorinate only those samples which actually contain chlorine with 50 mg Sodium Sulfite - Na_2SO_4	

Table 1, 2 and 3 Footnotes (cont.)

11	This QL is based on 100 mL of sample.
12	TICs for organic analysis are available upon request.
13	For SDWA, unpreserved sample(s).
14	Filter in the field.
15	For petroleum sample(s) only.
16	For EPA 8270D sample(s) only.
17	For CLP sample(s) only.
18	For SDWA sample(s).
19	For NPDES sample(s).
20	Unpreserved.
21	Preserved.
22	One (1) inch air space in bottle.
23	Sterile container.
24	When requesting the analyte Boron, only use a plastic container
25	Filter in the field for NPDES sample(s).
26	On a 25µL Sample Injection Loop size
27	On a 250µL Sample Injection Loop size
28	If water has been chlorinated, use 0.2 mL of sterile 10% $Na_2S_2O_3$ per 250 mL or less of sample.
29	To preserve or analyze for solid matrix only.
30	Dechlorinate only those samples which actually contain chlorine: **k**) With Ascorbic Acid – $C_6H_8O_6$ **h**) With Ascorbic acid – $C_6H_8O_6$ (25 mg per 40 mL); or Sodium Thiosulfate – $Na_2S_2O_3$ (3 mg per 40 mL) **j**) With excess Ferrous Ammonium Sulfate – $(NH_4)_2Fe(SO_4)_2 * 6H_2O$
31	RCRA and NPDES sample(s) must be submitted both preserved and unpreserved if 2-Chloroethyl Vinyl Ether is an analyte of interest. This is due to losses of 2-Chloroethyl Vinyl Ether in acidified sample(s).
32	Four (4) glass 40 mL VOA vials for 160 mL of sample filled with no headspace.
33	Three (3) glass 40 mL VOA vials for 120 mL of sample filled with no headspace.
34	Chlorinated
35	Non-chlorinated
36	Filter in the field if for NPDES

Appendix 1: Quality Control (QC) Sampling Requirements

Parameter	Matrix	Additional Volume or Weight required of that in Tables 1 – 3
Biochemical Oxygen Demand (BOD5)	Aqueous	500 mL [(a)]
Glycols	Aqueous	2x40 mL [(a)]
IR Identification	Aqueous Solids Wipes Petroleum	40 mL [(a)] 100 g [(b)] 1 blank wipe [(b)] 20 g of material [(b)]
Mercury	Aqueous Wipes	25 mL [(a)] 3 blank wipes [(b)]
Nitroaromatics, Nitramines, and Explosives	Aqueous Soil	2x1000 mL [(a)] 100 g [(b)]
Oil & Grease	Aqueous	3x1000 mL [(a)]
PCB Congeners	Aqueous	4x1000 mL [(a)]
Perchlorate	Aqueous Soil	2x100 mL [(a)] 100 g [(b)]
Phenol (Total)	Aqueous	1000 mL [(a)]
Pesticides (Chlorinated)	Aqueous	2x1000 mL [(c)]
Pesticides	Aqueous Solids	2x1000 mL [(a)] 60 g [(b)]
Pesticides/PCBs	Aqueous	4x1000 mL [(a)]
PCBs	Aqueous Solids Petroleum Wipes	2x1000 mL [(a)] 60 g [(b)] 10 g of material [(b)] 1 blank; 2 duplicates [(b)]
Semi Volatiles (SVOCs)	Aqueous Solids	2x1000 mL [(a)] 60 g [(b)]
Volatiles (VOCs)	Aqueous	6x40 mL [(a, c)]

Appendix 1 Footnotes

a	Refer to Table 1 Aqueous Sample Requirements
b	Refer to Table 2 Non-Aqueous Sample Requirements
c	Refer to Table 3 SDWA Program Special Requirements

Appendix 2: Metals Quantitation Limits (QLs)

Analyte(s)	CAS Number	Aqueous		Solids		TCLP
		ICP	ICP/MS	ICP	ICP/MS	ICP
Aluminum	7429-90-5	200 µg/L	30 µg/L	20 µg/g	3 µg/g	NA
Antimony	7440-36-0	60 µg/L	2 µg/L	6 µg/g	0.2 µg/g	NA
Arsenic	7440-38-2	200 µg/L	1 µg/L	20 µg/g	0.1 µg/g	5 mg/L
Barium	7440-39-3	200 µg/L	10 µg/L	20 µg/g	1 µg/g	100 mg/L
Beryllium	7440-41-7	5 µg/L	1 µg/L	0.5 µg/g	0.1 µg/g	NA
Boron	7440-42-8	50 µg/L	NA	5 µg/g	NA	NA
Cadmium	7440-43-9	5 µg/L	1 µg/L	0.5 µg/g	0.1 µg/g	1 mg/L
Calcium	7440-70-2	500 µg/L	NA	50 µg/g	NA	NA
Chromium	7440-47-3	10 µg/L	2 µg/L	1 µg/g	0.2 µg/g	5 mg/L
Cobalt	7440-48-4	50 µg/L	1 µg/L	5 µg/g	0.1 µg/g	NA
Copper	7440-50-8	25 µg/L	2 µg/L	2.5 µg/g	0.2 µg/g	NA
Iron	7439-89-6	100 µg/L	NA	10 µg/g	NA	NA
Lead	7439-92-1	50 µg/L	1 µg/L	5 µg/g	0.1 µg/g	5 mg/L
Magnesium	7439-95-4	500 µg/L	NA	50 µg/g	NA	NA
Manganese	7439-96-5	15 µg/L	1 µg/L	1.5 µg/g	0.1 µg/g	NA
Nickel	7440-02-0	40 µg/L	1 µg/L	4 µg/g	0.1 µg/g	NA
Potassium	7740-09-7	2000 µg/L	NA	200 µg/g	NA	NA
Selenium	7782-49-2	200 µg/L	5 µg/L	20 µg/g	0.5 µg/g	1 mg/L
Silver	7440-22-4	10 µg/L	1 µg/L	1 µg/g	0.1 µg/g	5 mg/L
Sodium	7440-23-5	1000 µg/L	NA	100 µg/g	NA	NA
Thallium	7440-28-0	200 µg/L	1 µg/L	20 µg/g	0.1 µg/g	NA
Tin	7440-31-5	200 µg/L	NA	20 µg/g	NA	NA
Titanium	7440-32-6	200 µg/L	NA	20 µg/g	NA	NA
Vanadium	7440-62-2	50 µg/L	5 µg/L	5 µg/g	0.5 µg/g	NA
Zinc	7440-66-6	20 µg/L	2 µg/L	2 µg/g	0.2 µg/g	NA

