STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

How DEQ Evaluates Sample Collection and Data Analysis for Site Assessments and Corrective Actions

Idaho Department of Environmental Quality's (DEQ's) Quality Management (PS21-03) policy states "meeting the agency's mission necessitates environmental decisions based on using high-quality data…." DEQ must adhere to its Quality Management Plan (QMP) to ensure quality data collection and analysis. The QMP meets federal requirements mandated by the US Environmental Protection Agency (EPA). Additionally, the QMP directs all DEQ programs involved in making decisions regarding environmental data to follow a quality assurance project plan (QAPP) and standard operating procedures (SOPs). For data generated by external parties, DEQ is responsible for adhering to its state rules by assessing the data and other available information received to determine if the data are of sufficient quantity, type, and quality before use in decision-making processes. DEQ uses the following documents to evaluate sample collection and data analysis for site assessments and correction actions (cleanup/remediation):

- *Waste Management and Remediation Division Data Review, Verification, and Validation of External Party Petroleum Data Quality Assurance Project Plan and Standard Operating Procedure* (July 2025)

This fact sheet summarizes the QAPP and SOP and informs the public on how DEQ staff evaluates sample collection and data analysis for UST closures, UST change-in-services, release investigations, site assessments, and corrective actions. Anyone submitting data to DEQ should read the *QAPP and SOP*. DEQ must be on-site during critical aspects of petroleum release investigations or UST closure activities, and the analytical data must be current (i.e., within the last 12 months) to be considered representative of site conditions and status.

UST Notification, Release Reporting, and Confirmation

DEQ requires notification for the following:

- Within 30 days of acquiring an UST (owner change).
- At least 30 days before installing an UST.
- At least 30 days before permanently closing an UST.
- At least 30 days before installing new UST piping.
- At least 24 hours before replacing UST piping.
- Within 30 days after bringing an UST system into use, or back into use (with all required installation documentation).
- At least 30 days before switching to regulated substances blended with greater than 10% ethanol or greater than 20% biodiesel or other regulated substances identified by DEQ.
- Within 24 hours if a release is suspected. Suspected releases must be investigated within 7 days.

- Upon confirming a release, an initial site characterization is required within 45 days.

For both nonpetroleum storage tank (PST) system releases and PST system releases, the "Ground Water Quality Rule" (IDAPA 58.01.11.400) and "Rules for Petroleum Release Corrective Actions" (IDAPA 58.01.24) apply. Petroleum releases are also subject to the following documents:

- *Standard Operating Procedures for Management and Disposal of Petroleum-Contaminated Soil Following a Release from a Non-Underground Storage Tank Petroleum Storage Tanks* (February 2014)
- *Petroleum Contaminated Soil Landfarm Standard Operating Procedures* (May 2017)

Sample Collection and Handling

When DEQ receives a site assessment or corrective action report, DEQ will evaluate whether sampling collection, handling, and analysis procedures were conducted in a manner that provides quality data. This includes the following:

- The type of sampled media (soil, ground water, surface water, soil vapor, and indoor/ambient air) will depend on the nature and extent of the release and the exposure routes/pathways (e.g., vapor intrusion, direct contact, ingestion, and inhalation).
- Sufficient number of samples from appropriate locations and depths are necessary to conduct an assessment of the site to determine horizontal and vertical extent of soil, surface water, ground water, soil vapor, and indoor air vapor intrusion.
- Sampling procedures must be conducted in a manner that minimizes the loss of volatile organic compounds (VOCs). VOC samples will not be collected near a source of cross-contamination that may bias the results. Off-site sampling must occur if contamination appears to migrate off the subject property.
- One duplicate/replicate sample will be collected for every ten samples collected. If less than ten samples are collected, one duplicate/replicate will be collected.
- Proper sample containers must be used (Table 1).
- Preservation and holding times for typical analytical methods used are provided in Table 1.
- UST closure, release investigation, and change-in-service (if applicable) sample location(s) selection must consider the substance stored in a tank, tank backfill type and depth, depth to ground water, structures, closure type, soil type and any other applicable criteria. Samples should be collected where contamination is likely to be present (i.e., under tanks, piping, joints, dispensers, spill buckets, and sumps) and must be taken in native soil directly beneath the tank, piping, and/or dispensers. Table 2 and Table 3 provide the minimum number of samples and locations for UST closures depending on whether water is encountered in the excavation.

