

Iowa Department of Natural Resources

Quality Assurance Plan for Investigation of Underground Storage Tank Releases

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Approvals:

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Introduction: This Quality Assurance Project Plan (QAPP) describes the activities of the Iowa Department of Natural Resources' Underground Storage Tank (UST) Section and its acquisition of environmental information whether generated from direct measurements activities, collected from other sources, or compiled from computerized databases and information systems.

Section 1: Project Management

1.1 Project/Task Organization

The corrective action oversight at leaking underground storage tank (LUST) sites in Iowa is the responsibility of the Underground Storage Tank (UST) Section of the Land Quality Bureau, within the Environmental Services Division of the Department of Natural Resources (DNR). The UST Section Manager is Keith Wilken, the Land Quality Bureau (LQB) Chief is Amie Davidson, the Environmental Services Division Administrator is Ed Tormey, and the DNR Director is Kayla Lyon. The DNR's Quality Assurance Manager is Tim Hall.

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1.2 Problem Definition/Background

The purpose of a QAPP is to describe the quality system policies and management guidelines. Environmental programs funded by the Environmental Protection Agency (EPA) are required to establish and implement a quality system: a structured system that describes the policies and procedures for ensuring that work processes, products, or services satisfy stated expectations or specifications. Environmental programs are further required to document their quality system in a Quality Management Plan (QMP). The DNR has quality system and management guidelines for the agency outlined in the DNR's QMP, which was approved in July 2021, with an anniversary date for the QMP of July 2026.

The DNR's UST Section QAPP fits under the DNR-wide QMP and provides guidance for Iowa's UST and LUST programs to ensure data collected at UST and LUST sites are defensible and of known quality and origin. This QAPP should be consulted during the design of sampling plans developed under the UST/LUST program and the components incorporated or referenced in work plans. The goal of this QAPP is to describe the quality system that applies universally to petroleum sites and to ensure that minimum data quality objectives are met, and data is available for multiple uses. The data collected by this program are intended to be used to support, investigation, cleanup, monitoring, resolution, and enforcement activities associated with the release of petroleum and other regulated substances.

This QAPP broadly describes the data quality requirements that apply to petroleum tank release investigations required by the DNR's UST/LUST section. It is the policy of the ESD that:

- All environmental data generated, compiled, used or reported will be of appropriate quality for its intended use.
- The intended use(s) and of the data will be defined before data collection efforts begin and will account for the needs of secondary data users, as appropriate.
- The appropriate level of quality will be identified before data collection efforts begin.
- Application of managerial controls for data collection efforts will be appropriate for the intended use of and the degree of confidence required in the results.
- Quality information associated with environmental data collection efforts will be available to EPA, other data users, and the public.
- Each bureau or section generating, compiling, using or reporting environmental data will ensure that adequate

resources (both monetary and staff) are provided to support the QA effort, and will be responsible for QA activities and requirements applicable to them. It will also be the responsibility of bureaus and sections to ensure that appropriate QA policies and procedures are developed and implemented by any grantees or subgrantees, contractors, or, in some cases, the regulated community, who generate environmental data.

- Each bureau generating, compiling, using or reporting environmental data will designate a QAC.

1.3 Project/Task Description

The primary goal of the UST/LUST sampling program is the identification and quantification of chemicals of concern (COCs) released from USTs. Proper quantification of these regulated substances is necessary to identify leaking underground storage tank systems and the presence of COCs that threaten human health and the environment. Data from UST/LUST sites are then used to evaluate compliance with the DNR's UST/LUST program, for the protection of public health and the environment.

The DNR's UST/LUST Section maintains three documents that provide data acquisition guidance:

- Tier 1 Guidance
- Tier 2 Site Cleanup Report Guidance
- UST Closure Guidance

These three documents, available on the DNR's web site, include detailed information on chemicals of concern, including Total Extractable Hydrocarbons, methyl-tertiary butyl ether (MtBE), benzene, toluene, ethylbenzene, xylenes, and other chemicals of concern. These guidance documents also include information on the requirement for use of certified laboratories as well as laboratory data sheets. By following these guidance documents, the quality of the data used for this program is documented.