Appendix 3: Pesticides/PCBs Quantitation Limits (QLs) (PCBs→SW 8082A, Pesticides→SW 8081B)

Analyte(s)	CAS Number	Aqueous		Solid/Tissue	Petroleum	Wipes	TCLP
		EPA 608	SW 8081B, SW 8082A, SW 3520C	SW 8081B, SW 8082A, SW 3545A	SW 8082A, SW 3580A	SW 8082A, SW 3545A	EPA 608, SW 8081B, SW 3520C
4,4´-DDD	72-54-8	0.1 µg/L	0.1 µg/L	0.0033 mg/kg	NA	NA	NA
4,4´-DDE	72-55-9	0.1 µg/L	0.1 µg/L	0.0033 mg/kg	NA	NA	NA
4,4´-DDT	50-29-3	0.1 µg/L	0.1 µg/L	0.0033 mg/kg	NA	NA	NA
Aldrin	309-00-2	0.05 µg/L	0.05 µg/L	0.00167 mg/kg	NA	NA	NA
alpha-BHC	319-84-6	0.05 µg/L	0.05 µg/L	0.00167 mg/kg	NA	NA	NA
alpha-Chlordane	5103-71-9	NA	0.05 µg/L	0.00167 mg/kg	NA	NA	NA
beta-BHC	319-85-7	0.05 µg/L	0.05 µg/L	0.00167 mg/kg	NA	NA	NA
Chlordane	57-74-9	1 µg/L	1 µg/L	0.033 mg/kg	NA	NA	5.0 µg/L
delta-BHC	319-86-8	0.05 µg/L	0.05 µg/L	0.00167 mg/kg	NA	NA	NA
Dieldrin	60-57-1	0.1 µg/L	0.1 µg/L	0.0033 mg/kg	NA	NA	NA
Endosulfan I	959-98-8	0.05 µg/L	0.05 µg/L	0.00167 mg/kg	NA	NA	NA
Endosulfan II	33213-65-9	0.1 µg/L	0.1 µg/L	0.0033 mg/kg	NA	NA	NA
Endosulfan sulfate	1031-07-8	0.1 µg/L	0.1 µg/L	0.0033 mg/kg	NA	NA	NA
Endrin	72-20-8	0.1 µg/L	0.1 µg/L	0.0033 mg/kg	NA	NA	1.0 µg/L
Endrin aldehyde	7421-93-4	0.1 µg/L	0.1 µg/L	0.0033 mg/kg	NA	NA	NA
Endrin ketone	53494-70-5	NA	0.1 µg/L	0.0033 mg/kg	NA	NA	NA
gamma-BHC (Lindane)	58-89-9	0.05 µg/L	0.05 µg/L	0.00167 mg/kg	NA	NA	0.5 µg/L
gamma-Chlordane	5103-74-2	NA	0.05 µg/L	0.00167 mg/kg	NA	NA	NA
Heptachlor	76-44-8	0.05 µg/L	0.05 µg/L	0.00167 mg/kg	NA	NA	0.5 µg/L
Heptachlor epoxide	1024-57-3	0.05 µg/L	0.05 µg/L	0.00167 mg/kg	NA	NA	0.5 µg/L
Methoxychlor	72-43-5	NA	0.5 µg/L	0.0167 mg/kg	NA	NA	5.0 µg/L
Toxaphene	8001-35-2	5 µg/L	5 µg/L	0.167 mg/kg	NA	NA	25.0 µg/L
Aroclor-1016	12674-11-2	1 µg/L	1 µg/L	0.033 mg/kg	1 mg/kg	1 µg/wipe	NA
Aroclor-1221	1104-28-2	1 µg/L	1 µg/L	0.033 mg/kg	1 mg/kg	1 µg/wipe	NA
Aroclor-1232	11141-16-5	1 µg/L	1 µg/L	0.033 mg/kg	1 mg/kg	1 µg/wipe	NA
Aroclor-1242	53469-21-9	1 µg/L	1 µg/L	0.033 mg/kg	1 mg/kg	1 µg/wipe	NA
Aroclor-1248	12672-29-6	1 µg/L	1 µg/L	0.033 mg/kg	1 mg/kg	1 µg/wipe	NA
Aroclor-1254	11097-69-1	1 µg/L	1 µg/L	0.033 mg/kg	1 mg/kg	1 µg/wipe	NA
Aroclor-1260	11096-82-5	1 µg/L	1 µg/L	0.033 mg/kg	1 mg/kg	1 µg/wipe	NA
Aroclor-1262	37324-23-5	NA	1 µg/L	0.033 mg/kg	1 mg/kg	1 µg/wipe	NA
Aroclor-1268	11100-14-4	NA	1 µg/L	0.033 mg/kg	1 mg/kg	1 µg/wipe	NA

Appendix 4: Semivolatiles (SVOCs) Quantitation Limits (QLs)

