Quality Assurance Project Plan

Data Review, Verification, and Validation of External Party Petroleum Data

State of Idaho
Department of Environmental Quality
January 2023

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1 Title and Approval Page

Title: Data Review, Verification, and Validation of External Party Petroleum Data

Division: Waste & Remediation

Version Number: 2

Date: January 2023

EDMS Number: 2021BAP5

Approval Signatures

Note: This quality assurance project plan (QAPP) becomes effective on the date of the last approval signature.

QAPP Program Manager

Signature: Dana Swift 1/12/2023

Name: Dana Swift, Remediation Bureau Chief Date

QAPP Project Quality Assurance Officer

Signature: Darcy Sharp 1/12/2023

Name: Darcy Sharp, Water Quality Scientist Date

QAPP Project Manager

Signature: Dean Ehlert 1/12/2023

Name: Dean Ehlert, Assessment & Compliance Bureau Chief Date

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2 Table of Contents

List of Tables

3 Distribution List

The quality assurance project plan (QAPP) will be distributed to all personnel listed in Section 4.1.

4 Organization

4.1 Key individuals and their responsibilities

The project staff duties and responsibilities described in Table 1 is not intended to be all inclusive; see sections 1.2.5 through 1.2.7 of the DEQ Quality Management Plan (QMP) (DEQ 2017) for a more detailed description. Approved individual names will be maintained on the External Party Petroleum Data Roles and Responsibilities Staff List excel document (EDMS 2018BAF7).

Table 1. Statewide Roles and Responsibilities

Title	Statewide Project Roles & Responsibilities
Remediation Bureau Chief	State Office QAPP Program Manager: • Oversee the statewide QAPP by coordinating project efforts. • Review the QAPP to confirm it meets program needs. • Sign the final QAPP as an approver. • Ensure the program procedures and policies referenced in the QAPP template are current and approved for use. • Select and assign a state office project quality assurance officer (QAO). • Ensure the QAPP is approved prior to the start of project work.
Water Quality Scientist	State Office QAPP Project Quality Assurance Officer: • Review QAPP draft against the QAPP approval checklist and provide comments. • Sign the final QAPP as an approver. • Update the DEQ QAO project document tracker at http://apps.deq.idaho.gov/admin/qatrack. • Perform annual audit using the audit checklist (2016BAF7), SO QAO Audit tab (EDMS 2018BAF7), and file the audit (EDMS 2021BAE28).

Assessment & Compliance Unit Bureau Chief	State Office QAPP Project Manager:
	• Oversee the statewide QAPP.
	  ▪ Author the statewide QAPP.
	  ▪ Plan/Coordinate statewide projects.
	  ▪ Develop and approve quality system document, state office reporting functions, and state office project file maintenance in EDMS.
	  ▪ Ensure that state office personnel assigned to this project are appropriately trained and qualified, with the corresponding training records on file with human resources.
	• Ensure the state office procedures and policies referenced in the statewide QAPP are current and approved for use.
	• Enter the approved and current statewide QAPP in EDMS, including a copy of the signed QAPP approval page.
	• Sign the final QAPP as an approver.
	• Ensure the QAPP is approved prior to the start of project work.
	• Review the statewide QAPP and standard operating procedures (SOPs) annually to determine if revisions are necessary.

Table 2. Regional Roles and Responsibilities

Title	Regional Project Roles & Responsibilities
Regional Remediation Manager	**Regional QAPP Program Manager:** • Oversee project-specific aspects of the QAPP conducted by regional staff and communicate with counterparts concerning project activities. • Assist in reviewing project-specific information and data. • Evaluate data and information from instances of nonconformance. • Notify state office project manager of proposed changes to project management staff. Obtain project management approval for staff changes before new staff conducts project activities. • Ensure that regional office personnel assigned to projects are appropriately trained and qualified, with the corresponding training records on file in human resources.
State Office Program Manager/Coordinator or their designee (Brownfields Program Coordinator; Preliminary Assessment Program Coordinator; Solid Waste Program Manager; UST/LUST Program Manager; Voluntary Cleanup Program Manager)	**Regional QAPP Project Quality Assurance Officer (state office assumes role):** • Oversee the project-specific data quality functions. • Assist in reviewing the project-specific information and data. • Review the associated QAPP to ensure all information and requirements are present. • Perform data validation using the data validation checklist (Appendix D) and issue the comments on the decision-making.
Compliance Officer	**Regional QAPP Project Manager:** • Oversee project-specific aspects of the QAPP, such as data and information review and verification using the checklist (Appendix C). • Review the associated QAPP to ensure all information and requirements are present. • Perform project-specific duties, regional reporting functions, document reviews, and regional project file maintenance in EDMS project files. • Ensure all project work is conducted in accordance with the DEQ QMP, the approved QAPP, and the applicable standard operating procedures. • Notify the regional office QAPP project quality assurance officer when a project is ready for validation. • Review the QAPP and SOPs annually and inform the state office QAPP project manager of any necessary revisions. All such documents will be revised, reviewed, and approved in accordance with the DEQ QMP.

4.2 QAPP type

This is a statewide external party data QAPP and will be coordinated through all the regions.

4.3 Statewide Coordination

This is a statewide external party data QAPP; no sampling will be performed for statewide coordination.

4.3.1 Applicable Regional Offices, Roles and Responsibilities

This statewide QAPP applies to the state office and all six regional offices. The assigned compliance officer in each office is responsible for reviewing and verifying the data, completing the Data Review and Verification Checklist (verification checklist), and notifying the regional

QAO that the verification checklist is complete and ready for data validation. Due to staffing limitations, each regional office will have a state office employee assigned as the regional QAO (Table 2). The assigned regional (state office) QAO will be the program manager/coordinator, or their designee, for the applicable program the project applies to. For example, the regional (state office) QAO for a brownfields project will be the Brownfields Program Coordinator. The regional (state office) QAO will perform data validation on each individual project after the verification checklist has been completed and will complete the Data Validation Checklist (validation checklist). Approved individual names will be maintained on the External Party Petroleum Data Roles and Responsibilities Staff List excel document (EDMS 2018BAF7).

4.4 Organization Chart

N/A — see Tables 1 and 2

4.5 Special Training/Certification

External party property owners, their representative, or other parties conducting the field work at petroleum sites are responsible for ensuring their personnel are experienced in environmental sample collection and handling as well as trained on relevant Occupational Safety and Health Administration (OSHA) requirements and guidelines.

The regional office program manager and/or the state office project manager is responsible for ensuring the compliance officer conducting field oversight is appropriately trained and qualified, with applicable training records on file with DEQ Human Resources. All work performed by DEQ staff will be conducted in accordance with the current version of the DEQ Safety Program Plan (2013AEH1) and DEQ General Safety Manual (2015AEH1).

DEQ staff will complete OSHA hazardous waste operations and emergency response (HAZWOPER) training to at least the 24-hour level, with annual 8-hour refresher training, in accordance with 40 CFR 311 (Worker Protection) and 29 CFR 1910.120 (Hazardous Materials). All DEQ staff will perform their job according to their job safety analysis. DEQ staff evaluating external party data must have sufficient knowledge and understanding of appropriate practices for sampling various media (e.g., soil, soil vapor, indoor air, surface water, ground water) as well as data interpretation.

5 Problem Definition and Background

This section describes why the project will be done and what will be accomplished through a summary of the specific problem to be solved, project background, decisions to be made, how the work will be performed, what data are to be obtained, where the data gathering activities will occur, and the related projected schedule.

5.1 Problem Statement and Project Description

DEQ staff must evaluate petroleum assessment and cleanup data submitted by external parties when that data is used to make decisions. For the purposes of this QAPP, references to DEQ and DEQ staff refer to the DEQ Waste Management and Remediation Division.

5.2 Historical and Background Information

DEQ provides oversight of site assessment and corrective action activities conducted by external parties (e.g., property owners, their representative/operator, their contractor) at a variety of sites from above ground and underground petroleum storage tank releases, emergency response incidents, property transactions, property cleanup efforts, complaints, or other activities. The external party is responsible for assessing the contamination resulting from a petroleum release and performing corrective action in accordance with IDAPA 58.01.02.851-852 and 58.01.24. The external party typically provides DEQ with a petroleum site assessment report, a corrective action report, or other written documentation of assessment or corrective action activities. DEQ uses these data submittals to determine if contamination is present, the extent of contamination, if additional site investigation and/or corrective actions are necessary to mitigate the contaminant impact and acceptable risk to human health and the environment, to confirm that the completed corrective actions met cleanup criteria, and to determine suitability of the site for closure or for closure with activity and use limitations through an environmental covenant. DEQ project staff typically work with the external party to ensure the appropriate types of samples are collected, the necessary analytes are identified, and appropriate analytical methods are selected (see Appendix B)

Although there is no requirement for the external party to have or follow written standards or SOPs, the external party conducting the assessment and/or corrective action activities should follow standards of practice, professional practice, or industry-accepted standards for sample collection, handling, and analysis (e.g., chain of custody, sample collection techniques/methods, sample containers, analytical methods) so that DEQ is provided with sufficient data to make decisions. The acceptable standards and practices include various American Society for Testing and Materials (ASTM) standards for sample collection (e.g., ASTM D4448-01, D4687-95, D4700-91, D5956-96, D6009-12, D6044-96, D6051-96, D6597-10, E1903-11), sample handling protocols (e.g., ASTM D6911-03), chain of custody (e.g., ASTM 4840-99), EPA-published standards for sample collection/handling/analysis, the external party's own company standards, or other published standards and/or guidance documents (e.g., EPA guidance). Where the external party does not reference or follow a written standard, general industry standards, standards of practice, or professional practice, procedures still apply and should be followed. DEQ may provide guidance and input, but cannot act as a consultant to the external party.