Table 1. Typical analytical methods, container types, preservation methods, and holding times.[a]

Compounds	Parameter	Analytical Method	Sample Container	Preservative	Holding Time
Soil Samples					
Petroleum hydrocarbons	TPH[b]	EPA 8015D modified	4-oz glass	4 °C +/- 2°C	14 days
	GRO[b]	EPA 8015D modified	4-oz glass	4 °C +/- 2°C	14 days
	DRO[b]	EPA 8015D modified	4-oz glass	4 °C+/- 2°C	14 days (extraction), 40 days (analysis)
	BTEX, MTBE, EDB, EDC	EPA method 8260B/8260C	4-oz glass	No headspace, 4 °C+/- 2°C.	14 days
VOCs	VOCs	EPA 5035 & 8260B/8260C	2-oz glass (% solids and VOC screen)	4° C, ±2° C	14 days
			1 x 5 grams soil to 40-mL glass VOA vial, PFTE septa cap	4° C, ±2° C, MeOH	
			2 x 5 grams soil to 40-mL glass VOA vial, PFTE septa cap	4° C, ±2° C, sodium bisulfate, DI water, or no preservative	
SVOCs	SVOCs	EPA 8270D SIM	4-oz glass, Teflon lid	4° C, ±2° C	14 days (extraction), 40 days (analysis)
PAHs	PAHs	EPA 8270D SIM	4-oz glass, Teflon lid	4° C, ±2° C	14 days (extraction), 40 days (analysis)
Total RCRA metals	As, Ba, Cd, Cr, Pb, Ag, Se	EPA 6010/6020	2-oz glass	4° C, ±2° C	6 months
	Hg	EPA 7470A	2-oz glass	4° C, ±2° C	28 days
TCLP RCRA metals	As, Ba, Cd, Cr, Pb, Ag, Se	EPA 1311 extraction/ EPA 6010/6020	8-oz glass	4° C, ±2° C	6 months
	Hg	EPA 1311 extraction/ EPA 7471A			28 days
Groundwater and Surface Water					
Petroleum hydrocarbons	TPH	EPA 8015D modified	Two 1-L amber glass bottles	4 °C. pH < 2 with HCL	7 days (extraction), 40 days (analysis)
	GRO	EPA 8015D modified	Two 40-mL amber glass VOA vials	No headspace, 4 °C +/- 2°C. pH < 2 with HCL	14 days
	DRO	EPA 8015D modified	Two 1-L amber glass bottles	4 °C +/- 2°C. pH < 2 with HCL	7 days (extraction), 40 days (analysis)
	BTEX, MTBE, EDC	EPA method 8260B/8260C	Three 40-mL glass VOA vials, PFTE septa cap	No headspace, 4 °C +/- 2°C. pH < 2 with HCL	14 days
	EDB	EPA method 8011	Three 40-mL amber glass VOA vial, PFTE septa cap	No headspace, 4 °C +/- 2°C. Sodium Thiosulfate	14 days
VOCs	VOCs	EPA 8260B/8260C	Three 40-mL glass VOA vial, PFTE septa cap	No headspace, 4°C, ±2° C, pH < 2 with HCL	14 days

Compounds	Parameter	Analytical Method	Sample Container	Preservative	Holding Time
PAHs	PAHs	EPA 3511/8270D SIM	Three 40-mL amber glass VOA vial, PFTE septa cap	4° C, ±2° C	7 days (extraction), 40 days (analysis)
SVOCs	SVOCs	EPA 8270D SIM	One 1-L, amber glass	4° C, ±2° C	7 days (extraction), 40 days (analysis)
RCRA metals	As, Ba, Cd, Cr, Pb, Ag, Se	EPA 6010/6020 or 200.7	500 mL clear HDPE	4° C, ±2° C, pH < 2 with HNO_3 (may be added at the lab)	6 months
	Hg	EPA 7470A	500 mL clear HDPE	4° C, ±2° C, pH < 2 with HNO_3 (may be added at the lab)	28 days

Notes: L = liter; mL = milliliter; LDPE = low density polyethylene; HDPE = high density polyethylene; VOA = volatile organic analysis; HNO_3 = nitric acid; HCl = hydrochloric acid; MeOH = methanol
a. 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 external parties.
b. TPH, GRO, DRO, RRO should only be collected if required for disposal/characterization requirements.

Table 2. 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 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 3. 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/ground water interface
Greater than 10,000 gal or tank cluster	Four	From wall next to tank ends and each side at soil/ground water interface
Dispenser	One	Side wall of dispenser being removed/closed
Visual staining	One	From all stained areas

- VOC (i.e., for gasoline and diesel releases) and halogenated solvent soil sampling requires EPA Method 5035A. Method 5035 minimizes loss of volatiles and provides a representative sample. Laboratories will often supply a disposable sampler, along with preweighed 40 mL VOA glass vials with Teflon-coated, septum-sealed, screw-cap sampling containers containing a preservative. In addition, soil moisture content and VOC prescreening will be assessed at each sampling location to allow the laboratory to calculate chemical concentrations on a dry weight basis and screen the sample for VOC

content to determine if dilution is required before analysis. These samples are typically collected in a separate 2-ounce clear sample jar.