Analyte(s)	CAS Number	Aqueous	Solid	Petroleum	PAH-SIM		TCLP
		EPA 625, SW 8270D, SW 3520C	SW 8270D, SW 3540C	SW 8270D, SW 3580A	SW 8270D (Aqueous)	SW 8270D (Solids)	SW 1311, SW 8270D
1,1-Biphenyl *	92-52-4	5 µg/L	330 µg/kg	100 mg/kg	NA	NA	NA
1,2,4,5-Tetrachlorobenzene *	95-94-3	5 µg/L	330 µg/kg	100 mg/kg	NA	NA	NA
2,3,4,6-Tetrachlorophenol *	58-90-2	5 µg/L	330 µg/kg	100 mg/kg	NA	NA	NA
2,4,5-Trichlorophenol *	95-95-4	5 µg/L	330 µg/kg	100 mg/kg	NA	NA	0.05 mg/L
2,4,6-Trichlorophenol	88-06-2	5 µg/L	330 µg/kg	100 mg/kg	NA	NA	0.05 mg/L
2,4-Dichlorophenol	120-83-2	5 µg/L	330 µg/kg	100 mg/kg	NA	NA	NA
2,4-Dimethylphenol *	105-67-9	5 µg/L	670 µg/kg	200 mg/kg	NA	NA	NA
2,4-Dinitrophenol	51-28-5	5 µg/L	330 µg/kg	100 mg/kg	NA	NA	NA
2,4-Dinitrotoluene	121-14-2	5 µg/L	330 µg/kg	100 mg/kg	NA	NA	0.05 mg/L
2,6-Dinitrotoluene	606-20-2	5 µg/L	330 µg/kg	100 mg/kg	NA	NA	NA
2-Chloronaphthalene	91-58-7	5 µg/L	330 µg/kg	100 mg/kg	NA	NA	NA
2-Chlorophenol	95-57-8	5 µg/L	330 µg/kg	100 mg/kg	NA	NA	NA
2-Methylnaphthalene *	91-57-6	5 µg/L	330 µg/kg	100 mg/kg	0.1 µg/L	7 µg/kg	NA
2-Methylphenol *	95-48-7	5 µg/L	330 µg/kg	100 mg/kg	NA	NA	0.05 mg/L
2-Nitroaniline *	88-74-4	5 µg/L	670 µg/kg	200 mg/kg	NA	NA	NA
2-Nitrophenol	88-75-5	5 µg/L	330 µg/kg	100 mg/kg	NA	NA	NA
3,3´-Dichlorobenzidine	91-94-1	5 µg/L	670 µg/kg	200 mg/kg	NA	NA	NA
3-Methylphenol [λ]	108-39-4	NA	NA	NA	NA	NA	0.1 mg/L
3-Nitroaniline *	99-09-2	5 µg/L	670 µg/kg	200 mg/kg	NA	NA	NA
4,6-Dinitro-2-methylphenol	534-52-1	10 µg/L	330 µg/kg	100 mg/kg	NA	NA	NA
4-Bromophenyl phenyl ether	101-55-3	5 µg/L	330 µg/kg	100 mg/kg	NA	NA	NA
4-Chloro-3-methylphenol	59-50-7	5 µg/L	330 µg/kg	100 mg/kg	NA	NA	NA
4-Chloroaniline *	106-47-8	5 µg/L	330 µg/kg	100 mg/kg	NA	NA	NA
4-Chlorophenyl phenyl ether	7005-72-3	5 µg/L	330 µg/kg	100 mg/kg	NA	NA	NA
4-Methylphenol * [λ]	106-44-5	5 µg/L	330 µg/kg	100 mg/kg	NA	NA	0.1 mg/L
4-Nitroaniline *	100-01-6	5 µg/L	670 µg/kg	200 mg/kg	NA	NA	NA
4-Nitrophenol	100-02-7	10 µg/L	670 µg/kg	200 mg/kg	NA	NA	NA
Acenaphthene	83-32-9	5 µg/L	330 µg/kg	100 mg/kg	0.1 µg/L	7 µg/kg	NA
Acenaphthylene	208-96-8	5 µg/L	330 µg/kg	100 mg/kg	0.1 µg/L	7 µg/kg	NA

***** Not an EPA 625 compound

λ These compounds either coelute or cannot be separated during the analysis.

Appendix 4: Semivolatiles (SVOCs) Quantitation Limits (QLs) (cont.)

Analyte(s)	CAS Number	Aqueous	Solid	Petroleum	PAH-SIM		TCLP
		EPA 625, SW 8270D, SW 3520C	SW 8270D, SW 3540C	SW 8270D, SW 3580A	SW 8270D (Aqueous)	SW 8270D (Solids)	SW 1311, SW 8270D
Acetophenone *	98-86-2	5 µg/L	330 µg/kg	100 mg/kg	NA	NA	NA
Anthracene	120-12-7	5 µg/L	330 µg/kg	100 mg/kg	0.1 µg/L	7 µg/kg	NA
Atrazine *	1912-24-9	5 µg/L	330 µg/kg	100 mg/kg	NA	NA	NA
Benzaldehyde *	100-52-7	5 µg/L	330 µg/kg	100 mg/kg	NA	NA	NA
Benzo(a)anthracene	56-55-3	5 µg/L	330 µg/kg	100 mg/kg	0.1 µg/L	7 µg/kg	NA
Benzo(a)pyrene	50-32-8	5 µg/L	330 µg/kg	100 mg/kg	0.1 µg/L	7 µg/kg	NA
Benzo(b)fluoranthene	205-99-2	5 µg/L	330 µg/kg	100 mg/kg	0.1 µg/L	7 µg/kg	NA
Benzo(ghi)perylene	191-24-2	5 µg/L	330 µg/kg	100 mg/kg	0.1 µg/L	7 µg/kg	NA
Benzo(k)fluoranthene	207-08-9	5 µg/L	330 µg/kg	100 mg/kg	0.1 µg/L	7 µg/kg	NA
Bis(2-chloroethoxy)methane	111-91-1	5 µg/L	330 µg/kg	100 mg/kg	NA	NA	NA
Bis(2-chloroethyl)ether	111-44-4	5 µg/L	330 µg/kg	100 mg/kg	NA	NA	NA
Bis(2-chloroisopropyl)ether	108-60-1	5 µg/L	330 µg/kg	100 mg/kg	NA	NA	NA
Bis(2-ethylhexyl)phthalate	117-81-7	5 µg/L	330 µg/kg	100 mg/kg	NA	NA	NA
Butyl benzyl phthalate	85-68-7	5 µg/L	330 µg/kg	100 mg/kg	NA	NA	NA
Caprolactam *	105-60-2	5 µg/L	330 µg/kg	100 mg/kg	NA	NA	NA
Carbazole *	86-74-8	5 µg/L	670 µg/kg	200 mg/kg	NA	NA	NA
Chrysene	218-01-9	5 µg/L	330 µg/kg	100 mg/kg	0.1 µg/L	7 µg/kg	NA
Dibenz(a,h)anthracene	53-70-3	5 µg/L	330 µg/kg	100 mg/kg	0.1 µg/L	7 µg/kg	NA
Dibenzofuran *	132-64-9	5 µg/L	330 µg/kg	100 mg/kg	NA	NA	NA
Diethyl phthalate	84-66-2	5 µg/L	330 µg/kg	100 mg/kg	NA	NA	NA
Dimethyl phthalate	131-11-3	5 µg/L	330 µg/kg	100 mg/kg	NA	NA	NA
Di-n-butyl phthalate	84-74-2	5 µg/L	670 µg/kg	200 mg/kg	NA	NA	NA
Di-n-octyl phthalate	117-84-0	5 µg/L	330 µg/kg	100 mg/kg	NA	NA	NA
Fluoranthene	206-44-0	5 µg/L	330 µg/kg	100 mg/kg	0.1 µg/L	7 µg/kg	NA
Fluorene	86-73-7	5 µg/L	330 µg/kg	100 mg/kg	0.1 µg/L	7 µg/kg	NA
Hexachlorobenzene	118-74-1	5 µg/L	330 µg/kg	100 mg/kg	NA	NA	0.05 mg/L
Hexachlorobutadiene	87-68-3	5 µg/L	330 µg/kg	100 mg/kg	NA	NA	0.05 mg/L
Hexachlorocyclopentadiene	77-47-4	5 µg/L	330 µg/kg	100 mg/kg	NA	NA	NA
Hexachloroethane	67-72-1	5 µg/L	330 µg/kg	100 mg/kg	NA	NA	0.05 mg/L
Indeno(1,2,3-cd)pyrene	193-39-5	5 µg/L	330 µg/kg	100 mg/kg	0.1 µg/L	7 µg/kg	NA
Isophorone	78-59-1	5 µg/L	330 µg/kg	100 mg/kg	NA	NA	NA