5.3 Intended Usage of Data

This is a statewide external party data QAPP, data usage will vary. DEQ staff will evaluate petroleum assessment and/or cleanup data collected by external parties to make decisions.

5.4 Project Goals

This is a statewide external party data QAPP, project goals will vary.

This QAPP provides a framework for evaluating petroleum assessment and/or cleanup data collected from external parties for use in DEQ decision making. DEQ's Quality Management Program oversees planning, implementation, and review of data collection activities and the use of data in decision making. The primary goal of the project is to ensure the quality of

environmental data collection, generation, and use. It is DEQ policy (Section 1.1 of QMP, DEQ 2017) that:

- DEQ activities result in products and decisions of known and acceptable quality
- Quality management practices be implemented to documents and ensure all environmental data generated, stored, reported, or used by DEQ is of known and adequate quality to fulfill the needs of the primary data user
- Data used by DEQ will be accurate, precise, complete, representative, comparable, and legally defensible

This policy applies to data generated internally and externally from regulated activities, contracts, interagency agreements, grants, and/or cooperative agreements. To satisfy this policy, one of the specific objectives of the DEQ quality management system is to "ensure that environmental data generated and used by DEQ will be of known and documented quality through the use of approved QAPPs." Additional citations from the QMP are:

- Section 2.2.3 – All DEQ work that involves acquiring environmental data generated from direct or indirect measurement activities, collected from other sources, or compiled from computerized databases and information systems must be implemented in accordance with an approved QAPP….This requirement is in effect regardless of whether or not data are generated directly by DEQ, already exist, or are submitted to DEQ through the efforts of contractors, third [external] parties, or partners.
- Section 7.4 – Although DEQ personnel may not have direct responsibility for collecting and analyzing environmental samples and data in these situations, DEQ is responsible for assessing the quality of the data before using it in decision-making processes.
- Section 7.5 – Prior to accepting or using any existing data from external sources for project-related purposes, DEQ will develop an internal QAPP according to section 2.2.3 with a clearly defined problem statement, data quality needs, and criteria that will be used to assess the quality of that data.

Therefore, an external data QAPP is required whenever external data submitted to DEQ (without a DEQ-approved and signed QAPP) for the purpose of data evaluation and subsequent decision making. The external data must be of sufficient quantity and quality to allow DEQ to make decisions regarding the need for further investigation or corrective action, and to determine suitability of the site for closure or to approve implementation of activity and use limitations through an environmental covenant.

DEQ does not sign externally-generated QAPPs and does not have the authority to require external parties to create or follow a QAPP except under certain special circumstances. Exceptions include when a DEQ contractor generates a QAPP under contract for DEQ approval and signature or when specific consent order requirements specify external QAPP approval and signature by DEQ. The external QAPP must meet DEQ quality management system and QMP requirements and be suitable for DEQ signature as determined by the DEQ state office and regional office QAPP management staff. The DEQ quality manager may be consulted for this determination.

This QAPP applies to situations where DEQ has not reviewed and signed an externally-developed QAPP and focuses on petroleum site assessment and corrective action activities only, regardless of DEQ program association. Nonpetroleum or commingled contaminants are

addressed in the State Response Program Statewide Generic Quality Assurance Project Plan Third-Party Nonpetroleum Site Assessment and Remedial Action (EDMS 2013BAF3).

If DEQ project staff collect samples associated with oversight of external party activities, a project-specific QAPP and field sampling plan are required; these activities are not covered by this QAPP.

Specific information regarding external party data acceptance criteria can be found in the Data Review and Verification of External Party Petroleum Data Standard Operating Procedure (Appendix B).

5.5 Project Objectives

N/A - this is a statewide external party data QAPP, project objectives will vary.

5.6 Information Needed and Sources

This is a statewide external party data QAPP, the information needed will vary. External party property owners, their representatives, or other parties conducting field work at petroleum sites are responsible for submitting the data required in the Data Review and Verification of External Party Petroleum Data Standard Operating Procedure (Appendix B).

5.7 Assumptions in Relation to Objectives and Project Area

N/A - this is a statewide external party data QAPP, assumptions will vary.

5.8 Tasks Required

N/A - this is a statewide external party data QAPP, the tasks will vary.

5.9 Study Area and Surroundings

N/A - this is a statewide external party data QAPP, the study area will vary.

5.10 Regulatory Criteria or Standards

This is a statewide external party data QAPP; regulatory criteria will vary but may include:

- Environmental Protection and Health Act, Idaho Code §39-101 et. seq. Section 39-108 states “The director shall cause investigations to be made upon receipt of information concerning an alleged violation of this act or of any rule, permit or order promulgated thereunder, and may cause to be made such other investigations as the director shall deem advisable.”
- Water Quality Standards, IDAPA 58.01.02.851, Petroleum Release Reporting, Investigation and Confirmation Section 851 states “This section includes requirements for reporting releases to DEQ, investigations due to off-site impacts, release investigation and confirmation of suspected releases within 7 days if corrective action is not initiated per IDAPA 58.01.02.852, and cleanup of above ground spills and overfills.”

- Water Quality Standards, IDAPA 58.01.02.852, Petroleum Release Response and Corrective Action Section 852 states "This section includes requirements for release response, initial abatement, initial characterization within 45 days of release confirmation, free product removal, investigations for soil and water cleanup, corrective action plan, and compliance."
- Ground Water Quality Rule IDAPA 58.01.11.400, Ground Water Contamination Section 400 states "The discovery of any contamination exceeding a ground water standard that poses a threat to existing or projected future beneficial uses of ground water shall require appropriate actions, as determined by the Department, to prevent further contamination."
- Standards and Procedures for Application of Risk Based Corrective Action at Petroleum Release Sites, IDAPA 58.01.24 These rules establish standards and procedures to determine whether and what risk based corrective action measures should be applied to property subject to assessment and cleanup requirements under IDAPA 58.01.02, sections 851 and 852, "Water Quality Standards," and associated definitions; IDAPA 58.01.11, Subsection 400.05, "Ground Water Quality Rule;"

Petroleum releases are also subject to the following guidance, SOPs, and procedures:

- 2018 Risk Evaluation Manual for Petroleum Releases (https://www.deq.idaho.gov/waste-management-and-remediation/sampling-investigation-and-cleanup/risk-evaluation/)
- Standard Operating Procedure for Management and Disposal of Petroleum-Contaminated Soil Following a Release from a Non-UST Petroleum Storage Tank (EDMS 2011BAF2)
- DEQ Used Oil Underground Storage Tank (UST) Closure and Release Sampling Standard Operating Procedures (EDMS 2016BAF23)
- Data Review, Verification, and Validation of External Party Petroleum Data Standard Operating Procedure (Appendix B).

5.11 Project Timetable

This is a statewide external party data QAPP, timetables will vary. External party activities occur as scheduled by the party conducting the work. Therefore, a projected schedule for the major project activities, such as field sampling, data review, and report generation, is identified by the external party based on the needs of each individual project.

5.12 Possible Challenges and Contingencies

N/A - this is a statewide external party data QAPP, challenges and contingencies will vary.

6 Quality Objectives

This section of the QAPP defines the project data quality objectives (DQOs), essentially defining the requirements to support the qualitative or quantitative design of the data collection effort. DQOs are also used to assess the adequacy of the data (new or existing) in relation to their intended use. Data quality indicators (DQIs) are used to describe, in part, the specific measurement elements to be used when evaluating data in support of the project DQOs. Since this is a statewide external party data QAPP, the analytical data support level will vary for each project; see Attachment 20.2 in Appendix B.

6.1 Data Quality Objectives

The primary DQO for this QAPP is to evaluate all data received based on the minimum acceptance criteria (MAC) in the Data Review and Verification of External Party Petroleum Data Standard Operating Procedure (Appendix B). The MAC supports all the information regarding the need for further investigation or corrective action and to determine suitability of the site for closure or to implement activity and use limitations through an environmental covenant.

DQOs for the data submitted by external parties are presented below:

1. State the Problem

The problem is to determine the acceptability and usability of the data and information provided by external parties to allow DEQ to make decisions and to identify any necessary further actions.

2. Identify the Decision

The first decision is regarding the quantity and quality of the data and information provided by the external party. DEQ will evaluate the data and information and compare it to the MACs. The first question to be answered is:

Is the data provided by the external party of sufficient quantity and quality for an evaluation?

If the data and information is of sufficient quantity and quality to evaluate, the second decision is broken into two parts. Part one is evaluation of that data and information to determine whether additional assessment and/or corrective action are necessary. Part two is whether that submitted data and information are sufficient to allow for project closure with or without activity and use limitations. The two parts of the second question to be answered are:

Is additional assessment and/or corrective action necessary?

