Standard Operating Procedure for the Waste Management and Remediation Division

Data Review and Verification of Third-Party Petroleum Release Investigation and Underground Storage Tank Closure and Change-in-Service Data Submittals

SOP WST-2014-11, Version 1

State of Idaho
Department of Environmental Quality

Waste Management and Remediation

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Approval Signatures

This statewide standard operating procedure (SOP) becomes effective on the date of the last approval signature.

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1 Purpose and Applicability

This standard operating procedure (SOP) was created for Idaho Department of Environmental Quality (DEQ) Waste Management and Remediation Division (WMR) staff to conduct data review and verification for third-party underground storage tank (UST) closure or change-in-service data submittals. This SOP identifies the steps DEQ Waste Management and Remediation Division staff, typically the Regional Office Project Manager or other technical staff assigned to the project, will take in conducting the data review and verification. The data review and data verification checklists are included in Appendix B of the Third-Party Petroleum Release Investigation and UST Closure and Change-in-Service QAPP (DEQ 2014). Data review and data verification methods are presented in Section 23 of the Third-Party Petroleum Release Investigation and UST Closure and Change-in-Service QAPP (DEQ 2014). This SOP supplements the Third-Party Petroleum Release Investigation and UST Closure and Change-in-Service QAPP.

If contamination is identified during petroleum release investigation, then DEQ will direct the third-party to conduct further assessment of soil and ground water per IDAPA 58.01.02.852. Data collection and quality assurance associated with petroleum release assessment and corrective action, regardless of association with the Leaking UST Program or General Remediation Program, are discussed in a separate QAPP and SOPs.

If contamination is identified during UST closure activities and the contamination is limited to the surrounding soil only (i.e., ground water is not impacted), the contamination is completely removed during the UST closure activities, and the volume of contaminated soil removed is less than or equal to 10 cubic yards, then DEQ considers the soil excavation and disposal to be incidental to the UST closure and subject to the Third Party PST Petroleum Release Investigation and UST Closure and Change-in-Service QAPP. For all other instances, note that data collection and quality assurance associated with petroleum release assessment and corrective action, regardless of association with the Leaking UST Program or General Remediation Program, are discussed in a separate QAPP and SOPs. The LUST program manager will determine if the site will be identified as a LUST site.

This SOP does not address cleaning and disposal of the tank, sampling and disposal of tank fluids and sludge, or sampling and disposal of excavated soil incidental to UST closure or change-in-use activities

1.1 Mission and Authority

This SOP provides a process for conducting data review and verification of third-party petroleum release investigations or UST closure or change-in-service data submittals.

1.2 Program Objectives

The objective is statewide consistency for conducting data review and verification of third-party data submittals. The goal of data review is to ensure the data and information submitted to DEQ

is recorded correctly. The goal of data verification is to evaluate the completeness, correctness, conformance and compliance of the data and information submitted against specific acceptance criteria established in the Third-Party Petroleum Release Investigation and UST Closure and Change-in-Service QAPP. The third-party data and information submitted to DEQ are reviewed for completeness and content, and evaluated against project requirements.

2 Definitions

Accuracy: The closeness of agreement between an observed value and an accepted reference value. Typically, spiked sample recoveries are used to assess laboratory accuracy as well as satisfactory performance of blank analyses. Accuracy requirements are identified in the specific third-party data QAPP under which the data is being evaluated.

Analyte: The element, ion, compound, or aggregate property of a sample for which an analysis seeks to determine its quantity and/or presence.

Blank sample: Samples of known matrix free of the specific constituents selected for analysis. Blank samples are typically submitted to the laboratory blind and are used to measure data accuracy. Blank samples may also reveal contamination problems due to sample collection method or sampling conditions.

Completeness: The percentage of total measurements completed that are not qualified thus increasing the degree of confidence in the reported result. Completeness requirements are identified in the specific third-party data QAPP under which the data is being evaluated.

Data Package: A collection of information that includes data from analysis of all samples associated with a work request, including field and analytical samples, re-analyses, blanks, duplicates, and spikes.

Data Validation: A technical review performed to compare data with established quality criteria to ensure the data are adequate for the intended use. Data validation confirms that the verified results meet the overall quality requirements of the intended use.

Data Verification: An evaluation of the completeness, correctness, consistency and conformance/compliance of the data against pre-determined requirements, and to ensure that the records associated with the data reflect actual activities.

Duplicate samples: Two samples collected from the same location and representing the same sampling event which are carried through all assessment and analytical procedures in an identical manner. Duplicate samples are collected sequentially, or nearly so, from the same sample location or split from the same container and analyzed for the same analytes. Duplicate samples may be “replicates” (samples taken one immediately after the other, separated only by the actual time required to fill the sample container), or “splits” (subsamples drawn from the same initial volume of sample matrix). Duplicate samples are analyzed to verify sampling and analytical reproducibility and sample repeatability; i.e. precision.

Equipment blank: A sample matrix of known constituent quantity that has passed through or over non-dedicated sampling equipment to verify the cleaning procedure (decontamination) between samples.

Field blank: A clean sample of known matrix that is placed into a sampling container and otherwise treated the same as other samples collected to verify general sampling and handling procedures.

Holding Time: The time period from sample collection to laboratory analysis. For some analyses, the time from sample collection to sample preparation or extraction must also be considered.

Matrix: The dominant material of which the sample to be analyzed is composed. Matrix is not synonymous with phase (solid, vapor, or liquid).

MDL: Method detection limit (MDL) is the lowest concentration of a substance that can be measured with 99% confidence that the substance is present in the sample.

Precision: The agreement among a set of replicate measurements without assumption of knowledge of the true value. Precision is calculated by means of duplicate/replicate analyses. These samples will contain concentrations of analyte above the MDL, and may involve the use of matrix spikes. The most commonly used measures of precision are the relative percent difference (RPD) when comparing duplicate and standard samples. Precision requirements are identified in the specific third-party data QAPP under which the data is being evaluated.

Professional Judgment: Discernment that is a cumulative result of scientific and technical training, experience in analytical testing and reporting, and good understanding of specific method-required quality assurance and quality control (QA/QC) procedures.

Trip blank: Generally pertain to volatile organic compound (VOC) samples. A trip blank is a clean sample prepared by the laboratory prior to the sampling event and transported with the sample containers to the site and back to the laboratory with the samples collected in the field (i.e., trip blanks accompany sample containers throughout the sampling event). Trip blanks are analyzed for VOCs or dissolved gasses to verify that the sample containers are clean and free of contamination through outside influences.

