West Virginia Department of Environmental Protection (WVDEP)
Quality Assurance Program Plan
for
Underground Storage Tanks (UST) /Leaking Underground Storage Tanks (LUST)

Effective Date: April 4, 2022

Prepared by:

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West Virginia Department of Environmental Protection (WVDEP)
Quality Assurance Program Plan
for
Underground Storage Tanks/Leaking Underground Storage Tanks
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Environmental Enforcement Tanks Corrective Action personnel

EPA Project Manager

Tank Owners

Tank Operators

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ACRONYMS AND DEFINITIONS

AST	Aboveground Storage Tank
BTO	Business Technology Office
BOO	Business Operations Office
CAGD	Corrective Action Guidance Document
CAP	Corrective Action Plan
CLP	Contract Laboratory Program
CSM	Conceptual Site Model
DLR	Division of Land Restoration
DOT	Department of Transportation
DQA	Data Quality Assessment
DQI	Data Quality Indicators
DQO	Data Quality Objective
DWWM	Division of Water and Waste Management
ERS	Environmental Resource Specialist
EOI	Expression of Interest
HAZWOPER	Hazardous Waste Operations and Emergency Response
IATA	International Air Transport Association
IDW	Investigation Derived Waste
LAST	Leaking Aboveground Storage Tanks
LCS	Laboratory Control Sample

LRS	Licensed Remediation Specialist
LUST	Leaking Underground Storage Tank
MQO	Measurement Quality Objective
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NIMS	National Incident Management System
NFA	No Further Action
OEE	Office of Environmental Enforcement
OER	Office of Environmental Remediation
OSHA	Occupational Safety & Health Administration
PARCCS	Precision, Accuracy, Representativeness, Completeness, Comparability, and Sensitivity
PE	Performance Evaluation
QA	Quality Assurance
QA/QC	Quality Assurance/Quality Control
QAM	Quality Assurance Manager
QAPP	Quality Assurance Project Plan
QAPrP	Quality Assurance Program Plan
QMP	Quality Management Plan
RCRA	Resource Conservation Recovery Act
RFQ	Request for Quote
SAP	Sampling and Analysis Plan

SAWP	Site Assessment Workplan
SOP	Standard Operating Procedure
SW-846	Refers to the EPA publication entitled Test Methods for Evaluating Solid Waste, Physical/Chemical Methods
TCAU	Tanks Corrective Action Unit
TSA	Technical Systems Audit
UECA	Uniform Environmental Covenant Act
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
VOC	Volatile Organic Compound
VRP	Voluntary Remediation Program
WVDEP	West Virginia Department of Environmental Protection

1.0 INTRODUCTION

The Environmental Protection Agency (EPA) requires that all environmental monitoring and measurement efforts mandated or supported by EPA have in place a centrally managed Quality Assurance Program Plan (QAPrP). The format and elements of this QAPrP are in accordance with EPA Region 9 Guidance for Quality Assurance Program Plans R9QA/03.2 (March 2012), EPA Requirements for Quality Assurance Project Plans for Environmental Data Operations EPA QA/R-5 (March 2001), and EPA Guidance for Quality Assurance Project Plans EPA QA/G-5 (December 2002). Specific elements of this QAPrP include project management, measurement data acquisition, assessment and oversight, data validation, and usability.

This QAPrP is intended for use by the West Virginia Department of Environmental Protection (WVDEP), Division of Water and Waste Management (DWWM), Office of Environmental Enforcement (OEE) to administer the underground storage tank (UST) and leaking underground storage tank (LUST) programs. The Office of Environmental Enforcement administers the Tanks Program which includes both UST prevention and LUST corrective action programs. The relevant statutes for these programs are the Underground Storage Tank Act (WV Code Chapter 22 Article 17), and the rules promulgated to enforce the Act.

The QAPrP is a management tool to ensure that data utilized by the WVDEP is of sufficient known quality to withstand scientific and legal challenge relative to its intended use. The primary beneficiaries of this plan will be the project management staff, inspection staff, and emergency response staff; however, other programs will be aided and protected by the consistency and quality assured by this plan. At a minimum, the QAPrP will be reviewed and updated, as necessary, every five (5) years.

1.1 Prevention Programs

The UST Program governs regulatory requirements intended to prevent releases. Activities performed by the program, includes but are not limited to, the following:

- Registration of USTs and issuance of annual registration certificates to operate for regulated tanks.
- Regulatory review of plans to install new tanks or to upgrade existing tanks including performing on-site installation inspections of new tanks or piping.
- Perform initial compliance monitoring inspections and follow up inspections.
- Licensing and certification of individuals who are to perform installation, repair, retrofitting, upgrade, change-in-service, closure, tightness testing or corrosion protection installation, repair, upgrade, or testing of a UST system.

- Issue closure numbers, track closure numbers, issue closure packages, and perform on-site inspections of tanks undergoing permanent closure or change in service.
- Emergency response/complaints investigations are conducted, as applicable.
- Enforcement actions, including delivery prohibition, are initiated for non-compliance with regulations, as applicable.

Data is collected to ensure that each tank system meets the installation, performance, testing requirements, recordkeeping, and closure standards established for USTs.

1.2 Corrective Action Programs

The LUST Program provides oversight of the cleanup of releases of regulated substances from leaking UST systems. Owners and operators of regulated UST systems may choose to clean up releases by following the traditional LUST corrective action path, seeking closure under Uniform Environmental Covenant Act (UECA), or applying to the Voluntary Remediation Program (VRP).

1.2.1 LUST Program

The traditional LUST approach utilizes specific numerical standards for soil (action levels) and groundwater (groundwater/drinking water standards) cleanup levels as defined in the West Virginia Corrective Action Guidance Document (CAGD). The LUST Program also administers the federal and state LUST Response Funds that are used for state-lead investigations and cleanups. State-lead sites are sites where an emergency exists; the responsible party does not have the financial means to respond to the release; or in those circumstances where the responsible party refuses to comply with the requirements. Data is collected under this program to delineate the extent of contamination from LUST sites and to formulate corrective action plans, which result in the subsequent closure of the sites once numerical clean-up standards have been reached.

1.2.2 Risk-Based Program (UECA-LUST and VRP)

The Division of Land Restoration (DLR), Office of Environmental Remediation (OER) administers the risk-based remediation programs. OER provided a separate QAPrP for the risk-based programs to EPA.

2.0 PROGRAM/TASK ORGANIZATION

A number of parties/entities are involved with specific responsibilities related to data quality associated with UST/LUST sites. The following identifies various stakeholders and their general responsibilities for ensuring data quality.

2.1 WVDEP Program Organization and Responsibility

The WVDEP maintains an EPA approved Quality Management Plan (QMP). The WVDEP Cabinet Secretary has delegated the day-to-day responsibility of overseeing quality control to the Agency Quality Assurance Manager (QAM). The Agency Quality Assurance Manager is responsible for ensuring quality data is produced within the WVDEP. The QA Manager position resides within the Business Operations Office/Executive and is independent from the other offices and divisions in the DEP.

The QAM works to address quality issues through regular meetings with programs, as well as through workgroups formed as needed to address specific issues and provide recommendations for solutions. Each Division and major office are required to ensure adequate resources are available to successfully implement QA requirements for their environmental programs.

2.2 Office of Environmental Enforcement/Tanks Program

The organizational chart provided in Figure 1 identifies the OEE positions responsible for the lines of authority that are appropriate to accomplish the quality assurance (QA) objectives of OEE. Certain individuals may be responsible for more than one function. Program Managers and QAMs are mentioned by name and position. An organizational chart, including names of personnel & positions, can be found at https://dep.wv.gov/Documents/DEPOrgChart.pdf. The Prevention QAM is the Environmental Inspector Specialist (Michel Boyer) and the Corrective Action QAM is the Environmental Resources Analyst (Randal Scott Lemons). The Tanks Program Manager (Ruth Porter) has overall responsibility for ensuring maintenance of the QAPrP working in consultation with the Prevention and Corrective Action QAMs.

2.2.1 Chief Inspector, Assistant Chief Inspectors, and Program Managers

The Chief Inspector of Environmental Enforcement (Jeremy Bandy) oversees Dam Safety, Hazardous Waste, Tanks, Water/Waste and Administrative Enforcement. An Assistant Chief Inspector (Joseph Sizemore) oversees the Hazardous Waste, Aboveground Storage Tank (AST), Leaking Aboveground Storage Tank (LAST), UST, and LUST Programs. The Tanks Program Manager (Ruth Porter) oversees the LAST and LUST programs and administers the daily operations of the AST and UST programs. The Tanks Program Manager reports directly to the Assistant Chief Inspector for the Hazardous Waste & Tanks Programs. The Tanks Corrective Action Unit Program Manager (Melissa McCune) administers the daily operations of the LAST and LUST programs and reports directly to the Tanks Program Manager.

The Assistant Chief for Environmental Enforcement (David Simmons) reports directly to the Chief Inspector. As necessary, the Tanks Program will refer non-compliant sites to the Chief Inspector for the issuance of administrative orders and civil actions. The individual responsible for maintaining the official approved QAPrP is Ruth Porter, Tanks Program Manager.

2.2.2 Tanks Prevention Staff

The Tanks prevention staff conducts UST inspection activities and consists of inspector supervisors, an inspector specialist, inspectors, and administrative and technical support staff which includes a Secretary, an Environmental Resource Specialist (ERS) 1, and an ERS 2. The Secretary and ERS 2 perform duties associated with both the inspection and corrective action staff but report directly to the Tanks Program Manager. The Inspector Supervisors have direct oversight of the Inspectors and the Inspector Specialist. The Supervisors provide final approval of inspection related documents, serve as a technical resource for the staff, and assist with inspection and enforcement actions. The Inspector Supervisors report directly to the Tanks Program Manager. The Tanks Inspection Staff do not collect any environmental samples.

The Tanks Inspectors perform various functions associated with the sites for which they have regulatory oversight. Depending upon the specific situation for a given site, an Inspector may perform duties related to regulation of USTs including, but not limited to:

- Review of installation and upgrade documents
- Compliance monitoring inspections
- Initiating enforcement actions
- Issuance of closure packages
- On-site installation and closure inspections
- Emergency response actions
- Complaint investigations

Inspectors may initiate administrative orders against non-compliant facilities after collaboration with the Inspector Supervisor, the Inspector Specialist, and the Tanks Program Manager. The draft administrative order passes up the chain of command from the Inspector to the Inspector Supervisor, the Program Manager, the Assistant Chief Inspector of the Hazardous Waste and Tanks Programs, to the

Assistant Chief Inspector of Administrative Enforcement, the Chief Inspector, and then to Director of DWWM.

The Inspector Specialist currently serves as the Tanks Quality Assurance Manager (QAM) for the UST prevention program. The Tanks QAM has direct responsibility for assessing Quality Assurance /Quality Control (QA/QC) performance and determining if QA/QC objectives are being met, recommending corrective actions, and keeping the staff informed of relevant QA/QC information. The Tanks QAM is generally independent of the data generators; however, the QAM may have some duties that result in the generation of data. When a situation arises where there may be a conflict of interest between the Tanks QAM and the review of Tank's activities, the Agency QAM will be called upon to review the circumstance as it pertains to quality assurance. All issues and decisions regarding this QAPrP and any site-specific Quality Assurance Project Plan (QAPP) should be made by the Tanks QAM in consultation with the OEE project management staff, the Agency QAM, and Environmental Protection Agency (EPA) Region III, as appropriate.

2.2.3 Tanks Corrective Action Unit

The Tanks Corrective Action Unit (TCAU) staff addresses LUST sites and consists of a Program Manager, an Environmental Analyst, Project Managers, and an Environmental Technician. As previously noted in Section 2.2.2, the ERS 2 performs some work for the TCAU, specifically performing contract specialist duties. The TCAU Program Manager has direct daily oversight and approval for the corrective action staff activities. Project Managers perform various functions associated with the projects that they manage. Depending upon the program managed and the specific situation for a given site, a Project Manager may perform duties including, but not limited to:

- prioritizing sites,
- obtaining rights-of-entry,
- sampling,
- selecting laboratories for sample analysis,
- selecting and managing contractors,
- overseeing remedial actions at sites,
- reviewing and approving site-specific plans and reports,
- and implementing the QAPrP.
- In addition, the Project Managers are responsible for review and approval of data and documents generated at the sites they manage.

The Environmental Analyst currently serves as the TCAU Quality Assurance Manager (QAM) for the TCAU. The TCAU QAM has direct responsibility for assessing QA/QC performance and determining if QA/QC objectives are being met, recommending corrective actions, and keeping the staff informed of relevant QA/QC information. The TCAU QAM is independent of the data generators (i.e., laboratories and contractors); however, the QAM may have some duties that result in the generation of data. When a situation arises where there may be a conflict of interest between the QAM in a division and the review of that division's activities, the Agency's QAM will be called upon to review the circumstance as it pertains to quality assurance. All issues and decisions regarding this QAPrP and any site-specific Quality Assurance Program Plan should be made by the QAM for the TCAU in consultation with the OEE project management staff, Agency Quality Assurance Manager (QAM), and Environmental Protection Agency (EPA) Region III, as appropriate.

The ERS 2 acts as the contract specialist for the LUST programs. The contract specialist selects consultants and/or contractors to perform environmental site assessments and other environmental work. The selection is made by using a Best Value Procurement tool such as Expression of Interests (EOIs) for selection of architectural and engineering services. Work also involves using the competitive bidding process such as Request for Quotes (RFQs), ensuring that contracts are in place with laboratories and other vendors, and are updated as needed.

2.3 WVDEP Laboratory Quality Assurance Program

WVDEP's Division of Water and Waste Management (DWWM) Laboratory Quality Assurance Program is responsible for certifying environmental laboratories to ensure that all divisions of WVDEP receive accurate and reliable analytical data. The Laboratory Quality Assurance Program staff consists of a Program Manager and associated Quality Assurance Officers who operate independently from other sections of the WVDEP.

Laboratories are certified when they follow approved methods, employ well-trained, capable staff, and use equipment and instrumentation suited to the work they perform. A laboratory's certification may be revoked if the laboratory commits any falsification relating to certification, testing, or reporting of analytical results or for failing to meet the proficiency testing requirements. DWWM Laboratory Quality Assurance Program personnel provide laboratory certification services to all divisions of WVDEP. In addition, the certification program is open to any U.S. laboratory seeking to provide data to WVDEP.

2.4 Certified Environmental Laboratories

All parties and organizations submitting analytical data to WVDEP are required to use analytical laboratories certified by the WVDEP's Laboratory Quality

Assurance Program. A list of certified laboratories can be found at https://dep.wv.gov/WWE/Programs/lab/Pages/default.aspx The data produced from the analysis of environmental samples provide information to make informed decisions relating to the health and welfare of West Virginia's citizens. The data must be of known quality, technically sound, and legally defensible.

The Laboratory Quality Assurance Program prescribes requirements providing for minimum standards of proficiency, methodology, quality assurance, operation, safety for environmental laboratories, standards for personnel education, training, and experience to meet Federal environmental statutes or regulation.

2.5 UST Owners/Operators

As primary data generators, the UST facility owner/operators are responsible for meeting compliance requirements at their facilities. This includes the implementation and documentation of various quality control elements associated with the collection of data. Typically, the owner/operator will utilize contractors and consultants to perform work at their sites and to provide required reporting to the WVDEP.

2.6 Contractors and Consultants

Responsible parties hire contractors and consultants to perform environmental assessment and remediation work. There are instances when WVDEP also finds it necessary to hire contractors and consultants to perform work. WVDEP follows state purchasing requirements when hiring contractors/consultants. Contractors/consultants are selected based upon their qualifications through the EOI and RFQ processes. Contractors/consultants may be hired by WVDEP to perform a wide range of services such as, but not limited to, the following: completing site investigations, executing simple sampling events, performing laboratory analysis, removing underground storage tanks, disposing waste, and designing/installing remediation systems.

Depending upon the scope of work to be performed, a contractor may hire subcontractors to perform work for them. The contractors are responsible for the selection of subcontractors. In cases where WVDEP has hired the contractor, the Agency must grant approval for the use of the subcontractor. It is the responsibility of the primary contractor to train the subcontractors and to ensure their compliance with the provisions of the QAPrP and any other project related plans.

The contractor and any subcontractors are required to be clearly identified in site-specific documents generated for projects. The primary contractor's site project manager will be responsible for maintaining communications with the Agency Project Manager. Communication procedures between the contractor's personnel, subcontractors, and the WVDEP shall be addressed in the site-specific Sampling and Analysis Plan (SAP) or Site Assessment Work Plan (SAWP) as appropriate. The contractor's site Project Manager will be required to notify the WVDEP's Inspector/Project Manager in advance (one-week minimum) of all field activities so that the Inspector/Project Manager may perform oversight procedures.

2.7 Data Reviewers/Data Validators

Personnel at the WVDEP Certified Laboratory performing the sample analyses generally perform laboratory data review. The contractor/consultant, and/or Project Manager may also perform data review activities to determine whether the data is of acceptable quality.

Data validation includes assessment of the raw data package from the laboratory. It requires that the techniques utilized be applied to the body of the data in a systematic and uniform manner. Standard EPA protocols for validation (e.g., Contract Laboratory Program (CLP) protocol) should be used. Consultants, contractors, or subcontractors may perform third party data validation if the data validator is not affiliated in any way with the analytical laboratory that produced the data. Furthermore, the data validator cannot be involved in the collection of data for the project. A data validator should be a person who is knowledgeable of chemistry, with an understanding of analytical methods and laboratory instrumentation. A degree in chemistry or a related physical science with training in laboratory instrumentation, analytical procedures, and general laboratory operations is appropriate and recommended.

3.0 PLANNING DOCUMENTATION

3.1 Problem Definition/Background

The WVDEP UST/LUST Program administers RCRA Subtitle I requirements for underground storage tanks through the UST Act (WV Code Chapter 22 Article 17) and rules promulgated thereunder.

In administering the program, WVDEP:

- Tracks UST system registrations and registration fees;
- Conducts compliance and complaint inspections to ensure that UST systems are safely and properly managed;

- Administers a worker certification program;
- Oversees UST system closures; and
- Investigates and oversees corrective action of releases from UST systems.

3.2 Planning Documents and Reports

Although all sites are unique, prevention and corrective action activities occur within a framework that is well-defined by specific documentation requirements. Most activities are conducted along a coordinated flow path consisting of the submittal and review of documents by the Inspectors and Project Managers. Therefore, each defined document plays a role in establishing QC elements to ensure the production of a usable and reliable final product. Tank owners/operators may obtain copies of testing forms, report templates, the approved QAPrP, and other documents from the WVDEP Tanks website (https://dep.wv.gov/WWE/ee/tanks/Pages/default.aspx) and/or by contacting WVDEP Tanks staff.

3.2.1 UST Prevention

The following are typical documents associated with UST sites. Not all documents will be required for all sites. The Prevention staff are responsible for reviewing and approving the documents below:

a) Notification for Underground Storage Tanks - A tank owner that stores regulated substances in a UST must notify the WVDEP of the existence of a regulated UST. The primary purpose of the notification form is to provide information about the ownership, operation, installation, existence, changes to, and closure of USTs that store regulated substances. The owner/operators must submit the report to the ERS1 for review and approval.

b) UST Compliance Inspection - On-site UST compliance monitoring inspections (CMIs) are performed by WVDEP Staff in order to determine compliance with State (§22-17, §33-30, and §33-31) and Federal (§40CFR280) Regulations. CMIs are conducted at least once every three (3) years by Tanks Prevention staff and may or may not contain Inspection of Violation (IOV) and/or Notice of Violation (NOV), as appropriate to the inspection. Inspections include a visual inspection of the accessible UST system equipment and a review of applicable records such as registration forms, certificate to operate, financial responsibility documents, operator training certificates, walkthrough inspection records, corrosion protection tests, tightness test, leak detection records, tightness testing, etc. Copies of these documents, as appropriate, are routinely obtained and made part of the permanent facility file. The Inspector conducts the inspection and then it is submitted for review and approval by the Inspector Supervisor. The Northern Inspector Supervisor is Eric Mauzy. The Southern Inspector Supervisor is Cleve Honaker. Upon request by the Inspector, additional supporting documents must be submitted submit by the owner/operator to the Inspector for review and approval. Once completed, the Inspector Supervisor is responsible for reviewing and approving all documents related to the inspection.

c) Notice of Violation (NOV) - A NOV provides notice to a tank owner/operator that they are not in compliance with a UST rule. NOVs are generally associated with an inspection of a facility; however, NOVs may be written for things such as fees or deliveries violations without an inspection being performed.

d) Inspection of Violation (IOV) - An IOV is used to abate a NOV once compliance is achieved.

e) <u>ATG Testing Report Form</u> – This form is to be utilized by certified workers who are performing testing on automatic tank gauges (ATG) for owners/operators. The applicable portions of this form must be completed and provided to the facility owner/operator within 30 days of the test date, along with written test procedures, data collection logs, and printouts from test equipment (if applicable). The facility must keep this document for submittal to the WVDEP at time of inspection or upon WVDEP request. The Inspector is responsible for initial review of the document at the time of inspection. The Inspector Supervisor is responsible for reviewing for reviewing and approving all documents related to the inspection.

f) <u>Interstitial Monitoring Testing Report Form</u> - This form is to be utilized by certified workers who are performing interstitial testing for owners/operators. The applicable portions of this form must be completed and provided to the facility owner/operator within 30 days of the test date, along with written test procedures, data collection logs, and printouts from test equipment (if applicable). The facility must keep this document for submittal to the WVDEP at time of inspection or upon WVDEP request. The Inspector is responsible for initial review of the document at the time of inspection. The

Inspector Supervisor is responsible for reviewing for reviewing and approving all documents related to the inspection.

g) Spill and Overfill Testing Report Form - This form is to be utilized by certified workers who are performing UST system testing on spill and overfills for owners/operators. The applicable portions of this form must be completed and provided to the facility owner/operator within 30 days of the test date, along with written test procedures, data collection logs, and printouts from test equipment (if applicable). The facility must keep this document for submittal to the WVDEP at time of inspection or upon WVDEP request. The Inspector is responsible for initial review of the document at the time of inspection. The Inspector Supervisor is responsible for reviewing for reviewing and approving all documents related to the inspection.

h) Cathodic Protection: Impressed Current – This form is to be utilized by certified workers when evaluating UST impressed current cathodic protection systems for owners/operators. The applicable portions of this form must be completed and provided to the facility owner/operator within 30 days of the test date, along with written test procedures, data collection logs, and printouts from test equipment (if applicable). The facility must keep this document for submittal to the WVDEP at time of inspection or upon WVDEP request. The Inspector is responsible for initial review of the document at the time of inspection. The Inspector Supervisor is responsible for reviewing for reviewing and approving all documents related to the inspection.

i) Cathodic Protection: Galvanic – This form is to be utilized by certified workers when evaluating UST galvanic cathodic protection systems for owners/operators. The applicable portions of this form must be completed and provided to the facility owner/operator within 30 days of the test date, along with written test procedures, data collection logs, and printouts from test equipment (if applicable). The facility must keep this document for submittal to the WVDEP at time of inspection or upon WVDEP request. The Inspector is responsible for initial review of the document at the time of inspection. The Inspector Supervisor is responsible for reviewing for reviewing and approving all documents related to the inspection.

j) UST Walkthrough Inspections Checklist – This form can be utilized by the tank owner/operator to document the UST Walkthrough Inspections required by 40 CFR280.36. The facility must keep this document for submittal to the WVDEP at time of inspection or upon WVDEP request. The Inspector is responsible for initial review of the document at the time of inspection. The Inspector Supervisor is responsible for reviewing for reviewing and approving all documents related to the inspection.

k) WV Underground Storage Tank System Installation/Upgrade Request – This form is to be utilized by tank owners/operators when they are installing a new UST system or upgrading their existing system. The install/upgrade form must be submitted thirty days prior to installation or upgrade of a UST system and must identify the certified worker who will be on-site performing the work. The owner/operators must submit the request to the ERS1 for tracking purposes, the ERS1 provides an initial review of the document for completeness then forwards the document to the Inspector Specialist for review and approval.

l) UST Alternative Fuel Installation/Conversion Application - If a tank owner/operator is utilizing an alternative fuel (fuel with greater than 10% ethanol or 20% biodiesel) then they must submit this form thirty days prior to using an alternative fuel. This form may also be submitted as part of an installation/upgrade at a facility. This form will be reviewed and approved by the Inspector Specialist.

m) UST Intent to Close Notification - A tank owner/operator seeking to close a UST system must submit an intent to close prior to the intended closure date to UST/LUST Program. A closure plan is not required for UST closure, but adherence to WVDEP prescribed closure sampling is required. The owner/operators must submit the report to the ERS1 for review and approval.

n) UST Closure Authorization - This form is issued by the ERS 1 after review and approval of a UST Intent to Close Notification. Upon receipt of this authorization, the tank owner/operator may proceed with the closure of their UST system.

o) UST Closure Report – The major function of a UST Closure Report is to provide information on environmental samples collected at a site during the UST closure activities. A UST Closure Report details laboratory analytical results of samples collected during the closure of a UST system. The UST closure report template is to be utilized for submittal of closure reports. The owner/operators must submit the report to the ERS 1 for review and approval. When necessary, the ERS 1 consults with the Inspectors or Project Managers for review and approval.

3.2.2 Traditional LUST Corrective Action

Owners and operators with a leaking regulated UST system may follow the traditional LUST Corrective Action path, which utilizes specific numerical standards as defined in the Corrective Action Plan Guidance Document (CAGD) for final soil and groundwater clean-up levels. Once the clean-up standards are achieved, the owner will receive a "No Further Action at this time" which grants release/closure of the leak case. Alternatively, owners may choose to remediate the site to risk based standards by applying for and being accepted into programs managed by the Office of Environmental Remediation. The following are typical documents associated with corrective action sites following the traditional LUST pathway. Not all documents will be required for all sites. The Tanks Corrective Action Unit PMs, Venisa Flesher, Andrew Stout, and Justin Tincher are responsible for generating, reviewing and/or approving the documents listed below. The PMs may consult with the corrective action QAM, Randall Scott Lemons as needed. All reports generated by WVDEP personnel and templates provide by the WVDEP for the use of the RP detailed below, can be found in Appendix E with the exception of the SAP which is in Appendix H.

a) Leaking Underground Storage Tank Site Visit Report: This document is completed each time a PM goes to a LUST Site to document the purpose of the visit. Reasons for conducting a site visit may include meeting with the RP, overseeing corrective actions, observing onsite monitoring, UST closures, etc. This report documents the date, time, purpose, and the other people present at the site during the visit, which usually include the responsible party and/or the consultant performing the environmental work at the site. Also, there is a section on the report for the PM to comment on any information or observations gathered at the site that may be important to future decisions for the leak. This report is generated by the PM.

b) Incident Report: The incident report functions as the primary document to notify the PM of a new UST release. This document provides the PM information about the facility, the owner, and the operator for the location where the release occurred. The incident report may also include some preliminary information regarding the release, such as: substance released, source of the release, cause of the release, and the contact information of the person who notify the WVDEP of the release and/or any comments they had concerning the release. This is completed by the ERS 1 and sent to the PMs.

c) Confirmed Release Notice to Comply: This document is created by the PM in response to the Incident Report and sent to the Responsible Party for the release to notify them that a Leak # has been issued to the release. This document will also outline the reports that are required to be completed in response to the release and the date the reports are due. This document also provides the Responsible Party the contact information for the PM assigned to the Leak # and the address for report submittal by mail and e-mail.

d) Initial Abatement Measures and Site Check: The tank owner/operator must perform initial abatement measures and site check and submit a report within twenty (20) days after release confirmation unless directed otherwise by the Agency. Initial abatement measures and site check are actions taken to mitigate hazards immediately after a release. The owner/operators must submit the report to the PM for review and approval.

e) LUST Project Status Checklist: This document is created and/or updated each time a review of the Leak has been completed, a reporting requirement has changed, or the status of the Leak needs updated. Status changes for a Leak include Clean-up Initiated, Site Investigation Completed, Site Clean-up Completed, NFA Issued, Emergency Response, Corrective Action Approved and/or the Leak moving to a different program. Comments can be included for the reason for the change to the Leak. This Checklist is generated by the PM.

f) Initial Site Characterization Report (ISCR): The tank owner/operator must perform the initial site characterization actions and submit a report within forty-five (45) days of release confirmation unless directed otherwise by the Agency. This is intended to provide an overview of the site and the release that occurred to assess potential environmental problems. The initial site characterization is not intended to completely define the nature and extent of contamination, but to determine if further investigation is necessary. The owner/operator must submit the report to the PM for review and approval.

g) Free Product Recovery: If free product is found on the UST site, the tank owner/operator must perform free product recovery activities and submit a report within forty-five (45) days of a release unless directed otherwise by the Agency. Site investigation and other remedial activities as appropriate must be continued in conjunction with free product recovery. Recovery of free product, if present, must begin as soon as possible. The owner/operators must submit the report to the PM for review and approval.

h) <u>Fast Track Report:</u> The major function of Fast Track is to encourage tank owners/operators of low impact sites to quickly remediate their contaminated LUST sites. Fast Track is most commonly used in association with UST removal activities. Utilizing Fast Track, a tank owner/operator reports a release and then works with the WVDEP Project Manager to move immediately to remediation, generally soil over-excavation. The Project Manager provides the owner/operator guidance on sampling and analytical parameters. The tank owner/operator is required to perform an initial site characterization, proper corrective actions, and confirmation sampling and so that the report template can be completed and submitted. The Fast Track Report template, including disposal manifests and supporting documentation, is due within sixty (60) days of release confirmation, unless directed otherwise by the Agency. If there is still contamination above action levels, additional site work will be required. The report is submitted to the PM for review and approval.

i) <u>Site Investigation Report (SIR)</u>: The tank owner/operator must perform a site investigation (i.e., site assessment or site characterization) and submit a site investigation report within ninety (90) days of a UST release unless directed otherwise by WVDEP. The site investigation is performed to determine the full extent and severity of contamination, and to evaluate actual or potential exposure to human health, safety, water resources, and the environment. The owner/operators must submit a Sampling and Analysis Plan (SAP) or a Site Assessment Work Plan (SAWP) for the proposed scope of the investigation for review and approval by the PM. The site investigation report must be submitted to the PM for review and approval.

j) <u>Sampling and Analysis Plan (SAP):</u> The SAP, sometimes referred to as a Site Assessment Work Plan (SAWP), is the primary planning document for data generation activities associated with corrective action. The SAP is developed in conjunction with a baseline conceptual site model (CSM). Critical components of the SAP include data quality objectives, level of data validation required, sample locations and number, sampling and analysis methods including detection limits, quality control samples, and data management requirements. Not all situations, such as those described in the SAP Template in Appendix H require an SAP. For example, UST closure activities which follow a WVDEP prescribed sampling and analytical protocol would not require an SAP. The SAP must be submitted to the PM for review and approval, as appropriate.

k) Quarterly Groundwater Monitoring Reports (QGWMR) - The tank owner/operator must perform quarterly groundwater monitoring when groundwater is impacted by a LUST release. The sampling results for these groundwater monitoring events can be submitted to the WVDEP by using the Groundwater Monitoring Report Template along with the required attachments for the report. Common attachments include tables detailing the sampling results, figures showing site details and any reports from the laboratory detailing the sample analysis. The RP generate these reports and they are reviewed by the PM assigned to the Leak.

l) Corrective Action Plan (CAP)- Presumptive Remedy Templates: The objective of a CAP is to address remediation of UST releases where contamination is above action levels and regulatory standards. It includes a collection of sufficient information to determine remedial progress and satisfaction of LUST case closure requirements. Owners/operators have the option of developing a traditional CAP or utilizing one of the several presumptive remedies developed by WVDEP to streamline the corrective action process and improve consistency. A "presumptive remedy" refers to a technology or technique where experience has shown the remedy to be a proven solution for specific types of sites and/or contaminant classes. By providing presumptive remedy technologies, this guidance attempts to streamline selection of these technologies and shift the time and resources employed in remedy selection to other, more fundamental aspects of remediation. The owner/operators must submit a traditional CAP or a completed presumptive remedy template to the Project Managers for review and approval. Below is a list of the presumptive remedy templates that have been developed to date.

1. Air Sparing
2. Excavation
3. Aggressive Fluid Vapor Recovery
4. Dual Phase
5. Oxidation
6. Soil Vapor Extraction
7. Thermal Desorption

m) Notice of Intent to Enter UECA-LUST Program: The public may choose to clean up a site using risk based corrective action through the UECA-LUST Program. This is a voluntary program that is offered by WVDEP – OER to owners and operators of leaking underground storage tanks (responsible parties), property owners, or other stakeholders to complete required remediation and achieve closure (No Further Action) using risk-based principles, when traditional LUST standards are not practical. Any LUST site may enter the UECA-LUST Program; however, this program is most beneficial for more complicated sites that may have free product, extensive or deep soil contamination, groundwater contamination, or vapor intrusion impacts.

n) LUST No Further Action Letter: This document is generated by the PM and sent to the RP once all site requirements have been completed, sampling shows that contamination levels are below action levels and regulatory standards, and that monitoring wells/remediation networks that are related to the release have been properly abandoned/closed. This letter formally closes the Leak # for the release. Note: If future site activities discover that contamination remains action levels or regulatory standards, then a Leak # can be reopened by the WVDEP and the RP will be required to perform corrective actions to remediation the contamination to below action levels or regulatory standards.

3.3 Quality Objectives and Criteria for Measurement

This section is broken into two parts, consistent with EPA Region 9 guidance for QA Program Plans. The first section discusses measurement quality objectives (MQOs) and data quality indicators (DQIs), and the second section documents action levels associated with the UST/LUST program.

3.3.1 Measurement Quality Objectives and Data Quality Indicators

The primary objective of the Tanks Prevention Unit is to ensure that all active USTs in the State operate in compliance with all applicable state and federal UST regulations. In order to meet this objective, Prevention Staff perform compliance monitoring inspections at active facilities. In order to ensure consistency, inspection staff utilize the mobile inspection tablet which provides a standardized checklist for inspections. Inspection reports are reviewed and approved by Inspector Supervisor for consistency, proper documentation, and use of correct citations for areas of concern.

The primary objective of the Tanks Corrective Action Unit is to ensure that sufficient environmental data of a known quality is produced that will support the objectives of any LUST site investigation. Analysis involves the characterization of samples based on chemical and/or physical properties. Analyses result in generating raw data from instrumental analysis, chemical analysis, or physical testing. The analytical methods used will be specific and need to be sensitive enough to meet program objectives. MQOs are based upon several qualitative and quantitative parameters termed DQIs.

MQOs are project or method-specific quality acceptance criteria established to support project-specific DQIs. MQOs specify what the QC acceptance criteria are for each analysis. All analytical work for WVDEP programs must be performed by a WVDEP Certified Laboratory. Laboratory certification is conducted in accordance with the requirements of WV CSR Title 47, Series 32, *Environmental Laboratories Certification and Standards of Performance* http://apps.sos.wv.gov/adlaw/csr/readfile.aspx?DocId=22511&Format=PDF. A copy of WV CSR Title 47, Series 32 is in Appendix A of this plan. Regardless of how the laboratory evaluates performance, the laboratory's acceptance criteria must meet the needs of each project. This QAPrP provides general requirements, but individual planning documents (see Section 3.2 Planning Documents and Reports) will provide project or site-specific requirements as appropriate. QC data from the labs must meet the requirements specified in the approved EPA method. QC data packages may vary depending upon the level of data package requested, but typical QC data includes surrogate recoveries, lab control samples, method blanks, matrix spike and matrix spike duplicates, as applicable.

DQIs, as defined by EPA, involve precision, accuracy, representativeness, completeness, comparability, and sensitivity, also known as "PARCCS" parameters. Utilization of DQIs is part of the data evaluation processes. Refer to Table 1 for general information related to data evaluation. In general, project data quality needs are determined by PARCCS parameters. The extent to which program or project QC results meets MQOs determines whether data are acceptable for the intended use.

During the planning phase, pre-determined limits on the acceptability of the data in regard to accuracy, bias, and precision, completeness and sensitivity will be established in site specific planning documents such as a SAP and SAWP. Each DQI helps interpret and assess specific data quality needs for each sample medium/matrix, and for each associated analytical operation. The following summaries contain a description of each DQI along with a summary of information, related to assessing each DQI:

- Precision - Precision is the degree of agreement among repeated measurements of the same parameter under the same or similar conditions. Reporting precision as either relative percent difference or relative standard deviation depends on the end use of the data. Collection and analysis of field duplicate samples aids in assessment of field precision.

Laboratory matrix spike/matrix spike duplicate (MS/MSD) analyses are the basis for laboratory precision.