Is the project suitable for closure? With or without activity and use limitations?

3. Inputs to the Decision

The inputs to the decisions are primarily from the data and information provided by the external party. Additional information may be available, including observations made by DEQ staff conducting oversight of the field activities or data from other sources (e.g., DEQ records and databases, other state and federal agencies).

4. Define the Boundaries

The boundaries are generally the spatial limits of the assessment and/or corrective action activities conducted by the external party, which may include off-site impacts to various media.

5. Develop a Decision Rule

    a. If the data provided by the external party is of sufficient quantity and quality for an evaluation:

i. If additional assessment and/or corrective action are necessary, then DEQ's response would indicate this. Additional data submitted to DEQ would be evaluated under this QAPP.

ii. If additional assessment and/or corrective action is not necessary and the project area is suitable for closure either with or without activity and use limitations, DEQ's response would indicate this.

b. If the data provided by the external party is not of sufficient quantity and/or quality for an evaluation, DEQ will request additional data and information from the third party before proceeding with the data review, data verification, and data validation. Additional data submitted to DEQ would be evaluated under this QAPP.

Decision rules related to MAC for data and information provided by the external party are further provided in section 11.

6. Specify Limits on Decision Errors

Decision errors will be managed by evaluation of the MAC. Data review, verification, and validation will be conducted on all external party submittals. An annual audit will be conducted.

7. Optimize the Design

The number, type, and location of samples are site-specific and will be evaluated based on the quantity and quality of the external party data.

6.2 Measurement Quality Objectives

N/A - this is a statewide external party data QAPP, the measurement quality objectives will vary. The Data Review and Verification of External Party Petroleum Data Standard Operating Procedure (Appendix B) discusses measurement quality objectives that will apply.

7 External Measurements and Data

External measurements and data acquisition refer to those obtained for use by the project from existing data sources, not directly measured or generated by this project. Examples of these data include those obtained from existing sources or databases (outside DEQ) and data obtained by others and offered or presented to DEQ for use. Project staff are encouraged to review the EPA guidance for acquisition and use of non-direct measurements presented in chapter 3 of EPA QA/G-5 (EPA 2002a).

7.1 Sources of Data

The data are generated or compiled by external parties and may include existing data from previous assessments and/or corrective activities. The external party submits the data to DEQ for evaluation. DEQ staff may also document site-specific information from on-site observations made during field activities performed by external parties.

7.2 Types of Data to Be Used

External parties conduct sampling of various media (e.g., soil, soil vapor, indoor air, surface water, ground water) to determine the areal and vertical extent of contamination during site assessments and confirmation sampling during corrective actions, or to assess or characterize local physical/chemical conditions. Also see the Data Review and Verification of External Party Petroleum Data Standard Operating Procedure (Appendix B).

7.3 Intended Use of Data

DEQ staff will evaluate the information and data provided by the external party to determine necessary further action at the site based on acceptable risk to human health and the environment. These further actions may include site closure without further assessment or corrective action, site closure with activity and use limitations, or additional assessment or corrective actions. The observations made by on-site DEQ staff and site-specific circumstances are included in the data review and verification checklist (Appendix C).

7.4 Process for Verification of Quality and the Acceptance Criteria of External Data

See section 10 and the Data Review and Verification of External Party Petroleum Data Standard Operating Procedure (Appendix B).

7.5 Data Use Limitations

See section 10 and the Data Review and Verification of External Party Petroleum Data Standard Operating Procedure (Appendix B).

8 Project Sampling

N/A - this is a statewide QAPP for external party data, no sampling will be performed. For QC checks on external party data, see the Data Review and Verification of External Party Petroleum Data Standard Operating Procedure (Appendix B).

8.1 Field Data Collection

N/A

8.1.1 Sample Locations and Frequency

N/A

8.1.2 Field Parameters and Laboratory Analytes to be Measured

N/A

8.2 Measurement and Sampling Procedures

N/A

8.3 Sample Analysis Requirements

N/A

8.4 Sample ID

N/A

8.5 Chain of Custody (COC)

N/A

8.6 Field Log Requirements

N/A

8.7 Equipment Calibration, Checks, and Maintenance

N/A

8.8 Modeling and Analysis design

N/A

8.9 Other activities

N/A

8.10 Field, Laboratory, and other Audits

N/A

8.11 Corrective Action Processes

Actions to be taken if activities are found to be inconsistent with the QAPP are described in section 11.3.1.

9 Quality Control

See section 10 and the Data Review and Verification of External Party Petroleum Data Standard Operating Procedure (Appendix B).

9.1 Field QC Checks

See the Data Review and Verification of External Party Petroleum Data Standard Operating Procedure (Appendix B).

9.2 Laboratory QC Checks

See the Data Review and Verification of External Party Petroleum Data Standard Operating Procedure (Appendix B).

9.3 Data Analysis Quality Control Checks

See the Data Review and Verification of External Party Petroleum Data Standard Operating Procedure (Appendix B).

9.4 Field, Laboratory, and Other Audits

The state office project QAO will use the checklist to audit the QAPP annually to determine if revision is necessary. The resulting audit checklist will be entered into EDMS, indicating the date of the audit and listing identified issues or concerns. If the QAPP requires revision, a revised QAPP will be submitted for approval before implementation.

The QAPP audit conducted by the state office project QAO should include a review of randomly-selected DEQ field notes, submitted external party documents, and DEQ correspondence. Any errors or inconsistencies identified in the DEQ field notes, including electronic notes, will be investigated and corrected to ensure the integrity of the data and conformance to the QAPP. Results of internal QA reviews, audits, surveillances, or other types of assessments will also be considered. The state office project QAO will conduct reasonable review of project-specific activities, ensuring conformance with QAPP requirements. Before the annual audit, the state office project QAO, state office program manager, and state office project manager will discuss the level of state office project QAO effort to review specific projects and select the project(s) for audit. This is not predetermined and the number of project(s) included in the annual audit by the state office project QAO is undesignated. The number of projects reviewed by the state office project QAO depends on the current understanding of potential impacts to human health and the environmental based on the data reviewed under the QAPP.

9.5 Corrective Action Processes

See section 10 and the Data Review and Verification of External Party Petroleum Data Standard Operating Procedure (Appendix B).

10 Data Validation and Usability

The data review and verification checklist is Appendix C and the validation checklist is Appendix D.

10.1 Review, Verification

See the Data Review and Verification of External Party Petroleum Data Standard Operating Procedure (Appendix B).

Data review will include, at a minimum, the following activities:

- An examination of project data to identify potential errors in data entry, calculation, or transcription.

- An examination to ensure all MAC information is documented and available in preparation for the verification and validation process.
- An examination to identify supplemental data and information submitted for the verification and validation process.
- A completeness check to determine if any data deficiencies exist, such as missing or compromised data.

Data verification will include, at a minimum, the following activities:

- Verification that all MACs have been satisfied.
- Determination and documentation of any limitations on the use of the project data, using the verification checklist.

10.2 Validation Level and Qualifiers

DEQ does not conduct formal data validation but reviews, verifies, and validates the formal data validation conducted by the external party. Much of the traditional formal data validation processes (e.g., calculating accuracy, precision, relative percent difference) will be addressed in the verification process and documented on the verification checklist.

For the purposes of this QAPP, data validation consists of validating the data review and verification process. Specifically, the regional office (state office) QAO (i.e., program manager/coordinator or their designee) will determine if the decision resulting from the data review and verification process is reasonable and agreeable. Data validation will occur before the final decision regarding data usability and before DEQ making decisions regarding necessary further actions at the site. The data validation checklist will be used to document the agreement or disagreement with the decision.

Data validation will include, at a minimum, the following activities:

- A review of the outcome of the data verification effort to evaluate the impact on data quality with respect to the DQOs.
- Determination and documentation of any limitations on the use of the project data.
- A determination of the decision/outcome of the data review and verification process.

10.3 Data Quality and Usability Assessment

10.3.1 Process for Determining Project Objectives Were Met

After the data review and verification activities are completed, the regional office project officer will decide if the data can be used (i.e., does the data meet the DQOs). The regional office project officer will document project activities, including the data that can or cannot be used, in a letter to the external party. Project letters sent by the regional office project manager to the external party will be entered into EDMS following program procedures. The letter will include the following:

1. Summary of petroleum assessment and/or corrective action activities conducted, including a summary of the data submitted to DEQ.
2. Identification of DEQ presence onsite during site assessment and/or corrective action activities and a summary of observations made by DEQ.

3. One of the following three outcomes of the data evaluation:
   a. The data meet the needs of the project and can be used. The MAC are met.
   b. The data do not meet the needs of the project and cannot be used. The MAC are not met. Identify the reason(s) for not accepting the data and identify which MAC were not satisfied. Examples may include, but are not limited to, the following:
      i. too few samples were collected to characterize the contamination
      ii. samples were not collected in appropriate locations or at appropriate depths
      iii. samples were not analyzed for the appropriate constituents
      iv. standard of practice protocols were not followed during sampling and handling
      v. laboratory reporting limit or method detection limits were not appropriate or were higher than screening levels
      vi. chain of custody procedures were not followed

      This outcome implies that additional data collection is necessary. DEQ will not make decisions regarding the site if the data collected by the external party is not of sufficient quantity and quality. Discuss any limits on the use of these data resulting from uncertainty in its quality.

   c. The data can be used with caveats on the confidence or significance of the findings based on the data. The MAC may be revised or additional data may be necessary before DEQ makes a final determination.