Usability: The percentage of the total measurements requested that are not rejected and deemed usable.

3 Personnel Qualifications

DEQ staff conducting data review and verification of third-party data submittals under this SOP must have experience in petroleum release investigations and UST closure and change-in-service requirements typical of an Analyst 3 or 4, as well as a working knowledge of QA/QC requirements.

4 Procedures

4.1 Review Applicable Reference Documents

The data reviewer and verifier, typically the Regional Office Project Manager or technical staff assigned to the project, will be familiar with the Third-Party Petroleum Release Investigation and UST Closure and Change-in-Service QAPP (DEQ 2014) under which the data review and data verification is conducted.

The data reviewer and verifier may also need to review and utilize various reference documents, either directly (e.g., specifically referenced/cited by the third-party) or indirectly (e.g., general guidance documents) applicable to the specific activities conducted by the third-party. If the third-party does not specify which published procedure was used, states that industry practices were followed with no other information, or does not state anything about following industry practices, the data reviewer and data verifier will use professional judgment in identifying the necessary reference documents to utilize. The following standards and guidance documents, as well as others not listed, may be utilized by project staff:

- ASTM standards (available from Regional Office Remediation Managers)
    - D4547-09 (2009) Standard Guide for Sampling Waste and Soils for Volatile Organic Compounds
    - D4687-95 (2006) Standard Guide for General Planning of Waste Sampling
    - D4840-99 (2010) Standard Guide for Sampling Chain-of-Custody Procedures
    - D5283-92 (2009) Standard Practice for Generation of Environmental Data Related to Waste Management Activities: Quality Assurance and Quality Control Planning and Implementation
    - D5792-10 Standard Practice for Generation of Environmental Data Related to Waste Management Activities: Development of Data Quality Objectives
    - D5956-96 (2006) Standard Guide for Sampling Strategies for Heterogeneous Wastes
    - D6044-96 (2009) Standard Guide for Representative Sampling for Management of Waste and Contaminated Media
    - D6051-96 (2006) Standard Guide for Composite Sampling and Field Subsampling for Environmental Waste Management Activities
    - D6233-98 (2009) Standard Guide for Data Assessment for Environmental Waste Management Activities
    - D6418-09 Standard Practice for Using the Disposable En Core Sampler for Sampling and Storing Soil for Volatile Organic Analysis
- EPA Analytical Methods (*http://www.epa.gov/epawaste/hazard/testmethods/sw846/online/index.htm*)
- DEQ Guidance
    - Used Oil UST Closure and Release Sampling Standard Operating Procedures (TRIM 2016BAF24)
    - The 2012 risk evaluation manual and guidance for petroleum constituents (*http://www.deq.idaho.gov/waste-mgmt-remediation/remediation-activities/risk-evaluation-manuals.aspx*)

- ITRC Guidance
  - ITRC Biofuels Release Prevention, Environmental Behavior and Remediation, September 2011 (*http://www.itrcweb.org/GuidanceDocuments/biofuels/biofuels-1.pdf*)
- EPA guidance
  - RCRA Waste Sampling Draft Technical Guidance, August 2002 (*http://www.epa.gov/solidwaste/hazard/testmethods/sw846/samp_guid.htm*)
  - OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils, November 2002 (*http://www.epa.gov/epawaste/hazard/correctiveaction/eis/vapor/complete.pdf*)

4.2 Data Review

Data review is conducted to ensure that data and information submitted to DEQ is correctly recorded and applies to activities conducted in the field as well as in the analytical laboratory. Therefore, the data reviewer must review the submitted information and documents regarding field activities and laboratory analysis of samples collected by the third-party.

4.2.1 Field Data

Submission of field activity information and data may include:

- Information regarding tank cleaning, including liquid and sludge removal.
- Information regarding tank removal or closure-in-place with a solid inert material.
- Field instrument calibration records.
- Field notebook or daily activity logs which record field activities via written notes or electronic notes by field personnel.
- Sample collection logs or records of samples collected.
- Driller logs for borings or records of soil, geology, and hydrogeology at sample locations.
- Monitoring well logs or records of well completion information.
- Chain-of-custody (COC) documents or proof that samples were not tampered with and samples were under appropriate security at all times.

Each project may not have all of the identified records above submitted to DEQ by third parties for field and analytical laboratory activities. The data reviewer will document what records were submitted and included as part of the data review process.

4.2.2 Laboratory Data

Submission from the analytical laboratory may include:

- Sample receipt information including identification of the condition and status of samples upon delivery to the laboratory (e.g., temperature, sealed cooler, broken containers, air pockets/bubbles for VOC samples, etc.)
- Sample identification and analysis information including preparation dates and times, analysis dates and times, analytical methods, analytical results, reported unit values, sample size, dilution factors, and MDLs.
- Chain-of-custody documentation or proof that samples were not tampered with and that samples were under appropriate security at all times.

Each project may not have all of the identified records above submitted to DEQ by third parties for field and analytical laboratory activities. The data reviewer will document what records were submitted and included as part of the data review process.

4.2.3 Minimum Acceptance Criteria

The data reviewer will ensure that the minimum data and information required for DEQ to evaluate the site assessment and/or corrective action activities conducted by third parties, and to determine further necessary actions at petroleum sites, are provided to DEQ (see minimum acceptance criteria below from Section 18.6 of the Third-Party Petroleum Release Investigation and UST Closure and Change-in-Service QAPP [DEQ 2014]):

1. Identification of the petroleum storage tanks subject to petroleum release investigation or underground storage tanks being closed (either by removal or filling with a solid inert material for closure-in-place) or subject to change-in-service as containing only certain petroleum products (e.g., leaded or unleaded gasoline, diesel, heating oil, motor oil, aviation gas and/or jet fuels) and/or used oil. Minimum Acceptance Criteria 18.6.1.a.
2. Sample collection information.
    a. Type, location and depth (elevation) of soil and soil vapor samples. Soil vapor sampling would not typically occur for a petroleum release investigation or for an UST closure. However, soil vapor sampling may be conducted for an UST change-in-service. Minimum Acceptance Criteria 18.6.1.b.
    b. Sample collection procedures. This includes information and other documentation on sample collection methods (e.g., 5035 for VOC soil samples), sampling equipment used (e.g., scoop, hand auger, push-probe, etc.) as well as the sampling method(s) employed (e.g., discrete). Deviations from standard practice (industry accepted practices) or written procedures accepted by DEQ should be noted. Minimum Acceptance Criteria 18.6.1.c and f.
    c. Sample handling documentation. Minimum Acceptance Criteria 18.6.1.d.

   d. Sample location map. Map depicting the site and locations of samples collected as part of the petroleum release investigations or UST closure activities. Minimum Acceptance Criteria 18.6.1.e.