- Accuracy - Accuracy is the extent of agreement between an observed or measured value and the accepted reference, or true value of the parameter. For example, the objective for accuracy of the field sample collection procedures is to ensure that samples stay unaffected by sources external to the sample, such as sample contamination by ambient conditions or inadequate equipment decontamination procedures. Evaluating the results of equipment blank samples for contamination is an assessment of sampling accuracy. Pervasive contamination found in equipment blank results will prompt further investigation or reanalysis of samples. Laboratories assess accuracy by determining percent recoveries from the analysis of laboratory control samples (LCSs) or standard reference materials.
- Representativeness - Representativeness is a qualitative term that describes the extent to which a sampling design adequately reflects the environmental conditions of the site. It also reflects the ability of the sample team to collect samples and laboratory personnel to analyze those samples in such manners that the data generated accurately and precisely reflect the conditions at the site.
- Completeness - Completeness is the measure of the quantity of valid data obtained from a measurement system compared to the quantity expected under normal conditions. While a completeness goal of 100 percent (%) is desirable, achieving an overall completeness goal of a minimum of 90% is more realistic under normal field sampling and laboratory analysis conditions.
- Comparability - Comparability is a confidence measure of comparisons between data sets. The ability to compare data sets is particularly critical when comparing a set of data for a specific parameter to historical data for the purpose of determining trends. Ensuring adherence to property-specific Site Assessment Plans and properly handling and analyzing all samples will satisfy the comparability of field data.
- Sensitivity - Sensitivity is the ability of a method or instrument to detect a parameter at a specific measured level of interest. For example, the sensitivity measurements of the field instruments that measure temperature, pH, conductivity, and turbidity of groundwater occurs by analyzing calibration check solutions, where appropriate, that equate to the lower end of the expected concentration range.
    - Sensitivity relates to the reporting limit. In this context, sensitivity refers to the capability of a method or instrument to detect a given analyte at a given concentration and reliably quantitate the analyte at that concentration. The investigator

should be concerned that the instrument or method can detect and provide an accurate analyte concentration that is not greater than an applicable standard and/or screening level. Analytical results for samples that are non-detect for a particular analyte that have reporting limits greater than the applicable cleanup standards and/or screening levels cannot be used to demonstrate compliance with the applicable cleanup standards and/or screening levels.

- The issue of analytical sensitivity may be one of the most difficult to address as it pertains to data usability evaluations. Samples contaminated with a sufficient quantity of material may require diluting prior to laboratory analysis. Dilution is a leading cause of reporting limits exceeding applicable criteria. However, there may be instances where such exceedances are insignificant relative to the site specific DQOs. As an example, the project may be on-going and/or other compounds are "driving" the cleanup such that not meeting applicable criteria for all compounds at that juncture is not an issue.

3.3.2 Action Levels

The WVDEP has authority to require owners and operators to conduct corrective actions at the site of a UST release. Corrective action is intended to stop, minimize, and mitigate damage to the public health and the environment. In order to determine if there is a potential risk to human health and/or the environment at a site, the contaminants known to be present or potentially present at a site will be assessed. Refer to Appendix B for the current action levels listed below. These documents are available in the CAGD, on our website, and/or by contacting TCAU staff. Contaminant concentrations focusing on human health will be compared to the following action levels by media:

- Soil
  - Current LUST guidelines as defined in the *CAGD*
- Groundwater
  - Current guidelines as defined in WV CSR Title 47, Series 12, *The Requirements Governing Groundwater Standards*
- Surface Water
  - Current guidelines as defined in WV CSR Title 47, Series 2, *Requirements Governing Water Quality Standards*

3.4 Special Training/Certification

3.4.1 Responsibilities

In accordance the WVDEP QMP, WVDEP Program Managers are responsible for ensuring that each staff member involved with collecting environmental data has the necessary technical, quality assurance, and project management training and certifications or documentation required for their assigned tasks and functions. Program managers are also responsible for ensuring that technical staff maintain the necessary level of proficiency to effectively meet QA responsibilities. QA training and additional development needs will be identified as part of regular performance discussions.

Maintaining staff proficiency is the joint responsibility of the individuals filling those positions and their managers. Inspectors, Project Managers and Program Manager shall have a working knowledge, through appropriate training, of the WVDEP planning process (i.e., DQO process), The Agency QMP, and the EPA QAPrP requirements.

3.4.2 Identification of Training Needs

Core training will be coordinated through the Inspector Specialist for prevention staff and by the Environmental Resource Analyst for corrective action staff. These personnel, in conjunction with Program management, will identify continuing professional training requirements and address those requirements as needed.

3.4.3 Implementation of Training Requirements

WVDEP staff members are encouraged by their managers/supervisors to draw upon their educational background, experience, technical training, and on-the-job training to enhance their understanding and performance of their duties, including QA/QC related procedures. WVDEP's training program will offer courses or arrange courses from a third-party vendor, on the following subject matter on a schedule and frequency suited to meet the needs of the staff.

Specialized training or certification requirements may be necessary for performing work at a given project location. As appropriate, WVDEP personnel and contractors performing work at project locations will have specialized training. Specialized training/certification may include, but is not limited to, the following:

Prevention Staff

- 40-Hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training (Occupational Safety & Health Administration (OSHA) 1910.120)
- OSHA 8-Hour Annual Refresher Training (OSHA 1910.120), as appropriate
- Basic Resource Conservation Recovery Act (RCRA) Inspector Course
- Introduction to UST Program and Basic UST Inspector Course
- Independent study of Worker Certification Study Guides and subsequent testing by the WVDEP Worker Certification Program
- National Incident Management System (NIMS): IS-100 Introduction to Incident Command System
- National Incident Management System (NIMS): IS-200 Incident Command System for Single Resource and Initial Action Incidents
- National Incident Management System (NIMS): IS-700 National Incident Management System, an Introduction
- Training on Quality Assurance Management including data review basics and data quality objectives

Corrective Action Staff

- 40-Hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training (Occupational Safety & Health Administration (OSHA) 1910.120)
- OSHA 8-Hour Annual Refresher Training (OSHA 1910.120), as appropriate
- National Incident Management System (NIMS): IS-100 Introduction to Incident Command System
- National Incident Management System (NIMS): IS-200 Incident Command System for Single Resource and Initial Action Incidents
- National Incident Management System (NIMS): IS-700 National Incident Management System, an Introduction
- Training for various remedial systems
- Training for non-routine field sampling techniques or field screening methods
- Training on Quality Assurance Management including data review basics and data quality objectives

On-site contractors are responsible for providing any specialized training and/or certification for their personnel. Furthermore, they are responsible for assuring that all required training and/or certification requirements are met and documented.

3.5 Documents and Records

The QAPrP and associated QA planning documents (such as the SAP template) will be reviewed and, if necessary, revised at least annually by the Tanks Prevention and Corrective Action QAMs. Current approved versions of the QAPrP will be placed on the WVDEP Website along with templates and forms for easy access by the regulated community and consultants. The Tanks Prevention and Corrective Action QAM's are responsible for ensuring that staff have been provided the current approved version of the QAPrP and associated QA planning documents. The QAMs will document that staff have received any updates to the QAPrP and associated documents. This documentation may take the form of a signed document or email from each staff member acknowledging receipt of the documents or the link to the documents and the requirement to utilize the most currently available version of all documents.

Information and records, whether generated because of in-house sampling and analysis or reported by external parties, is highly dependent upon the purpose of the sampling event and activities at the site. WVDEP has developed various reporting templates as described in Section 3.2.2 of this document and included in Appendix E. All sections of the template must be completed and required attachments must be submitted for the appropriate site activity. These templates, depending upon their purpose, may require slightly different information. For example, the Initial Abatement Measures and Site Check template may require only basic information to determine whether further site assessment is required while a Site Investigation Report may require extensive information to be submitted. The basic information required in all reports includes , but is not limited to: responsible party identification and contact information, facility identification and contact information, site history, release details, receptor survey information, description of activities covered by the report, soil boring logs and monitoring well logs (if applicable), description of sampling activities, discussion of results, recommendations for the site, analytical data tables with analytical compared to action levels, laboratory analytical data with QA/QC information, field screening data (if applicable), and site maps.

Reports and analytical data obtained from in-house sampling or from external reports are reviewed to ensure the quality of the data obtained. Information/data is compared to data quality requirements of the QAPrP and site- specific QA documents, as may be applicable. Reports and analytical data are readily available to the public through submittal of a Freedom of Information request. If a report/data contains confidential business information, it may be excluded from access to the public or may have portions of the data redacted prior to providing it to the public.

3.5.1 Environmental Data Documentation

All data generated, including data from sampling and inspections, must be of sufficient quality to withstand challenges to their validity, accuracy, and legibility. To meet this objective, standardized formats and prescribed procedures are utilized. The documentation of all environmental data collection activities must meet the following minimum requirements:

- Documentation of data should be done directly, promptly, and legibly. All reported data must be uniquely traceable to the raw data.
- All original data records should include, as appropriate, a description of the data collected, units of measurement, unique sample identification, station, or location identification (if applicable), name (signature or initials) of the person collecting the data, and date of data collection.
- Any changes to the original (raw data) entry must not obscure the original entry. The reason for change should be documented and the person making the change should initial and date the change.

Discussions of other specific documentation requirements are throughout this QAPrP and/or may be found in the SOPs located in Appendix C. Documentation not specified in these documents will be included in site specific planning documents, as appropriate.

3.5.2 Field Documentation and Forms

Completion of appropriate field documentation including, but not limited to, inspection reports, field notes, and forms are the responsibility of the field personnel. Both Prevention and Corrective Action field personnel utilize Panasonic Toughbook's to collect and record field data through the mobile Inspection Module or the mobile Corrective Action Module. Field staff then sync inspections or site visits with the Tanks Database transferring the data to the database. Supervisors are notified of new submittals such as inspection reports which they can then review, approve, or send back to staff for corrections. Approved data is stored in database. Reports to the regulated community can be generated from the database and sent to tank owners/operators. The database system automatically files documents into Application Xtender, the Agency's electronic data filing system where records are maintained in accordance with the Tanks records retention policy. The UST Tanks database is updated on an as needed basis by the Vendor who manages the database. Field staff use mobile inspection tablets to conduct inspections, respond to complaints, perform site visits, and retrieve information from the tanks database. Synchronization between the tablet and the database ensures data consistency for all members of staff as the activities are performed and data changes. Updates are received automatically each time users synchronize their computer to the database.

3.5.3 Facility Files

WVDEP's program personnel are responsible for the maintenance of the facility files associated with their program. The facility file may consist of notification forms, inspection reports, test documents, closure reports, site-specific planning documents and reports listed in Section 3.2 of this plan, as appropriate. Additionally, program personnel will collect and include in the facility file all other relevant project documentation in the file. These additional documents may include any official correspondence that does not correspond to any of those previously listed documents. The facility file will also include all information not related to data generation, including documentation of all public involvement or community notification efforts.

3.5.4 Routine Records Management Quality Assurance

WVDEP document control procedures require that documents generated, or obtained, by Agency personnel are accounted for when a project is completed. WVDEP utilizes Application Xtender as the Agency's electronic filing system. Electronic files are retained within the WVDEP electronic filing system, and all electronic files are backed-up daily. The Application Xtender SOP for UST/LUST is included in Appendix C.

The objectives of the record management include the following:

- Prevent the creation of unnecessary records (this includes duplication of files)
- Promote the continuous development of filing systems and structures that allow for the efficient organization, maintenance, and retrieval of records
- Ensure that records of continuing value are preserved, but that valueless or noncurrent information is disposed of or transferred to storage in a timely manner in accordance with the program's records retention requirements (refer to Appendix I)
- Preserve and protect information that is vital to the essential functions or mission of the organization. Preserve and protect information that is essential to the legal rights and interests of individual citizens and the government

3.6 Data Generation and Acquisition

Prior to an inspection, the UST Inspector will review the facility file and facility information in the database. Depending upon the situation, review may be limited to the last inspection and registration form or may be a complete review of the facility's compliance history and any relevant submissions or other historical data that might be relevant to the inspection or investigation. A consistent approach with environmental regulation and enforcement is stressed throughout the training of inspection and administrative staff, during subsequent staff meetings, and in everyday operations.

For corrective action activities, owners/operators are typically required to conduct initial site investigations to determine if site media are contaminated. Further investigations follow to determine characteristics of the contamination if the initial phase of the investigation finds evidence of contamination above action levels. Characterization includes evaluating the extent of the contamination, the potential threat posed by the contamination, and determining potential solutions for cleanup of the contamination. This is typical performed by reviewing reports completed by the RP, usually by a consultant, or by the WVDEP Project Manager. Templates, including the SAP template, have been created for these reports to provide consistency in reporting and can be found at https://dep.wv.gov/WWE/ee/tanks/lustmain/Pages/default.aspx, in Appendix E, Appendix H, or by contacting TCAU staff. Site investigation/characterization requirements are required to be addressed in the site-specific documents such as the SAP.

These documents should include discussion of the following, as applicable to the project. A SAP template is provided in Appendix H which incorporates the components of a Field Sampling Plan/Site Assessment Work Plan and a QAPP.

- Site Description and Background
    - Site name and location (in text, as well as figures)
    - Site description, including ownership, size, tax parcels, site access, current use, topography, groundwater flow (if known), adjoining properties, etc.
    - Figures that clearly depict site boundary overlaid on a topographic map, road map, and aerial, as appropriate, with structures and areas of concern labeled
    - Site history including a summary of any previous data collected, soil geology, groundwater information, and any previous actions taken at the site
- Project Organization
    - Identification of project personnel, including contractors and subcontractors
    - Appropriate chain of command for the project
    - Any special training required
    - Project schedule

- Project Data Quality Objectives (DQO)
    - Data quality indicators and measurement quality objectives
    - Data review and validation requirements
    - Data acquisition and management (field logbooks, boring logs, photographs, recording of non-direct measurements, etc.)
- Sampling and Analytical Requirements
    - Applicable regulations and action limit rationale
    - Identification of the laboratory (WVDEP Certified Laboratory required)
    - Sample locations, matrices, sample types (composite, grab, field screening, etc.), and number of samples required with justification for type and number of samples (in tabular format, as well as in figures)
    - Justification for type and number of samples
    - Identification and location of critical samples, if applicable
    - Identification of field QC samples (field duplicates, rinsate, trip blanks, temperature blanks, MS/MSD, etc.)
    - Identification of lab QC requirements
    - Identification and location of background samples
    - Detailed discussion of sample collection techniques for each sample type (with SOPs, if applicable)
    - Discussion of analytical methods to be used (listing specific methods, specific compound/analyte lists, project required reporting limits, identify the extraction, digestion, analytical methodologies, etc.)
    - Sample handling, preservation, and chain-of-custody requirements
    - Discussion of field screening techniques and/or field data collection (summary of technique, equipment used, calibration and maintenance requirements, appropriateness of the method, etc.)
    - Discussion of lab equipment calibration and maintenance requirements
    - Data acquisition and management, including sample documentation to be used (field logbooks, boring logs, photographs, recording of non-direct measurements, etc.)
    - Decontamination procedures and disposal of investigative derived waste (IDW)

3.6.1 Sampling Design

A sampling design specifies the number and location of samples collected at a site. Sampling design strategies should factor in the conditions unique to the site, including data gaps in the CSM, exposure potential, projected site reuse, and available resources. The various sampling strategies that can be employed at a specific site can be grouped into two basic categories: statistical methods and non-statistical methods. Applications and limitations of each sampling strategy are briefly described in Table 2.

Typical designs for the collection of samples at UST sites often include biased sampling because the location of sources of contamination are well known at most sites. For example, Section X of the UST/LUST Closure Guidance Memo, prescribes a sampling protocol that is based upon biased sampling. The full version of the UST/LUST Closure Guidance Memo can be found at https://dep.wv.gov/WWE/ee/tanks/lustmain/Documents/Appendix%20D.2-UST-LUST%20Closure%20Memo.pdf, or in Appendix F. Any deviations from this prescribed sampling protocol must be documented and pre-approved by the WVDEP. For other corrective action activities, specific sampling strategies and sample locations shall be described in the site-specific planning documents, such as a SAP, that are developed for each site, as appropriate.

3.6.2 Sample Collection and Preservation

Details of sample collection methods will depend upon site conditions, equipment limitations, chemicals of concern, and sample matrices. Sample collection and preservation procedures should be conducted in accordance with *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (commonly known as SW-846) and/or other EPA approved sample collection and preservation procedures for the appropriate media sampled, including soils, sediments, sludge, waste material, surface water, groundwater, and, in some cases, air monitoring. Soils and sediment data should be reported on a “dry weight” basis, as appropriate.

Standard operating procedures must be followed pertaining to sampling methods. Contractors/consultants may include these SOPs in their site-specific SAP/SAWP or may utilize WVDEP developed SOPs.

The type of sample container, the preservative (if any), and holding times are all dependent upon the type of analysis to be performed upon the sample. Refer to Table 3 for information on sample containers, preservation and holding times for common contaminants. Any deviations from the information in the table or the addition of contaminants not addressed in the table, must be clearly set forth in the site-specific planning documents for the site.

3.6.3 Sample Handling and Custody

All sample handling and custody field documentation should be completed in indelible ink . Errors in handwritten field data collection documents shall be corrected by drawing a single line through the error, writing in the correction, and initialing and dating the correction.

Sample labels are required to properly identify the samples. All samples will be labeled in the field, and care will be taken to assure that each sample container is properly labeled. The samples will be placed in sealed plastic bags to prevent the labels from soaking off or becoming illegible from exposure to ice/water during transport to the laboratory. Labels will contain the following information:

- Project name and designated project number
- Sample identification number
- Date and time sample was collected
- Description of sample
- Sampling location
- Notation of whether preservatives were added to sample and type of preservative
- Type of sample (such as grab or composite)
- Type of analysis requested
- Name of sampler

Chain-of-custody procedures provide documentation of the handling of each sample from the time it is collected until analysis is completed. Chain-of-custody procedures are implemented so that a record of sample collection, transfer of samples between personnel, sample shipping, and receipt by laboratory that will analyze the sample is maintained. The chain-of-custody document serves as a legal record of possession of the sample. To simplify records and eliminate potential litigation problems, as few people as possible should handle the samples during the investigation. All samples will be maintained in accordance with the following chain-of-custody procedures. A sample is considered to be under custody if one or more of the following criteria are met:

- In a person's physical possession
- In view of that person after he/she has taken possession
- Secured by that person so that no one can tamper with the sample
- Secured by that person in an area which is restricted to authorized personnel

A chain-of-custody record must always be maintained from the time of sample collection until final deposition. An example of a chain-of-custody form is found in Figure 2. Every transfer of custody will be noted and signed for with a copy of the record being kept for each individual who endorsed it. At a minimum, the chain-of-custody record includes the following information:

- Project Description
    - Project number and site location
    - Name and contact information of project manager
- Laboratory Information
    - Name of WVDEP certified laboratory where samples will be analyzed
    - Means of results transmittal (such as e-mail, mail, or fax)

  - Turnaround time requested
  - Data deliverables

- Sample Information

  - Sample identification number(s)
  - Description of sample(s)
  - Date and time sample(s) collected
  - Notation of whether preservatives were added to the sample(s) and type of preservative(s) added
  - Type of sample(s) (such as grab or composite)
  - Matrix of sample(s) (i.e., water, soil, sludge, and so forth)
  - Amount of sample being transported to the laboratory, along with the number and type of containers

- Analysis Requested

  - The appropriate analytical parameters to be tested and analytical method
  - Any other information, such as field screening data, that the sampler feels is pertinent to the analysis of the sample(s)

- Sampling Handling

  - Names and signatures of samplers
  - Signatures of all individuals who have had custody of the samples

Samples should be placed in an appropriate transport container. All sample containers should be packed to maintain a temperature of $\leq 6°$ C, but without freezing the sample. A temperature blank will be added to each transport container that contains samples for VOC analysis. All sample documentation will be placed in a plastic bag and affixed to the underside of each transport container lid. Samplers will transport environmental samples directly to the laboratory within twenty-four (24) hours of sample collection, arrange for pickup by the laboratory sample courier within twenty-four (24) hours of sample collection, or utilize an overnight delivery service within twenty-four (24) hours of sample collection.

All of the appropriate Department of Transportation (DOT) regulations for packaging, marking/labeling, and shipping hazardous materials and wastes will be followed. Air carriers that transport hazardous materials will comply with the current edition of the *International Air Transport Association (IATA) Dangerous Goods Regulations,* which detail the procedures to be used to enable the proper shipment and transportation of hazardous materials by a common air carrier. Following the current IATA regulations will ensure compliance with state and federal DOT regulations.

3.6.4 Analytical Methods

Analytical methods are dependent upon the type of contaminate for which you are sampling. As an example, Table 4 list the analytes, and the associated methods, that are typically required for a Diesel, Kerosene, and Oil UST Closure Sampling event. Method detection and reporting limits for each analyte must be below the action level for the parameter of interest.

Site-specific documents should identify analytical method numbers, extraction and/or digestion method numbers, method detection limits, and quantitation limits for each parameter. The SOPs for analytical methods will be included in the site-specific SAP/SAWP.

The methods and equipment used for sampling environmental matrices vary with the associated physical and chemical properties. Analytical procedures should be conducted in accordance with *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (commonly known as SW-846) and/or other EPA approved analytical methods, as appropriate.

3.6.5 Quality Control Program Policy

The general field quality control requirements (for QC sample type, frequency, acceptance criteria, etc.) found in Table 5 shall be utilized for UST related projects, except for UST closures. It is noted that the field quality control requirements provided in the table may be modified, if appropriate, with the approval of the PM in consultation with the corrective action QAM when site-specific SAPs are being approved.

The general laboratory quality control sample requirements (for standards, surrogate recoveries, control samples, blanks, etc.) specified in SW-846 shall serve as a guideline for all UST related projects, except for UST closures. It is noted that the lab quality control requirements should be defined in the site-specific planning documents for a site. The laboratory must follow the quality objectives for precision, accuracy, representativeness, comparability, completeness, and method detection limits as set forth in their WVDEP approved laboratory quality assurance plan. Laboratory internal QC results should include information about agreement between replicate analyses, spike, and surrogate recoveries. Analysis of laboratory control samples, method blanks, matrix spikes, and duplicates should be included with each analytical batch in accordance with SW-846 requirements. Soil and sediment data should be reported on a “dry weight” basis.

For UST closure activities, field quality control samples include a temperature and trip blank for VOC analysis as determined by the TCAU management in consultation with the corrective action QAM. An example of the laboratory QC data that WVDEP typically receives associated with UST closure samples are provided in Table 6.

3.6.6 Instrument/Equipment Testing, Inspection, and Maintenance

All field and laboratory analytical instruments should be tested, inspected, and maintained according to the manufacturer's guidelines and recommendations. Data collected from improperly functioning equipment is not to be used.

WVDEP contractors and owner/operator contractors typically are the ones that collect field data and are responsible for the correct operation and maintenance of their field equipment. Certified labs are responsible for the correct operation of their laboratory equipment. Instrument/equipment testing, inspection, and maintenance information and/or SOPs should be included in the site-specific planning documents.

3.6.6.1 Field Based Instruments

WVDEP staff, on rare occasion, do utilize some field-based instruments. Field equipment will be calibrated following the procedures found in Table 7. When the acceptance criteria are not met, the corrective actions found in the table will be implemented. It is possible that other field equipment may be utilized on-site (equipment may be rented, or contractors may have different equipment). If this is the case, field equipment calibration and acceptance criteria/corrective action will be required to be addressed in the site-specific planning documents. If additional equipment is acquired by the Agency, that equipment will be added to the table during revisions to the QAPrP.

All WVDEP field equipment will be maintained in accordance with each respective instrument manufacturer's operating instructions. All maintenance activities will be recorded in a logbook. For field equipment, the preventive maintenance information found in Table 8 will be used. Spare parts for the specific field equipment may be available from the manufacturer as noted in the equipment manufacturers operating instruction booklet. It is noted that the field equipment listed in Tables 7 and 8 are specific to the common field equipment that Project Managers currently have available to them. As noted above, contractors/consultants utilizing field-based instruments are required to provide operation and maintenance information within their site-specific planning documents.

3.6.6.2 Laboratory Instruments

WVDEP, owner/operators, and contractors are required to submit samples to a WVDEP approved laboratory. The WVDEP Laboratory Program reviews lab procedures, performs audits, and certifies laboratories for use. The contract laboratory will be responsible for ensuring that their personnel adhere to the instrument/equipment maintenance requirements outlined in their Quality Assurance Plan. The instrument/equipment maintenance requirements shall conform to the manufacturer's specifications for each instrument and shall comply with all requirements of SW-846 and the WVDEP Laboratory Certification Program.

3.7 Inspection/Acceptance of Supplies and Consumables

WVDEP staff are required to make purchases in accordance with the West Virginia Purchasing Division's Procedure Handbook. This document describes not only how to make purchases but proper procedures for inspecting and accepting purchases. It requires inspection on all delivered commodities and services. Nonconformity is to be reported to the Purchasing Director and the chief officer of the spending unit purchasing such commodities for remedial action.

Contractors performing field operations are responsible for inspecting supplies and consumables prior to their use. They are expected to note any deficiencies or problems and return any deficient item for replacement.

Laboratories are responsible for inspecting supplies and consumables prior to their use in analysis. The WV Laboratory Certification program requires that the lab document that they are using materials meeting requirements established in the approved analytical methods.

3.8 Non-direct Measurements

Non-direct measurements refer to data and other information that has been previously collected or generated under some effort outside the specific project being addressed. Non-direct measurement data may include data from inspection activities, computer models, literature files, or computer databases. Refer to Appendix D and Appendix E for some examples of forms and checklists used by Inspectors and Corrective Action Project Managers, respectively.

Sources of existing data include, but is not limited, to the following:

- Environmental indicator data obtained from federal/state/local databases and records
- Existing field and analytical data from a previous investigation of the area

- Historical data (e.g., from organization's/facility's corporate records and/or federal/state local records pertaining to previous monitoring events, compliance inspections, site investigations, etc.)
- Background information/data from organization's/facility's corporate records and/or federal/state/local records pertaining to site-specific industrial processes, process by-products, past and current chemical uses, raw material and finished product testing, waste testing and disposal practices, and potential chemical breakdown products
- Literature files/searches
- Publications
- Photographs
- Topographical maps

Basing decisions on existing data may result in errors if the data was not generated for the same purpose or using the same methods as the current investigation. Biased data can impact final conclusions. The use of the existing data should be evaluated to determine its appropriateness for a specific project. It is anticipated that the use of non-direct measurement data for specific projects will be addressed in a site-specific Quality Assurance Project Plan for the site. The following issues regarding information on how non-direct measurements are acquired and used on the project will be addressed in the site-specific planning documents for the project:

- The need and intended use of each type of data or information to be acquired
- How the data will be identified or acquired, and the expected sources of the data
- The method of determining the underlying quality of the data
- The criteria established for determining whether the level of quality for a given set of data is acceptable for use on the project

Furthermore, the acceptance criteria for the data should also be addressed in the site-specific plans for the project. In general, the acceptance criteria for individual data values address issues such as the following:

<u>Representativeness:</u>	Representativeness expresses the degree to which the data is sufficiently similar. Were the data collection and analytical methods used to generate the collected data acceptable to the project?

Bias:	Are there characteristics of the data that may shift the conclusions? Is there enough information to estimate and correct bias?
Precision:	What is the estimate of the viability of the data?
Qualifiers:	Has the data been evaluated in a manner that will allow for logical decisions to be made about the applicability of the data for use in the project?
Summarization:	Is the data summarization process clear and sufficiently consistent with the goals of the current project?

3.9 Data Management

All data collected during field activities, including inspection and sampling activities, will be recorded, reduced, reviewed, and reported. The WVDEP Inspector, Project Manager, contractor, subcontractor, and certified worker are responsible for these functions for field data, as appropriate. Each off-site contract laboratory receiving field samples is responsible for the recording, reduction, reviewing, and reporting of the corresponding analytical results. Analytical data may be obtained from the laboratory, when appropriate, in the form of generic electronic data deliverables.

Hard copies of information relating to a site have historically been placed in files in the file room. WVDEP has been scanning historic files and moving them to Application Xtender, the WVDEP electronic filing system. New documents are being placed in Application Xtender as received. These files will be retained within the WVDEP electronic filing system. All electronic files are backed-up daily.

3.9.1 Standard Operating Procedures

Standard operating procedures (SOPs) are often developed for many laboratory and field activities. When applicable and available, SOPs will be utilized in facility data collection. To ensure field data collection efforts are comparable, procedures found in sampling SOPs will be followed. If the SOPs in Appendix C do not address a data collection method necessary for a site, then an SOP shall be submitted in the site-specific planning documents that details the data collection procedures not previously addressed. Laboratory SOPs are submitted to the

WVDEP/DWWM Laboratory Quality Assurance Program and approved in accordance with lab certification procedures.

UST inspections are completed in the mobile inspection module which was designed in a manner to standardize how inspections are performed. Each section of the module must be completed, and the system will not allow submission of an incomplete inspection, unless it is a focused follow up inspection. The module will alert the inspector to any areas of incomplete and will provide the supervisor reviewing the inspection report a summary of potential compliance issues at the facility.

3.9.2 Field Sample Documentation

All real-time measurements and observations will be recorded in mobile field inspection module, mobile corrective action module, field logbooks, field data records, or in similar types of record keeping books. Field data records will be organized into standard formats whenever possible and retained in WVDEP's permanent files. Field sample documents such as the chain-of-custody, field logbook, and so forth will be legibly written in ink. Any corrections or revisions to sample documentation shall be made by striking a line through the original entry, initialing, and dating any changes.

The field logbook is a descriptive notebook detailing site activities and observations so that an accurate and factual account of field procedures may be reconstructed. All entries in the field logbook will be signed by the person making the entries. All field logbook entries should document the following specifics:

- Dates and times of entries
- Site name and project number
- Contractor name and address
- Names of all personnel on site
- Weather conditions
- Descriptions of all relevant site activities, including site entry and exit times
- Site observations
- Dates and times of sample collections and chain-of-custody information
- Identification and description of samples and locations
- Noteworthy events and discussions
- Records of photographs and site sketches
- All relevant and appropriate information delineated in field data sheets and sample labels

3.9.3 Analytical Data Deliverable Requirements

At a minimum, analytical data deliverable packages provided by the WVDEP certified laboratory will be in an organized, legible, and tabulated manner. Laboratory analytical reports should include QC results and any other necessary analytical information which enable reviewers to determine data quality. Data deliverable requirements for the LUST Program and for waste characterization samples generally include the following, as applicable:

- Chain-of-custody
- Sample documentation (location, date and time of collection and analysis, etc.)
- Analyte(s) identification
- Analyte(s) quantitation including
- Determination and documentation of detection and reporting limits
- Data qualifiers are defined
- Dilution factor
- Moisture content (data for soils and sediments must be reported on a dry weight basis for risk-based programs)
- Signature of laboratory representative
- Sample paperwork, both preparatory and analysis
- Trip blank
- Laboratory sample receipt documentation indicating the condition of samples upon receipt at the lab
- Surrogate recoveries, as appropriate

With respect to samples collected for the LUST Program or samples collected for waste characterization purposes, documentation equivalent to a full CLP deliverable package is generally not warranted, unless the responsible party intends to bring the LUST site into one of the risk-based programs. The analytical data deliverable format for both programs is typically electronic, as a PDF or Excel file. Hard copies are generally available on request. Prior to submission of laboratory data to the WVDEP, the laboratory's Quality Assurance Officer should review the data for accuracy, precision, and completeness.

4.0 ASSESSMENT AND OVERSIGHT

Assessment and oversight actions are part of the quality system for ensuring and documenting those procedures required by this QAPrP are being followed during the generation of data to be included in all planning documents and reports generated for and submitted to the WVDEP.

4.1 Purpose/Background

During the planning process, many options regarding inspection, sampling, sample handling, sample analysis, and data reduction are evaluated. Selection of specific options depends on the nature of the preventive inspection, corrective action, or monitoring activity. This section of the QAPrP describes the internal and external checks necessary to ensure correct implementation of all elements. In addition, needed checks ensure adequate data quality and implementation of timely and effective preventive and corrective actions. Documenting all internal assessments is a critical component of the quality system.

4.2 Assessment Activities and Program Planning

WVDEP employs several assessment activities designed to provide a better understanding of the components of, and the basis for improving quality control. Not all of the activities are appropriate for all situations.

4.2.1 Performance Evaluations

Use of Performance Evaluation (PE) samples help assess the ability of a laboratory, or field measurement system, to provide reliable data. PE samples are for laboratories providing analytical services to the WVDEP. The WVDEP Lab Certification Program is responsible for handling all aspects of lab certification program including the PE samples. The evaluation consists of providing a reference "blind" or “double blind” sample, to the laboratory for analysis. A PE sample contains known concentrations of chemical constituents, or pollutants of interest, and will normally be in the appropriate media (e.g., soil, water, air). The analytical results obtained by the laboratory are compared to the known concentrations of the chemical constituents contained in the PE sample(s), as a means of determining if the laboratory demonstrated its ability to properly identify, and quantify, pollutants within established, or calculated, control limits.

4.2.2 Technical Systems Audits

The purpose of a Technical Systems Audit (TSA) is to assess the sampling and analytical quality control procedures used to generate environmental data. TSAs entail a comprehensive, on-site evaluation of the field equipment; sampling and analyses procedures; documentation; data validation; and training procedures for collecting or processing environmental data.

Laboratory TSAs

The WVDEP Lab Quality Assurance Program is responsible for licensing environmental laboratories and can conduct audits and inspections at environmental laboratories. The WVDEP Lab Quality Assurance

Program is responsible for performing laboratory TSAs. The primary goals of a TSA are to review the laboratory organization, operation, and capabilities; determine the reliability of data; and note corrective action for any apparent deficiencies. Lab certification is valid for one (1) year and then the lab must undergo recertification.

Field TSAs

Oversight of field operations is an important part of the quality assurance process. The Tanks QAMs will conduct QA audits of inspection and field data collection activities as necessary, but at least semi-annually.

Specific items observed during the audit for Tanks prevention may include:

- Review of previous inspection
- Confirmation of current owner/operator or determination that ownership may have changed
- Request and review of owner/operator compliance records, if available
- Completeness of inspection form
- Timely submittal of inspection for review by Supervisor
- Knowledge of regulatory requirements and tank system operations.

Specific items observed during the audit for the TCAU may include:

- Availability of approved project plans such as the project-specific planning documents
- Documentation of personnel qualifications and training
- Sample collection, identification, preservation, handling, and shipping procedures
- Decontamination procedures used to clean sampling equipment
- Equipment calibration and maintenance
- Completeness of logbooks and other field records (including nonconformance documentation)

4.2.3 Peer Reviews

Peer reviews may be informal or formal in nature. Corrective action and inspection staff are highly trained in inspection and data collection activities. They may work in a team during a complex inspection or corrective action project in which members of the team informally review and discuss each other’s work on the project. Any concerns noted by a member of the team should be reported to the appropriate Tanks QAM, for discussion and resolution. As necessary, the QAM will move any concerns up through the chain of command and if necessary, corrective actions may be taken.

4.2.4 EPA Audits

Each year, EPA Region III Inspectors perform compliance evaluation inspections at a pre-determined number of UST facilities in West Virginia. While UST personnel do not accompany EPA during these inspections, the UST facility file is made available for review by EPA. These EPA inspections, including EPA file review of previous WVDEP inspections, are done to ensure consistent regulation and enforcement of federal UST regulations.

The Semi-Annual Activities Report (SAAR) is a UST grant requirement for each US State, which must be submitted during the mid-year and end of each federal fiscal year. The UST and LUST Programs report on a variety of parameters as delineated in our approved Work Plans (refer to Appendix G). Internally, WVDEP reviews this data, comparing the data to database information and to the previous report to ensure the precision, accuracy, representativeness, completeness, and comparability of the data being report to EPA. EPA Region III reviews and approves information submitted into the EPA database and the subsequent narrative report submitted to EPA.

4.2.5 WV Legislative Reports and Audits

The UST and LUST Programs provide an annual report to the WV Legislature concerning activities performed within the previous State Fiscal Year. Information typically provided to the Legislature includes, but is not limited to, the following:

- Receipts and Expenditures (total fines, penalties, and fees)
- Number of initial inspections and follow up inspections
- Review of installation plans
- Installation and closure inspections performed
- Emergency Response actions and complaint investigations
- NOV and administrative orders issued
- Number of corrective actions initiated
- Number of corrective actions completed

The UST and LUST Programs are subject to audits at the Legislature's will.

4.3 Reports to Management

The Tanks QAM will prepare any field audit results, including situations identified, corrective actions implemented, and overall assessment of field operations. They will submit the results of field audits to the Program Manager for review within 30 days of the completion of the audit. Serious deficiencies identified during field audits will be reported to the appropriate personnel by the QAM within two business days of their discovery. Depending upon the seriousness of the findings, a copy of the report will be submitted to the Tanks Program Manager, Assistant Chief Inspector, Chief Inspector, and/or the Agency QAM, as appropriate. The Tanks QAM, in consultation with the Project Manager or Inspector Supervisor, will begin implementation of corrective action, as needed.

The laboratory audit results, including major and minor situations identified, laboratory response to the problems, impact on data quality, and overall assessment of the laboratory, will be completed by the WVDEP/DWWM Laboratory Quality Assurance Program, and will be made available to WVDEP upon request. Because analytical data submitted to WVDEP is required to be generated by a laboratory certified by the WVDEP/DWWM Laboratory Quality Assurance Program, any data generated by a laboratory that is not certified at the time of the submitted analyses may be rejected, and any additional data will not be accepted until the laboratory is properly certified. WVDEP may require the laboratory to submit a copy of its certification along with a copy of the data deliverable package.