      The reasons for requiring additional data, or for accepting the data with the associated caveats and revised acceptance criteria, will be documented by the regional office project officer.

      Revision of MAC will be determined on a case-by-case basis through discussion involving the regional office project officer, regional office manager, regional office project QAO, state office project program manager/coordinator or their designee, and, if necessary, state office QAO. MAC will only be revised when supplemental data and information are sufficient to define uncertainty and support the conclusion that data of known quality were provided, in which case, DEQ will use the data for decision making regarding the need for further action at the site. Final approval of MAC revision will be made by the state office program manager. The regional office project officer will document the situation and rationale for MAC revision in a memo filed in EDMS with other project documents.

4. One or more of the following conclusions may be drawn and a resulting action may be appropriate following the data evaluation and included in the letter:
   a. If unexpected analytical results are reported, request that the external-party conduct additional quality review of the data in question.
   b. If data gaps are identified for an assessment or corrective action, indicate that additional site assessment or corrective action confirmation sampling activities are necessary to determine the extent of soil, soil vapor, surface water, and/or ground water contamination or to determine that cleanup criteria have been satisfied.

c. If the site assessment or corrective action sampling identifies contamination above risk-based or other criteria, indicate that additional corrective action or conducting a site-specific risk evaluation is necessary. The implementation of activity and use limitations through an environmental covenant in accordance with the Uniform Environmental Covenant Act (UECA) (Idaho Code §55-3001 et seq.) may be part of the corrective action. The external party should submit a Corrective Action Plan (CAP) in accordance with IDAPA 58.01.02.852.06 and IDAPA 58.01.24.200.03 to DEQ for review and comment.
d. If the site assessment or corrective action sampling does not identify contamination above risk-based or other criteria, indicate that DEQ will close the specific items addressed in the assessment without further assessment or corrective action.
e. If DEQ was not onsite during assessment or corrective action activities, then DEQ cannot verify what occurred for the activities, nor can DEQ verify the contents of or conclusions drawn based on those activities. If DEQ was not onsite and concludes that the activities were adequate, DEQ can only state that the assessment *appears adequate* with a caveat that the activities occurred without DEQ oversight. DEQ cannot use *no further action* or similar terms for these situations (see EDMS 2014BAF4).

10.3.2 Sampling Design Evaluation

N/A - this is a statewide external party data QAPP, sample designs of projects will vary.

10.3.3 Documentation of Assessment

All assessment and resulting decisions will be documented on any of the data verification checklist, the data validation checklist, through the letter to the external party, or a project file note in EDMS.

11 Documentation and Reports

The state office QAPP project manager is responsible for ensuring that a copy of the current approved QAPP, SOPs, and signature pages are available in EDMS. The approved QAPP, including the signed signature page, will be entered into EDMS in PDF format.

11.1 Frequency and Distribution of Reports

External parties will develop and submit reports to DEQ that detail assessment and/or corrective action activities. DEQ will try and provide a response (per Section 10.3.1) to those reports within 30 days of receipt. Other timeframes may be stipulated in a consent order or rule (e.g. 45 days to complete a site investigation, 60 days to submit a corrective action plan). DEQ will not develop reports.

11.1.1 Responsibility for Reports

DEQ staff (Table 1) are responsible for project-related, statewide documentation and records, including the following, as applicable to the project:

- QAPP
- SOPs
- Statewide reports summarizing program and/or regional data and information
- Training records for assigned state office staff
- Annual state office project QAO's QAPP audit and assessment reports
- Project document tracker spreadsheet updates related to QAPPs (http://apps.deq.idaho.gov/admin/qatrack)
- Corrective action reports and plans

DEQ staff (Table 2) are responsible for project-specific documentation and records, including the following, as applicable to the project:

External party data and information submitted to DEQ

- Project-specific reports and other project documents
- Supplemental project-related reports and documents
- Laboratory reports and data
- Sample chain-of-custody records

Created by DEQ staff

- Documentation for assignment changes in the regional office project manager or regional office project QAO
- Project-specific field notes, sheets, forms, checklists, etc. DEQ field personnel conducting oversight will record information on a field sheet or in a field logbook, to document each day's activities. These observations become part of the data/information used during the review, verification, and validation process. Field information will be recorded as follows:
    - Project data must be recorded directly, promptly, and legibly.
    - Field logbook or field sheet entries must be made in black or blue permanent ink and must be signed/initialed/dated by the person making the entry.
    - Changes or corrections to field logbook notes or field sheets must be indicated with a single line through the original entry. Changes must be initialed, dated, and explained.
- Data review, verification, validation checklists, and related documentation
- Training records for assigned regional office staff (to be put on file with DEQ HR)
- Corrective action reports and plans
- Environmental covenants
- Letters in response to external submittals

11.2 Assessment and Response Actions

See section 10.3.1.

11.3 Reports to Management

No reports will be created.

11.4 Data Management

External party and DEQ project documents will be filed electronically in EDMS in accordance with applicable data management SOPs (EDMS 2011BAE1).

Electronic copies of all documentation available to support the DQOs of the project and the validity of project data (e.g., chain-of-custody forms, audit reports, laboratory reports, field notes, field logbooks) will be entered into the project EDMS files by regional staff. The annual audit checklist will be entered into EDMS by the state office QAPP project quality assurance officer. The verification checklist will be entered into the project EDMS file by the regional QAPP project manager (i.e., regional compliance officer). The validation checklist will be entered into the project EDMS file by the regional QAPP project quality assurance officer (i.e. state office program manager/coordinator or their designee).
All project documentation and records will be retained in the EDMS system in accordance with the current approved DEQ records retention schedule (http://deq.intranet/records-management.aspx).

References

DEQ (Idaho Department of Environmental Quality). 2017. *Quality Management Plan*. Boise, ID: EDMS 2016AEC7.

DEQ (Idaho Department of Environmental Quality). 2018a. *General Safety Manual*. Boise, ID: EDMS 2015AEH1.

EPA (US Environmental Protection Agency). 2002b. *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.

DEQ (Idaho Department of Environmental Quality). No date (current version). "Data Review, Verification, and Validation of External Party Petroleum Data Standard Operating Procedure" Boise, ID.

Appendix A. Revision and Update History

In the event revisions or updates to the project occur, use this sheet to document these changes. Any modifications to the project should be documented and approved.

Detail of Revision or Update	Responsible Party	Date of Revision

Appendix B. Data Review, Verification, and Validation of External Party Petroleum Data Standard Operating Procedure

Idaho Department of Environmental Quality

Data Review, Verification, and Validation of External Party Petroleum Data

Standard Operating Procedure

1 Title and Approval Page

Title: Data Review, Verification, and Validation of External Party Petroleum Data

Region/Division: All Regions, Waste and Remediation

Programs: Underground and Leaking Underground Storage Tank, General Remediation, Brownfields, Preliminary Assessment, Solid Waste

Version Number: 1

Date: September 2021

Authors: Kristi Lowder, Derek Young, Eric Traynor

Authors

Signature: Kristi Lowder — 09/20/2021

Name: Kristi Lowder, Underground & Leaking Underground Storage Tank Program Manager — Date

Signature: D A Y — 09/20/2021

Name: Derek Young, Voluntary Cleanup Program Manager — Date

Signature: Eric Traynor — 9/21/2021

Name: Eric Traynor, Brownfields Program Coordinator — Date

Project Manager

Signature: Dean Ehlert — 09/21/2021

Name: Dean Ehlert, Assessment & Compliance Bureau Chief — Date

Division Administrator

Signature: Michael McCurdy — 09/21/2021

Name: Michael McCurdy, Waste Management & Remediation Division Administrator — Date

Administrator

2 Table of Contents

3 Purpose and Applicability

This SOP identifies how the Department of Environmental Quality (DEQ) Waste Management and Remediation (WMR) staff review, verify, and validate external party petroleum assessment and corrective action data submittals. The Data Review and Verification Checklist (verification checklist) can be found in Appendix C. The Data Validation Checklist (validation checklist) can be found in Appendix D. This SOP supplements the Data Review, Verification, and Validation of External Party Petroleum Data Quality Assurance Project Plan (QAPP), EDMS 2021BAP5.

This SOP establishes criteria for accepting or rejecting data collected by external parties for petroleum-only assessment and corrective action data submittals. Nonpetroleum or commingled contaminants are addressed in the State Response Program Statewide Generic Quality Assurance Project Plan Third-Party Nonpetroleum Site Assessment and Remedial Action, EDMS 2013BAF3.

This SOP will not apply to situations where DEQ has signed an externally-developed QAPP developed by a DEQ contractor or when specific consent order requirements specify external QAPP approval and signature by DEQ.

If DEQ staff collect samples associated with oversight of external party activities, a project-specific QAPP and field sampling plan (FSP) are required; these activities are not covered by this SOP.