3. Current analytical data (within the last 12 months). Minimum Acceptance Criteria 18.6.1.g.

4. Sample analytical methods used. Minimum Acceptance Criteria 18.6.1.h.

5. List of chemicals or analytes included in the analysis. Minimum Acceptance Criteria 18.6.1.i.

6. Sample containers and sample preservatives used. Minimum Acceptance Criteria 18.6.1.j.

7. Sample preparation, including extraction, and analysis dates. Minimum Acceptance 18.6.1.k.

8. Trip blank samples analyzed when collecting volatile organic compound (VOC) samples. Minimum Acceptance Criteria 18.6.1.l.

9. Laboratory reporting limits and MDLs, including measurement units for sample analysis. Minimum Acceptance Criteria 18.6.1.m.

10. Laboratory control sample and/or duplicate analyses. Minimum Acceptance Criteria 18.6.1.n.

11. Matrix spike and/or spike duplicate analyses. Minimum Acceptance Criteria 18.6.1.o.

12. Chain of custody documentation, including project identification or name, sample date and time, sample numbers, sample matrix, sample container and preservation, sample analytical methods, and sample transfer dates, times, and signatures. Minimum Acceptance Criteria 18.6.1.p.

13. Laboratory data reports. Data reports may include items above. Minimum Acceptance Criteria 18.6.1.q.

14. DEQ on-site during critical aspects of petroleum release investigations or UST closure site activities conducted by third parties. DEQ staff should observe and document petroleum release investigations or UST closure field activities. Minimum Acceptance Criteria 18.6.1.r.

Any missing data or information may be requested from the third-party prior to conducting data verification. If sampling activities were conducted using specific SOPs, copies of those SOPs will be provided to DEQ for review as part of the submittal.

If missing data or information is not available, the Regional Office Project Manager may discuss the situation with the Regional Office Program Manager, Regional Office QAO, and State Office Program Manager to determine if continuation to data verification activities will occur and the potential for modification of minimum acceptance criteria (see Section 18.4 of

the Third-Party Petroleum Release Investigation and UST Closure and Change-in-Service QAPP [DEQ 2014]).

4.2.4 Supplemental Data

The third-party may provide DEQ with additional data, considered as supplemental, that may be used to make decision regarding further necessary actions at petroleum release investigations or UST closure sites. Supplemental data may include the following (see below from Section 18.6 of the Third-Party Petroleum Release Investigation and UST Closure and Change-in-Service QAPP [DEQ 2014]):

1. Field data (Level I – see Appendix A) summary, readings, and field instrument calibration, if collected.

2. Documentation of field duplicate samples collected.

3. Equipment blank samples collected to evaluate decontamination practices.

4.3 Data Verification of Field Activities

The data verifier will conduct the following analysis, as applicable, based on information provided by the third-party:

4.3.1 Field Records.

1. Evaluate submitted field records for consistency. Field records will include field instrument calibration data, if instruments are used.

   Some examples of warning signs for improper field records include:

   - Unexpected field conditions (e.g., adverse terrain or inclement weather) may prompt ‘cutting of corners’ to collect samples.

   - Absence of field instrument calibration data or unusual calibration data for photoionization detector (or other field instruments) results in potential improper screening of soil and soil vapor borings and collection of soil and soil vapor samples.

   - Composited samples for VOC analysis result in loss of volatile compounds (contaminants) unless collected using appropriate methods such as EPA Method 5035 and the analytical data would be biased low and not representative of actual conditions.

2. Verification. Any field record inconsistencies, discrepancies, or missing information must be documented with an explanation provided in a verification narrative.

4.3.2 Sample Collection and Handling.

The type of petroleum product (e.g., gasoline, diesel, heating oil, and/or jet fuels) contained in the PST and/or use of a PST for used oil determines the chemicals of concern, sampling requirements and analytical method requirements. Review submitted sample collection and handling information, including specific sample collection procedures. If DEQ staff were on-site during all or part of the field activities, review DEQ field records and third-party records to identify potential warning signs or sampling problems.

1. Appropriate sample collection and handling methods were used, through implementation of standard of practice or industry standard practices, or in accordance with published standards and guidance (e.g., ASTM, company SOPs, EPA or other agency, etc.). If third parties do not have a written SOP, a general description of sample collection methods would suffice. However, there are certain aspects of sampling that are considered 'standard' or accepted industry practices that must be followed whether the third-party specifically identifies it or not.

    a. Soil, ground water and soil vapor sampling procedures must be conducted in a manner that minimizes the loss of VOCs and limits the potential for contamination.

        i. VOC soil sampling. The required method for the collection of soil samples for VOC analysis is EPA Method 5035A, as specified by EPA Region 4 (*http://www2.epa.gov/sites/production/files/2015-06/documents/Soil-Sampling.pdf*) (EPA 2014). Method 5035 is a best management practice for minimizing loss of volatiles and providing a representative sample for VOC analysis. Use of this method significantly reduces the losses of chemical constituents by volatilization. Sampling by this method typically involves the use of a soil syringe or similar tool to take a small 5 gram sample which can either be extruded in the field into a pre-weighed 40mL vial with a Teflon coated septum-sealed screw- which either contain a preservative (such as sodium-bisulfate for low-levels or methanol for high levels), or are frozen/chilled for shipment to the laboratory within 48 hours of collection.

            Laboratories will often supply the sampling equipment, along with pre-weighed sampling containers containing the preservative. Soil moisture content will be assessed at each sampling location to allow the laboratory to calculate chemical concentrations on a dry weight basis which is collected in a separate 2 oz. clear sample jar.