The required reports submitted for a project may include discussion of the following QA/QC report elements, if appropriate:

- Sampling and support equipment used, other than those specified in the approved QA Program or project-specific planning document
- Preservation or holding-time requirements for any sample that were not met
- QC checks (field and laboratory) that were found to be unacceptable
- Analytical requirements for precision, accuracy, or method detection limit/practical quantitation limit that were not met
- Sample collection protocols or analytical methods specified in the QA Program Plan that were not met
- Any activity or event that affected the quality of the data
- Any corrective actions that were initiated as a result of deficiencies
- Any internal or external systems or performance audits that were conducted

The QA/QC report contains an emphasis on evaluating whether project MQOs and data are of adequate quality to support the required decisions stated in the project DQOs.

4.4 Corrective Action

Corrective actions generally are developed on a case-by-case basis. Once a problem has been identified, the problem is documented, and individuals involved with the project are notified of the problem. Involved parties meet to discuss the problem. The Tanks QAM, in consultation with the Project Manager or Inspector Supervisor, will prepare Corrective Action Reports as necessary. The following general procedures are utilized for corrective action when either immediate or long-term corrective actions are necessary as a result of non-conformance in field and laboratory activities:

- Define the problem.
- Assign the responsibility to an appropriate person to investigate the problem.
- Determine the cause of the problem and describe it.
- Determine the appropriate corrective action to eliminate or minimize the problem.
- Assign an appropriate person to accept responsibility for implementing the corrective action.
- Establish the effectiveness of the suggested corrective action and implement the correction.
- Verify that the corrective action has achieved its goal and the problem has been eliminated.

Non-conformance and corrective actions should be documented in the project or program file to ensure that future individuals involved with the project or activity will be able to trace the evolution of procedural or policy change.

4.4.1 Field Activities

Field activities that are improper will be corrected as quickly as possible. It is the responsibility of all field personnel to report any problems that might jeopardize the integrity of the data collection and the project QA objectives. The Inspector or Project Manager is responsible to see that the problem is documented, corrective action is taken immediately, and results of the corrective action are documented. In cases where the Inspector/Project Manager is not the project field manager, then the Inspector/Project Manager must be notified as soon as possible for their input into the corrective action procedures. A corrective action report should be written by the field project manager and submitted to WVDEP for inclusion into the project files. The corrective action report should detail the nature of the problem, the proposed corrective action, who was responsible for implementing the corrective action, and who verified that it was executed properly.

4.4.2 Laboratory Activities

The laboratory personnel, usually the laboratory QAM or lab supervisor, are responsible for performing corrective actions if a problem occurs at the lab that might jeopardize the integrity of the data and the project QA objectives. Reanalysis of samples is a common acceptable corrective action at the laboratory, provided that hold times have not been exceeded and/or there is sufficient sample volume remaining for a re-analysis. The laboratory is required to report to WVDEP Laboratory Quality Assurance Program the need for corrective action and the corrective actions taken. The use of defined “flags” to qualify the data and the inclusion of a case narrative with the analytical data are typical ways in which a lab reports corrective actions that are taken.

4.5 Dispute Resolution

In accordance with the WVDEP QAM, when a dispute is realized, the Tanks QAM will attempt to resolve the dispute through informal procedures and will elevate the dispute through the management chain, as is necessary. If a resolution cannot be obtained at lower levels, the Agency QAM will be called upon to review the dispute and attempt to reach a mediated resolution. At all levels of dispute resolution, the Program Manager, Assistant Chief Inspector, Chief Inspector, and Agency QAM will be kept advised of the progress of the dispute resolution, as appropriate.

5.0 DATA REVIEW

5.1 Purpose/Background

Data verification, validation, and assessment ensures that environmental programs and decisions are supported by the type and quality of data needed and expected for the intended use.

5.2 Data Verification

Data verification is the process of evaluating the completeness, correctness, conformance, and compliance of a specific data set against the method, procedural or contractual requirements. Data verification evaluates adherence to data generation protocols, SOPs, analytical methods, and project specific planning documents. Verification also involves examining the data for errors or omissions. Verification applies to all aspects of data generation, inspection, sampling, and analytical.

5.3 Data Validation

Data validation focuses on the analytical data. It is a systematic process for reviewing a body of data against a pre-established set of acceptance criteria defined in this QAPrP and in project-specific planning documents. Data validation is an analyte and sample specific process. It extends data evaluation beyond data verification and determines the analytical quality of a specific data set.

WVDEP utilizes a tiered, or graded, approached in dealing with validation associated with LUST sites. Closures being pursued through the traditional LUST pathway have a less stringent validation procedure than those sites seeking closure via a risk-based program.

5.4 Data Quality Assessment

Data Quality Assessment (DQA) refers to the process used to determine whether the quality of a given data set is adequate for its intended use. DQAs may occur on selected projects and/or data generation processes. The purpose of this type of evaluation is to determine whether the data collected are acceptable to the decision-maker or end user. Assessments generally take place during the data generation process. As data accumulates, aspects of the project such as surveillance of field and laboratory operations, consistency of the data with MQOs, successfully completing performance evaluation sample studies, and so forth, help assess whether the data are valid and acceptable. WVDEP disregards rejected or questionable data in its decision making, except in limited circumstances, such as a rough site screening.

Once data are of known and acceptable quality, then evaluation of the results in the context of the Data Quality Objectives for the project occurs. Generally, sample results are compared directly to a regulatory standard, action level, and/or laboratory detection limits. An assessment occurs as to whether there is a sufficient quantity of data to support program or project decisions, and whether the original sampling design was appropriate. An assessment might show that data of a different type are required, or that the sensitivity of the instrument used in the measurement was not adequate to meet project objectives. As necessary, the WVDEP Project Manager and/or QAM will review data generated by the contract laboratories or data validation reports generated by consultants.

5.5 Approaches to Verification, Validation, and Assessment

Data verification and validation confirms the integrity of the data generated over the life of the project. The process for determining if the data satisfy program-defined requirements involves evaluating and interpreting the data, in addition to verifying meeting QC requirements.

EPA's 2002 *Guidance on Environmental Data Verification and Data Validation* presents the process for verifying and validating data. Section 5 of this EPA guidance provides tools and techniques for data verification and validation.

5.5.1 Data Verification

Project team personnel, whether they are WVDEP staff, contractors, or owner/operators, will verify field data through reviews of data sets to identify inconsistencies or anomalous values. Any inconsistencies discovered will be resolved as soon as possible by seeking clarification from field personnel responsible for data collection. To obtain defensible and justifiable data, all field personnel will be responsible for following the data collection and documentation procedures described in the project-specific planning document.

The Inspector Supervisors review UST inspection reports and associated compliance documents to evaluate them for completeness. Inspection staff are required to submit inspections through the mobile inspection module which produces a standardized report and was designed to reduce potential errors or omissions of data.

The Corrective Action Project Managers evaluate data submitted to them for completeness, correctness, conformance to acceptable practices, errors, omissions of data, and procedural or contractual requirements, as appropriate. Furthermore, they evaluate the data and field practices for adherence to SOPs, analytical methods, and project specific planning documents, as appropriate.

Laboratory personnel will verify analytical data at the time of analysis and reporting and through subsequent reviews of the raw data for any non-conformances to the requirements of the analytical method. Laboratory personnel will make a systematic effort to identify any outliers or errors before they report the data. Outliers are corrected if found to be the result of errors. The case narrative section of the analytical data package clearly identifies outliers not attributed to errors in analysis, transcription, or calculation. The laboratory must verify all analytical data generated for and submitted to WVDEP.

Verified data are checked for a variety of topics including transcription errors, correct application of dilution factors, appropriate reporting of dry weight versus wet weight, and correct usage of conversion factors, among others. Verified data may have laboratory qualifiers. Verified data are one output of this process.

A second output from the verification process is documentation, which may include a certification statement signed by the laboratory manager and included in the data package. Narratives on technical issues, non-compliance and any corrective action taken are included in the laboratory data package. Records from field activities are likely to be logbooks or handwritten notes, all of which require dates and signatures.

The laboratory is responsible for verifying that their measurement process was "in control" for each batch of samples before proceeding with analysis of a subsequent batch. In addition, each laboratory must establish a system for detecting and reducing transcription and/or calculation errors prior to reporting data. When deviations are noted, the laboratory shall submit data that have acceptable deviations explained. When there are unmet QA requirements, reanalysis of the sample occurs when possible. Only the results of the reanalysis will be submitted, provided these results are acceptable.

5.5.2 Data Validation

Data validation determines the analytical quality of data within a specific data set; it is an analyte and sample-specific process based on achieving the MQOs set forth in the planning documents for the project. Validation assesses whether data quality goals specified in the planning phase have been achieved. Unlike data verification, a qualified person not affiliated with the laboratory performs data validation.

The level of data validation depends on the size and complexity of the project and the project's decisions. Basically, data validation is the process of evaluating the available data against the project MQOs. The traditional LUST pathway utilizes specific numerical standards for soil and groundwater cleanup levels. Since the cleanup levels are based upon numerical standards rather than risk-based standards, the level of validation for the program is not as stringent as that set for the risk-based closure programs. Data collected under the LUST traditional pathway is used to delineate the extent of contamination from LUST sites and to formulate corrective action plans, which result in the subsequent closure of the sites once specific numerical clean-up standards for soil and groundwater have been reached. The Project Manager, in consultation with the QAM as needed, will review data validation of sites seeking closure under the LUST traditional path. In the event that any field or laboratory data does not meet the quality goals established in the site-specific planning documents, it may be necessary for corrective actions to be taken which potentially include resampling. Validation of samples associated with the traditional LUST pathway is performed in accordance with the Stage 1 level of EPA's *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use* (January 2009).

Sites may be remediated to risk-based standards through the risk-based program offered by OER. Under these programs, data is collected to delineate the extent of contamination at sites and to formulate remedial actions utilizing risk-based standards. Therefore, a higher level of data validation is required for risk-based closures than is required for non-risk-based LUST closures. As directed by EPA Region III, OER will be submitting a QAPrP to address risk-based closures.

5.5.3 Data Assessment

The purpose of a data assessment is to integrate all aspects of data generation to determine the usability of the data. The final step in the process is to compare the data obtained to the DQOs established by the program in its QA Program Plan or in project-specific planning documents. Aspects of the sampling program evaluated during the data assessment include sampling design, sample collection procedures, and sample handling. The process also includes a review of analytical procedures (both field and laboratory) and QC procedures. WVDEP Project Managers, contractors, and environmental laboratories maintain field and laboratory logbooks and documents. As appropriate, this documentation is reviewed by the Project Manager, consultant, and/or laboratory personnel to assess the data for usability.

5.6 Reconciliation with Data Quality Objectives

Data collected for a UST/LUST site needs to be evaluated to determine if the specific DQOs for the site have been met. This is done in conjunction with data verification and validation. A reviewer needs to know the context and use of a data set in order to establish a relevant yardstick for judging whether the data is acceptable. Reconciliation will document problems and corrective action throughout the project and discuss findings in the data and report that appear to be anomalous and may or may not significantly impact the usability of data as a whole. Because data generated with significant deviations from the requirements of the QAPrP will be rejected and because of the nature of the work (biased sampling), all data will have the same expected uncertainties and there will be no limitations on data use.

By applying the DQA process, a reviewer can answer important questions such as:

- Was the sampling design appropriate for the site?
- Is the quantity of data sufficient to have confidence in making decisions concerning the site?
- If deficiencies in data existed, what were the deficiencies and what might be their impact on decision making for the site?
- Did inspection and/or corrective action measures meet requirements of the State and Federal Regulation?

5.6.1 Purpose/Background

This section outlines methods for evaluating the results obtained from the sampling and analysis. Use of scientific and statistical evaluations of the data determine if the data collected are of the right type, quantity, and quality to support their intended use and to adequately address the primary study questions.

5.6.2 Reconciling Results with Program Objectives

As appropriate, WVDEP, Consultants/Contractors, and Owner/Operators will systematically assess data quality and data usability. This DQA should include the following:

- A review of the sampling design and sampling methods to verify that these were implemented as planned and are adequate to support project objectives
- A review of project specific MQOs for precision, accuracy, representativeness, completeness, comparability, and quantitation limits to evaluate whether acceptance criteria have been met
- A review of project specific DQOs to assess whether they have been achieved by the data collected
- An evaluation of any limitations associated with decisions based on the data collected. For example, if data completeness is only 90 percent compared to a project-specific completeness objective of 95 percent, the data may still be usable to support a decision, but at a lower level of confidence

5.7 QAPrP Revisions

Throughout the life of WVDEP's UST/LUST Program, there may be changes to program requirements, modifications to the way environmental data are collected, or changes to the definitions of enforcement activities. Therefore, this QAPrP is a dynamic document that is subject to revision, as needed. WVDEP Program personnel will examine and revise this plan on an as needed basis. Re-submittal of this plan to EPA Region III QA for review will occur once every five (5) years or as otherwise needed. Dissemination of approved revisions include personnel on the Distribution List provided in this document.

6.0 REFERENCES

The following reference materials were used in compiling the information contained in this QAPrP:

Corrective Action Plan Guidance Document (CAGD), West Virginia Department of Environmental Protection, Division of Water and Waste Management, Office of Environmental Enforcement, September 2018

EPA Region 9 Guidance for Quality Assurance Program Plans, United States Environmental Protection Agency, March 2012

Environmental Investigations Standard Operating Procedures and Quality Assurance Manual, United States Environmental Protection Agency, November 2001

EPA Quality Manual for Environmental Programs, 5360 A1, United States Environmental Protection Agency, May 2000

Guidance for Data Quality Assessment, *EPA QA/G-9,* United States Environmental Protection Agency, July 2000

Guidance on Environmental Data Verification and Data Validation, EPA QA/G-8, United States Environmental Protection Agency, November 2002

Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use, United States Environmental Protection Agency, January 2009

Guidance for the Data Quality Objectives Process, EPA QA/G-4, United States Environmental Protection Agency, February 2006

Quality Management Plan, West Virginia Department of Environmental Protection, May 2016

Figure 1- Organizational Chart

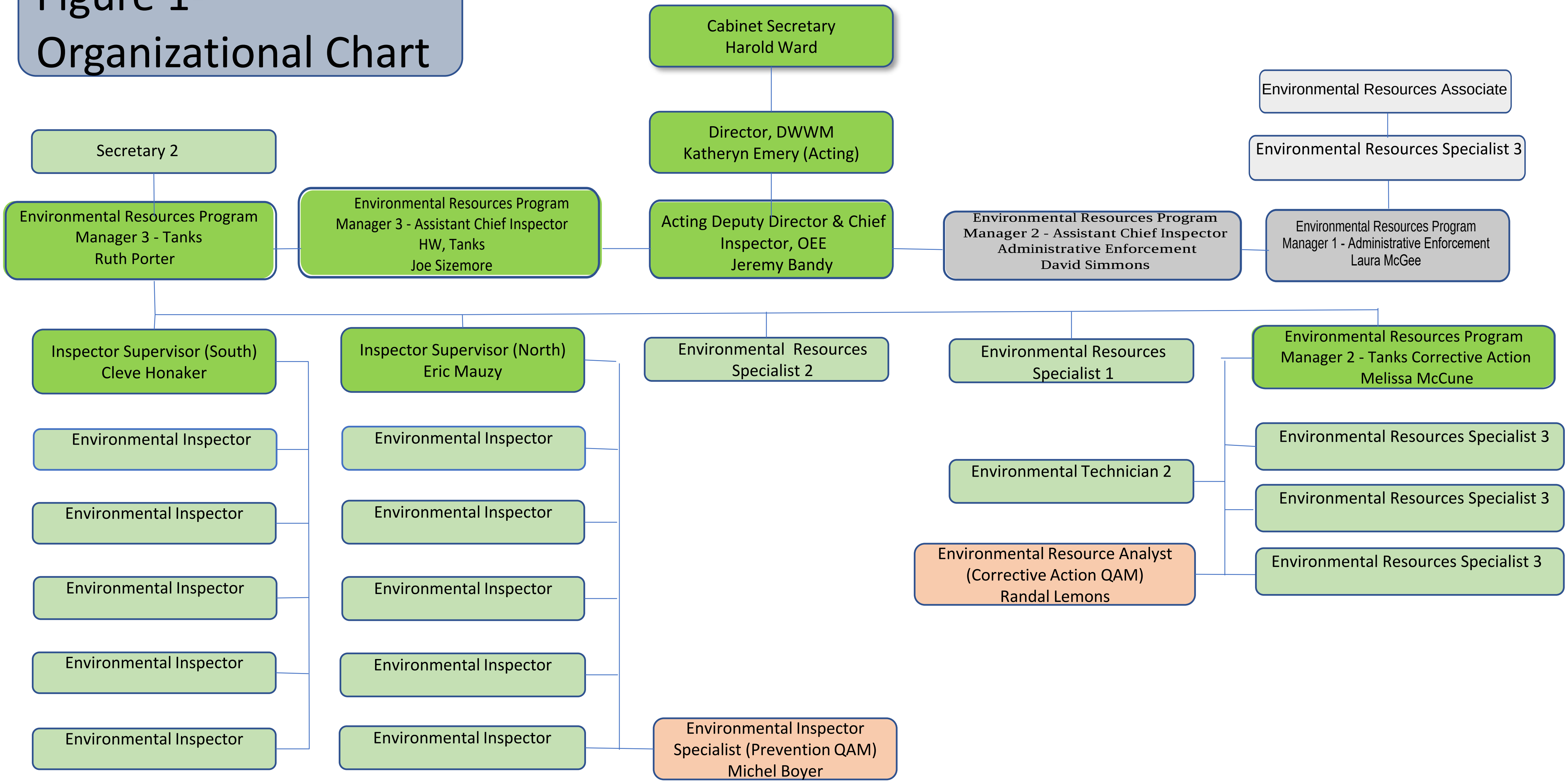

Figure 2: Typical Chain of Custody Record

CHAIN-OF-CUSTODY Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevent fields

LAB USE ONLY-

ALL SHADED AREAS are for LAB USE ONLY

Company:	Billing Information:
Address:	
Report To:	Email To:
Copy To:	Site Collection Info/Address:
Customer Project Name/Number:	State: County/City: / Time Zone Collected: [ ] PT [ ] MT [ ] CT [ ] ET

Container Preservative Type **

Lab Project Manager:

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other ________

Phone: Email:	Site/Facility ID #:	Compliance Monitoring? [ ] Yes [ ] No
Collected By (print):	Purchase Order #: Quote #:	DW PWS ID #: DW Location Code:
Collected By (signature):	Turnaround Date Required:	Immediately Packed on Ice: [ ] Yes [ ] No
Sample Disposal: [ ] Dispose as appropriate [ ] Return [ ] Archive: ________ [ ] Hold: ________	Rush: [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day (Expedite Charges Apply)	Field Filtered (if applicable): [ ] Yes [ ] No Analysis: ________

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Analyses

Lab Profile/Line:

```
Lab Sample Receipt Checklist:

Custody Seals Present/Intact  Y N NA
Custody Signatures Present    Y N NA
Collector Signature Present   Y N NA
Bottles Intact                Y N NA
Correct Bottles               Y N NA
Sufficient Volume             Y N NA
Samples Received on Ice       Y N NA
VOA - Headspace Acceptable    Y N NA
USDA Regulated Soils          Y N NA
Samples in Holding Time       Y N NA
Residual Chlorine Present     Y N NA
Cl Strips: ____________
Sample pH Acceptable          Y N NA
pH Strips: ____________
Sulfide Present               Y N NA
Lead Acetate Strips: ________

LAB USE ONLY:
Lab Sample # / Comments:
```

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Collected (or Composite Start) Time	Composite End Date	Composite End Time	Res Cl	# of Ctns

Customer Remarks / Special Conditions / Possible Hazards:

Type of Ice Used: Wet Blue Dry None

SHORT HOLDS PRESENT (<72 hours): Y N N/A

Packing Material Used:

Lab Tracking #:

Radchem sample(s) screened (<500 cpm): Y N NA

Samples received via: FEDEX UPS Client Courier Pace Courier

Lab Sample Temperature Info:
Temp Blank Received: Y N NA
Therm ID#: ________
Cooler 1 Temp Upon Receipt: ____oC
Cooler 1 Therm Corr. Factor: ____oC
Cooler 1 Corrected Temp: ____oC
Comments:

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:

LAB USE ONLY
Table #:
Acctnum:
Template:
Prelogin:
PM:
PB:

Trip Blank Received: Y N NA
HCL MeOH TSP Other

Non Conformance(s): YES / NO

Page: ______ of: ______

Table 1 - Data Evaluation

QC Element	Type of Failure	Possible Cause[1]	Major PARCCs Affected[2]	Possible Effect on Data	Possible Worst Case Data Evaluation Scenario[3]
Analysis Method	Wrong method	Incorrect method listed on chain-of-custody, failure to read SAP, incorrect SAP, laboratory analyst error	Accuracy Comparability Completeness Representativeness	False negatives High or low bias	Invalidates or qualifies all or some of the sample results
Chain-of-Custody	Chain broken or not kept	Missing signatures, missing seals, missing dates/times	Completeness	Incomplete data	Data not legally defensible
Detection Limit	Detection limit too high	Insufficient sample, high dilution factor, wrong or inappropriate method	Comparability Completeness	Incomplete data False positives False negatives	Invalidation of sample results
Dilution Factors	Extremely high dilution factors	High concentrations of interferences or analytes, inappropriate method	Accuracy Comparability Completeness	False negatives Poor accuracy Low sensitivity	Invalidation of samples with high dilution factors, may qualify sample results as estimated
Equipment Rinsate Blank	Contamination greater than the detection limit	Improper decontamination of field sampling equipment, contaminated rinsate water, containers, or preservatives	Accuracy Completeness Representativeness	False positives High bias	Invalidates all sample results where equipment blank contamination is greater than 5% of sample concentration
Field Quality Assurance Samples[4]	Quality assurance sample results do not agree with project and/or QC sample results	Improper SOP (QA and primary laboratory used different analytical methods), inadequate cleanup, inadequate background correction, laboratory contamination, preservative problems, method failure, sample misidentification, samples were not homogeneous	Comparability Completeness Precision Representativeness	Non-representative sample False positives False negatives High or low bias	Qualifies or invalidates all or part of the data set
Field Quality Control Samples[5]	Field and QC sample concentrations do not compare within acceptable limits	Samples were not homogeneous, insufficient mixing in the field, samples not split but collocated, insufficient mixing in laboratory	Precision Representativeness	Non-representative samples Poor precision High or low bias	Qualifies all sample results greater than detection limit (i.e., possible highly variable results), sample results less than detection limit are valid

QC Element	Type of Failure	Possible Cause[1]	Major PARCCs Affected[2]	Possible Effect on Data	Possible Worst Case Data Evaluation Scenario[3]
Headspace	Air bubbles in aqueous VOC vials; visible headspace in soil VOC container	Poor sampling technique, caps not sealed tight, septum caps not used, dirt between rim and cap, soil not packed tight, improper SOP	Accuracy Completeness Representativeness	False negatives Low bias	Invalidation of sample results
Holding Times[6]	Holding times exceeded	Excessive analysis time, holding samples too long prior to shipment, shipping samples prior to a weekend or holiday, inappropriate shipping method	Accuracy Completeness Representativeness	False negatives Low bias	Invalidation of sample results, affects legal defensibility of data, sample results greater than detection limit considered as minimum values only
Matrix Spike and/or Matrix Spike Duplicate[7]	High recoveries	Matrix effects, inappropriate method, method failure, inadequate cleanup, inadequate background correction, failure to use method of standard additions, improper spiking, degraded spiking solution, failed spiking device, contaminated reagents or glassware	Accuracy Precision	False positives High bias	Qualifies all sample results greater than detection limit (i.e., possible matrix effects)
	High relative percent difference	Sample is not homogeneous, inadequate sample mixing in laboratory, samples misidentified, method failure, improper spiking, degraded spiking solution, failed spiking device, contaminated reagents or glassware	Precision Representativeness	Non-representative sample Poor precision	Qualifies all sample results greater than the detection limit (i.e., possible highly variable results)
	Low recoveries	Matrix effects, inappropriate method, method failure, inadequate cleanup, inadequate background concentration, failure to use method of standard additions, improper spiking, degraded spiking solution, failed spiking device	Accuracy	False negatives Low bias	Qualifies all sample results (i.e., possible matrix effects)
	Matrix spike and/or matrix spike duplicate missing	Insufficient sample, lost during analysis, improper SOP	Accuracy Precision Representativeness	False negatives High or low bias	Qualifies all sample results (i.e., no measure of matrix effects)

QC Element	Type of Failure	Possible Cause[1]	Major PARCCs Affected[2]	Possible Effect on Data	Possible Worst Case Data Evaluation Scenario[3]
Method Blank[8]	Contamination greater than detection limit	Contaminated reagents or glassware, poor laboratory technique, improper SOP	Accuracy Completeness Representativeness	False positives High bias	Invalidates all sample results where method blank contamination is greater than 5% of sample concentration
	Method blank absent	Lost during analysis, improper SOP	Accuracy Completeness Representativeness	False negatives Low sensitivity	Invalidation of sample results greater than detection limit, sample results less than detection limit are valid
Preservation	No preservative or wrong pH	No preservative added, improper amount of preservative added, overfilling container with sample, improper SOP	Accuracy Completeness Representativeness	False negatives Low bias	Invalidation of sample results, affects legal defensibility of data, sample results greater than detection limit considered as minimum values only
	Samples not properly cooled, placed on ice	Insufficient ice used, shipping container not adequately insulated, transport time too long	Accuracy Completeness Representativeness	False negatives Low bias	Invalidation of sample results, affects legal defensibility of data, sample results greater than detection limit considered as minimum values only
	Wrong preservative	Improper SOP, failure to read SAP, SAP incorrect	Accuracy Completeness Representativeness	Incomplete data False positives False negatives	Invalidates or qualifies some or all of the sample results, affects legal defensibility of data
Sample Containers	Plastic containers used for organic analytes	Sampler unaware of requirements to use glass, SAP incorrect or not followed, improper SOP	Accuracy Completeness Representativeness	False positives False negatives High or low bias Phthalate interference	Invalidation of sample results

QC Element	Type of Failure	Possible Cause[1]	Major PARCCs Affected[2]	Possible Effect on Data	Possible Worst Case Data Evaluation Scenario[3]
Sample Filtration	Samples not filtered and preserved in field for dissolved metals	Sampler error, sampler unaware of requirement, improper SOP, failure to read SAP, SAP incorrect, filtration apparatus not available or damaged	Accuracy Completeness Representativeness	False positives False negatives High or low bias	Invalidation of sample results for dissolved metals
Sample Labeling	Sample labels missing, not attached to containers, or illegible	Failure to protect sample containers from moisture, failure to use appropriate marker, improper SOP	Completeness Representativeness	Incomplete data False positives False negatives	Invalidation of sample results
	Samples mislabeled	Sample error, improper SOP	Completeness Representativeness	Incomplete data False positives False negatives	Invalidation of sample results
Surrogate Recoveries in Method Blank	High recoveries	Method failure, improper spiking, degraded spiking solution, failed spiking device, contaminated reagents or glassware	Accuracy Completeness	High bias Possible false positives	Invalidation of sample results
	Low recoveries	Method failure, improper spiking, degraded spiking solution, failed spiking device	Accuracy Completeness	False negatives Low bias	Invalidation of sample results
Surrogate Recoveries in Samples	High recoveries	Matrix effects, inappropriate method, method failure, improper spiking, degraded spiking solution, failed spiking device	Accuracy Completeness	False positives High bias	Qualifies all sample results (i.e., possible matrix effects), rejection of individual sample results
	Low recoveries	Matrix effects, inappropriate method, method failure, improper spiking, degraded spiking solution, failed spiking device	Accuracy Completeness	False negatives Low bias	Qualifies all sample results (i.e., possible matrix effects), rejection of individual sample results
Trip Blank (applies to volatile analysis only)	Contamination greater than detection limit	Cross-contamination during shipment or storage, contaminated reagent water, glassware, or preservative	Accuracy Completeness Representativeness	False positives High bias	Invalidates all sample results where trip blank contamination is greater than 5% of sample concentration

QC Element	Type of Failure	Possible Cause[1]	Major PARCCs Affected[2]	Possible Effect on Data	Possible Worst Case Data Evaluation Scenario[3]
	Trip blank absent	Improper SOP, trip blank broken during shipment, trip blank lost during analysis	Accuracy Completeness Representativeness	False positives	Invalidation of sample results greater than detection limit, sample results less than detection limit are valid

1 The most common possible causes are listed.
2 PARCCs parameters most affected are listed. It is quite possible that other PARCCs are affected.
3 All data evaluation must take into account the specific data quality objectives for a given project; therefore, it is possible that even suspect data may be used, depending upon the DQOs established for a project.
4 Use of field QA sample data to evaluate project sample data assumes that the field QA sample data is supported by a complete set of in-control laboratory quality control data.
5 Conventional sampling protocols for some analyte classes (VOCs, BTEX, GRO) prohibit sample mixing and splitting, because it results in the loss of major fractions of the analytes. Field and QC samples for these analytes are appropriately collected as collocated sample pairs.
6 Generally, exceeding the holding times of a sample will result in false negatives and/or low bias; however, exceeding holding times on certain types of samples (carbonates, DO) may result in a false positive or high bias. Furthermore, high bias and false positives can occur when degradation products of contaminants are also themselves analytes.
7 When native samples concentrations are significantly greater that the effective spike concentration then the conclusion of a matrix effect is only tentative. As a general rule, the native sample concentration should be no more than four times higher than the matrix spike concentration for the matrix effect to be considered probably present.
8 Method blanks are not appropriate for all analytes (i.e., pH, conductivity, % solids, total suspended solids, etc.).

Note that entries in the possible causes, PARCCs parameters affected, effect on data, and possible data evaluation columns assume that only type of failure occurred at any given time. The cumulative or synergistic effects of more than one failure type occurring at the same time make data evaluation more complex and is beyond the scope of this table.

Table 2: Sampling Strategies

Sampling Strategy	Description	Application	Limitation
Statistical Sampling Approaches			
Simple Random Sampling	Representative sampling locations are chosen using the theory of random chance probabilities.	Sites where background information is not available and no visible signs of contamination are present.	Many not be cost-effective for samples located too close together. Does not take into account spatial variability of media.
Stratified Random Sampling	Site is divided into several sampling areas based on background or other site information; each area is evaluated using a separate random sampling strategy.	Larges sites characterized by a number of soil types, geographic features, past/present uses, or manufacturing/storage areas.	Often more cost-effective than simple random sampling. More difficult to implement in the field and analyze results. Does not take into account spatial variability of media.
Systematic Grid Sampling	Involves collecting samples at predetermined, regular intervals within a grid pattern. This is probably the most common statistical strategy.	Best strategy for minimizing bias and providing complete site coverage. Can be used effectively at sites where no background information exists. Ensures that samples will not be taken too close together.	Does not take into account spatial variability of media.
Hot-Spot Sampling	Systematic grid sampling strategy tailored to search for hot spots.	Sites where background information or site investigation data indicates that hot spots may exist.	Does not take into account spatial variability of media. Chance of missing a hot-spot can be high depending upon the amount of site information available.
Geostatistical Approach	Representative sampling locations are chosen based on spatial variability of media.	More appropriate than other statistical sampling strategies because it takes into account spatial variability of media. Especially applicable to sites where presence of contamination is unknown.	Previous investigation data must be available, and such data must be shown to have a spatial relationship.
Non-Statistical Sampling Approaches			
Biased Sampling	Sampling locations are chosen based on available information about site history or past investigations.	Sites with specific known contamination sources.	Contaminated areas can be overlooked if they are not indicated by background information or visual signs of contamination.
Judgmental Sampling	An individual subjectively selects sampling locations that appear to be representative of average conditions.	Homogeneous, well-defined sites.	Not usually recommended due to bias imposed by individual, especially for final investigations.

Table 3: Sample Containers, Preservation, Holding Times

Matrix	Analytical Method	Parameter/Fraction	Minimum Sample Volume[1]	Sample Container[2]	Sample Preservation[3]	Holding Time
LUST Sites						
Soil[4]	8260C	**Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX)**				
		Terra Core Samplers (< 200 ug/kg)	3 – 40 ml vials	Glass vial with Teflon lined cap	1g NaHSO4 and a magnetic stirring bar weighed to the nearest 0.01g	14 days
		Terra Core Samplers (> 200 ug/kg)	3 – 40 ml vials	Glass vial with Teflon lined cap	5mL of methanol weight checked to the nearest 0.01g	14 days
		EnCore Samplers	3 – EnCore Samplers	EnCore Sampler	Cool to ≤ 6° C	48 hours
	8260C	**Methyl t-butyl ether (MTBE) and t-butyl alcohol (TBA)[5]**				
		Terra Core Samplers	3 – 40 ml vials	Glass vial with Teflon lined cap	Cool to ≤ 6° C, add HCl to pH < 2	14 days
		EnCore Samplers	3 – EnCore Samplers	EnCore Sampler	Cool to ≤ 6° C	48 hours
	8260C	**Gasoline Range Organics (GRO)**				
		Terra Core Samplers (< 200 ug/kg)	3 – 40 ml vials	Glass vial with Teflon lined cap	1g NaHSO4 and a magnetic stirring bar weighed to the nearest 0.01g	14 days
		Terra Core Samplers (> 200 ug/kg)	3 – 40 ml vials	Glass vial with Teflon lined cap	5mL of methanol weight checked to the nearest 0.01g	14 days
		EnCore Samplers	3 – EnCore Samplers	EnCore Sampler	Cool to ≤ 6° C	48 hours
	8260C	**Diesel Range Organics (DRO)/Oil Range Organics (ORO)**	4 oz.	4 oz. wide-mouth glass with Teflon lined cap	Cool to ≤ 6° C	14 days

Matrix	Analytical Method	Parameter/Fraction	Minimum Sample Volume[1]	Sample Container[2]	Sample Preservation[3]	Holding Time
	8270C	**Polycyclic Aromatic Hydrocarbons (PAHs)**	4 oz.	4 oz. wide-mouth glass with Teflon lined cap	Cool to ≤ 6° C	14 days
	1311/7420	**Lead (Toxicity Characteristic Leaching Procedure – TCLP)**	4 oz.	4 oz. wide-mouth glass with Teflon lined cap	Cool to ≤ 6° C	180 days
Aqueous[6]	8260C	**Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX)**	3 – 40 ml vials	Glass vial with Teflon lined cap	Cool to ≤ 6° C, add HCl to pH < 2	7 days
	8260C	**Methyl t-butyl ether (MTBE) and t-butyl alcohol (TBA)**	3 – 40 ml vials	Glass vial with Teflon lined cap	Cool to ≤ 6° C, add HCl to pH < 2	7 days
	8260C	**Gasoline Range Organics (GRO)**	3 – 40 ml vials	Glass vial with Teflon lined cap	Cool to ≤ 6° C, add HCl to pH < 2	7 days
	8260C	**Diesel Range Organics (DRO)/Oil Range Organics (ORO)**	2 – 1250 ml	1250 ml amber glass with Teflon lined cap	Cool to ≤ 6° C	7 days
	8270C	**Polycyclic Aromatic Hydrocarbons (PAHs)**	2 – 1250 ml	1250 ml amber glass with Teflon lined cap	Cool to ≤ 6° C	7 days

1 Triple volume is required for matrix spike/matrix spike duplicate (MS/MSD) analysis.
2 All sample bottles must comply with the standards outlined in the following reference: U.S. EPA (Environmental Protection Agency). December 1992. Specifications and Guidance for Contaminant-Free Sample Containers. OSWER Directive #9240.0-05A, EPA 540/R-93/051. Office of Solid Waste and Emergency Response, Washington, DC.
3 Cool sample to ≤ 6° C, but without freezing the sample.
4 SW-846 sampling method 5035 may be used for VOCs associated with leaking underground storage tank sites. The sample methodology may also be applicable to non-LUST sites. In addition, Method 8260C may be utilized for BTEX and MTBE analysis as an alternative to Method 8021B.
5 If analysis by Method 8021B indicates the presence of MTBE or TBA, confirmation analysis by Method 8260B is required in the LUST Program.
6 Methods listed for the LUST Program for aqueous samples may also be applicable to non-LUST sites.

Table 4 - Diesel, Kerosene, and Refined Oils[1] Analytical Parameters for UST Closures

Chemical[2]	Analytical Method[3]
Benzene	SW 846 8260
Toluene	SW 846 8260
Ethylbenzene	SW 846 8260
Xylenes (total)	SW 846 8260
PAHs	SW 846 8270
Lead[4]	SW846 6010
Arsenic[4]	SW846 6010
Barium[4]	SW846 6010
Cadmium[4]	SW846 6010
Chromium[4]	SW846 6010
Mercury[4]	SW846 7474
Selenium[4]	SW846 6010
Silver[4]	SW846 6010

[1]Includes diesel, kerosene, fuel/heating oil, lubricating oils, and used oils

[2]Soil sampling protocol for BTEX must follow the requirements of SW846 Method 5035.

[3]Use the most recently promulgated version of the SW 846 method

[4]For used oil, metals must be analyzed in addition to the other parameters listed in the table. Additional request for ethylene glycol or a chlorinated solvent scan may be made on a site-by-site basis.