***** Not an EPA 625 compound

Appendix 4: Semivolatiles (SVOCs) Quantitation Limits (QLs) (cont.)

Analyte(s)	CAS Number	Aqueous	Solid	Petroleum	PAH-SIM		TCLP
		EPA 625, SW 8270D, SW 3520C	SW 8270D, SW 3540C	SW 8270D, SW 3580A	SW 8270D (Aqueous)	SW 8270D (Solids)	SW 1311, SW 8270D
Naphthalene	91-20-3	5 µg/L	330 µg/kg	100 mg/kg	0.1 µg/L	7 µg/kg	NA
Nitrobenzene	98-95-3	5 µg/L	330 µg/kg	100 mg/kg	NA	NA	0.05 mg/L
N-Nitrosodimethylamine	62-75-9	5 µg/L	330 µg/kg	100 mg/kg	NA	NA	NA
N-Nitroso-di-n-propylamine	621-64-7	5 µg/L	330 µg/kg	100 mg/kg	NA	NA	NA
N-Nitrosodiphenylamine	86-30-6	5 µg/L	330 µg/kg	100 mg/kg	NA	NA	0.05 mg/L
Pentachlorophenol	87-86-5	5 µg/L	670 µg/kg	200 mg/kg	NA	NA	NA
Phenanthrene	85-01-8	5 µg/L	330 µg/kg	100 mg/kg	0.1 µg/L	7 µg/kg	NA
Phenol	108-95-2	5 µg/L	330 µg/kg	100 mg/kg	NA	NA	0.05 mg/L
Pyrene	129-00-0	5 µg/L	330 µg/kg	100 mg/kg	0.1 µg/L	7 µg/kg	NA
Pyridine [Γ]	110-86-1	NA	NA	NA	NA	NA	0.5 mg/L

[Γ] Not an EPA 625 compound and TCLP compounds only

Appendix 5: Volatiles (VOCs) Quantitation Limits (QLs)

Analyte(s)	CAS Number	Aqueous		Solid	Air	Petroleum	TCLP
		CLP Equivalent (Trace)	EPA 624, SW 8260C, SW 5030C (Mid)	SW 8260C, SW 5030C, SW 5035A	TO-15	SW 8260C, SW 5030C	SW 1311, SW 8260C, SW 5030C
1,1,1,2-Tetrachloroethane	630-20-6	0.5 µg/L	5 µg/L	5 µg/kg	NA	12.5 mg/kg	NA
1,1,1-Trichloroethane	71-55-6	0.5 µg/L	5 µg/L	5 µg/kg	0.5 ppbv	12.5 mg/kg	NA
1,1,2,2-Tetrachloroethane	79-34-5	0.5 µg/L	5 µg/L	5 µg/kg	0.5 ppbv	12.5 mg/kg	NA
1,1,2-Trichloroethane	79-00-5	0.5 µg/L	5 µg/L	5 µg/kg	0.5 ppbv	12.5 mg/kg	NA
1,1-Dichloroethane	75-34-3	0.5 µg/L	5 µg/L	5 µg/kg	0.5 ppbv	12.5 mg/kg	NA
1,1-Dichloroethene	75-35-4	0.5 µg/L	5 µg/L	5 µg/kg	0.5 ppbv	12.5 mg/kg	0.005 mg/L
1,1-Dichloropropene	563-58-6	0.5 µg/L	5 µg/L	5 µg/kg	NA	12.5 mg/kg	NA
1,2,3-Trichlorobenzene	87-61-6	0.5 µg/L	5 µg/L	5 µg/kg	NA	12.5 mg/kg	NA
1,2,3-Trichloropropane	96-18-4	0.5 µg/L	5 µg/L	5 µg/kg	NA	12.5 mg/kg	NA
1,2,4-Trichlorobenzene	120-82-1	0.5 µg/L	5 µg/L	5 µg/kg	0.5 ppbv	12.5 mg/kg	NA
1,2,4-Trimethylbenzene	95-63-6	0.5 µg/L	5 µg/L	5 µg/kg	0.5 ppbv	12.5 mg/kg	NA
1,2-Dibromo-3-chloropropane	96-12-8	0.5 µg/L	5 µg/L	5 µg/kg	NA	12.5 mg/kg	NA
1,2-Dibromoethane (EDB)	106-93-4	0.5 µg/L	5 µg/L	5 µg/kg	0.5 ppbv	12.5 mg/kg	NA
1,2-Dichlorobenzene	95-50-1	0.5 µg/L	5 µg/L	5 µg/kg	0.5 ppbv	12.5 mg/kg	NA
1,2-Dichloroethane	107-06-2	0.5 µg/L	5 µg/L	5 µg/kg	0.5 ppbv	12.5 mg/kg	0.005 mg/L
1,2-Dichloropropane	78-87-5	0.5 µg/L	5 µg/L	5 µg/kg	0.5 ppbv	12.5 mg/kg	NA
1,3,5-Trimethylbenzene	108-67-8	0.5 µg/L	5 µg/L	5 µg/kg	0.5 ppbv	12.5 mg/kg	NA
1,3-Butadiene	106-99-0	NA	NA	NA	0.5 ppbv	NA	NA
1,3-Dichlorobenzene	541-73-1	0.5 µg/L	5 µg/L	5 µg/kg	0.5 ppbv	12.5 mg/kg	NA
1,3-Dichloropropane	142-28-9	0.5 µg/L	5 µg/L	5 µg/kg	NA	12.5 mg/kg	NA
1,4-Dichlorobenzene	106-46-7	0.5 µg/L	5 µg/L	5 µg/kg	0.5 ppbv	12.5 mg/kg	0.005 mg/L
1,4-Dioxane	123-91-1	NA	NA	NA	0.5 ppbv	NA	NA
2,2-Dichloropropane	594-20-7	0.5 µg/L	5 µg/L	5 µg/kg	NA	12.5 mg/kg	NA
2-Butanone	78-93-3	2 µg/L	5 µg/L	5 µg/kg	0.5 ppbv	12.5 mg/kg	0.005 mg/L
2-Chloroethylvinyl ether	110-75-8	NA	NA	5 µg/kg	NA	12.5 mg/kg	NA
2-Chlorotoluene	95-49-8	0.5 µg/L	5 µg/L	5 µg/kg	NA	12.5 mg/kg	NA
2-Hexanone	591-78-6	2 µg/L	5 µg/L	5 µg/kg	0.5 ppbv	12.5 mg/kg	NA
4-Chlorotoluene	106-43-4	0.5 µg/L	5 µg/L	5 µg/kg	NA	12.5 mg/kg	NA
4-Ethyltoluene	622-96-8	NA	NA	NA	0.5 ppbv	NA	NA
4-Methyl-2-pentanone	108-10-1	2 µg/L	5 µg/L	5 µg/kg	0.5 ppbv	12.5 mg/kg	NA