            A clear justification/rationale for not utilizing Method 5035 as the soil sample collection method and a clear description of the soil sample collection method used must be provided by the third party.

ii. PAH soil sampling. The method for collection of soil samples for PAH analysis is to place the soil samples directly into laboratory provided containers (e.g., 4-ounce clear glass jar with Teflon lid) using clean dedicated or decontaminated soil sampling devices (e.g., hand auger, soil corer, split spoon, direct push probe, backhoe, or hand tool). The PAH soil sample preservative is to place the samples on ice to 4^{o}C.

iii. Halogenated solvent soil sampling (for used oil release assessment and corrective actions). For used oil release assessment and corrective actions, soil samples for halogenated solvent analysis are required. The required method for collection and analysis of soil samples for halogenated solvent soil samples is the same as identified above for VOC soil sampling.

iv. Metal soil sampling (for used oil release investigations and UST closure or change-in-service). For used oil release investigations, and UST closure or change-in-service assessment, soil samples for total metals analysis are required. The total metals analysis should include the RCRA 8 metals (i.e., arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver). The method for collection of soil samples for metals analysis is to place the soil samples directly into laboratory provided containers (e.g., 4-ounce amber jar) using clean dedicated or decontaminated soil sampling devices (e.g., hand auger, soil corer, split spoon, direct push probe, backhoe, or hand tool). Preservatives are not necessary for soil samples for total metals analysis.

v. Soil vapor sampling (for change-in-service or closure-in-place, if applicable). Vapor points may be installed as subsurface or as sub-slab (below a concrete slab) points. Vapor points should be installed within permeable strata deep enough to minimize potential short-circuit or withdrawal of atmospheric vapor and shallow enough to measure potential risks from soil vapor to indoor air quality.

Prior to sample collection leak detection for the vapor monitoring points should be performed. The tracer gas method, with helium as the tracer gas, is generally used. Vapor point sampling should occur immediately following lead detection activities. *Reference Handbook for Site- Specific Assessment of Sub-Surface Vapor Intrusion to Indoor Air* (2005).

vi. Indoor/Ambient air sampling (for change-in-service or closure-in-place, if applicable). Collection of these data provides the best opportunity for developing multiple lines of evidence in determining if vapor intrusion presents a building-specific risk. Collection of indoor air data should, at a minimum, be

accompanied with concurrently collected outside ambient air, an inventory of potential indoor chemical sources, and information on building construction and heating/cooling system design and operation. In many cases, collection of subslab and subsurface soil vapor data can help determine if subsurface petroleum releases are contributing to vapor intrusion risk. Specifically, deeper subsurface soil vapor data collected under the building may establish that chemical concentrations detected in the subslab originate, in whole or in part, from indoor air rather than from subsurface contamination. Indoor air/ambient air samples must be collected in a method that allows for laboratory detection limits below the applicable risk screening level for the contaminants of concern. Typical collection methods are EPA Method TO-15 or EPA Method TO-17.

vii. VOC Ground water sampling. Ground water samples may be collected as part of the petroleum release investigation and will be representative of ground water quality upgradient, underlying, and downgradient of the site, and will be collected by appropriate methods (e.g., bailer, pumps, in-situ, etc.) and placed into appropriate containers. Samples for VOC analysis will be collected directly into, or transferred using clean equipment with as little disturbance as possible, to 40 ml VOA glass vial with a Teflon coated septum-sealed screw-cap. No air space will be present in the sample container. This can be checked by inverting the bottle and checking for air bubbles. The presence of air bubbles may mean the samples are not acceptable for laboratory analysis. Laboratories may analyze samples with air bubbles, if the bubbles are small, and note the presence of the bubble on the COC or data sheet. VOC samples will not be collected near an source (e.g., running engine) that may bias the results.

viii. PAH Ground Water Sampling. The method for collection of ground water samples for PAH analysis is to place the water samples directly into laboratory provided containers (e.g., 40 ml glass VOA with Teflon lid) using clean dedicated or decontaminated water sampling equipment. The PAH ground water sample preservative is to place the samples on ice to 4^{o}C.

b. IDAPA 58.01.24.800.01 (Table 1) includes the list of petroleum-related chemicals (volatile organic compounds (VOC), semi-VOCs (SVOCs), and polycyclic aromatic hydrocarbons (PAHs)) to include in sampling and analysis based on various petroleum products known or suspected to have been stored in the PST.

c. Ethylene dibromide (EDB) [also known as 1,2-dibromoethane] and ethylene dichloride (EDC) [also known as 1,2-dichloroethane] by Method 8260B will be included in the sampling and analysis for PST petroleum

release investigations and UST permanent closure or changes-in-service for sites that are known or suspected to contain leaded regular gasoline (e.g., tanks in service prior to 1990) or aviation gas (see IDAPA 58.01.24.800.01, Table 1).

d. Tanks that contain leaded gasoline may contain sludge having a high lead content, which may be subject to hazardous waste management and disposal requirements. The sludge removed from a tank must have a hazardous waste determination.

e. For used oil petroleum release investigations, and UST closures and change-in-service assessments, sampling must include total metals (e.g., arsenic, cadmium, chromium and lead) and halogenated solvents as shown in Table 1 unless the Third Party can demonstrate otherwise through process knowledge of operations or if the soil will be designated as a hazardous waste (see DEQ Used Oil UST Closure and Release Sampling Standard Operating Procedures (TRIM 2016BAF24)). Used oil means any oil that (as a result of use) has become contaminated by physical or chemical impurities. Examples of used oil include, but are not limited to, motor oils, metal cutting oils, and hydraulic fluids. Waste oil means oil that is discarded or spilled before use.

Table 1. Used Oil Tank Analytical Parameters		
Media	Parameter	EPA Methodology
Soil	BTEX, PAHs	8260, 8270 SIM
	Solvents	8260, 8270
	Total Metals	6010, 6020
	Mercury	7470
Water	BTEX, PAHs	8260, 8270 SIM
	Solvents	8260, 8270
	Total Metals	6010, 6020
	Mercury	7470

For used oil assessments, soil sampling must include TCLP metals (e.g., arsenic, barium, cadmium, chromium, lead, mercury, selenium and silver) if the total metal concentrations exceed the Rule of 20 limit, unless the soil will be treated as a hazardous waste (see DEQ Used Oil UST Closure and Release Sampling Standard Operating Procedures (TRIM 2016BAF24)). If soil exhibits the toxicity characteristic (see Table 2), it is considered to be a hazardous waste. Contact the hazardous waste compliance manager to discuss.