Table 5: Field Quality Control Requirements

Type of QC Sample	Frequency	Acceptance Criteria[1]	Corrective Action[2]
Cooler Temperature Blank	One per cooler	6° C	Resample, qualify data as necessary, and/or accept data with an acknowledged level of uncertainty.
Equipment Rinsate Blank	One per twenty samples per matrix per equipment type per decontamination event or one per day, whichever is more frequent	< minimum detection limit or < 30% of lowest sample up to two times the MDL	Reanalyze suspect samples; resample and reanalyze; qualify data as necessary, accepting data with an acknowledged level of uncertainty; recalibrate analytical instruments; and/or discard the data.
Field Blank	One per twenty samples per matrix or one per day, whichever is more frequent	< minimum detection limit or < 30% of lowest sample up to two times the MDL	Reanalyze suspect samples; resample and reanalyze; qualify data as necessary, accepting data with an acknowledged level of uncertainty; recalibrate analytical instruments; and/or discard the data.
Field Duplicate	One per twenty samples per matrix or one per day, whichever is more frequent	50% of RPD or two times the MDL	Reanalyze suspect samples; resample and reanalyze; accept data with an acknowledged level of uncertainty; recalibrate analytical instruments; and/or discard the data.
Matrix Spike / Matrix Spike Duplicate (MS/MSD)[3]	One per twenty samples per matrix or one per day, whichever is more frequent	Recovery within 50% for spikes at 10 times MDL	Review chromatograms and raw data quantitation reports; check instrument response using calibration standard; attempt to correct matrix problem and reanalyze sample; resample and reanalyze; accept data with an acknowledged level of uncertainty, and/or discard the data.
Split Sample	10% of field screening data will be confirmed with data from a fixed laboratory[4]	50% of RPD or two times the MDL	Reanalyze suspect samples; resample and reanalyze; accept data with an acknowledged level of uncertainty; recalibrate analytical instruments; and/or discard the data.
VOA Trip Blank	One for each cooler which contains samples for VOA analyses	< minimum detection limit or < 30% of lowest sample up to two times the MDL	Reanalyze suspect samples; resample and reanalyze; qualify data as necessary, accepting data with an acknowledged level of uncertainty; recalibrate analytical instruments; and/or discard the data.

1 The acceptance criteria provided are for guidance purposes only. The acceptance criteria for a specific project will be dependent upon the data quality objectives of that project and may differ from those criteria listed in this table. In cases where the acceptance criteria are different from that listed above, it will be specified in a site-specific SAP.
2 The corrective actions provided are for guidance purposes only. The corrective action procedures listed may vary depending upon the data quality objectives and the acceptance criteria provided in the site-specific SAP.
3 Sufficient sample will be collected to allow the laboratory to perform this analysis.
4 Split sampling may be modified, if appropriate, with the approval of the PM in consultation with the Corrective Action QAM.

Table 6 - Typical Laboratory QC Data for Semi-Volatiles[1]

Compound	Lab Control Sample (% Recovery Limits)	Method Blank (ug/kg)	Surrogate (% Recovery Limits)
Acenaphthene	70-130	6.7	
Acenaphthylene	70-130	6.7	
Anthracene	70-130	6.7	
Benzo(a)anthracene	70-130	6.7	
Benzo(a)pyrene	70-130	6.7	
Benzo(b)fluoranthene	70-130	6.7	
Benzo(g,h,i)perylene	70-130	6.7	
Benzo(k)fluoranthene	70-130	6.7	
Chrysene	70-130	6.7	
Dibenz(a,h)anthracene	70-130	6.7	
Fluoranthene	70-130	6.7	
Fluorene	70-130	6.7	
Indeno(1,2,3-cd)pyrene	70-130	6.7	
Naphthalene	70-130	6.7	
Phenanthrene	70-130	6.7	
Pyrene	70-130	6.7	
2-Fluorobiphenyl			30-115
Nitrobenzene-d5			23-120
Terphenyl-d14			18-137

[1] This is an example for a soil sample using EPA Method 8270

Table 7: Calibration and Corrective Action – Field Equipment

Instrument	Calibration Standards	Frequency	Acceptance Criteria	Corrective Action
Conductivity	Potassium chloride: 1,000 uS/cm ±1.0%	Each day of usage	Adjustable to standard	Clean probe if dirty or replace probe if damaged. Remove from service until the unit meets calibration standard.
Dissolved Oxygen	Water saturated air calibration	Each day of usage	Between 100 and 104% oxygen saturation in water-saturated air	Clean probe if dirty or replace probe if damaged. Remove from service until the unit meets calibration standard.
MutliRAE Lite	100 ppm Isobutylene	Each day of usage	Adjustable to standard	Take the unit out of service until the filter or lamp can be cleaned or replaced and the unit meets calibration standards.
	10 ppm H_2S, 50 ppm CO, 18% O_2, 2.5% CH_4 (50% LEL)	Each day of usage	Adjustable to standard	Take the unit out of service until the filter or lamp can be cleaned or replaced and the unit meets calibration standards.
Oxidation-Reduction Potential (ORP)	ORP standard iron-salt solutions: 100 mV	Each day of usage	Adjustable to standard	Clean probe if dirty or replace probe if damaged. Remove from service until the unit meets calibration standard.
pH	Buffer solutions: 4.00 ± 0.01, 7.00 ± 0.01, 10.00 ± 0.01	Each day of usage	Adjustable to standard	Clean probe if dirty or replace probe if damaged. Remove from service until the unit meets calibration standard.
Temperature	Check against National Institute of Standards and Technology (NIST) traceable thermometer	Each day of usage	1.0 F of NIST traceable thermometer	Clean temperature probe if dirty or replace probe if damaged. Remove from service until the unit meets calibration standard.

Note that the field equipment listed in Table 5 is specific to the common field equipment that is routinely utilized at a site. It is possible that other field equipment may be utilized on-site (equipment may be rented or contractors may have different equipment). If this is the case, field equipment calibration and acceptance criteria/corrective action will be required to be addressed in the site-specific SAP. If the Tanks Unit acquires additional equipment, that equipment will be added to the table during revisions to the QAPrP.

Table 8: Preventative Maintenance – Field Equipment

Instrument	Activity	Frequency
Conductivity	Check battery.	Each usage and replace as necessary.
	Check for damage to the probe.	Each usage and replace as necessary.
	Clean probe.	Probe should be rinsed with distilled water after every usage. Clean with manufacturer suggested cleaning solution (usually dilute acid) as necessary.
Dissolved Oxygen	Check battery.	Each usage and replace as necessary.
	Check for damage to the probe.	Each usage and replace as necessary.
	Clean probe.	Probe should be rinsed with distilled water after every usage. Clean with manufacturer suggested cleaning solution as necessary.
MutliRAE Lite	Check battery.	Each usage and charge as necessary.
	Clean PID sensor.	As necessary, as indicated during calibration.
	Replace combustible detector.	As necessary, as indicated during calibration.
	Replace filter element in inlet fitting.	As necessary.
	Replace gas inlet adapter.	As necessary.
	Replace pump.	As necessary.
	Replace O_2, CO, H_2S, and VOC (PID) sensors.	As necessary, as indicated during calibration (~ 1/yr.).
Oxidation-Reduction Potential (ORP)	Check battery.	Each usage and replace as necessary.
	Check for damage to the probe.	Each usage and replace as necessary.
	Clean probe.	Probe should be rinsed with distilled water after every usage. Clean with manufacturer suggested cleaning solution as necessary.
pH & Temperature Meter	Check battery.	Each usage and replace as necessary.
	Check for damage (scratches, cracks, or breaks) to the probe.	Each usage and replace as necessary.
	Clean probe and store wet.	Probe should be rinsed with distilled water after every usage. Clean with manufacturer suggested cleaning solution (usually dilute acid solution for salt deposits) as necessary.

Note that the field equipment listed in Table 5 is specific to the common field equipment that is routinely utilized at a site. It is possible that other field equipment may be utilized on-site (equipment may be rented or contractors may have different equipment). If this is the case, field equipment calibration and acceptance criteria/corrective action will be required to be addressed in the site-specific SAP. If Tanks Unit acquires additional equipment, that equipment will be added to the table during revisions to the QAPrP.

<u>APPENDIX A:</u> WV CSR TITLE 47, SERIES 32

TITLE 47
LEGISLATIVE RULE
DEPARTMENT OF ENVIRONMENTAL PROTECTION
WATER RESOURCES

SERIES 32
ENVIRONMENTAL LABORATORIES CERTIFICATION AND STANDARDS OF PERFORMANCE

§47-32-1. General.

1.1. Scope. -- This rule governs the certification of laboratories conducting environmental analysis of waste and wastewater performed as required by rules or orders issued pursuant to the covered statutory programs. The rule establishes the provisions for obtaining and maintaining laboratory certifications and the criteria and procedures laboratories will be required to follow in analyzing samples.

1.2. Authority. -- W. Va. Code §22-1-15.

1.3. Filing Date. -- May 12, 2009.

1.4. Effective Date. -- July 1, 2009.

1.5. Incorporation by Reference. -- The Department hereby adopts and incorporates into this rule the approved "Guidelines Establishing Test Procedures for the Analysis of Pollutants" 40 CFR 136, EPA SW 846 Methods, and such other methods as may be approved by U.S. Environmental Protection Agency (EPA) or the Secretary.

1.6. Construction. -- This rule shall be liberally construed to permit the Department to discharge its statutory functions and to effectuate the purposes of the laboratory certification program.

1.7. Purpose of this Rule. -- This rule is promulgated to ensure that the results of environmental analyses are accurate, reproducible and verifiable. This purpose will be achieved by:

1.7.1. Establishing the administrative procedures to be followed by certified laboratories and laboratories seeking certification;

1.7.2. Establishing the categories in which, and the parameters for which laboratories may be certified;

1.7.3. Establishing the minimum requirements, criteria and procedures for laboratory equipment and supplies, practices, methodology, quality control, personnel, facilities, data reporting, and laboratory and record maintenance, which a certified laboratory shall continually meet; and

1.7.4. Establishing the enforcement procedures the Department will follow to ensure that all certified laboratories or laboratories seeking certification are in compliance with this rule.

1.8. Certification Program Requirements.

1.8.1. A laboratory analyzing samples for compliance with adopted rules, permits, or orders issued pursuant to a covered statutory program will follow the procedures set forth in this rule in order to obtain and maintain certification. The provisions of this rule are only applicable to tests required by State and Federal regulatory programs.

1.8.2. Certified laboratories and laboratories seeking certification will analyze all samples requiring testing under this rule in accordance with the procedures and methods required by this rule.

1.9. Program Information and Communications. -- Questions concerning the requirements of this rule should be directed to the Department of Environmental Protection, Division of Water and Waste Management, Quality Assurance Program, 601 57th Street SE, Charleston, WV 25304-2345.

§47-32-2. Definitions.

The following words and terms, when used in this rule have the following meanings unless the context clearly indicates otherwise.

2.1. "Accredited" means an approval conferred upon institutions or programs where appropriate by a nationally recognized accrediting agency or association as determined by the Department.

2.2. “Accuracy” means the closeness of agreement between an observed value and the accepted reference value. Accuracy is best determined through the analysis of a sample spiked with a known concentration of target analytes and this value compared to an unspiked aliquot.

2.3. "Analyte" means an element, ion, isotope, compound, or component of interest to the analyst.

2.4. "Analytical Reagent Grade" (AR), "ACS reagent grade", and "Reagent Grade" are synonymous terms for reagents which conform to the current specifications of the Committee on Analytical Reagents of the American Chemical Society.

2.5. “Analyst” means the individual who performs the analytical methods and associated techniques and who is responsible for applying the required laboratory practices and quality controls to meet the required level of quality.

2.6. "APHA Standard Methods" or "Standard Methods for the Examination of Water and Wastewater" means the methods published by the American Public Health Association, 1015 Fifteenth Street NW, Washington, DC 20005.

2.7. "Approved analytical methods" are those analytical or test methods cited in the Code of Federal Regulations as being approved by EPA or such other methods as shall be approved by the Secretary.

2.8. “Batch” means the environmental samples that are prepared or analyzed together using the same procedures, personnel, lots of reagents, and standards.

2.9. “Batch, Analytical” means a batch composed of prepared environmental samples that are analyzed together as a group. An analytical batch may contain samples originating from various environmental matrices and can exceed 20 samples.

2.10. ”Batch, Preparation” means a batch composed of 1 to 20 environmental samples of the same matrix with a maximum time between the start of processing of the first and last sample in the batch to be 24 hours.

2.11. ”Cancellation” means the voluntary removal of a previously certified laboratory from the laboratory certification program.

2.12. "Category" means a group of parameters for which certification is offered.

2.13. "Certification" means the approval granted by the Secretary authorizing a laboratory to provide environmental compliance data.

2.14. "Certification parameter" means a parameter that is identified in a proficiency test sample and that is used to evaluate the overall analytical performance of a laboratory on the specific method.

2.15. "Certification year" is that period of time following the date upon which the laboratory first receives certification for any parameter or category and lasting for 365 consecutive days.

2.16. "Certified thermometer" is a thermometer that has documentation from the manufacturer showing that it has been compared against a National Institute for Standards Testing (NIST) thermometer covering the temperature ranges employed by the laboratory.

2.17. "CFR" means the Code of Federal Regulations.

2.18. "Compliance analysis" means the analysis of a sample that is required to be analyzed by a Department rule, permit or order.

2.19. "Covered statutory programs" means one of the regulatory programs developed under statutory authority of one of the following acts of the Legislature:

2.19.1. Water Pollution Control Act, W. Va. Code §22-11-1.

2.19.2. Hazardous Waste Management Act, W. Va. Code §22-18-1.

2.19.3. Hazardous Waste Emergency Response Fund Act, W. Va. Code §22-19-1.

2.19.4. Underground Storage Tank Act, W. Va. Code §22-17-1.

2.19.5. Solid Waste Management Act, W. Va. Code §22-15-1.

2.19.6. Groundwater Protection Act, W. Va. Code §22-12-1.

2.20. “Deficiency” means a deviation from acceptable procedures or practices.

2.21. “Department” means the West Virginia Department of Environmental Protection.

2.22. "EPA" and "USEPA" means the United States Environmental Protection Agency.

2.23. "Laboratory" means a facility conducting tests or analyses of parameters for which certification is required, where the results of such tests or analyses are used for purposes of demonstrating compliance under the covered statutory programs. Provided; The term "laboratory" shall not include individuals conducting analyses of constituents that must be conducted in the field because of practical constraints; such as, but not limited to pH, dissolved oxygen, total residual chlorine and sulfide.

2.24. "Laboratory pure water" means distilled or deionized water which is free of contaminants that interfere with analytical tests.

2.25. "Laboratory seeking certification" means an uncertified laboratory which has submitted an acceptable application and the appropriate fee.

2.26. “List of certified parameters” means the document displaying the categories and parameters for which a laboratory is certified.

2.27. “Matrix or matrices” means the media of an environmental sample, either non-potable water or solid and chemical materials.

2.28. “Method” means the scientific technique used to perform testing or analyses of an environmental sample.

2.29. “Mobile laboratory” means a portable enclosed structure within which testing or analyses of environmental samples occurs.

2.30. “NPDES” means National Pollutant Discharge Elimination System.

2.31. “Nonpotable water” means wastewater, ambient water, surface water, groundwater, effluents, water treatment chemicals, and toxicity characteristic leaching procedure or other extracts.

2.32. "Parameter" means an analytical method or test within a category and for which certification is offered.

2.33. “Proficiency test sample” means a sample containing a known amount of a specific or combination of parameters used in part to evaluate the performance of a laboratory.

2.34. "Person, Persons, or applicant" means any industrial user, public or private corporation, institution, association, firm or company organized or existing under the laws of this or any other state or country; state of West Virginia; governmental agency, including federal facilities; political subdivision; county commission; municipal corporation; industry; sanitary district; public service district; drainage district; soil conservation district; watershed improvement district; partnership; trust; estate; person or individual; group of persons or individuals acting individually or as a group; or any legal entity whatever.

2.35. "Personal and direct supervision" means that a supervisor is available either in person or on call at all times when laboratory procedures are being performed.

2.36. “Precision” means the agreement among a set of measurements performed on duplicate samples without assumption of knowledge of the true value. Precision is estimated by means of duplicate/replicate analyses.

2.37. "Quality Assurance Program" means a program developed to achieve the purposes of subsection 1.7 for the covered statutory programs of the Department.

2.38. “Quality Manual” means the document stating, or making reference to the policies, objectives, principles, responsibilities, accountability, implementation plans, methods, operation procedures, or other documents of an environmental laboratory for ensuring the quality of its testing analyses.

2.39. "Raw Data" means that data acquired in the process of collecting and analyzing samples for compliance testing purposes. Raw data includes such sampling report forms, sample log books, laboratory bench sheets, calculations and formulas, and analytical data and notes as are used during sample analysis.

Raw data may be in the form of graphs, line recorder charts, handwritten data, or computer printouts made at or near the time of the analysis or sample collection.

2.40. "Revocation of certification" means the action taken by the Department to halt the certification of a laboratory for cause.

2.41. "Sample Duplicate" means a sample prepared by dividing a homogeneous sample into separate parts so that each part is also homogeneous and representative of the original sample.

2.42. "Secretary" means the Secretary of the West Virginia Department of Environmental Protection or his or her designee.

2.43. "Solid and Chemical Materials" means soils, sediments, sludges, solid waste, drill cuttings, overburden, minerals, coal ash, and products and by-products of an industrial process that result in a matrix that is not otherwise defined.

2.44. "Standard Operating Procedure" means a written document that provides detailed instructions for the performance of all aspects of test analyses, operation, or action.

2.45. "Suspension of certification" means the temporary removal of approval to perform analyses under this rule until such time as the basis for suspension is rectified.

2.46. "Supervisor" means that designated person responsible for the technical adequacy and quality of data for a certification category, and who possesses the qualifications required under subsection 3.7.

§47-32-3. Certification Program; Application, Procedures, and Requirements.

3.1. Requirements of Certification.

3.1.1. With the exception of those tests not normally performed in a laboratory proper, all sample analyses required by order of the Department or performed for the purpose of determining compliance with chemical, microbiological, aquatic toxicity and radiological requirements of the State's covered statutory programs must be performed in laboratories certified for this purpose pursuant to this rule. Analyses performed in laboratories not so certified shall not be accepted by the Department as being in compliance with the requirements, rules or orders of the Department. All analyses not performed in a laboratory proper must be performed by personnel under the direction of a supervisor from a certified laboratory.

3.1.2. Laboratories doing business in other states where a state certifying agency grants reciprocal certification, approval, or other authorization to laboratories located in West Virginia, and which is certified, approved or authorized by the agency of that state having primary certification responsibility under Federal programs delegated to such other state under conditions equivalent to those required by this rule, are considered to be certified for the purpose of this rule once they have complied with the provisions of Section 3.4. Laboratories doing business in other states where certification is not required, and who are not certified in another state, may be considered for certification by following the conditions and requirements stated in Section 3.3.

3.1.3. Only laboratories certified pursuant to this rule or maintained by the EPA may be called West Virginia Certified Environmental Laboratories and no laboratory may adopt any name or make any oral or written statement intended or likely to mislead the public with respect to its certification status.

3.2. Categories of Certification. -- A laboratory applying for certification in one or more of the following categories must demonstrate acceptable performance on proficiency test samples for all matrices, where available, and meet all other requirements of this rule. The laboratory certificate, including the list of certified parameters, will specify the categories and the parameters within each category for which the laboratory is certified and it must be displayed in a location visible to the public. Tests for all categories, except Aquatic Toxicity, must be conducted in accordance with the method and procedures specified in the Code of Federal Regulations, Chapter 40 as applicable or other methods that may be approved by EPA or the Secretary. The certification categories are:

3.2.1. Nonpotable Water Trace Metals;

3.2.2. Nonpotable Water Inorganic Nonmetals;

3.2.3. Nonpotable Water Volatile Organic Chemicals;

3.2.4. Nonpotable Water Extractable and Semi-volatile Organic Chemicals;

3.2.5. Nonpotable Water Dioxin and Dibenzofuran;

3.2.6. Nonpotable Water Microbiology, comprising tests for Coliform Bacteria, Fecal Streptococci, Pathogenic Bacteria, Plate counts, Viruses, Parasites and Parasite ova;

3.2.7. Whole Effluent Toxicity, testing which must be conducted in accordance with the methods and procedures specified in 40 CFR 136;

3.2.8. Nonpotable Water Radiochemistry;

3.2.9. Hazardous Waste Characteristics, including Corrosivity, Ignitability, Reactivity, Extraction Procedure Toxicity, and Toxicity Characteristic Leaching Procedure, or other tests or analyses designated by the Secretary;

3.2.10. Solid and Chemical Trace Metals;

3.2.11. Solid and Chemical Inorganic Nonmetals;

3.2.12. Solid and Chemical Volatile Organic Chemicals;

3.2.13. Solid and Chemical Extractable and Semi-volatile Chemicals;

3.2.14. Solid and Chemical Dioxin and Dibenzofuran;

3.2.15. Solid and Chemical Microbiology; and

3.2.16. Solid and Chemical Radiochemistry.

3.3. Application Procedures and Requirements for Laboratories Located in West Virginia.

3.3.1. A person operating a laboratory in West Virginia who wants to be certified in one or more of the categories and parameters thereof or, who if already certified, wants to add a category or a parameter within a category, must apply for certification to the West Virginia Department of Environmental Protection, Quality Assurance Program, refer to subsection 1.9 for the address. The applicant shall submit the appropriate fee with the application for certification.

3.3.2. An application for certification is acceptable when a complete application is submitted. This includes the appropriate fee, and the information requirements of this rule for the category, categories or parameter(s) for which certification is requested. Acceptance of a complete application does not authorize the laboratory to perform analyses regulated by this rule. The applicant will be notified if the application is not acceptable and the laboratory inspected to determine if it is in compliance with the requirements of this rule prior to the issuance of certification.

3.3.3. An application will be rejected without prejudice for not being a complete application.

3.3.4. Proficiency test samples will be an element of the laboratory evaluation. Proficiency testing will be in accordance with subsection 3.10. The laboratory must receive acceptable scores on two separate proficiency test studies prior to an on-site inspection being performed. Certified laboratories that desire to include additional parameters within previously certified categories must demonstrate satisfactory results for proficiency test samples for these additional parameters.

3.3.5. The results of the analysis of proficiency test samples shall be considered in determining whether the certification of the laboratory should be granted, renewed, denied, revoked, or suspended. Certification may be granted only for those parameters for which the laboratory performs acceptably.

3.3.6. An applicant for certification who either does not perform acceptably on the proficiency test samples or does not otherwise meet the requirements of this rule shall be notified that the requirements for certification have not been met.

3.3.6.a. Applicants receiving a notification that certification requirements have not been met may not reapply for certification until the laboratory assures the Quality Assurance Office in writing that corrective actions have been taken and documented that bring the laboratory into compliance with this rule.

3.3.6.b. Owners, principal officers, managers or supervisors of a laboratory, for which certification has been denied, may not reapply for certification of this same facility by simply changing the company or laboratory name.

3.3.6.c. Certification is transferrable. A laboratory facility must notify the Department in writing at the address listed in subsection 1.9 that the facility is being sold or has a change of principal officer(s), manager(s) or supervisor(s) within 30 days of the change or activity.

3.3.7. Certifications may contain conditions requiring correction of minor deficiencies identified by the Quality Assurance Officer by a date or dates specified therein.

3.4. Application Procedures and Requirements for Laboratories Not Located in West Virginia.

3.4.1. Owners of laboratories located in a state other than West Virginia, which have been certified, approved or otherwise authorized by that state's agency having primary certification, approval or authorization responsibility for laboratory certification programs with conditions equivalent to those required by this rule, and who have entered into a reciprocity agreement with West Virginia, and who wish to perform analyses covered by this rule for West Virginia clients shall:

3.4.1.a. Annually complete the application form provided by the Department’s Quality Assurance Office;

3.4.1.b. Have the form certified by the state agency having primary certification authorization/enforcement responsibility; and

3.4.1.c. Return the form to the Quality Assurance Office of West Virginia at the address listed in subsection 1.9.

3.4.2. The application will be reviewed and if found to be complete the laboratory will be certified or recertified.

3.4.3. If the laboratory's certification, approval or authorization is revoked by the state agency having primary certification, approval or authorization responsibility, the West Virginia certification is automatically canceled for the same parameter(s) as has been revoked in the other state. The laboratory manager shall notify the West Virginia Quality Assurance Office and all clients in West Virginia of the revocation within 48 hours of receipt of notice of revocation.

3.4.4. The owner of a laboratory in a state other than West Virginia which is not certified by that state or is certified under conditions not equivalent to those required by this rule and who wishes to perform analyses for West Virginia clients may apply for certification in accordance with the procedure set forth in subsection 3.3 of this rule. In addition, prior to conducting the on-site laboratory inspection, the laboratory shall submit to the Quality Assurance Office a per diem sum the Department determines to be sufficient to cover the travel, room, and board expenses of the certification inspector(s).

3.5. Renewal of Certification. -- Applications for renewal of certification must be submitted, on forms provided therefore, no later than 180 days before the expiration date of certification, and accompanied by the appropriate fee. A laboratory submitting an application for renewal of certification may continue to operate under the previous certification until the Quality Assurance Office notifies the laboratory of the approval or denial of renewal.

3.6. Fees.

3.6.1. Owners of Laboratories applying for certification or renewal of certification, shall submit the appropriate fee obtained from the annual fee schedule specified in Table 1 for each category in which the laboratory seeks certification for one or more parameters, along with the required application materials. Fees are nonrefundable.

3.6.2. Laboratories owned or operated by the State of West Virginia or an agency of the Federal Government are exempt from the above fees, except in situations addressed in paragraph 3.6.2.a, but shall make appropriate application for certification in accordance with the other provisions of this rule.

3.6.2.a. In situations where a laboratory under this subdivision is conducting analyses for a fee, an appropriate certification fee will be assessed.

3.6.3. All application fees collected under this rule will be paid into a special state treasury fund designated the "Environmental Laboratory Certification Fund" which will be used to defray the cost of administering this rule.

3.7. Required Laboratory Personnel Qualifications.

3.7.1. Each laboratory must have one individual designated as the person responsible or in charge and irrespective of any local title or designation, is herein referred to as the laboratory manager.

3.7.2. Current employee records must include a resume documenting each employee's training, degrees held, experience, duties, and date(s) of relevant employment. This provision is applicable only to the employee's laboratory and environmental sampling work history. Table 2 lists the minimum education and experience requirements.

3.7.3. Laboratory supervisors who are also laboratory technicians and who do not have the required laboratory experience will be considered a Supervisor-in-Training and must have their work reviewed by an individual meeting the above education and experience requirements for supervisors.

3.7.4. Technicians holding a West Virginia Environmental Training Center Wastewater Laboratory Technician certificate meet the education and experience requirements of this rule only in the conduct of analyses while employed at a Publicly Owned Treatment Works (POTW).

3.8. Duties and Responsibilities of Laboratory Personnel.

3.8.1. The laboratory manager or his designee will administer the operations of the laboratory including the approval of test and analytical results.

3.8.2. Each laboratory supervisor shall provide personal and direct supervision for personnel and for the reporting of test and analytical results.

3.9. Management of Laboratories.

3.9.1. A certified laboratory may offer as a service those laboratory tests, analyses, or procedures that are within the category or categories for which it is certified.

3.9.2. A laboratory that is certified shall only report test and analytical data for samples which are properly labeled, and for which there is reasonable assurance the samples have been collected, preserved, stored and transported in such a manner as to assure identity, stability of the sample, and proper analysis.

3.10. Proficiency Testing.

3.10.1. Except when determined by the Quality Assurance Office that an appropriate performance evaluation test is not readily available, all certified laboratories or laboratories seeking certification shall participate in a proficiency testing program covering all tests, matrices, and analyses made available within the category, categories or parameter(s) for which the laboratory is certified or seeks certification. The laboratory must participate in two studies per certification year at a frequency of one study every six (6) months.

3.10.2. Each certified laboratory or laboratory applying for certification must obtain proficiency test samples from an approved provider for each parameter and matrix for which certification is requested. The list of approved providers is located at http://www.a2la.org/dirsearch/nelacptproviders.cfm.

3.10.3. Laboratories certified or those seeking certification must test or analyze the proficiency test samples and submit the results to the Quality Assurance Office or its authorized agent, as appropriate, within the time frame allowed each participant testing that set of samples for evaluation.

3.10.3.a. A laboratory may not send proficiency test samples to another laboratory for testing.

3.10.3.b. A laboratory shall not knowingly receive proficiency test samples from any laboratory seeking certification or certified by this office.

3.10.3.c. A laboratory shall not discuss proficiency test sample data with any other laboratory for any purpose.

3.10.3.d. Any laboratory found in violation of 3.10.3a, 3.10.3.b, or 3.10.3.c will be denied certification and not allowed to reapply for certification for a period of five (5) years from the date of the denial.

3.10.4. The laboratory will have satisfied the requirements for testing for a parameter when it receives an 'Acceptable' evaluation for that parameter, in two of the last three proficiency test studies.

3.10.5. The laboratory will be informed of the results of each evaluation by the proficiency test provider. For those parameters which a laboratory has not successfully completed the proficiency test after three attempts, the laboratory will be reevaluated upon written request.

3.10.6. Acceptance limits for proficiency tests will be established according to the USEPA document "National Standards for Water Proficiency Testing, Criteria Document." For analytes and matrices not found in this document, limits will be established in accordance with the procedures set forth by the current National Environmental Laboratory Accreditation Conference (NELAC).

3.10.7. The laboratory will have three separate opportunities to acceptably analyze proficiency test samples for any parameter for which the laboratory seeks certification. The laboratory need only repeat proficiency tests for those parameters for which the laboratory has failed to perform acceptably. Parameters for Organic Samples shall mean a method, or method subdivision (i.e. Volatiles, Extractables, BTEX, etc.). Laboratories that fail to successfully analyze two of three different sets or rounds of proficiency test samples in the time period allotted will not be certified for the failed parameters until two consecutive sets or rounds have been successfully analyzed.

3.10.8. This rule incorporates by reference the 2003 National Environmental Laboratory Accreditation Conference (NELAC) Proficiency Testing standard, Chapter 2 with appendices for the purposes of Proficiency Testing Criteria for Laboratory Certification.

3.11. Laboratory Inspections.

3.11.1. As a condition of obtaining and maintaining certification, a laboratory will permit and facilitate inspections by personnel of the Department. This inspection will include the physical facilities as well as laboratory records and reports.

3.11.2. The Department will conduct at least one on-site inspection of a laboratory seeking certification to determine whether or not the laboratory meets the Quality Assurance Office standards as set forth in this rule.

3.11.3. Regular inspections of laboratories certified in accordance with this rule will be conducted during reasonable hours. These inspections will be conducted annually or as determined by the Secretary, however, in no situation may more than two years elapse between inspections.

3.11.4. Authorized representatives of the Department may make inspections of a certified laboratory whenever the Department in its discretion considers such inspections necessary. A laboratory's refusal to allow entry to the Department's representative will be grounds for denial or revocation of certification.

3.11.5. During inspections, consideration will be given to staff competence, working conditions, tests or analytical methods used, quality control procedures, quality assurance programs, maintenance of records and compliance with the requirements of this rule.

3.11.6. The laboratory will be furnished with a copy of the inspection report which will list deficiencies found.

3.12. Cancellation, Suspension, and Revocation of Certification.

3.12.1. Any certified laboratory may cancel its certification in any category or parameter by notifying the Quality Assurance Office in writing of the laboratory's decision to cancel its certification. This cancellation notification will not entitle the laboratory to any refund of fees paid.

3.12.1.a. If the laboratory wishes to cancel the entire certification, all categories and parameters, the laboratory will enclose its Environmental Laboratory Certificate with the letter of notification.

3.12.2. A laboratory’s certification may be suspended for failure to correct deficiencies within the specified timeframe.

3.12.3. A laboratory’s certification may be suspended for failure to correct proficiency test sample failures.

3.12.4. A laboratory’s certification may be revoked if the laboratory commits any falsification relating to certification, testing, or reporting of analytical results or for failing to comply with the provisions in 3.10.

3.13. Effect and Duration of Suspension and Revocation.

3.13.1. The results of any tests or analyses performed after the effective date of a suspension or revocation order for any category or parameter will not be accepted by the Department as being in compliance with the requirements of the Covered Statutory Programs as defined in subsection 2.20.

3.13.2. Suspension or revocation will not be withdrawn until the basis for the suspension or revocation has been eliminated or rectified.

3.13.3. Any laboratory having its certification suspended or revoked must notify all clients of the suspension or revocation.

3.14. Notice of Changes -- In the event there are any changes in the name, location, ownership, address, telephone number or supervisory personnel of the laboratory to which the provisions of this rule apply, then the laboratory will immediately submit written notice thereof to the Department. For supervisory personnel this provision applies only to those whose responsibilities include analyses that must be made in compliance with this rule.

§47-32-4. Laboratory Requirements.

A certified laboratory or a laboratory seeking certification must continually meet and follow the requirements of this section.

4.1. Laboratories will have on the premises and under the control of the laboratory manager all of the equipment and instruments necessary to analyze each parameter in which the laboratory is certified, or is seeking certification. All equipment must meet the minimum standards required by the test method used.

4.2. General Requirements for All Laboratories.

4.2.1. Adequate laboratory space and facilities, to include equipment and instruments must be available to properly carry out the services performed in the laboratory.

4.2.2. Laboratory work areas will be arranged so as to minimize problems in contamination, transportation and communication.

4.2.3. Workbench space within the laboratory must be ample for the tests or analyses to be performed, have adequate lighting and be convenient to a sink, water, gas, vacuum and electrical outlets or other utilities as necessary to properly carry out the specific tests or analyses to be performed.

4.2.4. Temperature and humidity within the laboratory are to be maintained within the limits required for the proper performance of each test or analysis, the proper operation of the various instruments, and the proper storage of expendable supplies.

4.2.5. pH meters must have an accuracy of and scale graduations within 0.1 standard unit.

4.2.6. Analytical and pan balances are to be clean, not corroded, and be provided with Class-S weights or equivalent. Analytical balances will be capable of weighing to 0.1 milligram minimum. Pan balances will be capable of weighing to 100 milligrams.

4.2.6.a. An analytical balance must be mounted on a heavy, shockproof table. The balance level must be checked each use and adjusted as necessary;

4.2.6.b. An analytical balance must be located in an area that is not near laboratory traffic and is protected from drafts and humidity changes; and

4.2.6.c. Three Class-S or equivalent weights are to be available for checking the analytical balance. These weights must cover the range expected to be encountered during routine analyses.

4.2.7. All temperature measuring devices will be graduated in one degree Celsius (or 2 degrees Fahrenheit) increments and readable to 0.5 degrees Celsius (1 degree Fahrenheit) for all analyses except fecal coliform analysis; in which case glass or metal thermometers are to be readable to 0.2 degrees Celsius.

4.2.7.a. Continuous temperature recording devices will be sensitive and accurate to within 1.0 degree Celsius (2 degrees Fahrenheit).

4.2.7.b. The column of liquid in glass thermometers will have no separation.

4.2.7.c. Liquid column in glass and electronic type thermometers without a current manufacturer's certificate of accuracy must be verified as accurate annually. All other types, to include Automatic Temperature Compensation (ATC) devices, must be verified as accurate quarterly. Verification must be accomplished by comparison to a certified thermometer traceable to a National Institute for Standards Testing thermometer. See also paragraph 5.2.2.g for additional thermometer requirements.

4.2.7.d. Each temperature measuring device must be uniquely identified. The results of accuracy verifications must be documented. The corrected temperature must be recorded whenever temperatures are required to be recorded.

4.2.8. Sample storage refrigerators must maintain an internal temperature of ≤ 6 degrees Celsius.

4.2.9. Laboratory glassware, plastic ware, and metal utensils will meet the following requirements:

4.2.9.a. Glassware and metal utensils must resist corrosion, and be capable of withstanding high temperatures, and vigorous cleaning;

4.2.9.b. Flasks, beakers, dilution bottles, culture dishes, culture tubes and other glassware are to be of borosilicate glass and free of chips, cracks, and excessive etching;

4.2.9.c. Volumetric glassware must be Class A and need not be calibrated before use. Non Class A glassware must be calibrated before use; and

4.2.9.d. Metal utensils must be made of stainless steel or other inert material.

4.2.10. Pipettes must meet the following requirements:

4.2.10.a. Glass pipettes are to be made of borosilicate glass;

4.2.10.b. Plastic pipettes must be compatible with the reagents being measured, i.e. will not dissolve or show signs of etching or numbers being removed;

4.2.10.c. Plastic pipettes must be sterile or sterilizable for microbiological procedures;

4.2.10.d. Pipettes must deliver the required volume quickly and accurately within a 2.5 percent tolerance; and

4.2.10.e. Pipettes must not be excessively etched, nor the mouthpiece or delivery tips chipped, or the graduation marks illegible.

4.2.11. Magnetic stirrers must have variable speeds, and use Teflon coated stirring bars.

4.2.12. Volumetric dispensing devices including autopipetors, autotitrators and digital burets must be of sufficient sensitivity for the application. Delivery volumes of mechanical volumetric dispensing devices must be checked using the gravimetric method or using Class A volumetric glassware once every 3 months.

4.2.13. All purchased reagents and solutions must be certified as appropriate for the intended use by the manufacturer or supplier or must be verified as appropriate by the laboratory prior to use.