Appendix 5: Volatiles (VOCs) Quantitation Limits (QLs) (cont.)

Analyte(s)	CAS Number	Aqueous		Solid	Air	Petroleum	TCLP
		CLP Equivalent (Trace)	EPA 624, SW 8260C, SW 5030C (Mid)	SW 8260C, SW 5030C, SW 5035A	TO-15	SW 8260C, SW 5030C	SW 1311, SW 8260C, SW 5030C
Acetone	67-64-1	2 µg/L	5 µg/L	10 µg/kg	0.5 ppbv	12.5 mg/kg	NA
Benzene	71-43-2	0.5 µg/L	5 µg/L	5 µg/kg	0.5 ppbv	12.5 mg/kg	0.005 mg/L
Benzyl chloride	100-44-7	NA	NA	NA	0.5 ppbv	NA	NA
Bromobenzene	108-86-1	0.5 µg/L	5 µg/L	5 µg/kg	NA	12.5 mg/kg	NA
Bromochloromethane	74-97-5	0.5 µg/L	5 µg/L	5 µg/kg	NA	12.5 mg/kg	NA
Bromodichloromethane	75-27-4	0.5 µg/L	5 µg/L	5 µg/kg	0.5 ppbv	12.5 mg/kg	NA
Bromoform	75-25-2	0.5 µg/L	5 µg/L	5 µg/kg	0.5 ppbv	12.5 mg/kg	NA
Bromomethane	74-83-9	0.5 µg/L	5 µg/L	5 µg/kg	0.5 ppbv	12.5 mg/kg	NA
Carbon disulfide	75-15-0	0.5 µg/L	5 µg/L	5 µg/kg	0.5 ppbv	12.5 mg/kg	NA
Carbon Tetrachloride	56-23-5	0.5 µg/L	5 µg/L	5 µg/kg	0.5 ppbv	12.5 mg/kg	0.005 mg/L
Chlorobenzene	108-90-7	0.5 µg/L	5 µg/L	5 µg/kg	0.5 ppbv	12.5 mg/kg	0.005 mg/L
Chlorodibromomethane	124-48-1	0.5 µg/L	5 µg/L	5 µg/kg	NA	12.5 mg/kg	NA
Chloroethane	75-00-3	0.5 µg/L	5 µg/L	5 µg/kg	0.5 ppbv	12.5 mg/kg	NA
Chloroform	67-66-3	0.5 µg/L	5 µg/L	5 µg/kg	0.5 ppbv	12.5 mg/kg	0.005 mg/L
Chloromethane	74-87-3	0.5 µg/L	5 µg/L	5 µg/kg	0.5 ppbv	12.5 mg/kg	NA
cis-1,2-Dichloroethene	156-59-2	0.5 µg/L	5 µg/L	5 µg/kg	0.5 ppbv	12.5 mg/kg	NA
cis-1,3-Dichloropropene	10061-01-5	0.5 µg/L	5 µg/L	5 µg/kg	0.5 ppbv	12.5 mg/kg	NA
Cyclohexane	110-82-7	0.5 µg/L	5 µg/L	5 µg/kg	0.5 ppbv	12.5 mg/kg	NA
Dibromomethane	74-95-3	0.5 µg/L	5 µg/L	5 µg/kg	NA	12.5 mg/kg	NA
Dibromochloromethane	124-48-1	NA	NA	NA	0.5 ppbv	NA	NA
Dichlorodifluoromethane	75-71-8	0.5 µg/L	5 µg/L	5 µg/kg	0.5 ppbv	12.5 mg/kg	NA
Dichlorotetrafluoroethane	76-14-2	NA	NA	NA	0.5 ppbv	NA	NA
Ethanol	64-17-5	NA	NA	NA	0.5 ppbv	NA	NA
Ethyl Acetate	141-78-6	NA	NA	NA	0.5 ppbv	NA	NA
Ethylbenzene	100-41-4	0.5 µg/L	5 µg/L	5 µg/kg	0.5 ppbv	12.5 mg/kg	NA
Freon 113	76-13-1	0.5 µg/L	5 µg/L	5 µg/kg	0.5 ppbv	12.5 mg/kg	NA
Heptane	142-82-5	NA	NA	NA	0.5 ppbv	NA	NA
Hexachlorobutadiene	87-68-3	0.5 µg/L	5 µg/L	5 µg/kg	0.5 ppbv	12.5 mg/kg	0.005 mg/L
Hexane	110-54-3	NA	NA	NA	0.5 ppbv	NA	NA
Isopropyl alcohol	67-63-0	NA	NA	NA	0.5 ppbv	NA	NA

Appendix 5: Volatiles (VOCs) Quantitation Limits (QLs) (cont.)