If the concentration of total halogenated compounds determined by VOC analysis using method 8260 is greater than 1,000 mg/kg, the soil is presumed to be hazardous waste, unless the generator can rebut this presumption to the satisfaction of DEQ hazardous waste management staff through previous knowledge or chemical analysis.

Table 2. Used Oil Tank TCLP Analysis for Metals		
Metal	TCLP Limit (mg/L)	Rule of 20 (mg/kg)
Arsenic	5	100
Barium	100	2,000
Cadmium	1	20
Chromium	5	100
Lead	5	100
Mercury	0.2	4
Selenium	1	20
Silver	5	100

f. Soil sampling procedures must be conducted in a manner that minimizes cross-contamination. To minimize or avoid cross-contamination, all non-disposable sampling equipment must be cleaned and properly stored/handled between sample locations.

2. Appropriate types and volumes of samples will be collected. Types of samples collected will be based on the potential contaminants (see IDAPA 58.01.24.800.01 (Table 1) for petroleum products and DEQ Used Oil Closure and Release Sampling Standard Operating Procedures (TRIM 2016BAF24) for used oil requirements), and exposure routes/pathways (e.g., vapor intrusion, direct contact, and ingestion). Volume of sample will be based on the analytical method and type of sample.

3. Sufficient number of samples will be collected from appropriate locations and depths to conduct a petroleum release investigation of a suspected release in accordance with IDAPA 58.01.02.851.03, and to conduct an assessment of UST closure or change-in-service. Selection of sample locations must consider:
   - Substance stored
   - Backfill type
   - Depth to ground water
   - Other factors appropriate to identify a possible release

   These are professional judgment decisions made by DEQ staff based on the professional experience of the staff verifying the data and information. Various standards and guidance documents may need to be reviewed in association with the evaluation of the third-party submittal to determine if these criteria are satisfied (see Section 4.1). In addition, consultation with other DEQ staff (e.g., regional, program or technical services) may be conducted. See Section 1 of this SOP for standards and guidance documents that may be useful references.

The requirement is to conduct an assessment of UST closure or change-in-service site for the presence of a release where contamination is most likely to be present on the UST site in accordance with 40 CFR 280.71 (Permanent Closure and Changes in Service) and 72 (Assessing the Site at Closure or Change in Service). Samples for UST closure must be taken in native soil directly beneath the tank, piping, and/or dispensers. See Tables 3 and 4 below for minimum number of samples and locations for UST closures depending on whether water is encountered in the excavation.

Table 3. Minimum Number of Soil Samples for Petroleum Release Investigations or UST Closure When No Ground Water is Encountered in Excavation.

Tank Capacity or Area	Minimum # of Soil Samples	Location of Soil Samples
Less than 1,000 gal	One per tank	Fill port
1,000 - 10,000 gal	Two per tank	One at fill port and at opposite end of tank
Greater than or equal to 10,000 gal	Three per tank	Fill port, at one end and submersible pump
Piping	One	Every 20 lineal feet (at joints, if present) and obvious areas of contamination
Dispenser	One	Under each dispenser being removed/closed
Visual staining	Each	From all stained areas

Table 4. Minimum Number of Soil Samples for Petroleum Release Investigations or UST Closure When Ground Water is Encountered in Excavation.

Tank Capacity or Area	Minimum # of Soil Samples	Location of Soil Samples
10,000 gal or less (single tank)	Two	From wall next to tank ends at soil/groundwater interface

Greater than or equal to 10,000 gal or tank cluster	Four	From wall next to tank ends and each side at soil/groundwater interface
Dispenser	One	Side wall of dispenser being removed/closed
Visual staining	One	From all stained areas

Warning signs for improper sample collection procedures may include:

- Composite samples for VOC analysis without using EPA Method 5035.
- Sample location in close proximity to potential sources of contaminant or interference (e.g., soil and soil vapor samples near (six inches to one foot) asphalt when polycyclic aromatic hydrocarbon analysis is to be performed, or sample collected near running engine).
- Biased sampling locations (e.g., collecting samples to bias the result away from contaminated areas).
- Sample dates and times that do not match other information.
- Inconsistencies between COC and other information.

4. Verification. Any discrepancies between type of petroleum identified and chemicals of concern, sampling requirements and analytical method requirements must be documented with an explanation provided in a verification narrative. Any discrepancies in the number and/or type of samples collected must be documented with an explanation provided in the verification narrative. Any discrepancies between sample locations on map and information presented in narrative must be documented with an explanation provided in the verification narrative. Any sample collection and handling inconsistencies, discrepancies, or missing information must be documented with an explanation provided in a verification narrative.

4.3.3 DEQ On-Site.

1. DEQ's goal is to be on-site during critical aspects of petroleum release investigations or UST closure/change-in-service site assessment activities for all regulated UST sites. This typically includes being on-site when the tank is excavated (being removed) and sampling occurs to observe and document the UST closure/change-in-service field activities.

2. Verification. Any discrepancies between the DEQ documentation of field activities and the activities reported by the Third Party must be documented with an explanation in the verification narrative.

4.4 Data Verification of Analytical Laboratory Activities

The data verifier will conduct the following analysis, as applicable, based on the information provided by the third-party:

4.4.1 Chain of custody.

1. Chain of custody must include:

    a. Each sample must have an assigned unique number.

    b. The date and time of sample collection.

    c. The required testing parameters for each sample.

    d. Sample preservation.

    e. Sample matrix (e.g., soil or soil vapor).

    f. Sample numbers assigned by the laboratory must correspond to the appropriate sample number throughout the analysis.

    g. Chain-of-custody forms will also have applicable signatures identifying possession transfers throughout the process.

2. Verification. Any COC discrepancies must be documented with an explanation provided in a verification narrative.

4.4.2 Holding times.

1. The holding time requirements are listed in the analytical method used by the laboratory. Holding times for typical analytical methods are provided in Appendix B. Sample holding times are calculated by comparing the sample date and time on the COC form with the dates and times of analysis, including extraction dates, reported in the laboratory data sheets. For some analyses, the time from sample collection to sample preparation (e.g., extraction) must also be considered.

2. Verification. Data with holding times greater than the analytical method holding time will be documented and identified in the verification narrative. In general, data generated when holding times are exceeded will be rejected and not used in decision making. However, professional judgment may be used to flag data during verification as estimated if the data $\geq$ MDL (i.e., elevated data may still be used under certain circumstances).