4.3. Criteria and Procedures for Trace Metal Testing.

4.3.1. The Department incorporates methods approved in 40 CFR §136.3 Table IB, the current approved edition of EPA publication SW-846 Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, and other methods as may be approved by EPA or the Secretary, including all standards, criteria, sample collection procedures, analytical procedures, methodology, quality assurance and quality control specifications for evaluation and certification purposes.

4.4. Criteria and Procedures for Inorganic Nonmetals.

4.4.1. The Department incorporates methods approved in 40 CFR §136.3 Table IB, the current approved edition of EPA publication SW-846 Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, and other methods as may be approved by EPA or the Secretary, including all standards, criteria, sample collection procedures, analytical procedures, methodology, quality assurance and quality control specifications for evaluation and certification purposes.

4.5. Criteria and Procedures for Volatile Organic Chemicals, Extractable and Semi-volatile Chemicals and Dioxin and Dibenzofuran.

4.5.1. The Department incorporates methods approved in 40 CFR §136.3 Table IC, ID and IG, the current approved edition of EPA publication SW-846 Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, or such other methods as may be approved by EPA or the Secretary, including all standards, criteria, sample collection procedures, analytical procedures, methodology, quality assurance and quality control specifications for evaluation and certification purposes.

4.6. Criteria and Procedures for Microbiological Testing.

4.6.1. The Department incorporates from methods approved in 40 CFR §136.3 Table IA, or other methods as may be approved by EPA or the Secretary, including all standards, criteria, sample collection procedures, analytical procedures, methodology, quality assurance and quality control specifications for evaluation and certification purposes.

4.6.2. Laboratory pure water for use in microbiological examinations will be analyzed for the parameters listed in Table 3. Should the test results for any of the substances exceed the standards set forth in the table, corrective action must be taken and the water retested.

4.6.2.a. Analysis of laboratory pure water for use in microbiological examinations must be performed by a laboratory certified under this rule. Results must be maintained and include the date, type of analysis, results and identity of the individual responsible for the results.

4.6.2.b. For purchased laboratory pure water for use in microbiological examinations, a current certificate of analysis from the producer is required, documenting that the purity of the water is traceable. The purchased laboratory pure water must meet the requirements of Table 3.

4.7. Criteria and Procedures for Whole Effluent Toxicity Testing.

4.7.1. All work is to be performed in accordance with procedures outlined in Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, EPA/821/R-02/012, or Short Term Methods for Estimating Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, EPA/821/R-02/013 and other methods as may be approved by EPA or the Secretary for the test to be performed.

4.8. Criteria and Procedures for Radiochemistry Testing.

4.8.1. The Department incorporates methods approved in 40 CFR §136.3 Table IE, the current approved edition of EPA publication SW-846 Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, or other methods as may be approved by EPA or the Secretary, including all standards, criteria, sample collection procedures, analytical procedures, methodology, quality assurance and quality control specifications for evaluation and certification purposes.

4.9. Criteria and Procedures for Characteristics Testing.

4.9.1. The Department incorporates the current approved edition of EPA publication SW-846 Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, and other methods as may be approved by EPA or the Secretary, including all standards, criteria, sample collection procedures, analytical procedures, methodology, quality assurance and quality control specifications for evaluation and certification purposes.

§47-32-5. Methodology, Quality Control and Record Keeping.

5.1. Methodology.

5.1.1. Sample collection, handling, and preservation techniques specified in 40 CFR §136.3 Table II, or other procedures approved by EPA or the Secretary are to be followed.

5.1.1.a. Samples requiring preservation will be preserved in accordance with 40 CFR §136.3 Table II for compliance with subsection 2.19.1 and the NPDES. All other samples will be preserved in accordance with applicable methods and regulations.

5.1.1.b. Sample collection, handling and preservation techniques specified by the analytical methods will be followed for the parameters analyzed by those methods in the absence of guidance under paragraph 5.1.1.a.

5.1.1.c. The chain of custody form must be completed at the time of sample collection and will state the sampling location, date and time of collection, collector's name, type(s) of preservation, number of containers per sample, type of sample (grab or composite) and any remarks.

5.1.1.d. After the sample has been collected, the appropriate information as to identity of the sample is to be written on the label. The identity of the sample must be the same on the label and the chain of custody form. The label must remain affixed to the sample container and is not to be removed until the required analyses have been completed and the surplus sample has been discarded.

5.1.1.e. The chain of custody must accompany the sample at all times. Custody of the sample must be documented on the chain of custody throughout the life of the sample (from collection to disposal of surplus sample after all required analyses have been completed). Any time the custody of the sample is transferred from one person to another, except analysts in the same laboratory, this transfer must be documented in the appropriate fields on the chain of custody form.

5.1.1.f. Immediately upon delivery of the sample to the laboratory, the individual delivering the sample will complete the appropriate section(s) of the chain of custody form. A chain of custody form is not required where the sampler is also the analyst and in situations where the laboratory and the sample site(s) are within the property boundaries of the facility in which the laboratory is located.

5.1.1.g. Prior to accepting custody of a sample, laboratory personnel must be reasonably assured that the sample has met the chemical and temperature preservation requirements. If the sample fails to meet these requirements, the sample chain of custody form is to be marked indicating the sample was improperly preserved. Analytical data resulting from improperly preserved samples must be accompanied by a statement indicating the condition of the sample upon receipt by the laboratory. Analytical data resulting from samples improperly preserved will not be accepted as being in compliance with this rule.

5.1.1.h. When it is necessary to send samples by mail, bus, courier service, or private shipping, the chain of custody form is to be completed by the individual relinquishing custody of the sample for shipping and is to accompany the samples during shipping. Upon receipt of the samples in the laboratory, the provisions of paragraph 5.1.1.g are to be followed.

5.1.2. Test procedures identified in 40 CFR §136.3, EPA publication SW-846 Test Methods for Evaluating Solid Waste, Physical/Chemical Methods or other methods approved by EPA or the Secretary will be utilized for the analysis of all samples required to be reported to the Department.

5.1.2.a. All procedures other than those set forth in subdivision 5.1.2 are considered alternate test procedures (ATP). Laboratories must make special application to the Department for the use of ATPs in accordance with 40 CFR §136.4.

5.1.2.b. All laboratories which have previously been granted approval to use an ATP by the EPA will be allowed to continue using such method after submitting written proof of the approval to the Department.

5.1.3. General Laboratory Practices.

5.1.3.a. Chemistry -- Inorganic Nonmetals and Trace Metals.

5.1.3.a.A. Laboratories utilizing visual comparison devices must calibrate the standards incorporated into devices of this type at least once every four months. The laboratory will make and maintain records of the date and method of each calibration.

5.1.3.a.B. Distilled and deionized water is to have a resistivity value ≥ 0.5 megohms-cm at 25 degrees Celsius.

5.1.3.a.C. Analytical Reagent grade chemicals should be used for most analyses. Detailed information on reagent grades is set forth in the approved analytical methods and their recommendations must be followed for the reagent quality to be used for each test or analysis.

5.1.3.a.D. Where applicable, method detection limits must be determined for all categories and parameters. The method found in 40 CFR Part 136, Appendix B must be used for this calculation.

5.1.3.a.E. Field blanks must be prepared and analyzed for the test categories and parameters identified in subdivisions 3.2.1 and 3.2.2, at a minimum of two times per year, once during the cold wet season and once during the warm dry season.

5.1.3.a.F. Field duplicates must be collected and analyzed for the test categories and parameters identified in subdivisions 3.2.1, 3.2.2, 3.2.10, and 3.2.11, at a minimum of two times per year, once during the cold wet season and once during the warm dry season.

5.1.3.b. Microbiology.

5.1.3.b.A. All practices and procedures for the conduct of microbiological examinations must follow the guidance in methods approved in 40 CFR §136.3 Table IA.

5.1.3.b.B. The temperature of incubators, water baths and heat blocks must be monitored in accordance with approved methods or as specified by regulation.

5.1.3.b.B.1. Each incubator, water bath or heat block must have a thermometer placed so as to give a representative temperature measurement for the device.

5.1.3.b.B.2. Incubators, water baths and heat blocks must be clean and properly maintained in accordance with the manufacturer's instructions.

5.1.3.b.C. Autoclaves must meet the specified temperature tolerances in the approved method. The use of a pressure cooker is not recommended.

5.1.3.b.C.1. A continuous temperature recording device or a maximum temperature registering thermometer must be used to measure the temperature during each autoclave cycle.

5.1.3.b.C.2. The laboratory must use a sterilization verification technique such as autoclave tape to indicate proper sterilization of equipment and contaminated materials.

5.1.3.b.C.3. Autoclaves must be clean and properly maintained in accordance with the manufacturer's instructions.

5.1.3.b.C.4. Autoclaves must be serviced annually by a qualified person. Servicing must include a pressure check and calibration of temperature devices.

5.1.3.b.D. Hot air sterilization ovens must be of sufficient size to prevent crowding and constructed to give uniform sterilization.

5.1.3.b.D.1. Hot air sterilization ovens must be clean and properly maintained according to the manufacturer's instructions.

5.1.3.b.E. Appropriate optical counting equipment must be used in accordance with approved methods.

5.1.3.b.F. Appropriate inoculating equipment must be used in accordance with approved methods.

5.1.3.b.G. Appropriate membrane filters, pads and dishes must be used in accordance with approved methods.

5.1.3.b.H. A sterility blank must be analyzed:

5.1.3.b.H.1. with each lot or batch of media, either purchased or prepared in the laboratory;

5.1.3.b.H.2. with each lot of membrane filters, pads and dishes;

5.1.3.b.H.3. with each lot or batch of sample containers, either purchased or prepared in the laboratory;

5.1.3.b.H.4. with each lot or batch of rinse/dilution water, either purchased or prepared in the laboratory; and

5.1.3.b.H.5. with each lot or batch of culture tubes, either purchased or prepared in the laboratory.

5.1.3.b.I. Field blanks must be prepared and analyzed for the test categories and parameters identified in subdivision 3.2.6, at a minimum of two times per year, once during the cold wet season and once during the warm dry season.

5.1.3.b.J. Field duplicates must be collected and analyzed for the test categories and parameters identified in subdivision 3.2.6, at a minimum of two times per year, once during the cold wet season and once during the warm dry season.

5.1.3.b.K. All equipment and reagents must be sterilized prior to use. All contaminated equipment must be sterilized prior to reuse. All contaminated material must be rendered innocuous prior to disposal.

5.1.3.c. Whole Effluent Toxicity Testing.

5.1.3.c.A. Natural or artificial sources of water may be used, but natural sources are preferred.

5.1.3.c.B. Natural sources are to be free of pollution, low in turbidity, high in dissolved oxygen, low in B.O.D., and the pH must be favorable to the maintenance of the organisms.

5.1.3.c.C. Municipal water supplies are acceptable. Water from a municipal source must be passed through a filter to remove organic chemicals and chlorine before use, and be conditioned for the species under test.

5.1.3.c.D. Test organisms are to be fed as outlined in the approved methods, subdivision 3.2.7.

5.1.3.c.E. Treatment of diseased or parasitized organisms is to be in accordance with the procedures given in the approved methods, subdivision 3.2.7.

5.1.3.c.F. Organisms treated for disease or parasites are not to be used in whole effluent toxicity tests for at least 10 days after treatment.

5.1.3.d. Radiochemistry.

5.1.3.d.A. Analytical reagent grade (AR) chemicals will be used for all analyses, unless otherwise required for an individual analytical procedure.

5.1.3.d.B. Radioactive standards and radioactive wastes are to be stored in an enclosed and properly labeled area, either within the laboratory or in a separate room or facility. All radioactive materials must be safely stored in suitable containers.

5.1.3.d.C. Standards and samples are to be prepared in an area of the laboratory specifically designated for and exclusively used for the preparation of radioactive standards and samples. Adequate precautions must be taken in this area to ensure against radioactive contamination.

5.1.3.e. Volatile Organic, Extractable, and Semi-volatile Organic Testing. Equipment must be capable of meeting the quality control requirements specified in subdivision 5.2.6.

5.1.3.e.A. Trip blanks must be prepared, transported and analyzed for each batch of samples for analysis for Nonpotable Volatile Organic Chemicals, subdivision 3.2.3.

5.1.3.e.B. A method blank must be analyzed with each batch of samples.

5.1.3.e.C. A laboratory control sample must be analyzed with each batch of samples.

5.1.3.e.D. A matrix spike and a matrix spike duplicate must be analyzed with each batch of samples. In situations where the laboratory does not receive sufficient sample volume or quantity to perform a matrix spike and a matrix spike duplicate, a laboratory control sample and a laboratory control sample duplicate must be analyzed.

5.1.3.e.E. Surrogate spike compounds must be added to all samples and quality control standards prior to preparation/extraction and analysis where applicable. The recovery of surrogate compounds must be compared to acceptance limits established in the appropriate method. If acceptance limits are not provided in the method, the laboratory must use appropriate procedures to establish in-house acceptance limits.

5.1.3.e.F. Any time criteria are not met with respect to blanks, laboratory control samples, matrix spikes, matrix spike duplicates, or surrogates, data must be reported with appropriate qualifiers describing the situation and explaining the effect on the results.

5.2. Quality Control Programs -- Each laboratory will develop, and have on file available for inspection a written description of the current laboratory Quality Assurance Program Plan. This written description will outline the procedures the laboratory uses in meeting the quality control requirements set forth in this subsection. Managers, supervisors, and analysts should participate in developing the Quality Assurance Program Plan. Each participant within the laboratory is to have access to a copy of the quality control program Quality Assurance Program Plan and the detailed guidelines for implementation of the participant's responsibility. A record of analytical control tests and quality control checks on media, materials, and equipment will be prepared by the laboratory and retained for at least three years.

5.2.1. A written description includes, but need not be limited to, the following for each category:

5.2.1.a. Procedures which the laboratory will use in meeting the quality control requirements of this rule pertaining to laboratory equipment and instrumentation, and the frequency with which these procedures will be performed.

5.2.1.b. Each laboratory will develop and maintain a written standard operating procedure (SOP) manual, which sets forth, in detail, the methods the laboratory will use in chemical analyses or tests for all parameters for which the laboratory is seeking certification.

5.2.1.c. Each laboratory must record and retain all raw data and calculations derived from analyses and quality control procedures in a manner that will provide easy verification of the data and calculations during on-site inspections.

5.2.2. Laboratories conducting analyses for Inorganic Nonmetals and Trace Metals must perform the following internal quality control checks:

5.2.2.a. Each analytical balance, with the exception of electronic balances without internal calibration controls, is to be checked and adjusted annually by a balance service technician. The accuracy of each analytical balance must be checked on each day of use using at least three Class-S weights covering the range expected to be encountered during routine analysis. The weights used, weight detected, dates on which checks were performed, analyst, record of balance level check and other pertinent information is to be recorded in a log book. The daily weighing check will be used as an indication of proper operation of electronic balances.

5.2.2.b. The accuracy of the wavelength setting of spectrophotometers without built-in automatic system diagnostics is to be checked yearly by comparing the wavelength setting to the absorption maxima appropriate standards. Any observed variation of the wavelength setting from the expected value must be within the manufacturer's stated tolerance for the instrument. The check data must be recorded in a logbook.

5.2.2.c. pH meters are to be calibrated prior to use with two pH buffer standards bracketing the value to be measured and the calibration recorded. Records of pH meter standardization must be maintained in a laboratory notebook that documents the date of standardization, calibration buffers used and the initials of the individual conducting the standardization. If the meter displays a slope or other indicator of performance, this information must also be recorded.

5.2.2.c.A. Aliquots of standard buffers may not be used for longer than one day.

5.2.2.d. The linearity of conductivity meters must be checked over the range of the instrument using at least five concentrations of standard solutions yearly. The cell constant, k, is to be determined from this data. The meter must be calibrated using at least one standard with each use. The results of these calibrations must be recorded in a log book.

5.2.2.e. A daily record of the drying oven temperature must be maintained for each day on which the drying oven is in use. The oven thermometer must be kept in a sand bed or other inert material.

5.2.2.e.A. The oven temperature must be recorded immediately prior to placing samples in the oven and then again immediately prior to removing samples at the end of the drying cycle.

5.2.2.f. The temperature of each refrigerator and each incubator is to be either recorded continuously or recorded daily from in-place thermometers immersed in liquid and placed on one of the shelves being used. The refrigerator thermometer must be kept in a low vapor pressure liquid such as 50/50 water/Ethylene Glycol.

5.2.2.g. The accuracy of all thermometers used to monitor temperatures will be verified by comparing the readings of such thermometers with the readings of a certified thermometer. Refer to paragraphs 4.2.7.c and 4.2.7.d.

5.2.2.h. A calibration curve must consist of one calibration blank and 4 at least four standards to be prepared for each analysis requiring a calibration curve. This curve will be verified prior to each subsequent analysis by analyzing at least one calibration blank and one standard at or near the midpoint of the curve. These verifications are considered satisfactory if the result for the calibration blank is less than the method detection limit and the result for the midpoint standard is within 10 per cent of the expected value following vendor approved procedures for instrument calibration.

5.2.2.i. Standard curves used in the analysis of parameters in the Trace Metals category will be prepared in accordance with approved methods.

5.2.2.j. Where practicable, duplicate sample analyses are to be conducted for parameters in the Inorganic Nonmetals and Trace Metals categories to verify the precision of the method. Duplicate analyses will be performed at a frequency of 5 percent. Where less than 20 samples are analyzed at one time the analyst is to verify the precision once per analysis batch. Documentation will be made, in tabular form and on control charts, of precision testing.

5.2.2.j.A. In cases where sample results are normally below the method detection limit, precision must be determined by analysis of matrix spikes and matrix spike duplicates.

5.2.2.k. Where practicable, spiked sample analyses will be conducted to verify the accuracy of the method at the same frequency as set forth in paragraph 5.2.2.j of this rule. Documentation will be made, in tabular form and on control charts, of accuracy testing.

5.2.2.l. Where practicable, standard deviations are to be calculated and documented for all applicable measurements being conducted in the Inorganic Nonmetals and Trace Metals categories (spiked sample recoveries). Standard deviations must be documented in tabular form and on control charts.

5.2.3. Microbiology.

5.2.3.a. A start and finish membrane filter (MF) sterile control test of rinse water, media and supplies will be conducted for each sample filtration series. If the control tests indicate contamination, then all data which has been generated through tests involving the use of the contaminated materials will be rejected and the laboratory must request immediate resampling of those samples associated with the observed contamination.

5.2.3.b. When analyzing duplicate aliquots to assess precision, the same series of volumes/dilutions must be utilized for the sample and the duplicate.

5.2.3.c. The method detection limit for bacteria by the membrane filter method is defined as 1 colony /100 ml, adjusted as necessary for filtered volumes other than 100 ml.

5.2.3.d. The most probable number (MPN) test for bacteria must be carried through the "confirmed" stage for Fecal Coliform.

5.2.4. Whole Effluent Toxicity Testing -- An acceptable degree of precision for definitive toxicity tests is the 95 percent confidence level or fiducial intervals within less than ±30 percent of the 48 hour or incipient LC50 value.

5.2.4.a. Five reference toxicant tests on each reference toxicant and species combination evaluated by the laboratory are to be performed to establish the validity of effluent toxicity data generated by bioassay laboratories.

5.2.4.a.A. After completion of the requirements in paragraph 5.2.4.a, a reference toxicant test must be performed each month in which whole effluent toxicity testing is conducted using the same method and species as used for the whole effluent toxicity testing.

5.2.4.b. Quality control and proficiency test samples are available from commercial sources.

5.2.4.c. The reference toxicant test must be conducted within 7 days immediately preceding a whole effluent toxicity test or concurrently with the whole effluent toxicity test.

5.2.4.d. A control chart, as described in approved methods, should be prepared for each reference toxicant/species combination, and successive LC-50's plotted and examined to determine if the results are within prescribed limits.

5.2.4.e. If the LC-50 of a reference toxicant does not fall in the expected range for the test organisms, the sensitivity of the test system is suspect. In this case, the test procedure should be examined for defects, and a different batch of test organisms should be employed in repeating the reference toxicant and effluent toxicity test.

5.2.5. Radiochemistry -- Permanent records must be maintained of preventive maintenance, periodic inspections, testing, and calibration for the proper operation of radiation instruments and analytical balances; validation of methods; evaluation of reagents and volumetric equipment; surveillance of results; and remedial actions taken in response to detected defects. Such records must be kept on file by the laboratory for a period of at least five years.

5.2.5.a. To verify internal laboratory precision, duplicate analyses equal to ten percent of sample analyses shall be performed. The differences between duplicate measurements shall be less than twice the standard deviation of the specific analysis as described in Environmental Radioactivity Laboratory Intercomparison Studies Program, EPA 600/4-77-001 and other guidance from EPA or the Secretary.

5.2.5.b. One background and one calibration standard must be tested each day at a 5 percent level or fraction thereof.

5.2.5.c. Work records of quantitative tests are to indicate final results together with all corresponding instrument readings and calculations. Where instrumentation produces tracings or printouts, such tracings or printouts may serve as the work record.

5.2.6. Volatile Organic, Extractable and Semi-volatile Organic Testing.

5.2.6.a. The frequency and procedures for satisfying each of the requirements listed in paragraphs 5.2.6.b and 5.2.6.c are described in detail in EPA publication SW-846, 40 CFR Part 136, and/or in the US EPA Contract Laboratory Program Statement of Work for Organics Analysis.

5.2.6.b. Minimum quality control operations necessary to satisfy the analytical requirements associated with the determination of semi-volatile and volatile organic compounds by gas chromatographic methods will include the following:

5.2.6.b.A. Evaluation of Appropriate Blank Materials.

5.2.6.b.B. Surrogate Spike Response Monitoring.

5.2.6.b.C. Matrix Spike and Duplicate Analyses or Matrix Spike Duplicate.

5.2.6.b.D. Verification of Response and Calibration.

5.2.6.b.E. Conformational Analysis.

5.2.6.c. Minimum quality control operations to satisfy the analytical requirements associated with gas chromatographic/mass spectrometry determinations of semi-volatile and volatile compounds will be as follows:

5.2.6.c.A. Documentation of GC/MS Mass Calibration and Tune Abundance Patterns.

5.2.6.c.B. Documentation of GC/MS Response Factor Stability.

5.2.6.c.C. Internal Standard Response and Retention Time Documentation.

5.2.6.c.D. Surrogate Spike Recovery Monitoring

5.2.6.c.E. Matrix Spike and Duplicate Analyses or Matrix Spike Duplicate.

5.3. Records and Data Reporting.

5.3.1. Records of analyses, including but not limited to all raw data, calculations, quality control data, and laboratory reports, are to be kept by the laboratory for at least five years unless otherwise specified.

5.3.2. The following information is to be retained by the laboratory as part of the records of analysis and the records of custody:

5.3.2.a. The laboratory number or other form of identification of the sample;

5.3.2.b. The chain of custody form as required under paragraph 5.1.1.c;

5.3.2.c. The date and time when the laboratory received the sample, whether the sample was received preserved or unpreserved;

5.3.2.d. The date and time of analysis of the sample;

5.3.2.e. The person or persons who performed the analysis;

5.3.2.f. The type of analysis performed and the analytical method or methods employed;

5.3.2.g. The raw data generated by the analysis and results of the analysis; and

5.3.2.h. The name and address of the laboratory to which the sample was forwarded, if the analysis was not performed at the laboratory which first received the sample.

5.3.3. If the chain of custody information is reported on a chain of custody form, a copy of the form must be attached to the sample report form.

5.3.4. The results of each analysis are to be calculated and entered on the sample report form which is to be forwarded to the person requesting the analysis of the sample. A careful check is to be made to assure that each result entered on the sample report form is the same as the result generated by the analysis and entered on the bench sheet or other raw data document.

5.3.5. The original or true duplicate of the results of the test or analysis is to be sent promptly to the person who requested such tests or analysis, and must be signed by the laboratory manager or a designee whose designation has been documented in the laboratory Quality Assurance Manual or other instrument describing pertains within the laboratory.

5.3.6. Whenever a laboratory subcontracts samples to another laboratory, the person ordering the examination is to receive the original laboratory report or a true duplicate of that report on the form generated by the subcontract laboratory that actually performed the test or analysis.

5.3.7. If results are entered into a computer storage system, a printout of the data must be verified with the raw data.

5.3.8. The final data report must contain the following:

5.3.8.a. The name, address, and contact information of the laboratory performing the analyses;

5.3.8.b. Sample identification number (unique identifier assigned by the laboratory);

5.3.8.c. Sample description;

5.3.8.d. Date sample was collected;

5.3.8.e. Date sample was received at the laboratory;

5.3.8.f. Date of each individual analysis;

5.3.8.g. Method detection limit for each parameter;

5.3.8.h. Identity of the test method(s);

5.3.8.i. Deviations from the test method, if applicable;

5.3.8.j. Disclosure of contract laboratory and original or true copy of the results from the contract laboratory; and

5.3.8.k. Identity of the responsible agent.

§47-32-6. Appeals.

Appeal to Environmental Quality Board **--** Any person aggrieved or adversely affected by an order or action of the Secretary made and entered in accordance with the provisions of this rule or by issuance or denial of certification under the provisions of this rule, may appeal to the Environmental Quality Board in the same manner as appeals are taken under W. Va. Code §22B-1-7 to have the order vacated or modified. The filing of a notice of appeal will not automatically stay an order or action of the Secretary. The Environmental Quality Board will be reimbursed from the Environmental Laboratory Certification Fund for expenses incurred for appeal hearings filed with the Board relative to the provisions of this rule.

TABLE 1:

ENVIRONMENTAL LABORATORY CERTIFICATION
ANNUAL FEE SCHEDULE

Application fee – initial application	$100.00
Application fee – renewal application	$80.00
Application fee – additional parameters/methods	
When added other than at renewal	$50.00
Nonpotable water Trace Metals – per metal – one method	$20.00
Each additional method for the same metal	$10.00
Nonpotable water Inorganic Nonmetals – per analyte or parameter – one method	$50.00
Each additional method for the same analyte or parameter	$25.00
Nonpotable water Volatile Organic Chemicals – per method	$250.00
Per category maximum	$750.00
Nonpotable water Extractable and Semi—volatile Organic Chemicals – per method	$250.00
Per category maximum	$750.00
Nonpotable water Dioxin and Dibenzofuran	$1000.00
Nonpotable water Microbiology – per parameter per method	$75.00
Whole Effluent Toxicity – acute	$750.00
Whole Effluent Toxicity – chronic	$750.00
Nonpotable water Radiochemistry	$600.00
Solid and Chemical Trace Metals – per metal – one method	$20.00
Each additional method for the same metal	$10.00
Solid and Chemical Inorganic Nonmetals – per analyte or parameter – one method	$50.00
Each additional method for the same analyte or parameter	$25.00
Solid and Chemical Volatile Organic Chemicals – per method	$250.00
Per category maximum	$750.00
Solid and Chemical Extractable and Semi-volatile Organic Chemicals – per method	$250.00
Per category maximum	$750.00
Solid and Chemical Dioxin and Dibenzofuran	$1000.00
Solid and Chemical Microbiology – per parameter per method	$75.00
Solid and Chemical Radiochemistry	$600.00
Hazardous Waste Characteristics – per procedure	$150.00

TABLE 2:

EDUCATION & EXPERIENCE REQUIREMENTS
FOR SUPERVISORS

CERTIFICATION CATEGORY	EDUCATION (Years)(1)	+	EXPERIENCE (Years)(2)	SPECIAL REQUIREMENTS
Limited Chemistry	12	+	2 or	ETC Certificate(3)
&	14	+	1 or	
Microbiology	16	+	1	
Atomic Absorption	16	+	2(4)	2 years of experience must be in atomic absorption
Gas Chromatography	16	+	2(4)	2 years of experience must be in gas chromatography
Mass Spectrometry	16	+	2(4)	2 years of experience must be in mass spectrometry
Whole Effluent Toxicity	16	+	2(4)	2 years of experience must be in whole effluent toxicity testing
Radiochemistry	16	+	2(4)	2 years of experience must be in radiochemistry

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Notes:

(1) 12 years = High School diploma or GED.

14 years = 2 years of college with emphasis in laboratory technology or a natural science.

16 years = Bachelors degree in Chemistry, Biology, Environmental Science, or other natural science.

(2) Substitution -- 1 year of laboratory experience within the specific certification category may be used for each year of education beyond 12 years.

(3) ETC Certificate = Environmental Training Center Laboratory Technician Certificate required of all POTW laboratory supervisors.

(4) No substitution is allowed for the 2 years of minimum experience required.

TABLE 3:

QUALITY OF PURIFIED WATER USED IN MICROBIOLOGY TESTS

Test	Monitoring Frequency	Limit
Chemical Tests		
Conductivity	With each use	>0.5 megohms resistance or <2 umhos/cm at 25 degrees Celsius
pH	With each use	5.5 - 7.5
Heavy Metals (Cd, Cr, Cu, Ni, Pb, Zn) (single) (total)	 Annually Annually	 <0.05 mg/L <0.10 mg/L
Ammonia/Organic N	Monthly	<0.10 mg/L
Total Chlorine Residual	With each use	< detection limit (0.01 mg/L maximum, whichever is lower)
Total Organic Carbon	Monthly	<1.0 g/L
Bacteriological Tests		
Heterotrophic Plate Count	Annually	<1000 colonies/mL

APPENDIX B: ACTION LEVELS

LUST Program Action Levels

Groundwater Action Levels

Contaminant	Analytical Method[1]	Concentration (ug/l)
Benzene[2]	SW846 8260	5
Toluene[2]	SW846 8260	1000
Ethylbenzene[2]	SW846 8260	700
Xylenes (total)[2]	SW846 8260	10,000
Methyl tertiary butyl ether[3]	SW846 8260	40
TBA[3]	SW846 8260	360
Benzo (a) pyrene[2]	SW 846 8270	0.2
Lead[2]	SW846 6010	15
Arsenic[2]	SW846 6010	10
Barium[2]	SW846 6010	2000
Cadmium[2]	SW846 6010	5
Chromium[2]	SW846 6010	100
Mercury[2]	SW846 7474	2
Selenium[2]	SW846 6010	50
Silver[2]	SW846 6010	100

[1]Use the most recently promulgated version of the SW 846 method
[2]Federal Drinking Water Standard (Primary and Secondary standard) and/or WV Groundwater Standard
[3] EPA Drinking Water Advisory (1997)

LUST Program Action Levels

Tier 1 Soil Action Levels

Contaminant	Analytical Method[1]	Action Level (mg/kg)
Benzene	SW 846 8260[2]	0.130
Toluene	SW 846 8260[2]	44
Ethylbenzene	SW 846 8260[2]	2.0
Xylenes (total)	SW 846 8260[2]	5.2
Tertiary butyl alcohol (TBA)	SW 846 8260[2]	1400
Methyl tertiary butyl ether (MTBE)	SW 846 8260[2]	25
Acenaphthene	SW 846 8270	4100
Acenaphthylene	SW 846 8270	4200
Anthracene	SW 846 8270	23000
Benzo(a)anthracene	SW 846 8270	1
Benzo(a)pyrene	SW 846 8270	1
Benzo(b)fluoranthene	SW 846 8270	1
Benzo(g,h,i)perylene	SW 846 8270	1800
Benzo(k)fluoranthene	SW 846 8270	1
Chrysene	SW 846 8270	1
Dibenz(a,h)anthracene	SW 846 8270	1
Fluoranthene	SW 846 8270	2400
Fluorene	SW 846 8270	2900
Indeno(1,2,3-cd)pyrene	SW 846 8270	1
Naphthalene	SW 846 8270	4.1
Phenanthrene	SW 846 8270	23000
Pyrene	SW 846 8270	2300
Lead	SW846 6010	400
Arsenic[5]	SW846 6010	18
Barium	SW846 6010	15000
Cadmium	SW846 6010	37
Chromium[3]	SW846 6010	120000
Mercury[4]	SW846 7474	3.1
Selenium	SW846 6010	390
Silver	SW846 6010	390

[1]Use the most recently promulgated version of the SW 846 method
[2] Sampling method must utilize SW846 5035
[3] Assumes Chromium III
[4] Assumes inorganic Mercury
[5] Background level in WV

LUST Program Action Levels

Tier 2 Soil Action Levels

Contaminant	Analytical Method[1]	Action Level Depth (0-8 ft) (mg/kg)	Action Level Depth (>8 ft) (mg/kg)
Benzene	SW 846 8260[2]	0.75	5.0
Toluene	SW 846 8260[2]	44	44
Ethylbenzene	SW 846 8260[2]	6.2	46
Xylenes (total)	SW 846 8260[2]	260	260
Tertiary butyl alcohol (TBA)	SW 846 8260[2]	1400	42000
Methyl tertiary butyl ether (MTBE)	SW 846 8260[2]	40	50
Acenaphthene	SW 846 8270	4100	70000
Acenaphthylene	SW 846 8270	4200	80000
Anthracene	SW 846 8270	23000	700000
Benzo(a)anthracene	SW 846 8270	1	88
Benzo(a)pyrene	SW 846 8270	1	4.3
Benzo(b)fluoranthene	SW 846 8270	1	43
Benzo(g,h,i)perylene	SW 846 8270	1800	33000
Benzo(k)fluoranthene	SW 846 8270	1	430
Chrysene	SW 846 8270	1	4300
Dibenz(a,h)anthracene	SW 846 8270	1	4.3
Fluoranthene	SW 846 8270	2400	44000
Fluorene	SW 846 8270	2900	62000
Indeno(1,2,3-cd)pyrene	SW 846 8270	1	43
Naphthalene	SW 846 8270	4.1	25
Phenanthrene	SW 846 8270	23000	700000
Pyrene	SW 846 8270	2300	66000
Lead	SW846 6010	400	1000
Arsenic[5]	SW846 6010	18	35
Barium	SW846 6010	15000	400000
Cadmium	SW846 6010	37	980
Chromium[3]	SW846 6010	120000	1000000
Mercury[4]	SW846 7474	3.1	3.1
Selenium	SW846 6010	390	12000
Silver	SW846 6010	390	12000

[1]Use the most recently promulgated version of the SW 846 method
[2] Sampling method must utilize SW846 5035
[3] Assumes Chromium III
[4] Assumes inorganic Mercury
[5] Background level in WV

LUST Program Action Levels

Tier 3 Soil Action Levels

Contaminant	Analytical Method[1]	Action Level Depth (0-8 ft) (mg/kg)	Action Level Depth (>8 ft) (mg/kg)
Benzene	SW 846 8260[2]	5.0	57
Toluene	SW 846 8260[2]	44	820
Ethylbenzene	SW 846 8260[2]	46	280
Xylenes (total)	SW 846 8260[2]	260	260
Tertiary butyl alcohol (TBA)	SW 846 8260[2]	42000	42000
Methyl tertiary butyl ether (MTBE)	SW 846 8260[2]	50	2300
Acenaphthene	SW 846 8270	70000	70000
Acenaphthylene	SW 846 8270	80000	80000
Anthracene	SW 846 8270	700000	700000
Benzo(a)anthracene	SW 846 8270	88	88
Benzo(a)pyrene	SW 846 8270	4.3	4.3
Benzo(b)fluoranthene	SW 846 8270	43	43
Benzo(g,h,i)perylene	SW 846 8270	33000	33000
Benzo(k)fluoranthene	SW 846 8270	430	430
Chrysene	SW 846 8270	4300	4300
Dibenz(a,h)anthracene	SW 846 8270	4.3	4.3
Fluoranthene	SW 846 8270	44000	44000
Fluorene	SW 846 8270	62000	62000
Indeno(1,2,3-cd)pyrene	SW 846 8270	43	43
Naphthalene	SW 846 8270	25	25
Phenanthrene	SW 846 8270	700000	700000
Pyrene	SW 846 8270	66000	66000
Lead	SW846 6010	1000	1000
Arsenic	SW846 6010	35	35
Barium	SW846 6010	400000	400000
Cadmium	SW846 6010	980	980
Chromium[3]	SW846 6010	1000000	1000000
Mercury[4]	SW846 7474	3.1	3.1
Selenium	SW846 6010	12000	12000
Silver	SW846 6010	12000	12000

[1]Use the most recently promulgated version of the SW 846 method
[2] Sampling method must utilize SW846 5035
[3] Assumes Chromium III
[4] Assumes inorganic Mercury

WEST VIRGINIA
SECRETARY OF STATE
NATALIE E. TENNANT
ADMINISTRATIVE LAW DIVISION

Form #6

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OFFICE WEST VIRGINIA
SECRETARY OF STATE

NOTICE OF FINAL FILING AND ADOPTION OF A LEGISLATIVE RULE AUTHORIZED BY THE WEST VIRGINIA LEGISLATURE

Water Resources

AGENCY: DEP-Division of Water & Waste Management TITLE NUMBER: 47

AMENDMENT TO AN EXISTING RULE: YES X NO ___

IF YES, SERIES NUMBER OF RULE BEING AMENDED: 12

TITLE OF RULE BEING AMENDED: Requirements Governing Groundwater Standardss

IF NO, SERIES NUMBER OF RULE BEING PROPOSED: ___

TITLE OF RULE BEING PROPOSED: ___

THE ABOVE RULE HAS BEEN AUTHORIZED BY THE WEST VIRGINIA LEGISLATURE.