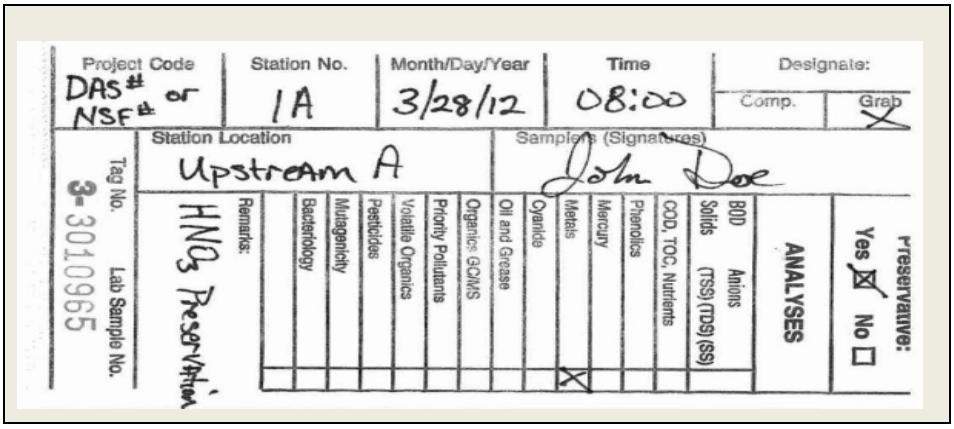
Analyte(s)	CAS Number	Aqueous		Solid	Air	Petroleum	TCLP
		CLP Equivalent (Trace)	EPA 624, SW 8260C, SW 5030C (Mid)	SW 8260C, SW 5030C, SW 5035A	TO-15	SW 8260C, SW 5030C	SW 1311, SW 8260C, SW 5030C
Isopropylbenzene	98-82-8	0.5 µg/L	5 µg/L	5 µg/kg	NA	12.5 mg/kg	NA
Methyl Acetate	76-20-9	0.5 µg/L	5 µg/L	5 µg/kg	NA	12.5 mg/kg	NA
Methylcyclohexane	108-87-2	0.5 µg/L	5 µg/L	5 µg/kg	NA	12.5 mg/kg	NA
Methylene Chloride	75-09-2	0.5 µg/L	5 µg/L	5 µg/kg	0.5 ppbv	12.5 mg/kg	NA
Methyl-tert-butyl ether	1634-04-4	0.5 µg/L	5 µg/L	5 µg/kg	0.5 ppbv	12.5 mg/kg	NA
m-Xylene p-Xylene	108-38-3 106-42-3	1 µg/L	10 µg/L	10 µg/kg	1 ppbv	25 mg/kg	NA
Naphthalene	91-20-3	0.5 µg/L	5 µg/L	5 µg/kg	0.5 ppbv	12.5 mg/kg	NA
n-Butylbenzene	104-51-8	0.5 µg/L	5 µg/L	5 µg/kg	NA	12.5 mg/kg	NA
n-Propylbenzene	103-65-1	0.5 µg/L	5 µg/L	5 µg/kg	NA	12.5 mg/kg	NA
o-Xylene	95-47-6	1 µg/L	10 µg/L	10 µg/kg	0.5 ppbv	25 mg/kg	NA
p-Isopropyltoluene	99-87-6	0.5 µg/L	5 µg/L	5 µg/kg	NA	12.5 mg/kg	NA
Propylene	115-07-1	NA	NA	NA	0.5 ppbv	NA	NA
sec-Butylbenzene	135-98-8	0.5 µg/L	5 µg/L	5 µg/kg	NA	12.5 mg/kg	NA
Styrene	100-42-5	1 µg/L	10 µg/L	10 µg/kg	0.5 ppbv	25 mg/kg	NA
tert-Butylbenzene	98-06-6	0.5 µg/L	5 µg/L	5 µg/kg	NA	12.5 mg/kg	NA
Tetrachloroethene	127-18-4	0.5 µg/L	5 µg/L	5 µg/kg	0.5 ppbv	12.5 mg/kg	0.005 mg/L
Tetrahydrofuran	109-99-9	NA	NA	NA	0.5 ppbv	NA	NA
Toluene	108-88-3	0.5 µg/L	5 µg/L	5 µg/kg	0.5 ppbv	12.5 mg/kg	NA
trans-1,2-Dichloroethene	156-60-5	0.5 µg/L	5 µg/L	5 µg/kg	0.5 ppbv	12.5 mg/kg	NA
trans-1,3-Dichloropropene	10061-02-6	0.5 µg/L	5 µg/L	5 µg/kg	0.5 ppbv	12.5 mg/kg	NA
Trichloroethene	79-01-6	0.5 µg/L	5 µg/L	5 µg/kg	0.5 ppbv	12.5 mg/kg	0.005 mg/L
Trichlorofluoromethane	75-69-4	0.5 µg/L	5 µg/L	5 µg/kg	0.5 ppbv	12.5 mg/kg	NA
Vinyl acetate	108-05-4	0.5 µg/L	5 µg/L	5 µg/kg	0.5 ppbv	12.5 mg/kg	NA
Vinyl chloride	75-01-4	0.5 µg/L	5 µg/L	5 µg/kg	0.5 ppbv	12.5 mg/kg	0.005 mg/L

Appendix 6: Nitroaromatics/Nitramines/Explosives Quantitation Limits (QLs)