4.4.3 Sample preservation.

1. The preservation requirements are listed in the analytical method used by the laboratory. Preservation for typical analytical methods utilized are provided in Appendix B. Examine the laboratory sample receipt reports, digestion and/or distillation logs, if available, to determine if samples were preserved at the proper temperature or pH.

2. Verification. In general, data generated when improper or no preservatives are used will be rejected and not used in decision making. However, professional judgment may be used to flag data during verification as estimated if the data ≥ MDL (i.e., elevated data may still be used under certain circumstances).

4.4.4 Sample Containers.

1. Typical sample container information is provided in Appendix B. Make note of any laboratory reported problems, such as sample leakage, broken containers, inadequate sample volume, inappropriate sample containers, air pockets or bubbles for VOC samples, or other information available regarding sample containers and sample condition.

2. Verification. In general, data generated when improper sample containers are used will be rejected and not used in decision making. However, professional judgment may be used to flag data during verification as estimated if the data ≥ MDL (i.e., elevated data may still be used under certain circumstances).

4.4.5 Sample Analytical Methods.

1. Ensure the appropriate analytical method was requested by the third-party on the COC and utilized by the laboratory. Typical analytical method information is provided in Appendix B of this SOP. Ensure the laboratory properly accounted for dilution, if utilized, in the sample analysis and reported result.

2. Verification. Any sample analytical method discrepancies must be documented with an explanation provided in a verification narrative.

4.4.6 Method Detection Limits.

1. Ensure correct MDLs are used as indicated below for petroleum projects:

    a. DEQ residential use screening levels from the Standards and Procedures for Application of Risk Based Corrective Action at Petroleum Release Sites (IDAPA 58.01.24); *http://adminrules.idaho.gov/rules/current/58/0124.pdf*, and the Petroleum Risk Evaluation Manual (2012 or more recent version); *http://www.deq.idaho.gov/waste-mgmt-remediation/remediation-activities/risk-evaluation-manuals.aspx*.

    b. For used oil constituents, see DEQ Used Oil UST Closure and Release Sampling Standard Operating Procedures (TRIM 2016BAF24).

2. Verification. In general, data generated with MDLs greater than screening concentrations and the data is less than the screening concentration (including non-detect) will be rejected and not used in decision making.

4.4.7 Comparability

1. Comparability is satisfied by the third-party conducting sample collection and handling processes that are consistent with "standard practice" or "industry accepted practices", and the laboratory performing sample analysis follows standard preparation and analysis procedures.

2. Verification. Any deviations from "standard practice" sample collection, handling, preparation and analysis must be documented with an explanation provided in a verification narrative.

4.4.8 Review QC Data (Precision and Accuracy).

1. Ensure precision and accuracy calculations either by third parties or by DEQ staff are valid and correct if LCS, matrix spikes, or surrogate spikes are conducted and recoveries are reported by the laboratory and submitted by the third-party for accuracy, and/or if duplicate samples are collected by the third-party or internal laboratory duplicate samples are analyzed with the samples and the information is submitted by the third-party. For petroleum release investigations or UST closure activities, field quality control sample results, except for trip blanks for VOC analyses, are considered to be supplemental data. However, laboratories routinely conduct internal quality control analyses. Therefore, laboratory quality control data is considered to be minimum acceptance criteria. Accuracy and precision information is considered to be minimum acceptance criteria.

2. Verification. Document precision and accuracy calculations and information in a verification narrative.

    a. Accuracy is to be within the ranges of acceptability for percent recovery identified by the specific laboratory conducting the analysis for each method and analyte; if LCS, matrix spikes, or surrogate spikes are conducted and recoveries are reported by the laboratory and submitted by the third-party for the analysis. Accuracy is minimum acceptance criteria.

    b. Precision for laboratory duplicate data (for laboratory control samples or matrix spike samples) is to be within the ranges of acceptability, based on RPD, identified by the specific laboratory conducting the analysis for each method and analyte and reported by the third-party. Precision for laboratory data is minimum acceptance criteria.

    c. Precision for field duplicate soil samples, if collected by the third-party, is to be within ± 50% based on RPD. Precision for field duplicate ground water samples, if collected by the third-party, is to be within ± 30% based on RPD. Precision for field duplicate soil vapor samples, if collected by the third-party, is to be within ± 25% based on RPD. Precision for field duplicate data is

supplemental information and not considered to be minimum acceptance criteria.

In general, data generated with accuracy and precision exceeding the criteria will be rejected and not used in decision making.

4.4.9 Review Blank Sample Results.

1. No contaminants will be present in blank samples. Examine results and identify samples where analytes were detected in blank samples at a concentration equal to or greater than the MDL. If problems with blank sample results exist, all data associated with the sample must be carefully evaluated to determine whether or not there is an inherent variability in the data, or if the problem is an isolated occurrence not affecting other data. For most third-party data submittals, blank sample information will likely not be available or submitted to DEQ. Field blank and equipment blank sample information is considered to be supplemental and is not included as minimum acceptance criteria. Trip blank sample information is considered minimum acceptance criteria when VOC analyses occur. Blank samples may consist of one or more of the following:

    a. Field blank – a field blank is a clean matrix sample that is placed into a sampling container and otherwise treated the same as other samples taken from the field to check general sampling and handling procedures, and/or

    b. Trip blank – a trip blank is a laboratory supplied sample (typically distilled or deionized water) that accompanies each shipment of samples for VOC analysis that is analyzed to assess potential cross contamination during sample shipment, and/or

    c. Equipment blank – equipment blanks consist of clean matrix that has passed through or over sampling equipment to check the decontamination cleaning procedure between samples. If no special equipment is used that require decontamination, such as dedicated monitoring well tubing, then equipment blanks are not necessary.

2. Verification. When blank sample results demonstrate that contamination has been detected, the Regional Project Manager will discuss the situation with the Regional Office Project QAO to consider on a case-by-case basis if the contamination is significant enough to reject, qualify, or narratively flag the data.