AUTHORIZATION IS CITED IN (house or senate bill number) SB121

SECTION 64-3-1(l), PASSED ON March 18, 2011

THIS RULE IS FILED WITH THE SECRETARY OF STATE. THIS RULE BECOMES EFFECTIVE ON THE FOLLOWING DATE: July 1, 2011

Authorized Signature

TITLE 47
LEGISLATIVE RULE
DEPARTMENT OF ENVIRONMENTAL PROTECTION
WATER RESOURCES

SERIES 12
REQUIREMENTS GOVERNING GROUNDWATER STANDARDS

§47-12-1. General.

1.1. Scope. -- The purpose of this Legislative rule is to establish minimum standards of purity and quality for groundwater located within this State.

1.2. Authority. -- W. Va. Code §22-12-4.

1.3. Filing Date. -- June 16, 2011.

1.4. Effective Date. -- July 1, 2011.

§47-12-2. Definitions.

As used in this rule:

2.1. "Act" means the Groundwater Protection Act, W. Va. Code §22-12-1, et seq.

2.2. "Constituent" means any chemical or biological substance found in groundwater due to either natural or man-made conditions.

2.3. "Groundwater" means the water occurring in the zone of saturation beneath the seasonal high water table, or any perched water zones.

2.4. "Person" means any industrial user, public or private corporation, institution, association, firm or company organized or existing under the laws of this or any other state or country; the State of West Virginia and any of its political subdivisions, including any county commission or municipal corporation; any governmental agency, including federal facilities; industry; sanitary district; public service district; soil conservation district; watershed improvement district; partnership; trust; estate; person or individual; group of persons or individuals acting individually or as a group; or any legal entity whatever.

§47-12-3. Groundwater Standards.

3.1. Except as provided in subsections 3.2 and 3.3 below, the standards of purity and quality for groundwater in the state shall be the constituent concentrations found in Appendix A of this rule.

3.2. Concentration of a constituent in excess of otherwise applicable groundwater quality standards shall be governed as follows:

3.2.a. Where the concentration of a constituent exceeds an otherwise applicable groundwater quality standard as a result of natural conditions, the naturally occurring level of that constituent shall become the groundwater quality standard for the affected area.

3.2.b. Where the concentration of a certain constituent exceeds an otherwise applicable groundwater quality standard due to human-induced contamination, no further contamination by that constituent shall be allowed and every reasonable effort shall be made to identify, remove or mitigate the source of such contamination and to strive, where practical, to reduce the level of contamination over time to support drinking water use.

3.3. Constituents in groundwater shall not cause a violation of the standards found at 47CSR2 in any surface water.

3.4. Groundwater quality standards do not apply:

3.4.a. Within areas of geologic formations that are site-specific to site production or storage zones of crude oil or natural gas and that are utilized for the exploration, development or production of crude oil or natural gas permitted pursuant to W. Va. Code §§22-6-1, et seq., 22-7-1, et seq., 22-8-1, et seq., 22-9-1, et seq., or 22-10-1, et seq.; and

3.4.b. Within areas of geologic formations that are site-specific to the injection zones of Class II or III or wells permitted pursuant to the statutes and regulations governing the underground injection control program.

3.4.c. To any constituent or any class of activities for which a variance from groundwater quality standards has been granted by the Secretary pursuant to W. Va. Code §22-12-5(l).

3.4.d. To coal extraction and earth disturbing activities directly involved in coal extraction that are subject to either or both W. Va. Code §§22-3-1, et seq. or 22-11-1, et seq.

3.5. Measurement of inorganic constituents.

3.5.a. Compliance with groundwater protection standards for inorganic constituents shall be determined in terms of dissolved concentrations rather than total concentrations, except as specified in subdivision 3.5.b below.

3.5.b. Any groundwater regulatory agency as specified in the Act may determine compliance with groundwater protection standards for inorganic constituents utilizing total concentration values only as necessary to protect human health or the environment. Appropriate situations for utilizing total concentrations values include, but are not limited to, the following:

3.5.b.1. The sample is from a carbonate formation in an area of karst terrane;

3.5.b.2. The sample is from a collection point for groundwater used for private or public water supply;

3.5.b.3. The sample is from a spring or seep; or

3.5.b.3. The sample is one for which State or Federal regulations require that total inorganic concentrations be measured.

§47-12-4. Hazardous Waste Treatment, Storage or Disposal Facilities.

4.1. Nothing in this rule prohibits the Division of Water and Waste Management, acting in accordance with federal regulations, from using criteria other than the standards specified in this rule for purposes of determining the need for corrective action at hazardous waste treatment, storage or disposal facilities, as provided in 40 C.F.R. Parts 264 and 265, Subpart F.

APPENDIX A

Organic Compounds

Constituent	Limit (mg/L) (except where noted)
Alachlor	0.002
Aldicarb	0.003
Aldicarb sulfone	0.002
Aldicarb sulfoxide	0.004
Atrazine	0.003
Benzene	0.005
Benzo (a) pyrene (PAH)	0.0002
Bromodichloromethane (THM)[1]	0.08
Bromoform (THM)[1]	0.08
Carbofuran	0.04
Carbon tetrachloride	0.005
Chlordane	0.002
Chloroform (THM)[1]	0.08
2, 4-D	0.07
Dalapon	0.2
Di(2-ethylhexyl)adipate	0.4
Di(2-ethylhexyl)phthalate	0.006
Dibromochloromethane (THM)[1]	0.08
Dibromochloropropane (DBCP)	0.0002
Dichloroacetic acid	0.06
Dichlorobenzene p-	0.075
Dichlorobenzene o-	0.6
Dichlorobenzene m-	0.6
Dichloroethane (1, 2)	0.005
Dichloroethylene (1, 1-)	0.007
Dichloroethylene (cis-1, 2-)	0.07
Dichloroethylene (trans-1, 2-)	0.1
Dichloromethane	0.005
Dichloropropane (1, 2-)	0.005
Dinoseb	0.007
Diquat	0.02
Endothall	0.1
Endrin	0.002
Ethylbenzene	0.7
Ethylene dibromide (EDB)	0.00005
Glyphosate	0.7
Heptachlor	0.0004
Heptachlor epoxide	0.0002
Hexachlorobenzene	0.001
Hexachlorocyclopentadiene	0.05
Lindane	0.0002
Methoxychlor	0.04
Monochloroacetic acid[2]	0.06
Monochlorobenzene	0.1
Oxamyl (Vydate)	0.2
Pentachlorophenol	0.001

Picloram	0.5
Polychlorinated biphenyls	0.0005
Simazine	0.004
Styrene	0.1
2, 3, 7, 8-TCDD (Dioxin)	0.00000003
Tetrachlorethylene	0.005
Toluene	1.0
Toxaphene	0.003
2, 4, 5-TP (Silvex)	0.05
Trichloroacetic acid[2]	0.06
Trichlorobenzene (1, 2, 4-)	0.07
Trichloroethane (1, 1, 1-)	0.2
Trichloroethane (1, 1, 2-)	0.005
Trichloroethylene	0.005
Vinyl Chloride	0.002
Xylenes (Total)	10.0

Inorganic Compounds

Constituent	**Limit (mg/L) (except where noted)**
Arsenic	0.01
Asbestos	7 MFL[3]
Barium	2.0
Beryllium	0.004
Bromate	0.01
Cadmium	0.005
Chloramine	4.0
Chlorine	4.0
Chlorine dioxide	0.8
Chlorite	1.0
Chromium (Total)	0.1
Copper	1.3
Cyanide	0.2
Fluoride	4.0
Lead	0.015
Mercury (Inorganic)	0.002
Nitrate (as N)	10.0
Nitrite (as N)	1.0
Total Nitrate and Nitrite (both as N)	10.0
Selenium	0.05
Thallium	0.002

Radionuclides

Beta particle and photon activity	4 mrem[4]
Gross alpha particle activity	15 pCi/L[5]
Combined Radium 226 and 228	5 pCi/L
Uranium	30 µg/L[6]

1 – The total of the trihalomethanes (THM) is 0.08 mg/L
2 – The total of the haloacetic acides is 0.06 mg/L
3 – MFL = million fibers per liter
4 – mrem = millirem (rem = roentgen – equivalent – man)
5 – pCi = picocurie
6 – µg/L = microgram per liter

NOTICE OF FINAL FILING AND ADOPTION OF A LEGISLATIVE RULE AUTHORIZED BY THE WEST VIRGINIA LEGISLATURE

AGENCY: Water Resources Division Of Water And Waste Management

TITLE-SERIES: 47-02

RULE TYPE: Legislative   Amendment to Existing Rule: Yes   Repeal of existing rule: No

RULE NAME: Requirements Governing Water Quality Standards

CITE STATUTORY AUTHORITY: W. Va. Code §§ 22-11-4(a)(16); 22-11-7b

The above rule has been authorized by the West Virginia Legislature.

Authorization is cited in (house or senate bill number) HB 2382

Section §64-3-1(h)   Passed On   4/7/2021 12:00:00 AM

This rule is filed with the Secretary of State. This rule becomes effective on the following date:

May 22, 2021

This rule shall terminate and have no further force or effect from the following date:

BY CHOOSING 'YES', I ATTEST THAT THE PREVIOUS STATEMENT IS TRUE AND CORRECT.

Yes

Jason E Wandling -- By my signature, I certify that I am the person authorized to file legislative rules, in accordance with West Virginia Code §29A-3-11 and §39A-3-2.

TITLE 47
LEGISLATIVE RULE
DEPARTMENT OF ENVIRONMENTAL PROTECTION
WATER RESOURCES

SERIES 2
REQUIREMENTS GOVERNING WATER QUALITY STANDARDS

§47-2-1. General.

1.1. Scope. -- This rule establishes requirements governing the discharge or deposit of sewage, industrial wastes, and other wastes into the waters of the state and establishes water quality standards for the waters of the State standing or flowing over the surface of the State. It is declared to be the public policy of the State of West Virginia to maintain reasonable standards of purity and quality of the water of the State consistent with (1) public health and public enjoyment thereof; (2) the propagation and protection of animal, bird, fish, and other aquatic and plant life; and (3) the expansion of employment opportunities, maintenance and expansion of agriculture, and the provision of a permanent foundation for healthy industrial development. (*See*, W. Va. Code § 22-11-2.)

1.2. Authority. -- W. Va. Code §§ 22-11-4(a)(16); 22-11-7b.

1.3. Filing Date. -- April 22, 2021

1.4. Effective Date. -- May 22, 2021

§47-2-2. Definitions.

The following definitions, in addition to those set forth in W. Va. Code § 22-11-3, shall apply to these rules unless otherwise specified herein, or unless the context in which used clearly requires a different meaning:

2.1. "Conventional treatment" is the treatment of water as approved by the West Virginia Bureau for Public Health to assure that the water is safe for human consumption.

2.2. Lakes

2.2a. "Cool water lakes" are lentic water bodies that have a summer hydraulic residence time greater than 14 days, and are either managed by the West Virginia Division of Natural Resources for the support of cool water fish species or support cool water fish species, such as walleye and trout. "Cool water lakes" do not include those waters that receive stockings of trout, but that do not support year-round trout populations. (*See*, Appendix F for a representative list.)

2.2.b. "Warm water lakes" are lentic water bodies that have a summer hydraulic residence time greater than 14 days, and are either managed by the West Virginia Division of Natural Resources for the support of warm water fish species or support warm water fish species, such as bass and catfish.

2.3. "Cumulative" means a pollutant which increases in concentration in an organism by successive additions at different times or in different ways (bio-accumulation).

2.4. "Designated uses" are those uses specified in water quality standards for each water or segment whether or not the uses are being attained. (*See*, sections 6.2 - 6.6, herein)

2.5. "Dissolved metal" is that portion of metal which passes through a 0.45 micron filter.

2.6. "Existing uses" are those uses actually attained in a water on or after November 28, 1975, whether or not those uses are included in the water quality standards.

2.7. The "Federal Act" means the federal Clean Water Act (also known as the Federal Water Pollution Control Act) 33 U.S.C. §§ 1251 - 1387.

2.8. "High quality waters" are those waters whose quality is equal to or better than the minimum levels necessary to achieve the national water quality goal uses.

2.9. "Intermittent streams" are streams which have no flow during sustained periods of no precipitation and which do not support aquatic life whose life history requires residence in flowing waters for a continuous period of at least six (6) months.

2.10. "Outstanding national resource waters" are those waters whose unique character, ecological or recreational value or pristine nature constitutes a valuable national or State resource.

2.11. "Natural" or "naturally occurring" values or "natural temperature" means, for all of the waters of the State:

2.11.a. Those water quality values which exist unaffected by, or unaffected as a consequence of, any water use by any person; and

2.11.b. Those water quality values which exist unaffected by the discharge, or direct or indirect deposit of, any solid, liquid or gaseous substance from any point source or non-point source.

2.12. "Non-point source" means any source other than a point source from which pollutants may reach the waters of the state.

2.13. "Persistent" means a pollutant and its transformation products which, under natural conditions, degrade slowly in an aquatic environment.

2.14. "Point source" means any discernible, confined, and discrete conveyance, including, but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock or vessel or other floating craft from which pollutants are or may be discharged. This term does not include agricultural stormwater discharges and return flows from irrigated agriculture.

2.15. "Representative important species of aquatic life" means those species of aquatic life whose protection and propagation will assure the sustained presence of a balanced aquatic community. Such species are representative in the sense that maintenance of water quality criteria will assure both the natural completion of the species' life cycles and the overall protection and sustained propagation of the balanced aquatic community.

2.16. "Secretary" means the Secretary of the Department of Environmental Protection or such other person to whom the Secretary has delegated authority or duties pursuant to W. Va. Code §§ 22-1-6 or 22-1-8.

2.17. The "State Act" or "State Law" means the West Virginia Water Pollution Control Act, W. Va. Code § 22-11-1, et seq.

2.18. "Total recoverable" refers to the digestion procedure for certain heavy metals as referenced in 40 CFR 136, as amended May 18, 2012, Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act.

2.19. "Trout waters" are waters which sustain year-round trout populations. Excluded are those waters which receive annual stockings of trout but which do not support year-round trout populations.

2.20. "Water quality criteria" means levels of parameters or stream conditions that are required to be maintained by this rule. Criteria may be expressed as a constituent concentration, levels, or narrative statement representing a quality of water that supports a designated use or uses.

2.21. "Water quality standards" means the combination of water uses to be protected and the water quality criteria to be maintained by this rule.

2.22. "Wetlands" are those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

2.23. "Wet weather streams" are streams that flow only in direct response to precipitation or whose channels are at all times above the water table.

§47-2-3. Conditions Not Allowable In State Waters.

3.1. Certain characteristics of sewage, industrial wastes, and other wastes cause pollution and are objectionable in all waters of the State. Therefore, the secretary does hereby proclaim that the following general conditions are not to be allowed in any of the waters of the State.

3.2. No sewage, industrial wastes or other wastes present in any of the waters of the State shall cause therein or materially contribute to any of the following conditions thereof:

3.2.a. Distinctly visible floating or settleable solids, suspended solids, scum, foam or oily slicks;

3.2.b. Deposits or sludge banks on the bottom;

3.2.c. Odors in the vicinity of the waters;

3.2.d. Taste or odor that would adversely affect the designated uses of the affected waters;

3.2.e. Materials in concentrations which are harmful, hazardous or toxic to man, animal or aquatic life;

3.2.f. Distinctly visible color;

3.2.g. Algae blooms or concentrations of bacteria which may impair or interfere with the designated uses of the affected waters;

3.2.h. Requiring an unreasonable degree of treatment for the production of potable water by modern water treatment processes as commonly employed; and

3.2.i. Any other condition, including radiological exposure, which adversely alters the integrity of the waters of the State, including wetlands; no significant adverse impact to the chemical, physical, hydrologic, or biological components of aquatic ecosystems shall be allowed.

§47-2-4. Antidegradation Policy.

4.1. It is the policy of the State of West Virginia that the waters of the State shall be maintained and protected as follows:

4.1.a. Tier 1 Protection. Existing water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected. Existing uses are those uses actually attained in a water on or after November 28, 1975, whether or not they are included as designated uses within these water quality standards.

4.1.b. Tier 2 Protection. The existing high quality waters of the State must be maintained at their existing high quality unless the secretary determines, after satisfaction of the intergovernmental coordination of the State's continuing planning process as outlined in the Legislative Rule entitled "Antidegradation Implementation Procedures", 60CSR5, and opportunity for public comment and hearing, that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located. If limited degradation is allowed, it shall not result in injury or interference with existing stream water uses or in violation of State or federal water quality criteria that describe the base levels necessary to sustain the national water quality goal uses of protection and propagation of fish, shellfish and wildlife, and recreating in and on the water.

In addition, the secretary shall assure that all new and existing point sources shall achieve the highest established statutory and regulatory requirements applicable to them and shall assure the achievement of cost-effective and reasonable best management practices (BMPs) for non-point source control. If BMPs are demonstrated to be inadequate to reduce or minimize water quality impacts, the secretary may require that more appropriate BMPs be developed and applied.

4.1.b.1. High quality waters are those waters meeting the definition at section 2.8 herein.

4.1.b.2. High quality waters may include, but are not limited to, the following:

4.1.b.2.A. Streams designated by the West Virginia Legislature under the West Virginia Natural Stream Preservation Act, pursuant to W. Va. Code § 22-13-5; and

4.1.b.2.B. Streams listed in West Virginia High Quality Streams, Sixth Edition, prepared by the Wildlife Resources Section of the Division of Natural Resources (2011).

4.1.b.2.C. Streams or stream segments which receive annual stockings of trout but which do not support year-round trout populations.

4.1.c. Tier 3 Protection. In all cases, waters which constitute an outstanding national resource shall be maintained and protected and improved where necessary. Outstanding national resource waters include, but are not limited to, all streams and rivers within the boundaries of Wilderness Areas designated by The Wilderness Act, 16 U.S.C. § 1131, et seq.; all Federally designated rivers under the "Wild and Scenic Rivers Act", 16 U.S.C. § 1271, et seq.; all streams and other bodies of water in State Parks which are high quality waters or naturally reproducing trout streams; waters in National Parks and Forests which are high quality waters or naturally reproducing trout streams; waters designated under the "National Parks and Recreation Act of 1978", 16 U.S.C § 461, et seq.; and pursuant to the rule entitled "Antidegradation

Implementation Procedures," 60CSR5, those waters whose unique character, ecological or recreational value, or pristine nature constitutes a valuable national or state resource.

Additional waters may be nominated for inclusion in that category by any interested party or by the secretary on the secretary's own initiative. To designate a nominated water as an outstanding national resource water, the secretary shall follow the public notice and hearing provisions as provided in the Procedural Rule Governing Site Specific Revisions to Water Quality Standards, 46CSR6.

4.1.d. All applicable requirements of section 316(a) of the Federal Act shall apply to modifications of the temperature water quality criteria provided for in these rules.

§47-2-5. Mixing Zones.

5.1. In the permit review and planning process or upon the request of a permit applicant or permittee, the secretary may establish, on a case-by-case basis, an appropriate mixing zone.

5.2. The following guidelines and conditions are applicable to all mixing zones:

5.2.a. The secretary will assign, on a case-by-case basis, definable geometric limits for mixing zones for a discharge or a pollutant or pollutants within a discharge. Applicable limits shall include, but are not limited to, the linear distances from the point of discharge, surface area involvement, and volume of receiving water and shall take into account other nearby mixing zones. Mixing zones shall take into account the mixing conditions in the receiving stream (i.e.: whether complete or incomplete mixing conditions exist). Mixing zones will not be allowed until applicable limits are assigned by the secretary in accordance with this section.

5.2.b. Concentrations of pollutants which exceed the acute criteria for protection of aquatic life set forth in Appendix E, Table 1 shall not exist at any point within an assigned mixing zone or in the discharge itself unless a zone of initial dilution is assigned. A zone of initial dilution may be assigned on a case-by-case basis at the discretion of the secretary. The zone of initial dilution is the area within the mixing zone where initial dilution of the effluent with the receiving water occurs, and where the concentration of the effluent will be its greatest in the water column. Where a zone of initial dilution is assigned by the secretary, the size of the zone shall be determined using one of the four alternatives outlined in section 4.3.3 of US EPA's Technical Support Document for Water Quality-based Toxics Control (EPA/505/2-90-001 PB91-127415, March 1991). Concentrations of pollutants shall not exceed the acute criteria at the edge of the assigned zone of initial dilution. Chronic criteria for the protection of aquatic life may be exceeded within the mixing zone but shall be met at the edge of the assigned mixing zone.

5.2.c. Concentrations of pollutants which exceed the criteria for the protection of human health set forth in Appendix E, Table 1 shall not be allowed at any point unless a mixing zone has been assigned by the secretary after consultation with the Commissioner of the West Virginia Bureau for Public Health. Human health criteria may be exceeded within an assigned mixing zone, but shall be met at the edge of the assigned mixing zone. Mixing zones for human health criteria shall be sized to prevent significant human health risks and shall be developed using reasonable assumptions about exposure pathways. In assessing the potential human health risks of establishing a mixing zone upstream from a drinking water intake, the secretary shall consider the cumulative effects of multiple discharges and mixing zones on the drinking water intake. No mixing zone for human health criteria shall be established on a stream which has a seven (7) day, ten (10) year return frequency of five (5) cubic feet per second (cfs) or less.

5.2.d. Mixing zones, including zones of initial dilution, shall not interfere with fish spawning or nursery areas or fish migration routes; shall not overlap public water supply intakes or bathing areas; kill or preclude the free passage of fish or other aquatic life; nor harm any threatened or endangered species, as listed in the Federal Endangered Species Act, 15 U.S.C. § 1531, et seq.

5.2.e. The mixing zone shall not exceed one-third (1/3) of the width of the receiving stream, and in no case shall the mixing zone exceed one-half (1/2) of the cross-sectional area of the receiving stream.

5.2.f. In lakes and other surface impoundments, the volume of a mixing zone shall not affect in excess of ten percent (10%) of the volume of that portion of the receiving waters available for mixing.

5.2.g. A mixing zone shall be limited to an area or volume which will not adversely alter the existing or designated uses of the receiving water, nor be so large as to adversely affect the integrity of the water.

5.2.h. Mixing zones shall not:

5.2.h.1. Be used for, or considered as, a substitute for technology-based requirements of the State or Federal Act and other applicable State and federal laws.

5.2.h.2. Extend downstream at any time a distance more than five times the width of the receiving watercourse at the point of discharge.

5.2.h.3. Cause or contribute to any of the conditions prohibited in section 3, herein.

5.2.h.4. Be granted where the instream waste concentration of a discharge is greater than 80%.

5.2.h.5. Overlap one another, except that the secretary may allow mixing zones for human health criteria to overlap, if the overlapping mixing zones comply with all guidelines and conditions of subsection 5.2 herein.

5.2.h.6. Overlap any half-mile zone described in section 7.2.a.2 herein.

5.2.i. In the case of thermal discharges, a successful demonstration conducted under section 316(a) of the Federal Act shall constitute compliance with all provisions of this section.

5.2.j. The secretary may waive the requirements of subdivision 5.2.e and paragraph 5.2.h.2 above if a discharger provides an acceptable demonstration of:

5.2.j.1. Information defining the actual boundaries of the mixing zone in question; and

5.2.j.2. Information and data proving no violation of subdivisions 5.2.d and 5.2.g above by the mixing zone in question.

5.2.k. Upon implementation of a mixing zone in a permit, the permittee shall provide documentation that demonstrates to the satisfaction of the secretary that the mixing zone is in compliance with the provisions outlined in subdivisions 5.2.b, 5.2.c, 5.2.e, and paragraph 5.2.h.2, herein.

5.2.l. In order to facilitate a determination or assessment of a mixing zone pursuant to this section, the secretary may require a permit applicant or permittee to submit such information as he or she deems necessary.

§47-2-6. Water Use Categories.

6.1. This section establishes general Water Use Categories and Water Quality Standards for the waters of the State. Unless otherwise designated by this rule, at a minimum all waters of the State are designated for the Propagation and Maintenance of Fish and Other Aquatic Life (Category B) and for Water Contact Recreation (Category C) consistent with Federal Act goals. Incidental utilization for whatever purpose may or may not constitute a justification for assignment of a water use category to a particular stream segment.

6.1.a. Waste assimilation and transport are not recognized as designated uses. The classification of the waters must take into consideration the use and value of water for public water supplies, protection and propagation of fish, shellfish and wildlife, recreation in and on the water, agricultural, industrial, and other purposes, including navigation.

Subcategories of a use may be adopted and appropriate criteria set to reflect varying needs of such subcategories of uses, for example to differentiate between trout water and other waters.

6.1.b. At a minimum, uses are deemed attainable if they can be achieved by the imposition of effluent limits required under section 301(b) and section 306 of the Federal Act and use of cost-effective and reasonable best management practices for non-point source control. Seasonal uses may be adopted as an alternative to reclassifying a water or segment thereof to uses requiring less stringent water quality criteria. If seasonal uses are adopted, water quality criteria will be adjusted to reflect the seasonal uses; however, such criteria shall not preclude the attainment and maintenance of a more protective use in another season. A designated use which is not an existing use may be removed, or subcategories of a use may be established if it can be demonstrated that attaining the designated use is not feasible because:

6.1.b.1. Application of effluent limitations for existing sources more stringent than those required pursuant to section 301 (b) and section 306 of the Federal Act in order to attain the existing designated use would result in substantial and widespread adverse economic and social impact; or

6.1.b.2. Naturally-occurring pollutant concentrations prevent the attainment of the use; or

6.1.b.3. Natural, ephemeral, intermittent or low flow conditions of water levels prevent the attainment of the use, unless these conditions may be compensated for by the discharge of sufficient volume of effluent discharges to enable uses to be met; or

6.1.b.4. Human-caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place; or

6.1.b.5. Dams, diversions or other types of hydrologic modifications preclude the attainment of the use, and it is not feasible to restore the water to its original condition or to operate such modification in a way that would result in the attainment of the use; or

6.1.b.6. Physical conditions related to the natural features of the water, such as the lack of a proper substrate, cover, flow, depth, pools, riffles, and the like, unrelated to water quality, preclude attainment of aquatic life protection uses.

6.1.c. The State shall take into consideration the quality of downstream waters and shall assure that its water quality standards provide for the attainment of the water quality standards of downstream waters.

6.1.d. In establishing a less restrictive use or uses, or subcategory of use or uses, and the water quality criteria based upon such uses, the secretary shall follow the requirements for revision of water quality standards as required by W. Va. Code § 22-11-7b and section 303 of the Federal Act and the regulations thereunder. Any revision of water quality standards shall be made with the concurrence of the U.S. EPA. The secretary and the applicant shall follow the Procedural Rule Governing Site Specific Revisions to Water Quality Standards, 46CSR6.

6.2. Category A -- Water Supply, Public. -- This category is used to describe waters which, after conventional treatment, are used for human consumption. This category includes waters on which the following are located:

6.2.a. All community domestic water supply systems;

6.2.b. All non-community domestic water supply systems (i.e. hospitals, schools, etc.);

6.2.c. All private domestic water systems;

6.2.d. All other surface water intakes where the water is used for human consumption. (*See* Appendix B for partial listing of Category A waters and paragraph 7.2.a.2, herein for additional requirements for Category A waters.) The manganese human health criterion shall only apply within the five-mile zone immediately upstream above a known public or private water supply used for human consumption.

6.3. Category B -- Propagation and maintenance of fish and other aquatic life. --

This category includes:

6.3.a. Category B1 -- Warm water fishery streams. -- Streams or stream segments which contain populations composed of all warm water aquatic life.

6.3.b. Category B2 -- Trout Waters. -- As defined in section 2.19 herein (*see*, Appendix A for a representative list.)

6.3.c. Category B4 -- Wetlands. -- As defined in section 2.22 herein; certain numeric stream criteria may not be appropriate for application to wetlands (*see*, Appendix E, Table 1).

6.4. Category C -- Water contact recreation. -- This category includes swimming, fishing, water skiing and certain types of pleasure boating such as sailing in very small craft and outboard motor boats. (*See*, Appendix D for a representative list.)

6.5. Category D. -- Agriculture and wildlife uses.

6.5.a. Category D1 -- Irrigation. -- This category includes all stream segments used for irrigation.

6.5.b. Category D2 -- Livestock watering. -- This category includes all stream segments used for livestock watering.

6.5.c. Category D3 -- Wildlife. -- This category includes all stream segments and wetlands used by wildlife.

6.6. Category E -- Water supply industrial, water transport, cooling and power. -- This category includes cooling water, industrial water supply, power production, commercial and pleasure vessel activity, except those small craft included in Category C.

6.6.a. Category E1 -- Water Transport. -- This category includes all stream segments modified for water transport and having permanently maintained navigation aids.

6.6.b. Category E2 -- Cooling Water. -- This category includes all stream segments having one (1) or more users for industrial cooling.

6.6.c. Category E3 -- Power production. -- This category includes all stream segments extending from a point 500 feet upstream from the intake to a point one-half (1/2) mile below the wastewater discharge point. (*See*, Appendix C for representative list.)

6.6.d. Category E4 -- Industrial. -- This category is used to describe all stream segments with one (1) or more industrial users. It does not include water for cooling.

§47-2-7. West Virginia Waters.

7.1. Major River Basins and their Alphanumeric System. All streams and their tributaries in West Virginia shall be individually identified using the stream codes developed by the Department and available on the Department's website.

7.1.a. J - James River Basin. All tributaries to the West Virginia - Virginia State line.

7.1.b. P - Potomac River Basin. All tributaries of the main stem of the Potomac River to the West Virginia - Maryland - Virginia state line to the confluence of the North Branch and the South Branch of the Potomac River and all tributaries arising in West Virginia excluding the major tributaries hereinafter designated:

7.1.b.1. S - Shenandoah River and all its tributaries arising in West Virginia to the West Virginia - Virginia state line.

7.1.b.2. PC - Cacapon River and all its tributaries.

7.1.b.3. PSB - South Branch and all its tributaries.

7.1.b.4. PNB - North Branch and all tributaries to the North Branch arising in West Virginia.

7.1.c. M - Monongahela River Basin. The Monongahela River Basin main stem and all its tributaries, excluding the following major tributaries which are designated as follows:

7.1.c.1. MC - Cheat River and all its tributaries.

7.1.c.2. MW - West Fork River and all its tributaries.

7.1.c.3. MT - Tygart River and all its tributaries except those listed below:

7.1.c.3.A. MTB - Buckhannon River and all its tributaries.

7.1.c.3.B. MTM - Middle Fork River and all its tributaries.

7.1.c.4. MY - Youghiogheny River and all its tributaries to the West Virginia - Maryland State line.

7.1.d. O Zone 1 - Ohio River - Main Stem. The main stem of the Ohio River from the Ohio - Pennsylvania - West Virginia state line to the Ohio - Kentucky - West Virginia state line.

7.1.e. O Zone 2 - Ohio River - Tributaries. All tributaries of the Ohio River excluding the following major tributaries:

7.1.e.1. LK - Little Kanawha River. The Little Kanawha River and all its tributaries excluding the following major tributary, designated as LKH – Hughes River and all its tributaries.

7.1.e.2. K - Kanawha River Zone 1. The main stem of the Kanawha River from mile point 0, at its confluence with the Ohio River, to mile point 72 near Diamond, West Virginia.

7.1.e.3. K - Kanawha River Zone 2. The main stem of the Kanawha River from mile point 72 near Diamond, West Virginia and all its tributaries from mile point 0 to the headwaters, excluding the following major tributaries which are designated as follows:

7.1.e.3.A. KP - Pocatalico River and all its tributaries.

7.1.e.3.B. KC - Coal River and all its tributaries.

7.1.e.3.C. KE - Elk River and all its tributaries.

7.1.e.3.D. KG - Gauley River. The Gauley River and all its tributaries excluding the following major tributaries which are designated as follows:

7.1.e.3.D.1. KG-19 - Meadow River and all its tributaries.

7.1.e.3.D.2. KG-34 - Cherry River and all its tributaries.

7.1.e.3.D.3. KGC - Cranberry River and all its tributaries.

7.1.e.3.D.4. KGW - Williams River and all its tributaries.

7.1.e.3.E. KN - New River. The New River from its confluence with the Gauley River to the Virginia - West Virginia state line and all tributaries excluding the following major tributaries which are designated as follows:

7.1.e.3.E.1. KNG - Greenbrier River and all its tributaries.

7.1.e.3.E.2. KNB - Bluestone River and all its tributaries.

7.1.e.3.E.3. KN-60 - East River and all its tributaries.

7.1.e.3.E.4. K(L)-81-(1) - Bluestone Lake.

7.1.e.4. OG - Guyandotte River. The Guyandotte River and all its tributaries, excluding the following major tributary, designated as OGM – Mud River and all its tributaries.

7.1.e.5. BS - Big Sandy River. The Big Sandy River to the Kentucky - Virginia - West Virginia state lines and all its tributaries arising in West Virginia, excluding the following major tributary, designated as BST – Tug Fork and all its tributaries.

7.2. Applicability of Water Quality Standards. The following shall apply at all times unless a specific exception is granted in this section:

7.2.a. Water Use Categories as described in section 6 herein.

7.2.a.1. Based on meeting those Section 6 definitions, tributaries or stream segments may be classified for one or more Water Use Categories. When more than one use exists, they shall be protected by criteria for the use category requiring the most stringent protection.

7.2.a.2. Each segment extending upstream from the intake of a Water Supply, Public (Water Use Category A), for a distance of one-half (1/2) mile or to the headwater, must be protected by prohibiting the discharge of any pollutants in excess of the concentrations designated for this Water Use Category in section 8 herein. In addition, within that one-half (1/2) mile zone, the secretary may establish, for any discharge, effluent limitations for the protection of human health that require additional removal of pollutants than would otherwise be provided by this rule. (If a watershed is not significantly larger than this zone above the intake, the water supply section may include the entire upstream watershed to its headwaters.) The one-half (1/2) mile zone described in this section shall not apply to the Ohio River main channel (between Brown's Island and the left descending bank) between river mile points 61.0 and 63.5 and mile points 70 and 71. All mixing zone regulations found in section 5 of this rule will apply except for subdivision 5.2.h.6. Whether a mixing zone is appropriate and the proper size of such zone would need to be considered on a site-specific basis in accordance with the U.S. EPA approved West Virginia mixing zone regulations in section 5 above.

7.2.b. In the absence of any special application or contrary provision, water quality standards shall apply at all times when flows are equal to or greater than the minimum mean seven (7) consecutive day drought flow with a ten (10) year return frequency (7Q10). NOTE: With the exception of paragraph 7.2.c.5 below, exceptions do not apply to trout waters nor to the requirements of section 3 herein.

7.2.c. Exceptions: Numeric water quality standards shall not apply: (See section 7.2.d, herein, for site-specific revisions)

7.2.c.1. When the flow is less than 7Q10;

7.2.c.2. In wet weather streams (or intermittent stream, when they are dry or have no measurable flow), so long as the existing and designated uses of downstream waters are not adversely affected;

7.2.c.3. In any assigned zone of initial dilution of any mixing zone where a zone of initial dilution is required by subdivision 5.2.b herein, or in any assigned mixing zone for human health criteria or aquatic life criteria for which a zone of initial dilution is not assigned or in zones of initial dilution and certain mixing zones, except that all requirements described in section 5 herein shall apply to all zones of initial dilution and all mixing zones;

7.2.c.4. Where, on the basis of natural conditions, the secretary has established a site-specific aquatic life water quality criterion that modifies a water quality criterion set out in Appendix E, Table 1 of this rule. Where a natural condition of a water is demonstrated to be of lower quality than a water quality criterion for the use classes and subclasses in section 6 of this rule, the secretary, in the secretary's discretion, may establish a site-specific water quality criterion for aquatic life. This alternate criterion may only serve as the chronic criterion established for that parameter. This alternate criterion must be met at end of pipe. Where the secretary decides to establish a site-specific water quality criterion for aquatic life, the natural condition constitutes the applicable water quality criterion. A site-specific criterion for natural conditions may only be established through the legislative rulemaking process in accordance with W. Va.

Code § 29A-3-1, et seq. and must satisfy the public participation requirements set forth at 40 C.F.R. § 131.20 and 40 C.F.R. Part 25. Site-specific criteria for natural conditions may be established only for aquatic life criteria. A public notice, hearing, and comment period are required before site-specific criteria for natural conditions are established.

Upon application or on the secretary's own initiative, the secretary will determine whether a natural condition of a water should be approved as a site-specific water quality criterion. Before he or she approves a site-specific water quality criterion for a natural condition, the secretary must find that the natural condition will fully protect existing and designated uses and ensure the protection of aquatic life. If a natural condition of a water varies with time, the natural condition will be determined to be the actual natural condition of the water measured prior to or concurrent with discharge or operation. The secretary will, in the secretary's discretion, determine a natural condition for one or more seasonal or shorter periods to reflect variable ambient conditions and require additional or continuing monitoring of natural conditions.

An application for a site-specific criterion to be established on the basis of natural conditions shall be filed with the secretary and shall include the following information:

7.2.c.4.A. A Unites States Geological Survey (USGS) 7.5 minute map showing the stream segment affected and showing all existing discharge points and proposed discharge point;

7.2.c.4.B. The alphanumeric code of the affected stream, if known;

7.2.c.4.C. Water quality data for the stream or stream segment. Where adequate data is unavailable, the secretary may require additional studies

7.2.c.4.D. General land uses (e.g. mining, agricultural, recreational, residential, commercial, industrial, etc.) as well as specific land uses adjacent to the waters for the affected segment or stream;

7.2.c.4.E. The existing and designated uses of the receiving waters into which the segment in question discharges and the location where those downstream uses begin to occur;

7.2.c.4.F. General physical characteristics of the stream segment, including, but not limited to width, depth, bottom composition, and slope;

7.2.c.4.G. Conclusive information and data of the source of the natural condition that causes the stream to exceed the water quality standard for the criterion at issue.