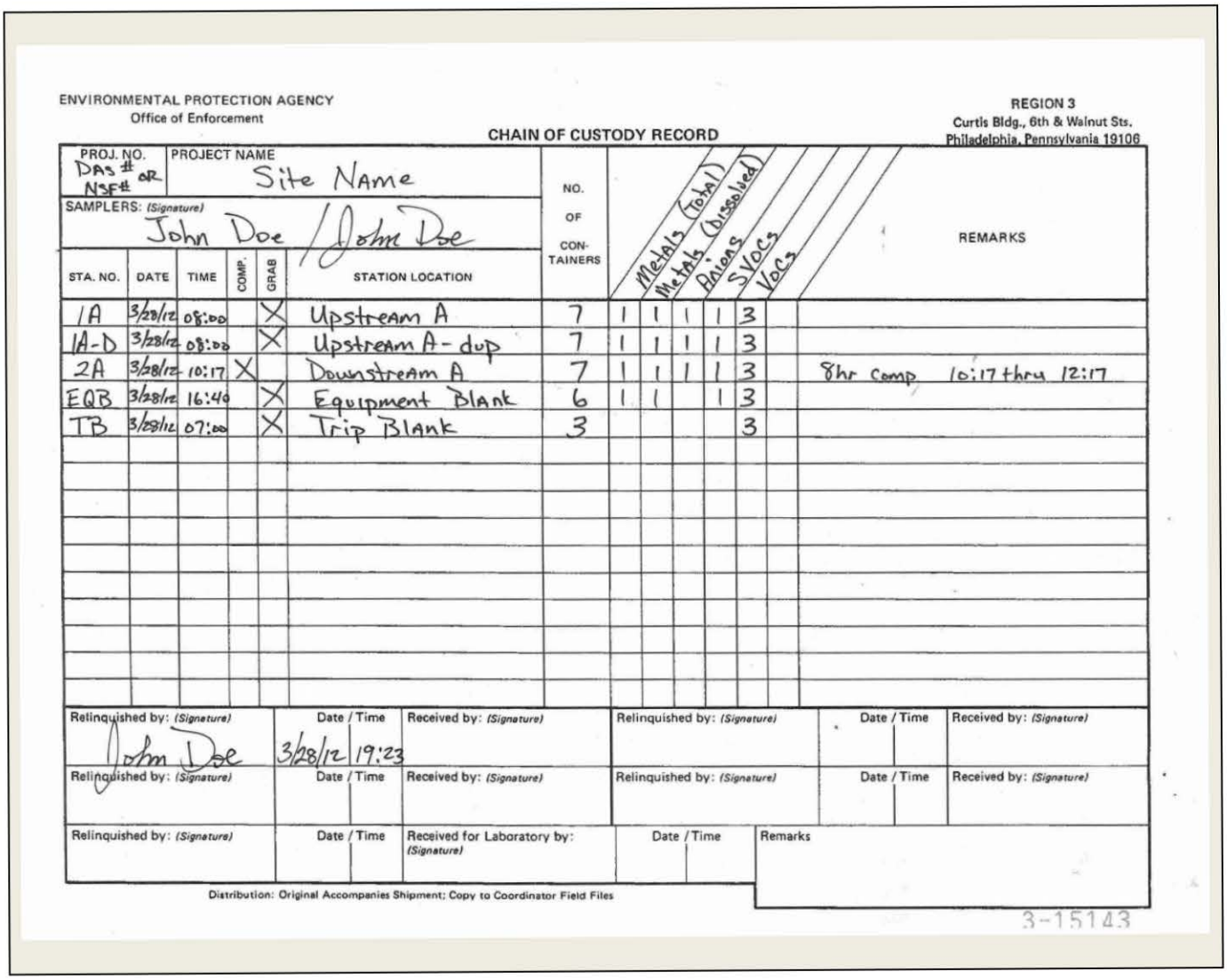
Analyte(s)	CAS Number	Aqueous	Soil
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	2691-41-0	0.075 µg/L	0.04 mg/kg
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	121-82-4	0.075 µg/L	0.04 mg/kg
1,3,5-Trinitrobenzene (1,3,5-TNB)	99-35-4	0.075 µg/L	0.04 mg/kg
1,3-Dinitrobenzene (1,3-DNB)	99-65-0	0.075 µg/L	0.04 mg/kg
Methyl-2,4,6-trinitrophenylnitramine (tetryl)	479-45-8	0.075 µg/L	0.04 mg/kg
Nitrobenzene (NB)	98-95-3	0.075 µg/L	0.04 mg/kg
2,4,6-Trinitrotoluene (2,4,6-TNT)	118-96-7	0.075 µg/L	0.04 mg/kg
4-Amino-2,6-dinitrotoluene (4-Am-DNT)	1946-51-0	0.075 µg/L	0.04 mg/kg
2-Amino-4,6-dinitrotoluene (2-Am-DNT)	35572-78-2	0.075 µg/L*	0.04 mg/kg
2,4-Dinitrotoluene (2,4-DNT)	121-14-2	0.15 µg/L*	0.08 mg/kg
2,6-Dinitrotoluene (2,6-DNT)	606-20-2	0.15 µg/L	0.08 mg/kg
2-Nitrotoluene (2-NT)	88-72-2	0.075 µg/L	0.04 mg/kg
3-Nitrotoluene (3-NT)	99-08-1	0.075 µg/L	0.04 mg/kg
4-Nitrotoluene (4-NT)	99-99-0	0.075 µg/L	0.04 mg/kg
Nitroglycerine (NG) (On Demand only)	55-63-0	–	–
1,2-Dinitrobenzene (surrogate standard)	528-29-0	–	–

* Reported as coeluting isomers

Appendix 7: Sample Tag Example



Appendix 8: Chain of Custody Example



ENVIRONMENTAL PROTECTION AGENCY
Office of Enforcement

REGION 3
Curtis Bldg., 6th & Walnut Sts.
Philadelphia, Pennsylvania 19106

CHAIN OF CUSTODY RECORD

PROJ. NO. DAS # OR NSF # | PROJECT NAME: Site Name

SAMPLERS: (Signature) John Doe / John Doe

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	Metals (Total)	Metals (Dissolved)	Arsenic	SVOCs	VOCs	REMARKS
1A	3/28/12	08:00		X	Upstream A	7	1	1	1	1	3	
1A-D	3/28/12	08:00		X	Upstream A - dup	7	1	1	1	1	3	
2A	3/28/12	10:17	X		Downstream A	7	1	1	1	1	3	8hr Comp 10:17 thru 12:17
EQB	3/28/12	16:40		X	Equipment Blank	6	1	1		1	3	
TB	3/28/12	07:00		X	Trip Blank	3					3	

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
John Doe	3/28/12 19:23				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)

Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

3-15143

Appendix 9: Hazard and Risk Exposure Data Sheet

Region III, Office of Analytical Services and Quality Assurance
Ft Meade, Maryland
HAZARD AND RISK-EXPOSURE DATA SHEET
LEVELS OF PERSONAL PROTECTION DURING SAMPLING

BACKGROUND

Under the authority Section 104 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund) of 1980, Section 311 of the Clean Water Act, and Subtitle I of the Resource Conservation and Recovery Act (RCRA), EPA has been delegated the responsibility to undertake response actions with respect to the release or potential release of oil, petroleum, or hazardous substances that pose a substantial threat to human health or welfare, or the environment.