4 Summary of Procedure

DEQ requests various petroleum assessment and corrective action sampling activities. The external party submits reports containing sampling and corrective action data and the Regional QAPP Project Manager (compliance officer) verifies the data by completing the data review and verification checklist. If the data is incomplete, the compliance officer will request additional data from the external party and continue with data review and verification. Once the data is complete, the compliance officer will notify the Regional QAPP Program Manager (program manager/coordinator or their designee) that the data review and verification checklist and their decision are ready for data validation. The program manager/coordinator or their designee will review the data review and verification checklist and proposed decision and agree or disagree with the decision, documenting that decision in the validation checklist. Once a final decision is made, the decision will be documented in a letter to the external party.

Exceptions: some emergency response actions due to petroleum releases, routine monitoring events (e.g., quarterly or semi-annual ground water monitoring events) may not need validation unless the frequency, discontinuation, or the last four quarterly events are modified or required. Environmental covenant recommendations always require validation.

5 Definitions

Accuracy: The closeness of a measured result to an accepted reference value. Accuracy is usually measured as a percent recovery. QC analyses used to measure accuracy include standard recoveries, laboratory control samples, spiked samples, and surrogates. The two equations below are examples of percent recoveries:

Spiked Sample or LCS Percent Recovery

$$\%\boldsymbol{R} = \frac{\boldsymbol{C_M}}{\boldsymbol{C_T}} \times \mathbf{100}$$

Where: C_M = measured spike (LCS concentration)
C_T = true concentration of spike added (LCS concentration)

Matrix Spike and Surrogate Recoveries

$$\%\boldsymbol{R} = \frac{(\boldsymbol{C_S} - \boldsymbol{C_{US}})}{\boldsymbol{C_T}} \times \mathbf{100}$$

Where: C_S = measured concentration of spiked sample
C_{US} = measured concentration of unspiked sample
C_T = true concentration of spike added

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 should be 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.

Comparability: Expresses the degree of confidence with which one data set can be compared to another. It is dependent upon the proper design of the sampling program and will be satisfied by ensuring that the approved plans are followed and that proper sampling and analysis techniques are applied. Data sets should be of known and documented quality.

Completeness: Percentage of the number of usable verified data relative to the total number of data points actually collected or planned. This includes the number of samples collected versus the number of samples planned, the specific analyses planned versus analyzed, and the actual number of individual analytes analyzed versus planned.

The percent completeness (%C) is calculated:

%C = ((Sum of the Total Samples, or Analyses Performed, or Analytes Analyzed minus Sum Total of Missing Samples, or Missing Analyses, or Rejected Analytes) divided by the Total Data Planned Samples, Analyses, or Analytes)) multiplied by 100.

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

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

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.

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 analyzed to verify sampling and analytical reproducibility and sample repeatability (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 matrix sample that is placed into a sampling container and otherwise treated the same as other samples taken from the field to check 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. Considerations may include particle size, % solids, % organic material or other distinguishing features of the dominant material being sampled. Matrix is not synonymous with phase (solid, vapor, or liquid).

MDL: The lowest concentration of a substance that can be measured with 99% confidence that the substance is present in the sample.

Practical Quantitation Limit (PQL): The lowest concentration of a chemical that can be reliably quantified among laboratories within specified limits of precision and accuracy for a specific laboratory analytical method during routine laboratory operating conditions. The PQL is set by each laboratory and comes down to what the laboratory feels comfortable signing their name to, confidently, on a daily basis.

Precision: The agreement among a set of duplicate/replicate measurements. Field precision is assessed through the collection and analysis of field duplicates/replicates. Analytical precision is estimated by duplicate/replicate analyses, usually on laboratory control samples, spiked samples and/or field samples. The most commonly used estimates of precision are the relative standard deviation (RSD) and, when only two samples are available, the relative percent difference (RPD).

Relative Percent Difference (RPD)

$$\boldsymbol{RPD = \frac{|(C_1 - C_2)|}{(C_1 + C_2)/2} \times 100}$$

Where:

C_1 = concentration in first sample
C_2 = concentration in the second (duplicate/replicate) sample

The above equation is valid when both C_1 and C_2 are equal to or greater than five times the laboratory reporting limit

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.

Replicate Samples: Two or more samples representing the same population characteristic, time, and place, which are independently carried through all steps of the sampling and measurement process in an identical manner. Replicate samples are used to assess total (sampling and analysis) method variance. In terms of this SOP, replicate samples are typically collected during soil vapor or air sampling.

Representativeness: The degree to which data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition. It is dependent on the proper design of the sampling program and will be satisfied by ensuring the approved plans were followed during sampling and analysis.

Reporting Limit (RL): The lowest concentration that can be reliably measured within specified limits of precision and accuracy during routine laboratory operating conditions. For many analytes, the reporting limit is selected as the lowest non-zero standard in the calibration curve. Results that fall below the reporting limit will be reported as "less than" the value of the reporting limit.

Sensitivity: An instrument's or method's minimum concentration that can be reliably measured or reported (i.e., or lower limit of quantitation [LLOQ]).

Trip Blank: A trip blank is a clean sample (typically distilled or deionized water) 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.

6 Health and Safety

Safety considerations include potential inhalation, direct contact, and accidental ingestion of solid, liquid, and air contaminants from petroleum. Other safety considerations include noise, falling objects, crushing extremities, heavy equipment operation (e.g., drill rig, push-probe, excavators, backhoes, dump trucks, trenching, excavations), and inclement weather.

Refer to project manager's Job Safety Analysis for recommended safe job practices, including proper personal protective equipment (PPE).

Reference the DEQ Safety Plan (2018a. General Safety Manual. Boise, ID: EDMS 2015AEH1) for accident prevention, preparation, PPE, confined spaces, flammable materials, equipment safety, electrical safety, construction safety, and excavations and trenching.

7 Cautions

This is a statewide QAPP for external party data, no sampling will be performed. Examples of potential cautions that DEQ staff will evaluate are described in section 18.

8 Interferences

This is a statewide QAPP for external party data, no sampling will be performed. Examples of potential interferences that DEQ staff will evaluate are described in section 18.

9 Personnel Qualifications and Responsibilities

External party property owners, their representative, or other parties conducting the field work at petroleum sites are responsible for ensuring their personnel are experienced in environmental sample collection and handling as well as trained on relevant Occupational Safety and Health Administration (OSHA) requirements and guidelines.

The regional QAPP program manager and/or the regional QAPP project QAO (state office) is responsible for ensuring the compliance officer conducting field oversight are appropriately trained and qualified, with applicable training records on file with DEQ Human Resources. All work performed by DEQ staff will be conducted in accordance with the current version of the DEQ Safety Program Plan (2013AEH1) and DEQ General Safety Manual (2015AEH1).

The regional QAPP project manager (compliance officer) is responsible for data review and verification. They must have experience in petroleum assessment and remediation requirements typical of an Analyst 3 or 4, as well as a working knowledge of QA/QC requirements. They are responsible for all external party communication, data report collecting, data report analysis, and conclusion. Additionally, they are responsible for completing the data review and verification checklist.

The regional QAPP project QAO (state office) is responsible for data validation. They must work in either the Underground and Leaking Underground Storage Tank, General Remediation, Brownfields, Preliminary Assessment, or Solid Waste programs and have experience in petroleum assessment and remediation requirements as well as a working knowledge of QA/QC requirements. They are responsible for completing the data validation checklist.

DEQ staff will complete OSHA hazardous waste operations and emergency response (HAZWOPER) training to at least the 24-hour level, with annual 8-hour refresher training, in accordance with 40 CFR 311 (Worker Protection) and 29 CFR 1910.120 (Hazardous Materials). All DEQ staff will perform their job according to their job safety analysis, OSHA Form 5.12. DEQ staff evaluating external party data must have sufficient knowledge and understanding of appropriate practices for sampling various media (e.g., soil, soil vapor, indoor air, surface water, ground water).

10 Apparatus and Materials

This is a statewide QAPP for external party data, no sampling will be performed. Examples of various apparatuses and materials that DEQ staff will evaluate are described in section 18.

11 Instrument or Method Calibration

This is a statewide QAPP for external party data, no sampling will be performed. Examples of various instrument and method calibrations that DEQ staff will evaluate are described in section18.

12 Sample Collection

This is a statewide QAPP for external party data, no sampling will be performed. Examples of various sample collection methods that DEQ staff will evaluate are described in section18.

13 Handling and Preservation

This is a statewide QAPP for external party data, no sampling will be performed. Examples of various handling and preservation procedures that DEQ staff will evaluate are described in section18.

14 Sample Preparation and Analysis

This is a statewide QAPP for external party data, no sampling will be performed. Examples of various sampling preparation and analyses that DEQ staff will evaluate are described in section18.

15 Data Acquisition, Calculations, and Data Reduction

This is a statewide QAPP for external party data, no sampling will be performed. Examples of various data acquisitions, calculations, and data reduction that DEQ staff will evaluate are described in section18.

16 Computer Hardware and Software

This is a statewide QAPP for external party data, no sampling will be performed. DEQ staff may utilize the Risk Evaluation Manual software and/or EPA's Vapor Intrusion Screening Level Calculator to evaluate external party data.