7.2.c.4.H. The average flow rate in the segment and the amount of flow at a designated control point and a statement regarding whether the flow of the stream is ephemeral, intermittent or perennial;

7.2.c.4.I. An assessment of aquatic life in the stream or stream segment in question and in the adjacent upstream and downstream segments; and

7.2.c.4.J. Any additional information or data that the secretary deems necessary to make a decision on the application.

7.2.c.5. For the upper Blackwater River from the mouth of Yellow Creek to a point 5.1 miles upstream, when flow is less than 7Q10. Naturally occurring values for Dissolved Oxygen as established by data collected by the dischargers within this reach and reviewed and approved by the secretary shall be the applicable criteria.

7.2.d. Site-specific applicability of water use categories and water quality criteria - State-wide water quality standards shall apply except where site-specific numeric criteria, variances or use removals have been approved following application and hearing, as provided in 46CSR6 and subsections 8.4 and 8.5 below. The following are approved site-specific criteria, variances, and use reclassifications:

7.2.d.1. James River - (Reserved)

7.2.d.2. Potomac River

7.2.d.2.1. A site-specific numeric criterion for aluminum, not to exceed 500 ug/l, shall apply to the section of Opequon Creek from Turkey Run to the Potomac River.

7.2.d.3. Shenandoah River - (Reserved)

7.2.d.4. Cacapon River - (Reserved)

7.2.d.5. South Branch - (Reserved)

7.2.d.6. North Branch - (Reserved)

7.2.d.7. Monongahela River – Flow in the main stem of the Monongahela River, as regulated by the Tygart and Stonewall Jackson Reservoirs, operated by the U.S. Army Corps of Engineers, is based on a minimum flow of 425 cfs at Lock and Dam No. 8, river mile point 90.8. This exception does not apply to tributaries of the Monongahela River.

7.2.d.8. Cheat River

7.2.d.8.1. In the unnamed tributary of Daugherty Run, approximately one mile upstream of Daugherty Run's confluence with the Cheat River, a site-specific numeric criterion for iron of 3.5 mg/l shall apply, and the following frequency and duration requirements shall apply to the chronic numeric criterion for selenium (5 μg/l): the four-day average concentration shall not be exceeded more than three times every three years (36 months), on average. Further, the following site-specific numeric criteria shall apply to Fly Ash Run of Daugherty Run: acute numeric criterion for aluminum: 888.5 μg/l and manganese: 5 mg/l. For both the unnamed tributary of Daugherty Run, approximately one mile upstream of Daugherty Run's confluence with the Cheat River, and Fly Ash Run, Water Use Category A shall not apply.

7.2.d.8.2. A variance pursuant 46CSR6, based on human-caused conditions which prohibit the full attainment of any designated use and cannot be immediately remedied, shall apply to the Division of Land Restoration's Office of Special Reclamation's discharges into Martin Creek of Preston County and its tributaries, including Glade Run, Fickey Run, and their unnamed tributaries. The following existing conditions will serve as instream interim criteria while this variance is in place: pH range of 3.2-9.0, 10 mg/L total iron, and 15 mg/L dissolved aluminum. Alternative restoration measures, as described in the variance application submitted by the Division of Land Restoration's Office of Special Reclamation, shall be used to achieve significant improvements to existing conditions in these waters during the variance period. Conditions will be evaluated during each triennial review throughout the variance period. This variance shall remain in effect until action by the secretary to revise the variance or until July 1, 2025, whichever comes first.

7.2.d.9. Blackwater River - (Reserved)

7.2.d.10. West Fork River - (Reserved)

7.2.d.11. Tygart River -

7.2.d.11.1. A variance pursuant to 46CSR6, based on human-caused conditions which prohibit the full attainment of any designated use and cannot be immediately remedied, shall apply to the Division of Land Restoration's Office of Special Reclamation's discharges into Maple Run, Left Fork Little Sandy Creek, and their unnamed tributaries. The following existing conditions will serve as instream interim criteria while this variance is in place: For Maple Run, pH range of 3.3-9.0, 2 mg/L total iron, and 12 mg/L dissolved aluminum; for Left Fork Little Sandy Creek, pH range of 2.5-9.0, 14 mg/L total iron, and 33 mg/L dissolved aluminum. Alternative restoration measures, as described in the variance application submitted by the Division of Land Restoration's Office of Special Reclamation, shall be used to achieve significant improvements to existing conditions in these waters during the variance period. Conditions will be evaluated and reported upon during each triennial review throughout the variance period. This variance shall remain in effect until action by the secretary to revise the variance or until July 1, 2025, whichever comes first.

7.2.d.12. Buckhannon River - (Reserved)

7.2.d.13. Middle Fork River - (Reserved)

7.2.d.14. Youghiogheny River - (Reserved)

7.2.d.15. Ohio River Main Stem - (Reserved)

7.2.d.16. Ohio River Tributaries -

7.2.d.16.1. Site-specific numeric criteria shall apply to the stretch of Conners Run (0-77-A), a tributary of Fish Creek, from its mouth to the discharge from Conner Run impoundment, which shall not have the Water Use Category A and may contain selenium not to exceed 62 µg/1 and iron not to exceed 3.5 mg/1 as a monthly average and 7 mg/1 as a daily maximum.

7.2.d.17. Little Kanawha River - (Reserved)

7.2.d.18. Hughes River - (Reserved)

7.2.d.19. Kanawha River Zone 1 - Main Stem

7.2.d.19.1. For the Kanawha River main stem, Zone 1, the minimum flow shall be 1,960 cfs at the Charleston gauge.

7.2.d.20. Kanawha River Zone 2 and Tributaries.

7.2.d.20.1. For the main stem of the Kanawha River only, the minimum flow shall be 1,896 cfs at mile point 72.

7.2.d.20.2. The stretch between the mouth of Little Scary Creek (K-31) and the Little Scary impoundment shall not have Water Use Category A. The following site-specific numeric criteria shall apply to that section: selenium not to exceed 62 µg/1 and copper not to exceed 105 µg/1 as a daily maximum or 49 µg/1 as a four-day average.

7.2.d.21. Pocatalico River - (Reserved)

7.2.d.22. Coal River - (Reserved)

7.2.d.23. Elk River - (Reserved)

7.2.d.24. Gauley River - (Reserved)

7.2.d.25. Meadow River - (Reserved)

7.2.d.26. Cherry River - (Reserved)

7.2.d.27. Cranberry River - (Reserved)

7.2.d.28. Williams River - (Reserved)

7.2.d.29. New River –

7.2.d.29.1. In Marr Branch, a tributary of the New River, a site-specific dissolved zinc criteria defined by the equation CMC=CCC=e0.8541*ln(hardness)+1.151 x CF shall apply for both chronic and acute exposures

7.2.d.30. Greenbrier River - (Reserved)

7.2.d.31. Bluestone River - (Reserved)

7.2.d.32. Bluestone Lake - (Reserved)

7.2.d.33. East River - (Reserved)

7.2.d.34. Guyandotte River -

7.2.d.34.1. Pats Branch from its confluence with the Guyandotte River to a point 1000 feet upstream shall not have Water Use Category A and Category D1 designation.

7.2.d.35. Mud River - (Reserved)

7.2.d.36. Big Sandy River - (Reserved)

7.2.d.37. Tug Fork River - (Reserved)

§47-2-8. Specific Water Quality Criteria.

8.1. Charts of specific water quality criteria are included in Appendix E, Table 1.

8.1.a. Specific state (i.e. total, total recoverable, dissolved, valence, etc.) of any parameter to be analyzed shall follow 40 CFR 136, Guidelines Establishing Test Procedures for Analysis of Pollutants Under the Clean Water Act, as amended, June 15, 1990 and May 18, 2012, 47CSR10, and "National Pollutant Discharge Elimination System (NPDES) Program."

8.1.b. Compliance with aquatic life water quality criteria expressed as dissolved metal shall be determined based on dissolved metals concentrations.

8.1.b.1. The aquatic life criteria for all metals listed in Appendix E, Table 2 shall be converted to a dissolved concentration by multiplying each numerical value or criterion equation from Appendix E, Table 1 by the appropriate conversion factor (CF) from Appendix E, Table 2.

8.1.b.2. Permit limits based on dissolved metal water quality criteria shall be prepared in accordance with the U.S. EPA document "The Metals Translator: Guidance For Calculating A Total Recoverable Permit Limit From A Dissolved Criterion, EPA 823-B-96-007 June 1996.

8.1.b.3. NPDES permit applicants may petition the secretary to develop a site-specific translator consistent with the provisions in this section. The secretary may, on a case-by-case basis, require an applicant applying for a translator to conduct appropriate sediment monitoring through SEM/AVS ratio, bioassay or other approved methods to evaluate effluent limits that prevent toxicity to aquatic life.

8.1.c. An "X" or numerical value in the use columns of Appendix E, Table 1 shall represent the applicable criteria.

8.1.d. Charts of water quality criteria in Appendix E, Table 1 shall be applied in accordance with major stream and use applications, sections 6 and 7, herein.

8.2. Criteria for Toxicants

8.2.a. Toxicants which are carcinogenic have human health criteria (Water Use Categories A and C) based upon an estimated risk level of one additional cancer case per one million persons (10^{-6}) and are indicated in Appendix E, Table 1 with an endnote ([b]).

8.2.b. The critical design flow for human health criteria effluent limits shall be the long-term harmonic mean flow.

8.3. Criteria for Nutrients

8.3.a. Lakes

8.3.a.1. This subsection establishes nutrient criteria designed to protect Water Use Categories B and C. The following cool water nutrient criteria shall apply to cool water lakes. (*See* Appendix F for a representative list.) The following warm water nutrient criteria shall apply to all other lakes with a summer residence time greater than 14 days.

8.3.a.2. Total phosphorus shall not exceed 40 µg/l for warm water lakes and 30 µg/l for cool water lakes based on an average of four or more samples collected during the period May 1 to October 31. Chlorophyll-a shall not exceed 20 µg/l for warm water lakes and 10 µg/l for cool water lakes based on an average of four or more samples collected during the period May 1 to October 31. In lieu of total phosphorus and/or chlorophyll-a sampling, impairment may be evidenced at any time by noncompliance with subsection 3.2 above, as determined by the secretary.

8.4. Variances from Specific Water Quality Criteria. A variance from numeric criteria may be granted to a discharger if it can be demonstrated that the conditions outlined in paragraphs 6.1.b.1 through 6.1.b.6 herein limit the attainment of one or more specific water quality criteria. Variances shall apply only to the discharger to whom they are granted and shall be reviewed by the secretary at least every three years. In granting a variance, the secretary shall follow the requirements for revision of water quality standards in 46CSR6.

8.5. Site-specific numeric criteria. The secretary may establish numeric criteria different from those set forth in Appendix E, Table 1 for a stream or stream segment upon a demonstration that existing numeric criteria are either over-protective or under-protective of the aquatic life residing in the stream or stream segment. A site-specific numeric criterion will be established only where the numeric criterion will be fully protective of the aquatic life and the existing and designated uses in the stream or stream segment. In adopting site-specific numeric criteria, the requirements for revision of water quality standards set forth in 46 CSR 6 shall be followed, unless developed pursuant to subdivision 8.5.a herein.

8.5.a. A site-specific numeric criterion may be established as part of the NPDES permitting process using any of the following established methods: a Water Effect Ratio study pursuant to the procedures described in U.S. EPA's "Interim Guidance on the Determination and Use of Water-Effect Ratios for Metals" (February 1994); the Streamlined Water-Effect Ratio Procedure for Discharges of Copper (March 2001); a Biotic Ligand Model analysis pursuant to the procedures described in U.S. EPA's "Aquatic Life Ambient Freshwater Quality Criteria – Copper" (February 2007).

8.6. The Secretary shall appoint a work group consisting of DEP employees (one of whom shall serve as a chairperson) and the DEP Environmental Protection Advisory Council. The work group will meet monthly from June 2020 to May 2021 to research and review remaining numeric human health criteria found in Appendix E, subsection 8.23 Organics and subsection 8.25 Phenolic Materials, in order to make a recommendation to the Secretary for the proposal of additional updates to the numeric human health criteria, if necessary, to be presented to the 2022 Legislative Session.

§47-2-9. Establishment Of Safe Concentration Values.

When a specific water quality standard has not been established by this rule and there is a discharge or proposed discharge into waters of the State, the use of which has been designated a Category B1, B2, B3 or B4, such discharge may be regulated by the secretary where necessary to protect State waters through establishment of a safe concentration value as follows:

9.1. Establishment of a safe concentration value shall be based upon data obtained from relevant aquatic field studies, standard bioassay test data which exists in substantial available scientific literature, or data obtained from specific tests utilizing one (1) or more representative important species of aquatic life designated on a case-by-case basis by the secretary and conducted in a water environment which is equal to or closely approximates that of the natural quality of the receiving waters.

9.2. In those cases where it has been determined that there is insufficient available data to establish a safe concentration value for a pollutant, the safe concentration value shall be determined by applying the appropriate application factor as set forth below to the 96-hour LC 50 value. Except where the secretary determines, based upon substantial available scientific data, that an alternate application factor exists for a pollutant, the following appropriate application factors shall be used in the determination of safe concentration values:

9.2.a. Concentrations of pollutants or combinations of pollutants that are not persistent and not cumulative shall not exceed 0.10 (1/10) of the 96-hour LC 50.

9.2.b. Concentrations of pollutants or combinations of pollutants that are persistent or cumulative shall not exceed 0.01 (1/100) of the 96-hour LC 50.

9.3. Persons seeking issuance of a permit pursuant to this rule authorizing the discharge of a pollutant for which a safe concentration value is to be established using special bioassay tests pursuant to subsection 9.1 shall perform such testing as approved by the secretary and shall submit all of the following in writing to the secretary:

9.3.a. A plan proposing the bioassay testing to be performed.

9.3.b. Such periodic progress reports of the testing as may be required by the secretary.

9.3.c. A report of the completed results of such testing including, but not limited to, all data obtained during the course of testing and all calculations made in the recording, collection, interpretation, and evaluation of such data.

9.4. Bioassay testing shall be conducted in accordance with test procedures outlined in 40 C.F.R. § 136, as amended, or other methodologies approved by the secretary.

APPENDIX A
CATEGORY B-2 - TROUT WATERS

This list contains known trout waters and is not intended to exclude any waters which meet the definition in Section 2.19.

River Basin	County	Stream
James River		
J	Monroe	South Fork Potts Creek
Potomac River		
P	Jefferson	Town Run
P	"	Rocky Marsh Run
P	Berkeley	Opequon Creek
P	"	Tuscarora Creek (Above Martinsburg)
P	"	Middle Creek (Above Route 30 Bridge)
P	"	Mill Creek
P	"	Hartland Run
P	"	Mill Run
P	"	Tillance Creek
P	Morgan	Meadow Branch
PS	Jefferson	Flowing Springs Run (Above Halltown)
PS	"	Cattail Run
PS	"	Evitt's Run
PS	"	Big Bullskin Run
PS	"	Long Marsh Run
PC	Hampshire	Cold Stream
PC	"	Edwards Run and Impoundment
PC	"	Dillons Run
PC	Hardy	Lost River
PC	"	Camp Branch
PC	"	Lower Cove Run
PC	"	Moores Run
PC	"	North River (Above Rio)
PC	"	Waites Run
PC	"	Trout Run
PC	"	Trout Pond (Impoundment)

PC	"	Warden Lake (Impoundment)
PC	"	Rock Cliff Lake (Impoundment)
PSB	Hampshire	Mill Creek
PSB	"	Mill Run
PSB	Hardy	Dumpling Creek
PSB	Grant-Pendleton	North Fork South Branch
PSB	Grant	North Fork Lunice Creek
PSB	"	South Fork Lunice Creek
PSB	"	South Mill Creek (Above Hiser)
PSB	"	Spring Run
PSB	Pendleton	Hawes Run (Impoundment)
PSB	"	Little Fork
PSB	"	South Branch (Above North Fork)

River Basin	County	Stream
Potomac River		
PSB	Pendleton	Senena Creek
PSB	"	Laurel Fork
PSB	"	Big Run
PNB	Mineral	North Fork Patterson Creek
PNB	"	Fort Ashby (Impoundment)
PNB	"	New Creek
PNB	"	New Creek Dam 14 (Impoundment)
PNB	"	Mill Creek (Above Markwood)
Monongahela River		
M	Monongalia-Marion	Whiteday Creek (Above Smithtown)
MC	Monongalia	Morgan Run
MC	"	Coopers Rock (Impoundment)
MC	"	Blaney Hollow
MC	Preston	Laurel Run
MC	"	Elsey Run
MC	"	Saltlick Creek
MC	"	Buffalo Creek
MC	"	Wolf Creek
MC	Tucker	Clover Run
MC	"	Elklick Run
MC	"	Horseshoe Run

MC	"	Maxwell Run
MC	"	Red Creek
MC	"	Slip Hill Mill Branch
MC	"	Thomas Park (Impoundment)
MC	"	Blackwater River (Above Davis)
MC	"	Blackwater River (Below Davis)
MC	Randolph	Camp Five Run
MC	"	Dry Fork (Above Otter Creek)
MC	"	Glady Fork
MC	"	Laurel Fork
MC	"	Gandy Creek (Above Whitmer)
MC	"	East Fork Glady Fork (Above C & P Compressor Station)
MC	Randolph	Shavers Fork (Above Little Black Fork)
MC	"	Three Spring Run
MC	"	Spruce Knob Lake (Impoundment)
MW	Harrison	Dog Run (Pond)
MW	Lewis	Stonecoal
MT	Barbour	Brushy Fork (Above Valley Furnace)
MT	"	Teter Creek Lake (Impoundment)
MT	"	Mill Run
MT	Taylor-Barbour	Tygart Lake Tailwaters (Above Route 119 Bridge)
MT	Preston	Roaring Creek (Above Little Lick Branch)
MT	Randolph	Tygart River (Above Huttonsville)
MT	"	Elkwater Fork

River Basin	County	Stream
Monongahela River		
MT	Randolph	Big Run
MTB	Upshur-Randolph-Lewis	Right Fork Buckhannon River
MTB	Upshur	Buckhannon River (Above Beans Mill)
MTB	Upshur	French Creek
MTB	Upshur-Randolph	Left Fork Right Fork
MTN	Upshur	Right Fork Middle Fork River
MTM	Randolph	Middle Fork River (Above Cassity)

MY	Preston	Rhine Creek
Little Kanawha River		
LK	Upshur	Left Fork-Right Fork Little Kanawha River
LK	Upshur-Lewis	Little Kanawha River (Above Wildcat)
Kanawha River		
KE	Braxton	Sutton Reservoir
KE	"	Sutton Lake Tailwaters (Above Route 38/5 Bridge)
KE	Webster	Back Fork
KE	"	Desert Fork
KE	"	Fall Run
KE	"	Laurel Fork
KE	"	Left Fork Holly River
KE	"	Sugar Creek
KE	"	Elk River (Above Webster Springs)
KC	Raleigh	Stephens Lake (Impoundment)
KC	"	Marsh Fork (Above Sundial)
KG	Nicholas	Summersville Reservoir (Impoundment)
KG	"	Summersville Tailwaters (Above Collison Creek)
KG	Nicholas	Deer Creek
KG	Randolph-Webster	Gauley River (Above Moust Coal Tipple)
KG	Fayette	Glade Creek
KG	Nicholas	Hominy Creek
KG	"	Anglins Creek
KG	Greenbrier	Big Clear Creek
KG	"	Little Clear Creek and Laurel Run
KG	"	Meadow Creek
KG	Fayette	Wolf Creek
KG	Nicholas	Cherry River
KG	Greenbrier-Nicholas	Laurel Creek
KG	" "	North Fork Cherry River
KG	Greenbrier	Summit Lake (Impoundment)
KG	Greenbrier-Nicholas	South Fork Cherry River

River Basin	County	Stream
Kanawha River		
KGC	Pocahontas-Webster-Nicholas	Cranberry River
KGC	Pocahontas	South Fork Cranberry River
KGW	Pocahontas	Tea Creek
KGW	Pocahontas-Webster	Williams River (Above Dyer)
KN	Raleigh	Glade Creek
KN	Summers	Meadow Creek
KN	Fayette	Mill Creek
KN	"	Laurel Creek (Above Cotton Hill)
KN	Raleigh	Pinch Creek
KN	Monroe	Rich Creek
KN	"	Turkey Creek
KN	Fayette	Dunloup Creek (Downstream from Harvey Sewage Treatment Plant)
KN	Mercer	East River (Above Kelleysville)
KN	"	Pigeon Creek
KN	Monroe	Laurel Creek
KNG	Monroe	Kitchen Creek (Above Gap Mills)
KNG	Greenbrier	Culverson Creek
KNG	"	Milligan Creek
KNG	Greenbrier-Monroe	Second Creek (Rt. 219 Bridge to Nickell's Mill)
KNG	Greenbrier	North Fork Anthony Creek
KNG	"	Spring Creek
KNG	"	Anthony Creek (Above Big Draft)
KNG	Pocahontas	Watoga Lake
KNG	"	Beaver Creek
KNG	"	Knapp's Creek
KNG	"	Hills Creek
KNG	"	North Fork Deer Creek (Above Route 28/5)
KNG	"	Deer Creek
KNG	"	Sitlington Creek
KNG	"	Stoney Creek
KNG	"	Swago Creek
KNG	"	Buffalo Fork (Impoundment)
KNG	"	Seneca (Impoundment)

KNG	"	Greenbrier River (Above Hosterman)
KNG	"	West Fork-Greenbrier River (Above the impoundment at the tannery)
KNG	"	Little River-East Fork
KNG	"	Little River-West Fork
KNG	"	Five Mile Run
KNG	"	Mullenax Run
KNG	"	Abes Run
KNB	Mercer	Marsh Fork
KNB	"	Camp Creek
OG	Wyoming	Pinnacle creek
BST	McDowell	Dry Fork (Above Canebrake)

APPENDIX B

This list contains known waters used as public water supplies and is not intended to exclude any waters as described in Section 6.2, herein.

River Basin	County	Operating Company	Source
Shenandoah River			
S	Jefferson	Charlestown Water	Shenandoah River
Potomac River			
P	Jefferson	3-M Company	Turkey Run
P	"	Shepherdstown Water	Potomac River
P	"	Harpers Ferry Water	Elk Run
P	Berkeley	DuPont Potomac River Works	Potomac River
P	"	Berkeley County PSD	Le Feure Spring
P		Opequon PSD	Quarry Spring
P	"	Hedgesville PSD	Speck Spring
P	Morgan	Paw Paw Water	Potomac River
PSB	Hampshire	Romney Water	South Branch Potomac River
PSB	"	Peterkin Conference Center	Mill Run
PSB	Hardy	Moorefield Municipal Water	South Fork River
PSB	Pendleton	U.S. Naval Radio Sta.	South Fork River
PSB	"	Circleville Water Inc.	North Fork of South Branch, Potomac River
PSB	Grant	Mountain Top PSD	Mill Creek, Impoundment
PSB	"	Petersburg Municipal Water	South Branch, Potomac River
PNB	Grant	Island Creek Coal	Impoundment
PNB	Mineral	Piedmont Municipal Water	Savage River, Maryland
PNB	"	Keyser Water	New Creek
PNB	"	Fort Ashby PSD	Lake
Monongahela River			

M	Monongalia	Morgantown Water Comm.	Colburn Creek & Monongahela River
M	"	Morgantown Ordinance Works	Monongahela River
M	Preston	Preston County PSD	Deckers Creek
M	Monongalia	Blacksville # 1 Mine	Impoundment
M	"	Loveridge Mine	Impoundment
M	"	Consolidation Coal Co.	Impoundment
M	Preston	Mason Town Water	Block Run
MC	Preston	Fibair Inc.	Impoundment
MC	Monongalia	Cheat Neck PSD	Cheat Lake
MC	"	Lakeview County Club	Cheat Lake-Lake Lynn

River Basin	County	Operating Company	Source
Monongahela River			
MC	Monongalia	Union Districk PSD	Cheat Lake-Lake Lynn
MC	"	Cooper's Rock State Park	Impoundment
MC	Preston	Kingwood Water	Cheat River
MC	Preston	Hopemount State Hosp.	Snowy Creek
MC	"	Rowlesburg Water	Keyser Run & Cheat River
MC	"	Albright	Cheat River
MC	Tucker	Parsons Water	Shavers & Elk Lick Fork
MC	"	Thomas Municipal	Thomas Reservoir
MC	"	Hamrick PSD	Dry Fork
MC	"	Douglas Water System	Long Run
MC	"	Davis Water	Blackwater River
MC	"	Hambleton Water System	Roaring Creek
MC	"	Canaan Valley State	Blackwater River Park
MC	Pocahontas	Cheat Mt. Sewer	Shavers Lake
MC	"	Snowshoe Co. Water	Shavers Fork
MC	Randolph	Womelsdorf Water	Yokum Run
MW	Harrison	Lumberport Water	Jones Run
MW	"	Clarksburg Water Bd.	West Fork River
MW	"	Bridgeport Mun. Water	Deecons & Hinkle Creek
MW	"	Salem Water Board	Dog Run
MW	"	West Milford Water	West Fork River
MW	Lewis	W.V. Water-Weston District	West Fork River

MW	"	Jackson's Mill Camp	Impoundment
MW	"	West Fork River PSD	West Fork River
MW	"	Kennedy Compresssor Station	West Fork River
MW	"	Jane Lew Water Comm.	Hackers Creek
MW	Harrison	Bel-Meadow Country Club	Lake
MW	"	Harrison Power Station	West Fork River
MW	"	Oakdale Portal	Impoundment
MW	"	Robinson Port	Impoundment
MT	Marion	Fairmont Water Comm.	Tygart River
MT	"	Mannington Water	Impoundment
MT	"	Monongah Water Works	Tygart River
MT	"	Eastern Assoc.	Coal Corp Impoundment
MT	"	Four States Water	Impoundment
MT	Harrison	Shinnston Water Dept.	Tygart River
MT	Taylor	Grafton Water	Tygart River-Lake
MT	Barbour	Phillippi Water	Tygart River
MT	"	Bethlehem Mines Corp.	Impoundment
MT	"	Belington Water Works	Tygart River & Mill Run Lake
MT	Randolph	Elkins Municipal Water	Tygart River
MT	"	Beverly Water	Tygart River
MT	"	Valley Water	Tygart River
MT	"	Huttonsville Medium Security Prison	Tygart River
MT	"	Mill Creek Water	Mill Creek
MTB	Upshur	Buckhannon Water Board	Buckhannon River

River Basin	County	Operating Company	Source
Ohio River			
O Zone 1	Hancock	Chester Water & Sewer	Ohio River
O "	Brooke	City of Weirton	Ohio River
O Zone 1	Brooke	Weirton Steel Division	Ohio River
O "	Ohio	Wheeling Water	Ohio River
O "	Tyler	Sistersville Mun. Water	Ohio River
O "	Pleasants	Pleasants Power Station	Ohio River
O "	Cabell	Huntington Water Corp.	Ohio River
O "	Marshall	Mobay Chemical Co.	Ohio River
O "	Wood	E. I. DuPont	Ohio River

O	Zone 2	Marshall	Meron Water	Glass House Hollow
O	"	"	New Urindahana Water	Wheeling Creek System
O	"	Wetzel	Pine Grove Water	North Fork, Fishing Creek
O	"	Marshall	Consolidated Coal Co.	Impoundment
O	"	Tyler	Middlebourne Water	Middle Island Creek
O	"	Doddridge	West Union Mun. Water	Middle Island Creek
O	"	Mason	Hidden Valley Country	Lake/Impoundment
O	"	Jackson	Ripley Water	Mill Creek
O	"	Wayne	Wayne Municipal Water	Twelve Pole Creek
O	"	"	East Lynn Lake	East Lynn Lake
O	"	"	Monterey Coal Co.	Impoundment

Little Kanawha

LK	Wood	Claywood Park PSD	Little Kanawha River
LK	Calhoun	Grantsville Mun. Water	Little Kanawha River
LK	Gilmer	Glenville Utility	Little Kanawha River
LK	"	Consolidated Gas Compressor	Steer Creek
LK	Braxton	Burnsville Water Works	Little Kanawha River
LK	Roane	Spencer Water	Spring Creek Mile Tree Reservoir
LK	Wirt	Elizabeth Water	Little Kanawha River
LKH	Ritchie	Cairo Water	North Fork Hughes River
LKH	"	Harrisville Water	North Fork Hughes River
LKH	"	Pennsboro Water	North Fork Hughes River

Kanawha River

K	Putnam	Buffalo Water	Cross Creek
K	"	Winfield Water	Poplar Fork & Crooked Creek
K	"	South Putnam PSD	Poplar Fork & Crooked Creek
K	Kanawha	Cedar Grove Water	Kanawha River
K	"	Pratt Water	Kanawha River
K	Fayette	Armstrong PSD PO-K1-CO-EL	Kanawha River & Gum Hollow
K	"	Kanawha Water Co.-	Unnamed Tributary Kanawha Beards Fork
K	Kanawha	Midland Trail School	Impoundment
K	"	Cedar Coal Co.	Impoundment
K	Fayette	Elkem Metals Co.	Kanawha River
K	Fayette	Deepwater PSD	Kanawha River

River Basin	County	Operating Company	Source
Kanawha River			
K	Fayette	Kanawha Falls PSD	Kanawha River
K	"	W.V. Water-Montgomery	Kanawha River
Pocatalico River			
KP	Kanawha	Sissonville PSD	Pocatalico River
KP	Roane	Walton PSD	Silcott Fork Dam
Coal River			
KC	Kanawha	St. Albans Water	Coal River
KC	"	Washington PSD	Coal River
KC	Lincoln	Lincoln PSD	Coal River
KC	Boone	Coal River PSD	Coal River
KC	"	Whitesville PSD	Coal River
KC	Raleigh	Armco Mine 10	Marsh Fork
KC	"	Armco Steel-Montc. Stickney	Coal River
KC	Raleigh	Peabody Coal	Coal River
KC	"	Stephens Lake Park	Lake Stephens
KC	Boone	W.V. Water-Madison Dist.	Little Coal River
KC	"	Van PSD	Pond Fork
KC	Raleigh	Consol. Coal Co.	Workmans Creek
KC	Boone	Water Ways Park	Coal River
Elk River			
KE	Kanawha	Clendenin Water	Elk River
KE	"	W.V. Water-Kanawha Valley District	Elk River
KE	Kanawha	Pinch PSD	Elk River
KE	Clay	Clay Waterworks	Elk River
KE	"	Procious PSD	Elk River
KE	Braxton	Flatwoods-Canoe Run PSD	Elk River
KE	"	Sugar Creek PSD	Elk River
KE	"	W.V. Water-Gassaway Dist.	Elk River
KE	"	W.V. Water-Sutton Dist.	Elk River

KE	Webster	W.V. Water-Webster Springs	Elk River
KE		Holly River State Park	Holly River

Gauley River

KG	Nicholas	Craigsville PSD	Gauley River
KG	"	Summersville Water	Impoundment/ Muddlety Creek
KG	"	Nettie-Leivasy PSD	Jim Branch
KG	Webster	Cowen PSD	Gauley River
KG	Nicholas	Wilderness PSD	Anglins Creek & Meadow River
KG	"	Richwood Water	North Fork Cherry River
KN	Fayette	Ames Heights Water	Mill Creek
KN	"	Mt. Hope Water	Impounded Mine (Surface)
KN	Fayette	Ansted Municipal Water	Mill Creek

River Basin	County	Operating Company	Source
New River			
KN	Fayette	Fayette Co. Park	Impoundment
KN	"	New River Gorge Campground	Impoundment
KN	"	Fayetteville Water	Wolfe Creek
KN	Raleigh	Beckley Water	Glade Creek
KN	"	Westmoreland Coal Co.	Farley Branch
Bluestone River			
KNB	Summers	Jumping Branch-Nimitz	Mt. Valley Lake
KNB	"	Bluestone Conf. Center	Bluestone Lake
KNB	"	Pipestem State Park	Impoundment
KNB	Mercer	Town of Athens	Impoundment
KNB	"	Bluewell PSD	Impoundment
KNB	"	Bramwell Water	Impoundment
KNB	"	Green Valley-Glenwood PSD	Bailey Reservoir
KNB	"	Kelly's Tank	Spring
KNB	"	W.V. Water Princeton	Impoundment/ Brusch Creek
KNB	"	Lashmeet PSD	Impoundment
KNB	"	Pinnacle Water Assoc.	Mine
KNB	"	W.V. Water Bluefield	Impoundment

Greenbrier River

KNG	Summers	W.V. Water Hinton	Greenbrier River & New River
KNG	"	Big Bend PSD	Greenbrier River
KNG	Greenbrier	Alderson Water Dept.	Greenbrier River
KNG	"	Ronceverte Water	Greenbrier River
KNG	"	Lewisburg Water	Greenbrier River
KNG	Pocahontas	Denmar State Hospital Water	Greenbrier River
KNG	"	City of Marlinton Water	Knapp Creek
KNG	"	Cass Scenic Railroad	Leatherbark Creek
KNG	"	Upper Greenbrier PSD	Greenbrier River
KNG	"	The Hermitage	Greenbrier River

Guyandotte River

OG	Cabell	Salt Rock PSD	Guyandotte River
OG	Lincoln	West Hamlin Water	Guyandotte River
OG	Logan	Logan Water Board	Guyandotte River
OG	"	Man Water Works	Guyandotte River
OG	"	Buffalo Creek PSD	Buffalo Creek/ Mine/Wells
OG	Logan	Chapmanville	Guyandotte River
OG	"	Logan PSD	Whitman Creek/ Guyandotte River
OG	Mingo	Gilbert Water	Guyandotte River
OG	Wyoming	Oceana Water	Laurel Fork
OG	"	Glen Rogers PSD	Impoundment
OG	Wyoming	Pineville Water	Pinnacle Creek
OG	Raleigh	Raleigh Co. PSD-Amigo	Tommy Creek
OMG	Cabell	Milton Water Works	Guyandotte River
OMG	"	Culloden PSD	Indian Fork Creek

River Basin	County	Operating Company	Source
Guyandotte River			
OMG	Putnam	Hurricane Municipal Water	Impoundment
OMG	Putnam	Lake Washington PSD	Lake Washington

Big Sandy River

BS	Wayne	Kenova Municipal Water	Big Sandy River
BS	"	Fort Gay Water	Tug Fork
BST	Mingo	Kermit Water	Tug Fork
BST	"	Matewan Water	Tug Fork
BST	"	A & H Coal Co., Inc.	Impoundment
BST	"	Williamson Water	Impoundment
BST	McDowell	City of Welch	Impoundment/Wells
BST	"	City of Gary	Impoundment/Mine

APPENDIX C
CATEGORY E-3 - POWER PRODUCTION

This list contains known power production facilities and is not intended to exclude any waters as described in Section 6.6.c, herein.

River Basin	County	Station Name	Operating Company
Monongahela River			
M	Monongalia	Fort Martin Power Station	Monongahela Power
M	Marion	Rivesville Station	Monongahela Power
MC	Preston	Albright Station	Monongahela Power
Potomac	Grant	Mt. Storm Power Station	Virginia Electric & Power Company
Ohio River			
O - Zone 1	Wetzel	Hannibal (Hydro)	Ohio Power
O " "	Marshall	Kammer	Ohio Power
O " "	"	Mitchell	Ohio Power
O " "	Pleasants	Pleasants Station	Monongahela Power
O " "	"	Willow Island Station	Monongahela Power
O " "	Mason	Phillip Sporn Plant	Central Operating (AEP)
O " "	"	Racine (Hydro)	Ohio Power
O " "	"	Mountaineer	Appalachian Power Co.
K	Putnam	Winfield (Hydro)	Appalachian Power Co.
K	Kanawha	Marmet (Hydro)	Appalachian Power Co.
K	"	London (Hydro)	Appalachian Power Co.
K	"	Kanawha River	Appalachian Power Co.
K	"	John E. Amos	Appalachian Power Co.

APPENDIX D
CATEGORY C - WATER CONTACT RECREATION

This list contains waters known to be used for water contact recreation and is not intended to exclude any waters as described in section 6.4, herein.