- Polycyclic aromatic hydrocarbon (PAH) (i.e., for diesel releases) soil sampling requires placing the soil samples directly into laboratory-provided containers (e.g., 4-ounce glass jar with Teflon lid) using clean, disposable, or decontaminated soil sampling devices (e.g., hand auger, soil corer, split spoon, direct push probe, backhoe, or hand tool).
- Metal soil sampling (for used oil and other applicable assessments), see *Used Oil UST Closure and Release Sampling Standard Operating Procedures* (May 2017).
- For soil vapor sampling, vapor points may be installed as subsurface or as subslab (below a concrete slab) points. Vapor points should be installed within permeable strata deep enough to minimize potential short-circuit of atmospheric air and shallow enough to measure potential risks from soil vapor intruding into indoor air. Before sample collection, leak detection for the vapor monitoring points should be performed using a shut-in test to verify the sampling circuit is free from leaks. The tracer gas method (helium) is used to evaluate atmospheric air intrusion. Vapor point sampling should occur immediately following leak detection activities. Reference *EPA's Technical Guide for Addressing Petroleum Vapor Intrusion at Leaking Underground Storage Tank Sites* (2015).
- Indoor air sampling determines if vapor intrusion presents a building-specific risk. Collection of indoor air data should 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, but for some constituents (i.e., naphthalene), the minimum detection limit (MDL) for TO-15 is above the screening level and TO-17 would be required.
- VOC ground water samples will be representative of ground water quality upgradient, underlying, and downgradient of the release site, and will be collected by appropriate methods (e.g., bailer, pumps, or in-situ,) 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 (head) space should be present in the sample container. Head space can be checked by inverting the bottle and checking for air bubbles. The presence of head space may mean the samples are not acceptable for laboratory analysis. Laboratories may analyze samples with head space, if the head space (bubbles) is small, and the presence of the head space is noted in the laboratory narrative or report.

- PAH ground water samples will be placed directly into laboratory-provided containers (e.g., 40 mL glass VOA with Teflon lid) using clean dedicated, disposable, or decontaminated water sampling equipment.

Sample Analysis

Ensure the appropriate analytical method was requested by the external party on the chain-of-custody (COC) and used by the laboratory. Ensure the laboratory properly accounted for dilution, if used, in the sample analysis and reported result.

DEQ will evaluate that the laboratory used the appropriate analytical methods and quality assurance controls. Laboratories conduct internal quality control analyses, and DEQ will ensure control samples are within laboratory-specified ranges for the laboratory control sample, laboratory control sample duplicate, matrix spikes, matrix spike duplicates, surrogate spikes, and method blank. The laboratory will produce quality control data sheets that accompany the sample results. DEQ evaluates whether the *accuracy* is within the range of acceptability for percent recovery and whether the *precision* for laboratory duplicate data is within the ranges of acceptability.

Additionally, DEQ will evaluate that the laboratories' reporting limits (i.e., MDL, practical quantitation limit, reporting limit) are at or below the DEQ residential use screening levels correct reporting limits are used. DEQ uses screening levels from the *EPA Regional Screening Level Tables* and *Calculator* as well as *EPA's Vapor Intrusion Screening Level Calculator*. DEQ will consider other criteria such as organic vapor analysis (photoionization detector/flame ionization detector) readings and instrument calibrations, trip blanks (highly recommended), representativeness, project-specific field collected samples for matrix spikes and matrix spikes duplicate analysis, field blanks, rinsate blank samples, and equipment blanks.

Field duplicate/replicate samples collected of soil, surface water, ground water, and soil vapor or air (replicate) must be within specified relative percent differences (RPDs). Precision (RPD) for field duplicate samples is to be within ± 50% for soil, ± 30% for ground water/surface water, and ± 25% for soil vapor or air samples.

A completeness goal of 80% is required for analyses and analytes. A completeness goal of 80% is required for the sampling results versus the plan.

Reporting

A report containing descriptions of the above information and the following documents is required to be submitted.

- A figure (map) depicting the site and locations of samples with laboratory data, including nondetections and detections. Isocontour figures of ground water laboratory data and ground water flow. Monitoring well tables identifying groundwater elevation, well depth, and well screen depth and interval. Summary tables (per media) of all current and historical laboratory data.

- Well boring logs
- COC documentation that includes:
  - Project identification or name
  - Unique sample number
  - Sample date and time
  - Sample location
  - Sample analytical methods
  - Sample container and preservation
  - Sample matrix (e.g., soil, water, and soil vapor)
  - Sample numbers assigned by the laboratory must correspond to the appropriate sample number throughout the analysis
  - Sample transfer dates, times, and signatures
- Laboratory quality control data sheets.

Used Oil and Sludges

Used oil tank closure and sampling procedures are discussed in DEQ's *Used Oil UST Closure and Release Sampling Standard Operating Procedures* (May 2017). The sludge removed from a tank must have a hazardous waste determination per 40 CFR 262.11; consult the fact sheet on *How DEQ Evaluates Sample Collection and Data Analysis for Used Oil UST Closures and Releases* and contact DEQ's hazardous waste program for additional information.