17 Data and Records Management

17.1 Frequency of SOP Revision and Review

When procedures, protocols, or activities change, this SOP will be modified, reviewed, and approved in the same manner. All modifications or edits will be documented in the revision history. The author of the SOP is responsible for reviewing each SOP every five years to ensure that the policies and procedures remain current and appropriate.

17.2 Document Control

This SOP shall be placed in DEQ's Electronic Data Management System (EDMS) and marked as final.

17.3 Document Storage and Availability

DEQ uses EDMS for managing agency documents. EDMS is a database for creating, entering, storing, locating, and accessing electronic documents. This SOP will be maintained on the intranet on the Quality Management Page.

17.4 Retention

DEQ maintains current SOP versions in EDMS. Superseded versions are maintained so that inadvertent use is prevented, but documents are available for historical data review.

18 Quality Assurance and Quality Control

18.1 Data Review and Verification

The compliance officer must review external party information and documents regarding the project and make a decision based on the findings. The decision depends on the nature of the project but could be site closure, further sampling to delineate the plume, ground water monitoring, implement corrective action, environmental covenant, etc.

- There are four types of data that can be received: Field Data/Reports, Laboratory Reports, Lab QA/QC Reports, and Supplemental Information
- The compliance officer will be familiar with the Data Review, Verification, and Validation of External Party Petroleum Data QAPP (EDMS 2021BAP5).
- The compliance officer may need to review and utilize various reference documents. There is a list of minimum criteria that must be received to make a decision on the project. See section 18.5 for details on minimum criteria. See Attachment 20.1 for a

reference list of Standards and Guidance Documents that may need to be reviewed alongside a project.
- The data review and verification checklist is prescriptive and enables the verifier to step-by-step verify submitted data to ensure the desired level of quality and make project decisions.
- All data should be reviewed for consistency and address questions listed in the data review and verification checklist.
- Any data (e.g., field, lab) inconsistencies, discrepancies, or missing information must be documented on the data review and verification checklist with an explanation.

18.2 Data Types: Field Data

Evaluate submitted field records for consistency. Examples of field records 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 (written or electronic).
- Sample collection logs and records.
- Driller logs for borings or records of soil, geology, and hydrogeology at sample locations.
- Field parameter data collected during ground water purging.
- Monitoring well logs or records of well completion.
- Chain-of-custody (COC) documents or proof that samples were not tampered with and were under appropriate security at all times.

Examples of indicators of 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 (PID) (or other field instrument) result in potential improper screening of soil and soil vapor borings and collection of soil and soil vapor samples.
- Absence of field parameter calibration data or unusual calibration data for multi-parameter instruments (e.g., pH, dissolved oxygen, oxygen reduction potential, conductivity) or insufficient well purge timeframe (i.e., ground water parameters did not stabilize during purging timeframe before sample collection) result in potential improper purging of monitoring wells and collection of non-representative ground water samples.
- For many chemicals of concern, no-purge or passive sample collection methods under certain subsurface condition yield better results than active purge and methods for ground water. Active purging may have the effect of volatilizing some constituents and may not be the most "appropriate" collection method. As the goal is to ensure collection of representative samples, the verification process will evaluate if the sample collection process may have biased the samples.
- Homogenized or composited samples for volatile organic compound (VOC) analysis result in loss of VOCs and as a result the analytical data will be biased low and therefore not representative of actual site conditions. However, although rare, composite samples

may be collected if the use of an appropriate method such as the state of Alaska's Department of Environmental Conservation's gasoline in soil Method AK 101 is employed.

18.3 Data Types: Laboratory Records and QA/QC Data

Evaluate laboratory records and data.

- 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.
- COC documentation specifying that samples were not tampered with and that samples were under appropriate security at all times.
- Ensure accuracy and precision calculations by external parties or by DEQ staff are valid and correct for laboratory control samples (LCS) (e.g., LCSD, matrix spikes, matrix spike duplicates, surrogate spikes, method blanks, field duplicate/replicate samples). Accuracy and precision calculations can be found in the Definition section. The criteria for precision can be found in section 18.5.

18.4 Data Types: Supplemental Information

The external party may provide DEQ with additional data, considered as supplemental, that may be used to make decisions regarding further actions. Supplemental data may include the following:

- Project-specific, field-collected samples for matrix spikes and matrix spikes duplicate analysis
- Trip blank samples when collecting VOC samples. Trip blanks are highly recommended.
- Field blank samples to evaluate sample collection, handling, and analysis processes.
- Field data (Level I – see Attachment 14.2) summary, readings, and field instrument calibration, if collected (e.g., photoionization detector [PID]).
- Rinsate/equipment blank samples.

18.5 Minimum Acceptance Criteria

The following MAC must be submitted by the external party in order for DEQ staff to make a decision on the project. All MAC must be documented on the data review and verification checklist. In the event the compliance officer identifies missing or questionable MAC, do one or more of the following:

- Contact the external party and request the missing data or clarification.
- Discuss the situation with the program manager/coordinator or their designee to determine if continuation of data review and verification activities will occur and the

potential for site-specific modification of the MAC with justification on the data review and verification checklist.

- Reject the data.

Minimum Acceptance Criteria

1. Current Analytical Data (within the last 12 months) to be considered representative of site conditions and status.
2. Identification of Chemicals or Analytes of the petroleum release, petroleum tank release investigation or closure or change-in-service as containing only petroleum products (e.g., leaded or unleaded gasoline, diesel, heating oil, motor oil, aviation gas, jet fuel, used oil). The type of petroleum product determines the chemicals of concern, sampling requirements, and analytical method requirements. The table in IDAPA 58.01.24.800 (Attachment 14.4) includes the list of petroleum-related chemicals (VOC and PAHs) to include in sampling and analysis based on the petroleum products known or suspected to have been released. DEQ Used Oil Underground Storage Tank (UST) Closure and Release Sampling Standard Operating Procedures (EDMS 2016BAF23) identifies used oil requirements. The VOC ethylene dibromide (EDB), also known as 1,2-dibromoethane, uses Method 8260 for soil samples and Method 8011 for ground water samples. Ethylene dichloride (EDC), also known as 1,2-dichloroethane, uses Method 8260B. The results of each method will be included in the sampling and analysis for petroleum assessment and corrective action sampling for sites that are known or suspected to contain leaded regular gasoline or aviation gas (e.g., tanks in service before 1990).
3. DEQ On-Site during critical aspects of petroleum release investigations or UST closure site activities (e.g., tank closure, dig and chase, remediation system installation, monitoring well installation). Non-critical activities include quarterly ground water monitoring and well abandonment. The compliance officer can discuss other activities with the program manager/coordinator or their designee and document it on the data review and verification checklist.
4. Appropriate Type of Media. The type of sampled media (soil, ground water, surface water, soil vapor, indoor/ambient air) will be dependent on the nature and extent of the release and the exposure routes/pathways (e.g., vapor intrusion, direct contact, ingestion, inhalation).
5. 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. These are professional judgment calls made by DEQ staff based on the experience of the staff verifying the data. Consultation with other DEQ staff (e.g., regional, program, technical services) is encouraged.

6. Duplicate/Replicate Samples are required. 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.
7. Figures and Tables are required. A figure (map) depicting the site and locations of samples with laboratory data, including non-detections and detections. Isocontour figures of ground water laboratory data and ground water flow. Summary tables (per media) of all current and historical laboratory data.
8. Well boring logs are required.
9. UST Closure, Release Investigation, Change-in-Service (if applicable). Sample location(s) selection must consider the substance stored in a tank (i.e. high ethanol percentage may make the release travel further), tank backfill type and depth, depth to ground water, buildings, closure type (close in place versus removal), soil type and any other applicable criteria. Samples should be collected where contamination is likely to be present (e.g., under tanks, piping, joints, dispensers, spill buckets, sumps) and must be taken in native soil directly beneath the tank, piping, and/or dispensers. See Tables 1 and 2 below for minimum number of samples and locations for UST closures depending on whether water is encountered in the excavation.

Table 1. 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 2. 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 0,000	Four	From wall next to tank ends

gal or tank cluster		and each side at soil/groundwater interface
Dispenser	One	Side wall of dispenser being removed/closed
Visual staining	One	From all stained areas

10. Sample Collection Method, Volume, and Handling Procedures. Sampling activities for releases or UST closures may be performed in phases with soil sampling conducted during the first phase and surface water, ground water, soil vapor, and/or indoor/ambient air sampling (if necessary) conducted during subsequent phases. Sampling procedures must be conducted in a manner that minimizes the loss of VOCs. VOC samples will not be collected near a source of cross-contamination that may bias the results. Off-site sample collection must occur if contamination appears to migrate off the subject property. All nondisposable sampling equipment must be properly decontaminated, stored, and handled between sample locations. Deviations from published standards and guidance practices (e.g., ASTM, company SOPs, EPA, other approved agency) or written procedures accepted by DEQ should be noted. Indications of improper sample collection procedures may include:

- Composite or homogenized samples for VOC analysis.
- Sample location in close proximity to potential sources of contaminant or interference (e.g., soil sample near asphalt when polycyclic aromatic hydrocarbon analysis is to be performed, 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.