1.4 Data Quality Objectives and Criteria

The DNR's UST Section utilizes the Risk-Based Corrective Action (RBCA), which assesses the risk(s) posed by petroleum contamination using site-specific conditions and a tiered approach to protect human health and the environment. Based on the results of the tiered assessment, corrective action can then be used to minimize or remove risk(s). Corrective action options can include: reducing contamination through active or passive methods, using technological or institutional controls, eliminating receptors of concern, or monitoring.

A Tier 1 Site Assessment (Tier 1) uses limited site data to determine whether a site poses an unreasonable risk to public health, safety, and the environment. A Tier 1 assessment generally includes: conducting a field investigation to determine the maximum concentrations of chemicals of concern in soil and groundwater associated with the petroleum release, surveying the surrounding area for receptors and comparing maximum contaminant concentrations to the Tier 1 Look-up Table to determine which pathways are complete. The Tier 1 levels are derived from models using conservative assumptions to predict contaminant movement and exposure to receptors.

A Tier 2 site assessment must be conducted and a Tier 2 Site Cleanup Report submitted for all sites when any of the following conditions are present:

- Free phase petroleum product.
- The responsible party decides to bypass the Tier 1 assessment and go directly to the Tier 2 site assessment.
- Failure of a Tier 1 pathway.
- Bedrock is encountered above groundwater.
- Explosive vapor levels are documented.

1.5 Documents and Records

The DNR maintains a Records Center at the Wallace State Office Building, 502 East 9th Street, 5th floor Des Moines, Iowa 50319, 515-725-8480. DNR Records Centers Hours are 8:00 a.m. - 4:30 p.m. Monday through Friday (except for state holidays).

The DNR also maintains an electronic records program, which includes a document search application. The Document Search Web Application is a web interface connecting to OpenText. The search interface allows easy searches by a

variety of meta data such as program, city, county, or facility name. It's possible to search an individual program or all programs (with additional programs as they are added). Among the DNR Programs available is the Land Quality – UST program. Electronic records are available for the Underground Storage Tanks program.

Section 2: Data Generation and Acquisition

The DNR's UST/LUST Section maintains three guidance documents:

1. Tier 1 Guidance Document
2. Tier 2 Site Cleanup Report Guidance
3. UST Closure Guidance

These documents provide details on elements needed for the QAPP, including

- Sampling Process Design (Experimental Design)
- Sampling Methods
- Sample Handling and Custody
- Analytical Methods
- Quality Control
- Instrument/Equipment Testing, Inspection, and Maintenance
- Instrument/Equipment Calibration and Frequency
- Inspection/Acceptance of Supplies and Consumables
- Non-direct Measurements

Tier 1 Guidance Document: The Table of Contents from the Tier 1 Guidance Document indicates what information is available to meet the needs of this section, including:

- Risk-Based Corrective Action Overview
- Tier 1 Site Assessment
- Tier 2 Site Cleanup Report
- Tier 3 Assessment
- No Action Required Site Classification
- No Further Action Certificate
- Conditions Requiring a Tier 2 Site Cleanup Report
- Tier 1 Flowchart
- Iowa Comprehensive Petroleum Underground Storage Tank Fund Program
- Tier 1 Report Form
- Tier 1 Worksheet and Flowcharts
- Report Preparation
- Review Process
- Chemicals of Concern
 - OA1 and OA2
 - Total Extractable Hydrocarbons
 - Methyl-tertiary butyl ether (MtBE)
 - Other Chemicals of Concern
- Soil Gas Analysis
- Certified Laboratory Required
- Laboratory Data Sheets
- Quality Control/Quality Assurance Procedures
- Iowa Tier 1 Level Look-Up Table
- Soil Gas Target Levels
- Tier 1 Pathway Evaluation
- Tier 1 Pathway Specific Guidance
- Groundwater Ingestion Pathway
- Soil Leaching to Groundwater Pathway
- Groundwater Vapor to Enclosed Space Pathway
- Soil Vapor to Enclosed Space Pathway
- Groundwater to Water Line Pathway
- Soil to Water Line Pathway
- Surface Water Pathway
- Site Data Summary
- Pathway Evaluation Summary
- Corrective Action Documentation
- Site Chronology and Current Conditions
- Sampling Requirements
- Where to Sample
- Monitoring Well Placement
- Soil Sample Collection
- Possible Sample Location(s)
- Possible Sampling Scenarios
- Drilling and Well Construction
- Exploratory Methods
- Monitoring Well Construction Design
- Monitoring Well Construction Permit
- Boring Depth for Sampling
- Boring Depth for Screening
- Soil Gas Sampling (Optional)
- Collecting a Soil Gas Sample
- Checking the Static Water Levels
- Field Screening
- Groundwater Sampling
- Hydraulic Conductivity

- Protected Groundwater Source
- Groundwater Flow Direction
- Total Dissolved Solids
- Receptor Survey
- Wells
- Well Search
- Enclosed Spaces and Conduits
- Surface Waterbody
- Tier 1 Corrective Action Response
- No Action Required Site Classification
- No Further Action Certificate
- Compliance Monitoring and Confirmation Sampling
- Replacement or Relocation of Water Lines
- Soil Excavation as Corrective Action

Tier 2 Guidance Document: The Table of Contents from the Tier 2 Site Cleanup Report Guidance indicates what information is available to meet the needs of this section, including:

- Conditions Requiring Submittal of a Tier 2 Report
- Financial Responsibility
- Iowa Comprehensive Petroleum UST Fund Program
- Tier 2 Site Assessment Overview
- Tier 2 Web-based Application
- Tier 2 Report Form
- Tier 2 Report Preparation & Submittal
- Tier 2 Application
- Quality Control/Quality Assurance Procedures
- Chemicals of Concern
 - Benzene, Toluene, Ethylbenzene, Xylenes
 - Total Extractable Hydrocarbons
 - Methyl-tertiary Butyl Ether
- Certified Laboratory Required
- Laboratory Data Sheets
- Soil Gas Analysis
- Soil Gas Sampling
- Collecting a Soil Gas Sample
- Checking the Static Water Levels
- Indoor Air Sampling
- Report Review Procedures
- Site Classification
- No Action Required Site Classification
- No Further Action Certificate
- Tier 3 Assessment
- Expedited Corrective Action
- Free Product Recovery

UST Closure Guidance: The Table of Contents from the UST Closure Guidance indicates what information is available to meet the needs of this section, including:

- Sampling for Contamination at Tank Removal
- Visual Inspection
- Soil Sampling Equipment
- Release Reporting
- Sampling for UST Closure
- Soil Sampling for Tank Closure When Groundwater Interferes with Soil Sampling
- Soil Sampling for Product Piping Closure
- Closed Trench and Abandonment of Piping
- Open Trench and Removal of Piping
- Soil Sampling Beneath the Dispenser
- Soil Sampling Beneath the Remote Fill
- Containment, Piping, and Satellite Dispensers
- Groundwater Sampling for Tank Closure
- Laboratory Procedures for Testing Soil and Groundwater Samples
- Soil Sample Locations
- Sampling Exceptions
- Excavation Backfill
- Tank Fill in Place
- Closure Report Forms

Section 3: Assessment/Oversight

Performance audits may be conducted periodically by DNR staff to evaluate whether samplers are adhering to appropriate QA/QC controls, including the proper execution and use of sample identification, sample control, chain-of-custody procedures, documentation, and sampling procedures. Analytical results meeting data quality objectives (DQOs) will be accepted. If QC samples are outside acceptance criteria, they will be further evaluated.