GENERAL

This form is to be used when collecting Environmental Samples (i.e. streams, farm ponds, wells, soils etc.) and for Hazardous Sample (i.e. drums, storage tanks, lagoons, leachates, hazardous waste sites). This information is intended for use as a guide for the safe handling of these laboratory samples in accordance with EPA and OSHA regulations. The sample classification(s) and levels of personal protection used by the sampler in all situations will enable the analyst to be better aware of potential exposure to substances in air, splashes of liquids, or other direct contact with material due to work being done.

DEGREE OF PROTECTION

_____ Level A: Highest level of respiratory, skin, and eye protection needed. Fully encapsulated suit, respirator self-contained (Tank type).

_____ Level B: Highest level of respiratory protection but lesser level of skin protection needed. Chemical suit, respirator self-contained (Tank type).

_____ Level C: Lesser level of respiratory protection than Level B. Skin protection criteria are similar to Level B. Chemical suit, canister respirator/cartridge

_____ Level D: Work uniform without any respirator or skin hazards. Lab coat, gloves etc.

CLASSIFIED FIELD SAMPLES

_____ Environmental _____ Hazardous _____ Comb. (Env. & Haz.) _____ Radioactive

Site Name:_____ Sampling Date:_____

Station No. _____, _____, _____, _____, _____, _____,

Field pH: _____, _____, _____, _____, _____, _____,
(must be taken prior to submission of aqueous samples)

Sampler: _____ Work Phone Number: _____

Personal observations at time of sampling (surroundings):
Sample collection observations (physical sample, odors etc.):

Appendix 10: OASQA Sample Acceptance Policy

OASQA Sample Acceptance Policy

The following are those conditions which indicate that the integrity of the sample may have been jeopardized, either during the actual sampling event or during its shipment to the lab. If one or more of these conditions exist, the laboratory will consult with the requester to determine whether to reject the sample(s) for analysis or to perform a qualified analysis. If the sample(s) is (are) rejected, the sampler will be given the opportunity to resample. If the analysis is performed, the data will be reported with qualifiers explaining why the data may have been compromised, and the potential impact on the data. In some cases it may be possible for the laboratory to complete the analysis with some adjustments. For example, if there is insufficient sample volume, the data may have to be reported with increased quantitation limits or the requestor may be asked to prioritize analytical requests.

The condition of sample(s) and shipment will be documented on the OASQA Shipment Documentation Form. The Sample Scheduling Coordinator may request a Letter-To-File from the sampler to document additional critical details. Any actions taken because of the compromised condition of a sample will be noted in the laboratory's information management database and in the report narrative sent to the requester.

Conditions which may jeopardize the integrity of the sample:

- Not collected in appropriate containers.
- If cooling is required for the requested analytes, samples are received at greater than 6 degrees C or missing the temperature blank.
- Not properly preserved as outlined in Tables 1, 2, and/or 3 of the OASQA Sample Submission Procedures.
- Received past the analytical holding time.
- Samples tampered with during shipment. (Example: custody seal has been broken)
- Insufficient sample to perform sample analysis or the quality control analysis.
- Sample identification incorrect, incomplete, or missing.
- Chain-of-custody documentation not available, inaccurate or incomplete.
- Samples inappropriate for requested analysis. (Example: decomposed condition)
- Leaking or broken container.
- Lack of a trip blank with samples collected for volatile analysis.
- Not completing the Hazard and Risk Exposure Data Sheet.

NOTE: One other condition which would cause samples to be rejected by OASQA is if the samples are suspected to contain dioxin or radioactivity. At this time, this facility is not prepared to handle the potential hazard of dioxin contamination.

Appendix 11: Region III 5035A Fact Sheet

Region III 5035A Fact Sheet
May 15, 2003, Revision No: 2

Field Samplers Guide to the Collection and Handling of Soil Samples for Volatile Organic Analysis using SW 846 Method 5035A, July 2002

Summary:
The purpose of this fact sheet is to specify procedures for the collection and handling by **field samplers** of soil samples for volatile organic analysis (VOA) in Region III. SW-846 Method 5035A is the collection method required for analysis of soil samples for VOA. This method incorporates chemical preservatives and sample storage techniques to limit volatilization and biodegradation of organic compounds. Method 5035A is applicable to both low/medium and high level soil samples.

Collection Procedures:
• Soil samples being analyzed for volatile organic compounds collected via Method 5035A should not be chemically preserved in the field.
• Samples should be collected using the following collection options:

Option 1: For most Soil types

Number of samples: 4 EnCore (or similar closed-sampling vessel) samplers
4 QC EnCore samplers
1x40 mL vial for moisture analysis

EnCore samplers (or similar sample collection device, refer to Section 6.5 of Method 5035A)

Samples must be cool, ≤ 6°C upon collection and during shipment and bagged individually upon collection.
Samples must arrive at the laboratory within 24 hours.
Samples must be analyzed or preserved by the lab within 48 hours of collection.

Option 2: For Non-Cohesive Granular Material (wet, rocky, sediments, etc.)

Number of samples: 4x40 mL vials (sampler may use wide mouth jars if sample not amenable to smaller vials)
2 QC 40 mL vials
1x40 mL vial for moisture analysis

Samples must be cool, ≤ 6°C upon collection and during shipment.
Samples must arrive at the laboratory within 24 hours.
Samples must be analyzed or preserved by the lab within 48 hours of collection.