10.1 VOC Soil Sampling.

The required method for the collection of soil samples for VOC analysis is EPA Method 5035A, as specified by EPA *(https://www.epa.gov/hw-sw846/sw-846-test-method-5035-closed-system-purge-and-trap-and-extraction-volatile-organics-soil)*.
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 preservative(s). In addition, soil moisture content and VOC prescreening will be assessed at each sampling location to allow the laboratory to both calculate chemical concentrations on a dry weight basis as well as screen the sample for VOC content to evaluate if dilution is required before analysis. These samples are typically collected in a separate 2-ounce clear sample jar.

10.2 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 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, hand tool).

10.3 Metal and Halogenated Solvent Soil Sampling (required for used oil).

Used oil is any oil that has become contaminated by physical or chemical impurities through use (e.g. motor oils, metal cutting oils, hydraulic fluids). Waste oil is oil that is discarded or spilled before use. Tanks that contain leaded gasoline may contain sludge with 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. For used oil assessments, soil sampling must include sampling and analysis of the RCRA 8 metals (i.e., arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver) as shown in Table 3 by the toxicity characteristic leaching procedure (TCLP), unless the external 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 [EDMS 2016BAF23]). If the total metal concentrations exceed the Rule of 20 limit, unless the soil will be treated as a hazardous waste.

If soil exhibits the toxicity characteristic (see Table 3), it may be considered a hazardous waste. Contact the hazardous waste compliance manager to discuss.

Table 3. 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

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 glass jar) using clean, disposable, or decontaminated soil sampling devices (e.g.,

hand auger, soil corer, split spoon, direct push probe, backhoe, hand tool). The method for analysis is shown in Table 4.

Table 4. Used Oil Tank Analytical Parameters

Media	Parameter	EPA Methodology
Soil	BTEX, PAHs	8260, 8270
	Solvents	8260,8270
	Total Metals	6010, 6020
	Total Mercury	7470
Water	BTEX, PAH's	8260, 8270
	Solvents	8260,8270
	Total Metals	6010, 6020
	Total Mercury	7470

If halogenated compounds are detected by Method 8260 and are 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.

10.4 Soil Vapor Sampling.

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 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 generally used to evaluate the potential for atmospheric air intrusion. Vapor point sampling should occur immediately following leak detection activities. Reference Appendix G of the DEQ Risk Evaluation Manual for Petroleum Releases (2018).

10.5 Indoor/Ambient Air Sampling.

Indoor air sampling determines 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 but for some constituents (i.e., naphthalene) the MDL for TO-15 is above the screening level and TO-17 would be required.

10.6 VOC Ground Water Sampling.

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, 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. This 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 note the presence of the headspace in the laboratory narrative or report.

10.7 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, disposable, or decontaminated water sampling equipment.

10.8 Sample Containers and Preservatives Used.

The preservation requirements are listed in the analytical method used by the laboratory. Preservation for typical analytical methods utilized are provided in Attachment 20.3. Preservatives are not necessary for soil samples for total metals analysis. Examine the laboratory sample receipt reports, digestion, and/or distillation logs to determine if samples were preserved at the proper temperature or pH. Make note of any laboratory-reported problems (e.g., sample leakage, broken containers, inadequate sample volume, inappropriate sample containers, head space or bubbles for VOC ground water samples, other information available regarding sample containers and sample condition). In general, data generated when improper or no sample containers

or preservatives are used will be rejected and not used in decision making. However, professional judgment may be used during the data verification process to flag but accept the results, particularly if the results are greater than the laboratory MDL (i.e., elevated data may still be used under certain circumstances).

11. Chain-of-Custody Documentation must include:
    - 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, soil vapor)
    - sample numbers assigned by the laboratory must correspond to the appropriate sample number throughout the analysis
    - sample transfer dates, times, and signatures

12. Sample Holding Times Met for Extraction and Analysis. The holding time requirements are listed in the analytical method used by the laboratory. Holding times for typical analytical methods are provided in Attachment 20.3. 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. Data with holding times greater than the analytical method holding time will be documented and identified in the data review and verification checklist. In general, data generated when holding times are exceeded will be rejected and not used in decision making. However, professional judgment may be used during the data verification process to flag but accept the results, particularly if the results are greater than the laboratory MDL (i.e., elevated data may still be used under certain circumstances).

13. Sample Analytical Methods Used. Ensure the appropriate analytical method was requested by the external party on the COC and utilized by the laboratory. Typical analytical method information is provided in Attachment 20.3. Ensure the laboratory properly accounted for dilution, if utilized, in the sample analysis and reported result.

14. Completeness. A completeness goal of 80% is required for analyses and analytes. If DEQ reviewed and approved a sampling plan, a completeness goal of 80% is required

for the sampling results versus the plan. See Definitions section for explanation and calculation.

15. Field Duplicate/Replicate Samples collected of soil, surface water, ground water, and soil vapor or air (replicate) must be within specified 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. For precision calculation, see Definitions.

16. Laboratory Data Package. A data package includes items from above and sample preparation, including extraction, analysis, and laboratory control samples.

    16.1 Laboratory Reporting Limits.
    Ensure the laboratories reporting limits (i.e., MDL, PQL, RL) are at or below the DEQ residential use screening levels. J qualifiers/flags are the most commonly encountered data qualifiers in laboratory data packages. The presence of a J flag attached to an analytical result indicates that the chemical was positively identified, but the concentration is estimated. The J flag is used by the laboratory when a chemical is observed at a level between the RL and the PQL. The J flag must have a narrative justification for its use. R flag means the sample was rejected by the laboratory and the results are not usable for any purpose.

    16.2 Laboratory Control Samples. (Accuracy and Precision)
    Ensure control samples are within laboratory specified range for LCS, LCSD, matrix spikes, matrix spike duplicates, surrogate spikes, and method blank. Accuracy is to be within the ranges of acceptability for percent recovery identified by the laboratory conducting the analysis for each method and analyte. Precision for laboratory data is to be within the ranges of acceptability, based on RPD, identified by the laboratory conducting the analysis for each method and analyte for the laboratory data for laboratory duplicate sample analysis. Accuracy and precision calculations can be found in the Definition section.

19 References

DEQ (Idaho Department of Environmental Quality). 2017. Quality Management Plan. Boise, ID: DEQ. EDMS 2012AEC1.

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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 https://www.epa.gov/quality/guidance-environmental-data-verification-and-data-validation

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 https://www.epa.gov/clp/superfund-clp-analytical-services-guidance-documents

DEQ (Idaho Department of Environmental Quality). 2018 or more recent version. Risk Evaluation Manual. Boise, ID: DEQ. http://www.deq.idaho.gov/media/60181992/idaho-risk-evaluation-manual-for-petroleum-releases-2018.pdf

EPA (US Environmental Protection Agency). 2019 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 https://adminrules.idaho.gov/rules/current/58/580124.pdf

IDAPA 58.01.02. Water Quality Standards. https://adminrules.idaho.gov/rules/current/58/580102.pdf

IDAPA 58.01.07. Rules Regulating Underground Storage Tank Systems. https://adminrules.idaho.gov/rules/current/58/580107.pdf

20 Attachments

Attachment 20.1

ASTM Standards

- *D4840-99 (2018) 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*
- *D5956-15 (2015) Standard Guide for Sampling Strategies for Heterogeneous Wastes*
- *D6044-96 (2015) Standard Guide for Representative Sampling for Management of Waste and Contaminated Media*
- *D6051-15 (2015) Standard Guide for Composite Sampling and Field Subsampling for Environmental Waste Management Activities*
- *D6311-98 (2014) Standard Guide for Generation of Environmental Data Related to Waste Management Activities: Selection and Optimization of Sampling Design*
- *E1903-11 Standard Guide for Environmental Site Assessments: Phase II Environmental Site Assessment Process*
- *E1943-98 (2015) Standard Guide for Remediation of Ground Water by Natural Attenuation at Petroleum Release Sites*
- *E2531-06 (2014) Standard Guide for Development of Conceptual Site Models and Remediation Strategies for Light Nonaqueous-Phase Liquids Released to the Subsurface*

API and PEI Guidance

- *API Recommended Practice 1604, "Closure of Underground Petroleum Storage Tanks"*
- *PEI Recommended Practice 1700, "Closure of Underground Storage Tank and Shop-Fabricated Aboveground Storage Tank Systems"*
- *SW-846 methods (https://www.epa.gov/hw-sw846)*

DEQ Guidance

- *DEQ statistical guidance for determining background ground water quality and degradation, March 2014 (http://www.deq.idaho.gov/water-quality/ground-water/degraded-ground-water.aspx)*
- *The 2018 risk evaluation manual for petroleum constituents (http://www.deq.idaho.gov/media/60181992/idaho-risk-evaluation-manual-for-petroleum-releases-2018.pdf)*
- *DEQ Used Oil UST Closure and Release Sampling Standard Operating Procedures (EDMS 2016BAF23)*

Attachment 20.2

Analytical Data Support and Data Packages

Analytical Data Support Levels

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 external party data include the level of QC the laboratory employed when analyzing the samples; and equally important, the documentation accompanying the returned results.