4.4.10 Representativeness.

1. Representativeness is satisfied by confirming that sampling locations are properly selected, sample collection procedures are appropriate and consistently followed, a sufficient number of samples are collected, MDLs are less than screening criteria, and analytical results are useable (see Section 4.3, 4.4.1-9 and 4.4.11 of this SOP).

a. Field data is likely Level I (e.g. PID).

i. Level I data will be used to evaluate representativeness of samples collected. Level I data is not used to make assessment and remediation decisions. Level I data is used to evaluate acceptability of the data and information provided (e.g., identify potential problems or issues with sample collection that may result in uncertainty of the data).

b. Laboratory data is likely Level III/Stage 1 or Stage 2A (see Appendix A). Analytical results must be current (within the last 12 months) to be considered representative of site conditions and status. Historical, peer-reviewed published data may be used, but do not represent current site conditions if more than 12 months old.

2. Verification. Document representativeness in a verification narrative.

4.4.11 Completeness (90% verified data related to minimum acceptance criteria).

1. Complete is calculated as a percent of the number of verified data points relative to the total number of data points.

2. Verification. If data completeness is less than 90%, the Regional Project QAO will discuss the situation with the Regional Project Manager to consider, on a case-by-case basis, if the data submittal is to be rejected or partially accepted.

4.5 Data Review and Verification Report

Data review identifies that the appropriate data and information was submitted to DEQ by third parties, and data verification compares the submitted data and information from third parties to the project requirements (minimum acceptance criteria) identified in the Third-Party Petroleum Release Investigation and UST Closure and Change-in-Service QAPP. The data review and verification checklist (see Appendix B of the Third-Party Petroleum Release Investigation and UST Closure and Change-in-Service QAPP [DEQ 2014]) will be the Data Review and Verification Report. The checklist will summarize the data review and verification process conducted by the Regional Office Project Manager or other staff for the project. The data review and verification checklist will also summarize data quality and data usability.

In the event that significant problems with the submitted data are discovered through the application of this review and verification procedure, additional action may be taken to ensure minimum data quality is achieved. This may include, but is not limited to, a data validation process following EPA (2002) guidance and DEQ Standard Operating Procedure for Waste Management and Remediation Division Data Validation of Third-Party Petroleum Release Investigation and UST Closure and Change-in-Service Data Submittals (Trim record 2016BAF16) , and the development of Corrective Action Report and Corrective Action Plan per the DEQ Quality Management Plan (2012).

5 Records

The review and verification checklists (from Section 4.5 of this SOP and Appendix B of the Third-Party Petroleum Release Investigation and UST Closure and Change-in-Service QAPP), and DEQ's response to the third-party submission of data will be entered into TRIM following applicable program SOPs:

- UST documents will be entered into TRIM per the TRIM SOP (TRIM 2011BAQ8).
- LUST documents will be entered into TRIM per the TRIM SOP (TRIM 2012BAQ6).

6 References

DEQ (Idaho Department of Environmental Quality). 2012 or more recent version. Risk Evaluation Manual. Boise, ID: DEQ. *http://www.deq.idaho.gov/waste-mgmt-remediation/remediation-activities/risk-evaluation-manuals.aspx*.

DEQ (Idaho Department of Environmental Quality). 2012a. Quality Management Plan. Boise, ID: DEQ. TRIM record number 2012AEC1.

DEQ (Idaho Department of Environmental Quality). 2014a. Standard Operating Procedure for Data Validation of Third-Party Petroleum Release Investigation and UST Closure and Change-in-Service Data Submittals. Boise, ID: DEQ. TRIM record number 2016BAF16.

DEQ (Idaho Department of Environmental Quality). 2014c. Third Party Petroleum Storage Tank Release Investigation and UST Closure and Change-in-Service Quality Assurance Project Plan. Boise, ID: DEQ. TRIM record number 2016BAF15.

DEQ (Idaho Department of Environmental Quality). Used Oil UST Closure and Release Sampling Standard Operating Procedures (TRIM 2016BAF24). Boise, ID: DEQ. TRIM record number 2016BAF24.

EPA (US Environmental Protection Agency). 2002. *Guidance on Environmental Data Verification and Data Validation* (EPA QA/G-8). Washington DC: EPA, Office of Environmental Information. EPA/240/R-02/004. Available at *http://www.epa.gov/quality/qs-docs/g8-final.pdf*

EPA (US Environmental Protection Agency). 2009. *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use* (OSWER No. 9200.1-85). Washington, DC: EPA, Office of Solid Waste and Emergency Response. EPA 540-R-08-005. Available at *http://www.epa.gov/superfund/policy/pdfs/EPA-540-R-08-005.pdf*.

EPA (US Environmental Protection Agency). 2014 or more recent version. Regional Screening Levels. *http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/index.htm*.

IDAPA 58.01.24. Standards and Procedures for Application of Risk Based Corrective Action at Petroleum Release Sites *http://adminrules.idaho.gov/rules/current/58/0124.pdf*

IDAPA 58.01.02. Water Quality Standards.
http://adminrules.idaho.gov/rules/current/58/0102.pdf

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Appendix A. Analytical Data Support Levels

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The concept of *analytical data support* is generally described as having five levels, where Level I is considered minimal quality assurance, quality control (QA/QC) control/documentation, and Level V is considered the highest available QA/QC control/documentation.

The appropriate type of sampling and analysis for a given project or at a given site depends on numerous factors, the foremost of which are the intended end use of the data and associated data quality requirements. The Regional Project Manager, in consultation with the appropriate Regional Quality Assurance Officer and State Office Program Manager, will determine which "level" of analytical data support is necessary for each remediation project. There is no requirement from DEQ for a specific data level package to be submitted by third parties.

Since individual laboratories frequently describe the analytical data support provided by their facility in a variety of terms other than "level," such as "stages," "classes," or "packages," the data levels described herein are intended as a general guide for project staff. Issues to consider when evaluating third-party data include the level of QC the laboratory employed when analyzing the samples; and equally important, the documentation accompanying the returned results. Though not required as minimum acceptance criteria (see Section 18), this laboratory QC information is supplemental and may be useful to DEQ in evaluating the submitted data, if provided with the third-party submittal.

The five levels of analytical support (Levels I and II, field analytical methods, and Levels III through V, laboratory analytical methods) are described below in general terms.

Included in the general description of the analytical data support level is the generally associated and/or corresponding "stage" of data verification and validation to be applied upon receipt of data and documentation by the project from the laboratory. The verification and validation "stages" are described in detail in EPA's *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use* (EPA 2009).

While a given laboratory may or may not recognize various designations of analytical data support levels, the laboratory will likely be able to support the needs of the data user if the "stage" of data verification and validation is described to laboratory staff.