Implementation of QC requirements for sampling is the responsibility of the person carrying out the sampling. Persons carrying out the sampling will follow the sampling procedures described in DNR Tier 1 Guidance, Tier 2 Site Cleanup Report Guidance, and UST Closure Guidance. Analytical data will be reviewed by DNR staff. The DNR agrees to allow the EPA Project Officer and the EPA Quality Assurance Staff to have access to oversee the field collection and the laboratory procedures.

Site-specific QA/QC information will be included in the appropriate facility files from each sampling event. For each facility, the final summary of reported data from the laboratory will reflect all laboratory QA/QC measures taken. If further reporting and clarification is necessary, the laboratory will prepare a report detailing recommendations and submit the report with the data to the DNR staff, who will review the QA recommendations and take necessary corrective actions.

Section 4: Data Validation and Usability

Performance audits by DNR may be conducted periodically to evaluate whether samplers are adhering to the QA/QC controls of this QAPP, including the proper execution and use of sample identification, sample control, chain-of-custody procedures, documentation, and sampling procedures.

Implementation of QC requirements for sampling is the responsibility of the person carrying out the sampling. Persons carrying out the sampling will follow the sampling procedures described in this QAPP. Analytical data will be reviewed by DNR staff. The PTC program agrees to allow the EPA Project Officer and the EPA Quality Assurance Staff to have access to oversee the field collection and the laboratory procedures if requested.

Site-specific QA/QC information will be included in the appropriate facility files from each sampling event. For each facility, the final summary of reported data from the laboratory will reflect all laboratory QA/QC measures taken.

4.1 Data Validation & Usability

The level of detail and frequency with which data is reviewed, verified, and validated may be scaled to the importance of the intended decisions to be made based on the data.

Data Review, Validation, and Verification Requirements

Data review, verification and validation procedures will focus on determining if the data meets the requirements of this QAPP. Specifically, DNR staff project managers will routinely review sampling, calibration, field measurement, field logging, and chain-of-custody procedures. Where possible, generated data will be compared with previous data to evaluate consistency. Any data generated outside standard protocol will be either rejected or identified with the inconsistency.

4.2 Validation and Verification Methods (Data Analysis, Validation and Reporting)

Laboratories

Laboratories compile a data package which includes lab reports, and a QA/QC Summary Report. Laboratories analyze lab QC samples and assign result qualifiers as needed. Actions taken by laboratories to review, verify, and validate data may include the following:

- Visually inspect sample integrity.
- Perform a temperature check for each cooler containing samples and record these temperatures on the site visit/chain-of-custody forms.
- Ensure COC signatures.
- Provide QA/QC summary report in data package.
- Perform lab QC and assign result qualifiers as necessary:
- Flag dilutions (D flag)
- Flag holding times if exceeded and record to the minute (H flag)
- Measure cooler temperatures upon receipt and report temperatures in QA/QC summary report notes in EDD.
- Flag result values that are $> \text{MDL}$ and $\leq \text{LRL}$ as estimates (J flag) (result comment "Result between MDL and LRL, J flagged as estimate).
- Flag results when the lowest LRL they could achieve is higher than the RRL in the SAP (L flag)
- Identify detections ("hits") in blanks.
- Add activity comments to distinguish duplicate samples ("duplicate to...")
- Indicate instances in the QA/QC summary report if lab QC samples (laboratory control samples, blanks,

duplicates, matrix spikes) were outside the required control limits.

DNR staff may verify laboratory results against the QC limits specified in this document.

4.3 Reconciliation and User Requirements

Data will be evaluated for suitability for its intended use by DNR staff before it is applied to decision- making. Data quality and will be verified by reviewing the data package (including QC samples such as duplicates, blanks, spikes). Where quality data fails, corrective action will be taken as described in section 3.1.