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. 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 (photoionization detector readings (PID)), 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 only 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. 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, with the exception that the level of documentation supplied with analytical results is less robust than higher level data. Laboratory analytical data submitted by external parties to DEQ for review (i.e., data from samples submitted to a laboratory for analysis) is an example. **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. **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.

Laboratory Data Package Submittals

There is no requirement for external 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.

Attachment 20.3

Sample Containers, Preservation Methods and Holding Times

Typical analytical methods, container types, preservation methods, and sampling holding times.[1]					
Compounds	**Parameter**	**Analytical Method**	**Sample Container**	**Preservative**	**Holding Time**
Soil Samples					
Petroleum hydrocarbons	TPH*	EPA 8015D modified	4-oz glass	4 °C +/- 2°C	14 days
	GRO*	EPA 8015D modified	4-oz glass	4 °C +/- 2°C	14 days
	DRO*	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

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

Compounds	Parameter	Analytical Method	Sample Container	Preservative	Holding Time
Ground Water 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
Total 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
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 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

* TPH, GRO, DRO, RRO should only be collected if required for disposal/characterization requirements

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 external parties. Therefore, the analytical method, container types, preservation method, and sampling holding time information submitted by the external party will be compared against the requirements identified in the external party's 'standard of practice', or other SOPs, in case there is a reason to deviate from the requirements identified in this table.

Attachment 20.4

Chemicals of Interest from IDAPA 58.01.24.800

Table 1. Chemicals of Interest for Various Petroleum Products

Chemical	Gasoline/ JP-4/AVGas	Diesel/ Fuel Oil No. 2/ Kerosene	Fuel Oil No.4	Jet Fuels (Jet A, JP -5, JP -8)
Benzene	X	X	—	X
Toluene	X	X	—	X
Ethyl benzene	X	X	—	X
Xylenes (mixed)	X	X	—	X
Ethylene Dibromide (EDB)	X[1]	—	—	—
1.2 Dichloroethane (EDC)	X[1]	—	—	—
Methyl Tert-Butyl Ether (MTBE)	X	—	—	—
Acenaphthene	—	X	X	X
Anthracene	—	X	X	X
Benzo(a)pyrene	—	X	X	X
Benzo(b)fluoranthene	—	X	X	X
Benzo(k)fluoranthene	—	X	X	X
Benz(a)anthracene	—	X	X	X
Chrysene	—	X	X	X
Fluorene	—	X	X	X
Fluoranthene	—	X	X	X
Naphthalene	X	X	X	X
Pyrene	—	X	X	X

Note: X[1] = Leaded Regular Only

Appendix C. Data Review and Verification Checklist

Idaho Department of Environmental Quality

Data Review and Verification Checklist

WMR – External Party Petroleum Data

Project Name & ID #:

Project Manager/Data Verifier:

Project QAO:

Project EDMS Folder:

EDMS #(s) of Reports/Documents this Checklist Verifies:

Date Completed:

See section 18.5 of the SOP EDMS 2021BAP5 (Appendix B)
Data Review: *Confirming data has been processed and recorded correctly.*
Data Verification: *Evaluating the completeness and conformance/compliance of a specific data set against the QAPP, method, procedural, or contractual requirements.*
Comments are required where answer is NO.

Minimum Acceptance Criteria (MAC)	Yes	No	N/A
Field Data/Reports			
a. Is the data provided current? **(within last 12 months, unless otherwise approved by DEQ)**	☐	☐	☐
b. Were the appropriate list of chemicals analyzed based on the type(s) of petroleum released? **(see Table in IDAPA 58.01.24.800)**	☐	☐	☐
c. Was DEQ on-site for critical aspects of the project?	☐	☐	☐
d. Were the number and types of samples collected to address potential contaminants and exposure routes/pathways (e.g., appropriate media such as soil, water, air for vapor intrusion, direct contact, ingestion)?	☐	☐	☐
e. Were sufficient numbers of samples collected from appropriate locations and depths? This includes horizontal and vertical extent of media. See Tables 1 and 2 in SOP for UST sites.	☐	☐	☐
f. Were field duplicate/replicate samples collected?	☐	☐	☐
g. Are the types, locations, depths, and laboratory data of all samples provided and on a location map?	☐	☐	☐

h.	Are isocontour figures of ground water laboratory data and flow provided?	☐	☐	☐
i.	Are summary tables (per media) of all current and historical laboratory data provided?	☐	☐	☐
j.	Were well driller reports and/or boring logs submitted?	☐	☐	☐
k.	Were samples collected in an acceptable manner that minimizes cross-contamination (e.g., not near a running engine)?	☐	☐	☐
l.	Were samples collected using appropriate equipment, containers, and preservatives (e.g., PAHs soils in 4-oz clear jar with Teflon lid)?	☐	☐	☐
m.	Are sample collection and handling methods appropriate and documented (e.g., method TO-15 or TO-17 for indoor/ambient air sampling, VOC ground water samples in 40 ml VOA glass vial with Teflon coated septum-sealed screwcap with no headspace)?	☐	☐	☐
n.	Were samples collected in an acceptable manner that minimizes loss of VOCs (e.g., VOC soil sampling utilized method 5035A)?	☐	☐	☐
o.	Was chain-of-custody documentation provided and complete? This includes project name, sample date and time, unique sample numbers, sample location, sample matrix, sample container and preservation, sample analytical methods, and transfer of samples to laboratory with appropriate dates and signatures.	☐	☐	☐
p.	Was the completeness goal of 80% achieved for the data collected (analyses and analytes)?	☐	☐	☐
q.	If DEQ reviewed and approved a sampling plan, was a completeness goal of 80% achieved for the sampling results versus the plan?	☐	☐	☐
r.	Is field soil duplicate precision within ± 50%; is field ground water duplicate precision within ± 30%; and is field soil vapor or air replicate precision within ± 25% based on RPD calculation for duplicate samples collected by the external party? **(see section 2.16 of the SOP)**	☐	☐	☐
Laboratory QA/QC **(if none submitted, stop reviewing as the MACs have not been met)**				
s.	Were the appropriate analytical methods used to analyze the samples collected? **(see attachment 20.3 of the SOP and Table 3)**	☐	☐	☐
t.	Were method holding times satisfied for sample extraction and analysis? **(see attachment 20.3 of the SOP)**	☐	☐	☐
u.	Were sample extraction and analysis dates provided as part of the laboratory report?	☐	☐	☐
v.	Did the laboratory properly account for dilution (e.g., laboratory reporting limits were increased by the same factor used for dilution)?	☐	☐	☐
w.	Are the laboratory reporting limits at or below the screening levels? Common Data Qualifiers/Flags: J= estimated value. Usually when the analyte is detected but below the PQL but above the MDL. Must have a narrative justification for its use. R= rejected by analyzing laboratory. Results are not usable for any purpose due to a QA/QC exceedance or equipment malfunction.	☐	☐	☐
x.	Were laboratory control samples analyzed (e.g., LCS, LCSD, matrix spikes, matrix spike duplicates, surrogate spikes, method blank)?	☐	☐	☐
y.	Is accuracy within the ranges of acceptability, based on percent recovery,	☐	☐	☐

for the LCS, matrix spikes, surrogate spikes, and method blank?			
z. Is laboratory precision within the ranges of acceptability, based on RPD, for laboratory duplicate sample analysis for the LCSD and matrix spike duplicates?	☐	☐	☐
aa. Was project data thoroughly examined— identifying errors in data entry, storage, calculation, reduction, transformation, or transcription? **(Common errors include incorrect units, unit conversion, RPD calculation, transcription.)**	☐	☐	☐
Supplemental:			
a. Were field records, if provided, consistent with the other data provided? Field records may include field instrument calibration data, etc.	☐	☐	☐
b. If collected, do field blank samples (e.g., rinsate, field, trip, equipment) demonstrate chemical detections equal to or greater than the MDL (if so, contact the applicable program manager/coordinator)?	☐	☐	☐
c. Were project-specific, field collected matrix spike and matrix spike duplicate samples analyzed?	☐	☐	☐
d. For project-specific, field collected matrix spikes, is accuracy within the ranges of acceptability, based on percent recovery?	☐	☐	☐
e. For project-specific, field collected matrix spikes, is laboratory precision within the ranges of acceptability, based on RPD?	☐	☐	☐
Summary			
a. Do any data deficiencies exist? Examples may include missing data or compromised data integrity, due to issues such as fraud, loss in acquisition, storage, or data processing. If yes, explain:	☐	☐	☐
b. Do deficiencies and/or conditions noted above impact the project specific DQOs? If yes, explain:	☐	☒	☐

Decision	**Yes**
Continue monitoring (ground water, remediation progress etc.)	☐
Perform a risk evaluation	☐
Additional assessment is required	☐
Corrective action is required	☐
Closure with activity and use limitation restrictions (environmental covenant)	☐
Closure without restrictions	☐

Comments:

Appendix D. Data Validation Checklist

Idaho Department of Environmental Quality

Data Validation Checklist

WMR – External Party Petroleum Data

Project Name & ID #:

Data Validator:

Data Review and Verification Checklist EDMS #:

Date Completed:

Data Validation: ***Determining the quality of a data set by evaluating results.***

Are the decisions the project manager made appropriate and acceptable? If no, explain and provide the response to the project manager for further site evaluation and/or discussion.