Level I: This refers to field screening or analyses using portable instruments, and results may or may not be compound-specific or quantitative. Generally, Level I data are related to activities such as locating sample collection points for laboratory analysis and are associated with media-specific instruments.

Generally associated verification/validation stage: Level I data may be associated, depending on data user requirements, with "Stage 1" verification and validation checks as described in Appendix A, Section 1.1, of EPA's *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use* (EPA 2009). Level I data may not be used by DEQ in decision making.

Level II: This refers to field analyses using more sophisticated portable analytical instruments or mobile laboratories onsite. Data generated can range from qualitative to quantitative (e.g., actual contaminant identification is made, but concentrations may or may not be quantified to a high

degree of accuracy). This data may or may not be acceptable for compliance purposes. Restrictions or limitations on the use of such data, if applicable, are stated below. Many types of field equipment—such as a mercury vapor analyzers and/or an XRF instrument—generate data that may (or may not) qualify as Level II data.

Generally associated verification/validation stage: Level II data may be associated, depending on data user requirements, with "Stage 1" or "Stage 2A" verification and validation checks as described in Appendix A, Sections 1.1 and 1.2, respectively, of EPA's *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use* (EPA 2009). Level II data may only be used by DEQ in decision making when supported by Level III or higher data.

Level III: This level refers to standard EPA-approved methods that may be equivalent to Level IV methods (see below), with the exception that the level of documentation supplied with analytical results is less robust than higher level data.

Generally associated verification/validation stage: Level III data may be associated, depending on data user requirements, with "Stage 1", "Stage 2A" or "Stage 2B" verification and validation checks as described in Appendix A, Sections 1.2 and 1.3, respectively, of EPA's *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use* (EPA 2009). Level III data is typically utilized for environmental projects and may be used by DEQ in decision making.

Level IV: This refers to EPA Contract Lab Program (CLP) Routine Analytical Services (RAS) analyses, or EPA-approved methods (Level III) with additional rigorous QA/QC protocols and full documentation provided to the project by the laboratory. Documentation allows validation of results against specific contractual requirements and allows for detailed data use, restriction, and/or limitations to be identified prior to use of data. Requirements or limitations for a Level IV analysis and full validation of the analytical data, if necessary, are specified below.

Generally associated verification/validation stage: Level IV data may be associated, depending on data user requirements, with "Stage 4" verification and validation checks as described in Appendix A, Section 1.5, of EPA's *Guidance for labeling Externally Validated Laboratory Analytical Data for Superfund Use* (EPA 2009). Level IV data may be used by DEQ in decision making.

Level V: This refers to nonstandard methods that are considered to be more rigorous than Level IV methods. This analytical data level is seldom used and must be accompanied by significant evidence substantiating the validity of the nonstandard methods employed. Level V is generally used when extremely accurate/precise measurements and quality documentation, far beyond standard EPA methods, are deemed necessary for site-specific contaminant identifications and quantitation.

Generally associated verification/validation stage: Level V data may be associated, at a minimum, with the "Stage 4" verification and validation checks as described in Appendix A, Section 1.5, of EPA's *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use* (EPA 2009). Level V data may not be used by DEQ in decision making.

Field screening data, if conducted and reported by the third-party property owner or other parties conducting the field work, may include photoionization detector readings (PID), and are at data quality Level I (field parameter/screening level data).

Laboratory analytical data submitted by third parties to DEQ for review (i.e., data from samples submitted to a laboratory for analysis) are typically at data quality Level III/Stage 1 or Stage 2A (standard laboratory procedures and data reviewed by standard QA protocols). See Section 18 of the Third-Party Petroleum Release Investigation and UST Closure and Change-in-Service QAPP.

There is no requirement for third parties to provide a certain laboratory data package to DEQ. Below are the general elements of Level III Stage 1 and Level III Stage 2A data packages (note that Level III Stage 2A data package also includes the elements from Level III Stage 1):

A. Level III/Stage 1

i. Chain of Custody documentation for all samples submitted for analysis, including name of laboratory receiving samples and conducting the analysis.

ii. Date and time of sample collection, date and time of laboratory receipt of samples, and documentation of sample condition (e.g., preservation, pH, and temperature) upon receipt..

iii. Analytical methods requested, analyses performed, and date of analysis.

iv. Report of analyte results, unit values, method reporting limits, data qualifiers, and qualifier definitions.

v. Report of sample results at/below reporting limits.

vi. Sample results compared to sample conditions upon receipt at the laboratory (e.g., preservation checks) and sample characteristic (e.g., percent moisture) comparison to the analytical method requirements.

B. Level III/Stage 2A

i. Dates, times, and methods for sample collection, handling, preparation, and analysis are present.

ii. Sample related QA/QC data and QA/QC threshold criteria are provided.

iii. If requested, report of spike analytes and results, including unit values and percent recovery.

iv. Sample holding times compared to method requirements.

v. Frequency of QA/QC samples checked for appropriateness (e.g., one QC sample per twenty samples in a batch).

vi. Sample results evaluated by comparing sample-related QA/QC data to requirements and guidelines, and qualified (i.e., flagged) as appropriate.

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Appendix B. Typical Analytical Methods, Container Types, Preservation Methods and Holding Times

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Typical Analytical Methods, Container Types, Preservation Methods, and Sampling Holding Times for Soil Samples.[1]					
Compounds	**Parameter**	**Analytical Method**	**Sample Container**	**Temperature and Preservative**	**Holding Time**
VOCs	BTEXN MTBE EDB EDC	EPA 5035A/8260B	3 x 5 grams soil to 40-ml amber glass VOA vial, PFTE septa cap	4° C, ±2° C, methanol 4° C, ±2° C, sodium bisulfate	14 days
PAHs	PAHs	EPA 8270C SIM	4-oz amber glass, Teflon lid	4° C, ±2° C	14 days (extraction), 40 days (analysis)

Notes: L = liter; mL = milliliter; PFTE = polytetrafluoroethylene; SIM = selective ion monitoring; VOA = volatile organic analysis; HNO_3 = nitric acid; HCl = hydrochloric acid

1 The analytical method, container types, preservation method, and sampling holding time requirements provided here are typical but may vary based on the laboratory and analytical methods used by third parties. Therefore, the analytical method, container types, preservation method, and sampling holding time information submitted by the third-party will be compared against the requirements identified in the third-party's 'standard of practice', or other SOPs, in case there is a reason to deviate from the requirements identified in this table.