River Basin	Stream Code	Stream	County
Shenandoah	S	Shenandoah River	Jefferson
Potomac	P	Potomac River	Jefferson
	P	" "	Hampshire
	P	" "	Berkeley
	P	" "	Morgan
	P-9	Sleepy Creek & Meadow Branch	Berkeley
	P-9-G-1	North Fork of Indian Run	Morgan
South Branch	PSB	South Branch of Potomac River	Hampshire
	PSB	" "	Hardy
	PSB	" "	Grant
	PSB-21-X	Hawes Run	Pendleton
	PSB-25-C-2	Spring Run	Grant
	PSB-28	North Fork South Branch Potomac River	Grant
North Branch	PNB	North Branch of Potomac River	Mineral
	PNB-4-EE	North Fork Patterson Creek	Grant
	PNB-7-H	Linton Creek	Grant
	PNB-17	Stoney River-Mt. Storm Lake	Grant
	PC	Cacapon River	Hampshire

Monongalia			
Cheat	MC	Cheat Lake/Cheat river	Monongalia/Preston
	MC	Alpine Lake	Preston
	MC-6	Coopers Rock Lake/ Quarry Run	Monongalia
	MC-12	Big Sandy Creek	Preston
	MSC	Shavers Fork	Randolph
	MTN	Middle Fork River	Barbour/Randolph/ Upshur
	MW	West Fork River	Harrison
	MW-18	Stonecoal Creek/ Stonecoal Lake	Lewis
River Basin	Stream Code	Stream	County
Ohio	O	Ohio River	Brooke/Cabell/ Hancock/Jackson/ Marshall/Mason/Ohio/ Pleasants/Tyler/ Wayne/Wood/Wetzel
	O-2-H	Beech Fork of Twelvepole Creek/Beech Fork Lake	Wayne
	O-2-Q	East Fork of Twelvepole Creek/East Lynn Lake	Wayne
	O-3	Fourpole Creek	Cabell
	O-21	Old Town Creek/ McClintic Ponds	Mason
	OMI	Middle Island Creek/ Crystal Lake	Doddridge
	OG	Guyandotte River	Cabell
	OG	Guyandotte River/ R. D. Bailey Lake	Wyoming
	OGM	Mud River	Cabell

Little Kanawha	LK	Little Kanawha River/ Burnsville Lake	Braxton
Kanawha	K	Kanawha River	Fayette/Kanawha/ Mason/Putnam
	K-1	Unnamed Tributary Krodel Lake	Mason
	KC	Coal River	Kanawha
	KC-45-Q	Stephens Branch/ Lake Stephens	Raleigh
	KE	Elk River	Kanawha/Clay/ Braxton/Webster/ Randolph
	KE	Sutton Lake	Braxton
	KN	New River	Fayette/Raleigh/ Summers
	KN-26-F	Little Beaver Creek	Raleigh
	KNG	Greenbrier River	Greenbrier/ Pocahontas/Summers
	KNG-23-E-1	Little Devil Creek/ Moncove Lake	Monroe
	KNG-28	Anthony Creek	Greenbrier
	KNG-28-P	Meadow Creek/ Lake Sherwood	Greenbrier
River Basin	Stream Code	Stream	County
	KNB	Bluestone River/ Bluestone Lake	Summers
	KG	Gauley River	Webster
Kanawha	KG	Gauley River/ Summersville Lake	Nicholas
	KGW	Williams River	Webster

APPENDIX E, TABLE 1

PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
8.1 Dissolved Aluminum (ug/l) For water with pH <6.5 or >9.0	750xCF[5]	750xCF[5]	750xCF[5]	87xCF[5]			
8.1.1 Dissolved Aluminum (ug/l) For water with pH $\geq$ 6.5 and $\leq$ 9.0, the four-day average concentration of dissolved aluminum determined by the following equation[e]: $Al = e^{(1.3695[\ln(hardness)]+0.9121)} \times CF^5$		X		X			
8.1.2 Dissolved Aluminum (ug/l) For water with pH $\geq$ 6.5 and $\leq$ 9.0, the one-hour average concentration of dissolved aluminum determined by the following equation[e]: $Al = e^{(1.3695[\ln(hardness)]+1.8268)} \times CF^5$	X		X				
8.2. Acute and chronic aquatic life criteria for ammonia shall be determined using the National Criterion for Ammonia in Fresh Water[d] from USEPA's 1999 Update of Ambient Water Quality Criteria for Ammonia (EPA-822-R-99-014, December 1999)	X	X	X	X			
8.3 Antimony (ug/l)					4300	14	
8.4 Arsenic (ug/l)					10	10	100
8.4.1 Dissolved Trivalent Arsenic (ug/l)	340	150	340	150			

APPENDIX E, TABLE 1

PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2				
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]	C[3]	A[4]	
8.5 Barium (mg/l)						1.0	
8.6 Beryllium (ug/l)	130		130			4.0	
8.7 Cadmium (ug/l) Hardness (mg/l $CaCO_3$) — Soluble Cd 0 - 35 — 1.0 36 - 75 — 2.0 76 - 150 — 5.0 > 150 — 10.0						X	
8.7.1 10 ug/l in the Ohio River (O Zone 1) main stem (see section 7.1.d, herein)						X	
8.7.2 The four-day average concentration of dissolved cadmium determined by the following equation: $Cd = e^{(0.7409[\ln(hardness)]-4.719)} \times CF^5$		X		X			
8.7.3 The one-hour average concentration of dissolved cadmium determined by the following equation: $Cd = e^{(1.0166[\ln(hardness)]-3.924)} \times CF^5$	X		X				
8.8 Chloride (mg/l)	860	230	860	230	250	250	
8.9.1 Chromium, dissolved hexavalent (ug/l):	16	11	16	7.2		50	
8.9.2 Chromium, trivalent (ug/l) The one-hour average concentration of dissolved trivalent chromium determined by the following equation: $CrIII = e^{(0.8190[\ln(hardness)]+3.7256)} \times CF^5$	X		X				

APPENDIX E, TABLE 1

PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
8.9.3 The four-day average concentration of dissolved trivalent chromium determined by the following concentration: $CrIII = e^{(0.8190[\ln(hardness)]+0.6848)} \times CF^5$		X		X			
8.10 Copper (ug/l)						1000	
8.10.1 The four-day average concentration of dissolved copper determined by the following equation[a]: $Cu = e^{(0.8545[\ln(hardness)]-1.702)} \times CF^5$		X		X			
8.10.2 The one-hour average concentration of dissolved copper determined by the following equation[a]: $Cu = e^{(0.9422[\ln(hardness)]-1.700)} \times CF^5$	X		X				
8.11. Cyanide (ug/l) (As free cyanide $HCN+CN^-$)	22	5.0	22	5.0	5.0	5.0	
8.12 Dissolved Oxygen[c]: not less than 5 mg/l at any time.	X				X	X	X
8.12.1 Ohio River main stem - the average concentration shall not be less than 5.0 mg/l per calendar day and shall not be less than 4.0 mg/l at any time or place outside any established mixing zone - provided that a minimum of 5.0 mg/l at any time is maintained during the April 15-June 15 spawning season.	X						
8.12.2 Not less than 7.0 mg/l in spawning areas and in no case less than 6.0 mg/l at any time.			X				

APPENDIX E, TABLE 1

PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
8.13 Fecal Coliform: Maximum allowable level of fecal coliform content for Water Contact Recreation (either MPN or MF) shall not exceed 200/100 ml as a monthly geometric mean based on not less than 5 samples per month; nor to exceed 400_/100 ml in more than ten percent of all samples taken during the month.					X	X	
8.13.1 Ohio River main stem (zone 1) - During the non-recreational season (November through April only) the maximum allowable level of fecal coliform for the Ohio River (either MPN or MF) shall not exceed 2000/100 ml as a monthly geometric mean based on not less than 5 samples per month.					X	X	
8.14 Fluoride (mg/l)						1.4	
8.14.1 Not to exceed 2.0 for category D1 uses.							X
8.15 Iron[c] (mg/l)		1.5		1.0		1.5	
8.16 Lead (ug/l)						50	
8.16.1 The four-day average concentration of dissolved lead determined by the following equation[a]: $Pb = e^{(1.273[\ln(hardness)]-4.705)} x\ CF^5$		X		X			
8.16.2 The one-hour average concentration of dissolved lead determined by the following equation[a]: $Pb = e^{(1.273[\ln(hardness)]-1.46)}\ x\ CF^5$	X		X				

APPENDIX E, TABLE 1

PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
8.17 Manganese (mg/l) (see §6.2.d)						1.0	
8.18 Mercury The total organism body burden of any aquatic species shall not exceed 0.5 ug/g as methylmercury.					0.5	0.5	
8.18.1 Total mercury in any unfiltered water sample (ug/l):	2.4		2.4		0.15	0.14	
8.18.2 Methylmercury (water column) (ug/l):		.012		.012			
Nickel (ug/l)					4600	510	
8.19.1 The four-day average concentration of dissolved nickel determined by the following equation[a]: $Ni = e^{(0.846[\ln(hardness)]+0.0584)} \times CF^5$		X		X			
8.19.2 The one-hour average concentration of dissolved nickel determined by the following equation[a]: $Ni = e^{(0.846[\ln(hardness)]+2.255)} \times CF^5$	X		X				
8.20 Nitrate (as Nitrate-N) (mg/l)						10	
8.21 Nitrite (as Nitrite-N) (mg/l)	1.0		.060				
8.22 Nutrients							
Chlorophyll –a (μg/l) (see §47-2-8.3)							
Total Phosphorus (μg/l) (see §47-2-8.3)							

APPENDIX E, TABLE 1

PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
8.23 Organics							
Acenaphthene (ug/l)					990	670	
Acrylonitrile[b] (ug/l)					7.0	0.061	
Aldrin[b] (ng/l)	3.0		3.0		0.071	0.071	0.071
alpa-BHC (alpha- Hexachloro-cyclohexane)[b] (ug/l)					0.013	.0039	
Anthracene (ug/l)					40,000	8,300	
Benzene[b] (ug/l)					51	0.66	
Benzo(a) Anthracene[b] (ug/l)					0.018	0.0038	
Benzo(a) Pyrene[b] (ug/l)					0.018	0.0038	
Benzo(b) Fluoranthene[b] (ug/l)					0.018	0.0038	
Benzo(k) Fluoranthene[b] (ug/l)					0.018	0.0038	
beta-BHC(beta- Hexachloro-cyclohexane)[b] (ug/l)					0.046	0.014	
Bromoform[b] (ug/l)					120	7.0	
Carbon tetrachloride[b] (ug/l)					5	0.4	
Chlordane[b] (ng/l)	2400	4.3	2400	4.3	0.46	0.46	0.46
Chlorobenzene (mg/l)					21	0.68	
Chloroform[b] (ug/l)					2,000	60	
Chrysene[b] (ug/l)					0.018	0.0038	

APPENDIX E, TABLE 1

PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
DDT[b] (ng/l)	1100	1.0	1100	1.0	0.024	0.024	0.024
Dibenzo(a,h)Anthracene[b] (ug/l)					0.018	0.0038	
Dichlorobromomethane[b] (ug/l)					27	0.95	
Dieldrin[b] (ng/l)	2500	1.9	2500	1.9	0.071	0.071	0.071
Dioxin (2,3,7,8- TCDD)[b] (pg/l)					0.014	0.013	0.014
Endrin (ng/l)	180	2.3	180	2.3	30	30	30
Ethylbenzene (mg/l)					29	3.1	
Fluoranthene (ug/l)					370	300	
Fluorene (ug/l)					5300	1100	
gamma-BHC (gamma- Hexachloro-cyclohexane)[b] (ug/l)	2.0	0.08	2.0	0.08	0.063	0.019	
Heptachlor[b] (ng/l)	520	3.8	520	3.8	0.21	0.21	
Hexachlorobenzene[b] (ng/l)					0.77	0.72	
Indeno(1,2,3-cd)Pyrene[b] (ug/l)					0.018	0.0038	
Methoxychlor (ug/l)		0.03		0.03	0.03	0.03	0.03
Methyl Bromide (ug/l)					1500	47	
Methylene Chloride[b] (ug/l)					1,000	20	
PCB[b] (ng/l)		14.0		14.0	0.045	0.044	0.045
Phthalate esters[6] (ug/l)		3.0		3.0			
Pyrene (ug/l)					4000	830	
Tetrachloroethylene[b] (ug/l)					29	10	

APPENDIX E, TABLE 1

PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
Toluene[b] (mg/l)					0.52	0.057	
Toxaphene[b] (ng/l)	730	0.2	730	0.2	0.71	0.70	0.71
Trichloroethylene[b] (ug/l)					7	0.6	
Vinyl chloride[b] (chloroethene) (ug/l)					1.6	0.022	
1,1,1- trichloroethane[b] (mg/l)					200	10	
1,1,2,2-tetrachloroethane (ug/l)					3	0.2	
1,1-dichloroethylene[b] (ug/l)					20,000	300	
1,2-dichlorobenzene (mg/l)					17	2.7	
1,2-dichloroethane[b] (ug/l)					650	9.9	
1,3-dichlorobenzene (mg/l)					0.010	0.007	
1,4-dichlorobenzene (mg/l)					0.90	0.30	
2,4-dinitrotoluene[b] (ug/l)					1.7	0.049	
2-Chloronaphthalene (ug/l)					1600	1000	
2-methyl-4,6-Dinitrophenol (ug/l)					30	2	
8.23.1 When the specified criteria for organic chemicals listed in §8.23 are less than the practical laboratory quantification level, instream values will be calculated from discharge concentrations and flow rates, where applicable.							
8.24 pH[c] No values below 6.0 nor above 9.0. Higher values due to photosynthetic activity may be tolerated.	X	X	X	X	X	X	X

APPENDIX E, TABLE 1

PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
8.25 Phenolic Materials							
8.25.1 Phenol (ug/l)					300,000	4,000	
8.25.2 2-Chlorophenol (ug/l)					800	30	
8.25.3 2,4-Dichlorophenol (ug/l)					790	93	
8.25.4 2,4-Dimethylphenol (ug/l)					3,000	100	
8.25.5 2,4-Dinitrophenol (ug/l)					300	10	
8.25.6 Pentachlorophenol[b] (ug/l)					8.2	0.28	
8.25.6.a The one-hour average concentration of pentachlorophenol determined by the following equation: exp(1.005(pH)-4.869)	X		X				
8.25.6.b The 4-day average concentration of pentachlorophenol determined by the following equation: exp(1.005(pH)-5.134).		X		X			
8.25.7 2,4,6-Trichlorophenol[b] (ug/l)					6.5	2.1	
8.26 Radioactivity: Gross Beta activity not to exceed 1000 picocuries per liter (pCi/l), nor shall activity from dissolved strontium-90 exceed 10 pCi/l, nor shall activity from dissolved alpha emitters exceed 3 pCi/l.	X		X		X	X	X

APPENDIX E, TABLE 1

PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
8.26.1 Gross total alpha particle activity (including radium-226 but excluding radon and uranium shall not exceed 15 pCi/l and combined radium-226 and radium-228 shall not exceed 5pCi/l; provided that the specific determination of radium-226 and radium-228 are not required if dissolved particle activity does not exceed 5pCi/l; the concentration of tritium shall not exceed 20,000 pCi/l; the concentration of total strontium-90 shall not exceed 8 pCi/l in the Ohio River main stem.	X		X		X	X	X
8.27 Selenium (ug/l) Water Column Concentration [f]		5		5		50	
8.27.1 Selenium (ug/g) [g] (based on instantaneous measurement) 8.0 ug/g Fish Whole-Body Concentration or 11.3 ug/g Fish Muscle (skinless, boneless filet)		X		X			
8.27.2 Selenium (ug/g) Fish Egg/Ovary Concentration [h] (based on instantaneous measurement)		15.8		15.8			

APPENDIX E, TABLE 1

PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C^3	A^4	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
8.28 Silver (ug/l) Hardness / Silver 0-50 / 1 51-100 / 4 101-200 / 12 >201 / 24				X		X	
8.28.1 0-50 / 1 51-100 / 4 101-200 / 12 201-400 / 24 401-500 / 30 501-600 / 43		X					
8.28.2 The one-hour average concentration of dissolved silver determined by the following equation: $Ag=e^{(1.72[\ln(hardness)]-6.59)} \times CF^5$	X		X				

APPENDIX E, TABLE 1

<table>
<tr><th rowspan="4">PARAMETER</th><th colspan="7">USE DESIGNATION</th></tr>
<tr><th colspan="4">AQUATIC LIFE</th><th colspan="2">HUMAN HEALTH</th><th rowspan="3">ALL OTHER USES</th></tr>
<tr><th colspan="2">B1, B4</th><th colspan="2">B2</th><th rowspan="2">C[3]</th><th rowspan="2">A[4]</th></tr>
<tr><th>ACUTE[1]</th><th>CHRON[2]</th><th>ACUTE[1]</th><th>CHRON[2]</th></tr>
<tr><td>8.29 Temperature
Temperature rise shall be limited to no more than 5°F above natural temperature, not to exceed 87°F at any time during months of May through November and not to exceed 73°F at any time during the months of December through April. During any month of the year, heat should not be added to a stream in excess of the amount that will raise the temperature of the water more than 5°F above natural temperature. In lakes and reservoirs, the temperature of the epilimnion should not be raised more than 3°F by the addition of heat of artificial origin. The normal daily and seasonable temperature fluctuations that existed before the addition of heat due to other natural causes should be maintained.</td><td colspan="2">X</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>8.29.1 For the Kanawha River Main Stem (K-1): Temperature rise shall be limited to no more than 5°F above natural temperature, not to exceed 90°F in any case.</td><td colspan="2">X</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>8.29.2 No heated effluents will be discharged in the vicinity of spawning areas. The maximum temperatures for cold waters are expressed in the following table:
Daily Mean °F / Hourly Max °F
Oct-Apr 50 55
Sep-&May 58 62
Jun-Aug 66 70</td><td></td><td></td><td colspan="2">X</td><td></td><td></td><td></td></tr>
</table>

APPENDIX E, TABLE 1

PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
8.29.3 For Ohio River Main Stem (01) (see section 7.1.d, herein): Dates / Period Ave. / Inst. Max. Jan 1-31 / 45°F / 50°F February / 45 / 50 March 1-15 / 51 / 56 March 16-31 / 54 / 59 April 1-15 / 58 / 64 April 16-30 / 64 / 69 May 1-15 / 68 / 73 May 16-31 / 75 / 80 June 1-15 / 80 / 85 June 16-30 / 83 / 87 July 1-31 / 84 / 89 August 1-31 / 84 / 89 Sept 1-15 / 84 / 87 Sept 16-30 / 82 / 86 Oct 1-15 / 77 / 82 Oct 16-31 / 72 / 77 Nov 1-30 / 67 / 72 Dec 1-31 / 52 / 57	X						
8.30 Thallium (ug/l)					6.3	1.7	
8.31 Threshold odor[c] Not to exceed a threshold odor number of 8 at 104°F as a daily average.		X		X	X	X	
8.32 Total Residual Chlorine (ug/l - measured by amperometric or equivalent method)	19	11					
8.32.1 No chlorinated discharge allowed			X				

APPENDIX E, TABLE 1

PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
8.33 Turbidity No point or non-point source to West Virginia's waters shall contribute a net load of suspended matter such that the turbidity exceeds 10 NTU's over background turbidity when the background is 50 NTU or less, or have more than a 10% increase in turbidity (plus 10 NTU minimum) when the background turbidity is more than 50 NTUs. This limitation shall apply to all earth disturbance activities and shall be determined by measuring stream quality directly above and below the area where drainage from such activity enters the affected stream. Any earth disturbing activity continuously or intermittently carried on by the same or associated persons on the same stream or tributary segment shall be allowed a single net loading increase.		X		X	X	X	
8.33.1 This rule shall not apply to those activities at which Best Management Practices in accordance with the State's adopted 208 Water Quality Management Plan are being utilized, maintained and completed on a site-specific basis as determined by the appropriate 208 cooperative or an approved Federal or State Surface Mining Permit is in effect. This exemption shall not apply to Trout Waters.		X			X	X	
8.34 Zinc (ug/l) The four-day average concentration of dissolved zinc determined by the following equation[a]: $Zn = e^{(0.8473[\ln(hardness)]+0.884)} \times CF^{5}$		X		X			

APPENDIX E, TABLE 1

PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
8.34.1 The one-hour average concentration of dissolved zinc determined by the following equation[a]: $Zn = e^{(0.8473[\ln(hardness)]+0.884)} \times CF^5$	X		X				

[1] One hour average concentration not to be exceeded more than once every three years on the average, unless otherwise noted.
[2] Four-day average concentration not to be exceeded more than once every three years on the average, unless otherwise noted.
[3] These criteria have been calculated to protect human health from toxic effects through fish consumption, unless otherwise noted. Annual geometric mean concentration not to be exceeded, unless otherwise noted.
[4] These criteria have been calculated to protect human health from toxic and/or organoleptic effects through drinking water and fish consumption, unless otherwise noted. Annual geometric mean concentration not to be exceeded, unless otherwise noted.
[5] The appropriate Conversion Factor (CF) is a value used as a multiplier to derive the dissolved aquatic life criterion is found in Appendix E, Table 2.
[6] Phthalate esters are determined by the summation of the concentrations of Butylbenzyl Phthalate, Diethyl Phthalate, Dimethyl Phthalate, Di-n-Butyl Phthalate and Di-n-Octyl Phthalate.
[a] Hardness as calcium carbonate (mg/l). The minimum hardness allowed for use in this equation shall not be less than 25 mg/l, even if the actual ambient hardness is less than 25 mg/l. The maximum hardness value for use in this equation shall not exceed 400 mg/l even if the actual hardness is greater than 400 mg/l.
[b] Known or suspected carcinogen. Human health standards are for a risk level of 10^{-6}.
[c] May not be applicable to wetlands (B4) - site-specific criteria are desirable.
[d] The early life stage equation in the National Criterion shall be used to establish chronic criteria throughout the state unless the applicant demonstrates that no early life stages of fish occur in the affected water(s).
[e] Hardness as calcium carbonate (mg/l). The minimum hardness allowed for use in this equation shall not be less than 26 mg/l, even if the actual ambient hardness is less than 26 mg/l. The maximum hardness value for use in this equation shall not exceed 200 mg/l even if the actual hardness is greater than 200 mg/l.
[f] Water column values take precedence over fish tissue values when new inputs of selenium occur in waters previously unimpacted by selenium, until equilibrium is reached between the water column and fish tissue.
[g] Overrides any water column concentration when water concentrations and either fish whole body or fish muscle (skinless, boneless filet) are measured, except in situations described in footnote [f]
[h] Overrides any fish whole-body, fish muscle (skinless, boneless filet), or water column concentration when fish egg/ovary concentrations are measured, except in situations described in footnote [f]

APPENDIX E

TABLE 2

Conversion Factors

Metal	Acute	Chronic
Aluminum	1.000	1.000
Arsenic (III)	1.000	1.000
Cadmium	1.136672-[(ln hardness)(0.041838)]	1.101672-[(ln hardness)(0.041838)]
Chromium (III)	0.316	0.860
Chromium(VI)	0.982	0.962
Copper	0.960	0.960
Lead	1.46203-[(ln hardness)(0.145712)]	1.46203-[(ln hardness)(0.145712)]
Nickel	0.998	0.997
Silver	0.85	N/A
Zinc	0.978	0.986

APPENDIX F
COOL WATER LAKES

This list contains lakes to be managed for cool water fisheries and is not intended to exclude any waters which meet the definition in Section 2.2.

River Basin	County	Lake
Potomac River		
PC	Hardy Lost River	Trout Pond (Impoundment)
PC	Hardy Lost River	Rock Cliff Lake (Impoundment)
PSB	Pendleton	Hawes Run (Impoundment)
PNB	Mineral	New Creek Dam 14(Impoundment)
Monongahela River		
MC	Monongalia	Coopers Rock (Impoundment)
MC	Monongalia	Cheat Lake
MC	Tucker	Thomas Park (Impoundment)
MC	Randolph	Spruce Knob Lake (Impoundment)
MT	Taylor	Tygart Lake
MW	Lewis	Stonecoal Lake
Kanawha River		
KC	Raleigh	Stephens Lake (Impoundment)
KG	Nicholas	Summersville Reservoir (Impoundment)
KG	Greenbrier	Summit Lake (Impoundment)
KNG	Pocahontas	Watoga Lake
KNG	Pocahontas	Buffalo Fork (Impoundment)
KNG	Pocahontas	Seneca (Impoundment)
KCG	Pocahontas	Handley Pond
Guyandotte River		
OG	Wyoming/Mingo	RD Bailey Lake

APPENDIX C: STANDARD OPERATING PROCEDURES (SOPS)

<u>General Decontamination Procedures for Non-Disposable Field Sampling Equipment</u>

SOP OEE-0100

Author	Revision No.	Effective Date	Description of Changes	Type of Change
Ruth Porter	1.0	7/1/2010	Reformatted, added SOP ID #, and renumbered. Supersedes Revision 0.0	Editorial
			Additional detail provided for decontamination procedures.	Technical
Dave Long	2.0	9/21/2016	Revised decontamination procedures. Reformatted.	Editorial, Technical
Randal Lemons	3.0	2/18/2020	Revised SOP ID #, Formatting Changes	Editorial

<u>GENERAL DECONTAMINATION PROCEDURES FOR NON-DISPOSABLE FIELD SAMPLING EQUIPMENT</u>

SOP OEE-0100

Table of Contents

1.0 SCOPE AND APPLICATION

The purpose of this Standard Operating Procedure (SOP) is to provide a description of the methods used for non-disposable field equipment decontamination. Field equipment decontamination serves many purposes, including, but not necessarily limited to:

- Preventing, minimizing, or limiting cross-contamination of samples
- Preventing cross-contamination of sampling locations
- Ensuring collection of representative samples
- Ensuring proper operation of field equipment
- Ensuring accuracy of field measurements
- Reducing potential exposure hazards for field personnel
- Preventing contamination of uncontaminated areas

This SOP also provides general guidelines for developing decontamination procedures for sampling equipment to be used for WVDEP projects. This SOP does not address personnel decontamination.

These are standard (i.e. typically applicable) operating procedures which may be varied or changed as needed, dependent upon site conditions, equipment limitation, and/or limitations imposed by the procedure. The actual procedures employed at a site should be fully documented.

2.0 SUMMARY OF METHOD

All non-disposable sampling equipment (including, but not limited to augers, GeoProbe™ drive rods, trowels, spatulas, hand augers, shovels, stainless steel mixing bowls, split spoon sampler, GeoProbe™ sampling spoon, etc.) will be thoroughly cleaned. Decontamination of all sampling equipment will be accomplished prior to and between sampling locations. The decontamination procedure is briefly summarized below.

Sampling equipment to be used at the site will be divided into one of two categories:

1. Equipment that does not contact the sample
2. Equipment that does contact the sample

<u>Procedures for Non-Sample Contacting Equipment</u>

a) Physically removal gross contamination.

b) Clean with portable power washer steam cleaning machine or dedicated pressurized sprayer *or* hand wash with brush using detergent solution.

c) Rinse with control water.

Procedures for Sample Contacting Equipment

a) Physically remove gross contamination.

b) Wash with non-phosphate detergent and brush made of inert material.
[Note: For equipment that cannot be disassembled for cleaning (e.g., tubing), circulate decontamination liquid through the equipment.]

c) Rinse with distilled water.

d) Rinse with inorganic desorbing agent (applicable only when analyzing for inorganics).

e) Rinse with distilled water.

f) Rinse with organic desorbing agent rinse (applicable only when analyzing for organics).

g) Rinse with deionized water.

h) Let equipment air dry.

i) Wrap equipment in inert material (e.g., aluminum foil or plastic wrap) for transport, to prevent contact with potentially contaminated materials.

3.0 SAMPLE PRESERVATION, CONTAINERS, HANDLING, AND STORAGE

Sample collection and analysis of decontamination waste may be required before beginning proper disposal of decontamination liquids and solids generated at a site. The amount of sample to be collected and the proper sample container type (i.e., glass, plastic), chemical preservation, and storage requirements should be determined prior to initiation of site activities. As part of the development of the project specific Sampling and Analysis Plan (SAP), decontamination waste sampling procedures should be determined and then incorporated into the SAP. Parameters to be sampled will be dependent upon the matrix being sampled and the requirements of the disposal facility.

4.0 INTERFERENCES AND POTENTIAL PROBLEMS

The use of an untreated potable water supply is not an acceptable substitute for tap water. The use of distilled/deionized water commonly available from commercial vendors should generally be acceptable for decontamination of sampling equipment. If there is a concern that the water is not analyte free, then it can be verified by laboratory analysis. If acids or solvents are utilized in decontamination, they could raise health, safety, and waste disposal concerns. Care must be used when working with acids and organic solvents.

5.0 EQUIPMENT APPARATUS

Decontamination equipment, materials, and supplies are generally selected based on availability. Other considerations include the ease of decontaminating or disposing of the equipment. The following are some of the materials and equipment that are potentially needed for decontamination activities:

- Non-phosphate detergent

- Organic and inorganic decontamination reagents, if required by site-specific SAP
- Tap water
- Distilled or deionized water
- Brushes (various assortment of sizes)
- Drop cloth/plastic sheeting
- Paper towels
- Wash and rinse containers (buckets)
- Portable power washer, steam cleaning machine or pressurized sprayers
- Solvent sprayers
- Aluminum foil/plastic wrap
- Trowel
- Trash bags
- Trash containers
- DOT approved 55-gallon drums
- Safety glasses
- Gloves
- Eyewash
- First aid kit

6.0 REAGENTS

Depending upon the project, a solvent rinse using organic or inorganic desorbing agent may be required. This shall be specified in the site-specific SAP. In cases where the use of solvents is planned, the analytical laboratory performing the analysis shall be consulted prior to sampling to ensure that decontamination procedures do not affect the subsequent analysis. It is recommended that all solvent rinses be made from an appropriate grade of chemical, such as pesticide or purge-and-trap grade quality.

7.0 PROCEDURES

These procedures are intended as general procedures to be followed for decontamination of field sampling equipment. The site-specific SAP should be referred to for any given project in order to establish what portions of these procedures are applicable to the project. It is always recommended that procedures be established in the site-specific SAP to minimize the potential for contamination. Such procedures may include the following:

- Work practices that minimize contact with potential contaminants
- Cover monitoring and sampling equipment with plastic or other protective material

- Avoid laying equipment down in areas of obvious contamination
- Use of disposable sampling equipment

7.1 Decontamination Methods

Various decontamination methods will physically remove contaminants, inactivate contaminants by disinfection or sterilization, or do both. In many cases, gross contamination can be removed by physical means. The physical decontamination techniques appropriate for equipment decontamination can be grouped into two categories: abrasive methods and non-abrasive methods.

7.1.1 Abrasive Cleaning Methods

Abrasive cleaning methods work by rubbing and wearing away the top layer of the surface containing the contaminant. The following abrasive methods are available:

- Mechanical cleaning methods are brushes of metal or nylon. The amount and type of contaminants removed will vary with the hardness of bristles, length of brushing time, and degree of brush contact.
- Air blasting is used for cleaning large equipment, such as bulldozers, drilling rigs or auger bits. The equipment used in air blast cleaning employs compressed air to force abrasive material through a nozzle at high velocities. The distance between the nozzle and the surface cleaned, as well as the pressure of air, the time of application, and the angle at which the abrasive strikes the surface, determines cleaning efficiency. This method generates a large amount of waste and is unlikely to be utilized on WVDEP projects.
- Wet blast cleaning, also used to clean large equipment, involves use of a suspended fine abrasive delivered by compressed air to the contaminated area. The amount of materials removed can be carefully controlled by using very fine abrasives. This method generates a large amount of waste and is unlikely to be utilized on WVDEP projects.

7.1.2 Non-Abrasive Cleaning Methods

Non-abrasive cleaning methods work by forcing the contaminant off a surface with pressure. The following non-abrasive methods are available:

<u>High-Pressure Water</u>:	This method consists of a high-pressure pump, an operator controlled directional nozzle, and a high-pressure hose.
<u>Low-Pressure Water</u>:	This system produces a pressurized water jet with operating pressures less than 240 atm which relates to a flow rate less than 20 liters per minute. Because of the low pressure, this method is applicable for hand-held sampling equipment.

7.1.3 Disinfection/Rinse/Hand Removal Methods

Disinfection/Sterilization:	Disinfectants are a chemical means of inactivating infectious agents, while sterilization methods involve heating the equipment to the point to inactivate infectious agents. It is unlikely that these methods would be utilized on WVDEP projects.
Rinsing:	In cases of gross soil/sediment contamination on handheld sampling equipment, a tap water rinse/wash may first be performed to remove clumps of dirt in order to make the detergent wash more effective.
Hand Removal:	In cases of gross soil/sediment contamination on handheld sampling equipment, dirt may be removed by hand (gloved) or using a trowel or similar device to remove clumps of dirt in order to make the detergent wash more effective.

7.2 Field Sampling Equipment Cleaning Procedures

If trace analysis for organics or metals are to be performed, then a solvent rinse for trace organics and an acid rinse for trace metals would be appropriate. If no trace analysis is planned, the solvent and acid rinses may be eliminated from the decontamination sequence specified below.

a) In cases of gross contamination, follow the most appropriate physical removal procedures specified in section 7.1.

b) Using a brush, wash equipment with soap (non-phosphate) and water.

c) Rinse the equipment with tap water. If contaminants are clearly present, wash the equipment again and rinse again with tap water.

d) Rinse with distilled/deionized water. A triple rinse with distilled/deionized water is recommended. (If solvent or acid rinses are not necessary, then proceed to step i.)

e) If applicable, rinse with an inorganic desorbing agent if the samples will be analyzed for inorganics.

f) Rinse with distilled/deionized water.

g) Use an organic desorbing agent rinse, as appropriate, if the sample will be analyzed for organics.

h) Rinse with distilled/deionized water.

i) Decontaminated equipment shall be dried or allowed to air dry on plastic sheeting in an area free of potential contaminants.

j) Wrap equipment in inert material (e.g., aluminum foil or plastic wrap) for transport. Store decontaminated equipment in an area free of potential contaminants when it is not in use.

8.0 CALCULATIONS

There are no calculations associated with decontamination procedures. This section is not applicable to this SOP.

9.0 QUALITY ASSURANCE/QUALITY CONTROL

Decontamination of field sampling equipment is necessary when dedicated or non-disposable sampling equipment is utilized at a site. An equipment rinsate blank should be collected as part of the quality control associated with the field decontamination on non-disposable, dedicated sampling equipment. An equipment rinsate blank is used to assess cross-contamination brought about by improper decontamination procedures and will provide information on the effectiveness of the decontamination process in the field. Equipment rinsate blanks are samples obtained by running distilled or deionized water over the decontaminated sampling equipment after cleaning to test for residual contamination. The equipment rinsate water is collected in sample containers and handled exactly as any other samples from the site. One equipment rinsate blank should be collected per each day of field work.

10.0 DATA VALIDATION

Data validation requirements set forth in the site-specific SAP or QAPP shall be followed for any given project. Quality control samples will be evaluated for the site-specific contaminants, which are being analyzed. This information will be utilized to qualify the environmental sample results in accordance with the project's data quality objectives as set forth in the site- specific SAP and/or QAPP.

11.0 HEALTH AND SAFETY

OSHA regulations should be adhered to when working with potentially hazardous materials. Personnel performing environmental work at WVDEP sites should have their 40 Hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training with 8 Hour refreshers, as appropriate. Some level of personal protective equipment (PPE) is generally required for all sampling and decontamination activities. The appropriate level of PPE for these activities may be found in the site-specific SAP and/or the site health and safety plan (HASP). Personnel should adhere to the safety requirements outlined in the site-specific plans.

Material Safety Data Sheets should be readily available on-site for all decontamination solvents and solutions as required by the Hazard Communication Standard requirements set forth in the OSHA regulations. Investigation derived waste (IDW) generated from decontamination activities requires proper handling, storage, and disposal. Refer to the site-specific SAP for IDW procedures.

12.0 REFERENCES

Guidance for Preparing Standard Operating Procedures (SOPs), EPA QA/G-6, US EPA, Office of Environmental Information, April 2007

Sampling Equipment Decontamination, SOP# 2006, US EPA, Environmental Response Team, August 11, 1994

Field Sampling Procedures Manual, New Jersey Department of Environmental Protection, August 2005, Update – April 2011

ASTM D5088-15a, *Standard Practice for Decontamination of Field Equipment Used at Waste Sites*, ASTM International, West Conshohocken, PA, 2015, www.astm.org

US EPA, 2015, *Field Equipment Cleaning and Decontamination*; SESD PROC-205-R3, U.S. Environmental Protection Agency Region 4, Athens, GA, 18 pp.

PID Field Screening

SOP OEE-0101

Author	Revision No.	Effective Date	Description of Changes	Type of Change
Ruth Porter	0.0	8/2/2010	New SOP	Technical
Dave Long	1.0	9/21/2016	Revised PID Screening Procedures. Reformatted.	Editorial, Technical
Randal Lemons	2.0	2/18/2020	Revised Sample Preservation, Container, Handling, and Storage. General Corrections. Formatting	Editorial, Technical

<u>PID FIELD SCREENING</u>
SOP OEE-0101

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1.0 SCOPE AND APPLICATION

The purpose of this Standard Operating Procedure (SOP) is to describe the procedure for using a photoionization detector (PID). The PID is a portable vapor/gas detector employing the principle of photoionization to detect a variety of chemical compounds. It is of particular use in identifying organic compounds, but can identify certain inorganic compounds such as chlorine, bromine, silicon, and sulfur. This procedure is a non-specific method applicable to field screening for organic compounds in surface and subsurface soils.

2.0 SUMMARY OF METHOD

The PID is a useful field screening tool. A PID can detect and measuring real-time concentrations of many organic vapors and some inorganic vapors. The PID is unable to respond to certain low molecular weight hydrocarbons, such as methane and ethane. The PID works by employing the principle of photoionization. It will respond to most vapors that have an ionization potential less than or equal to that supplied by the ionization source. The ionization source is an ultraviolet (UV) lamp.

Photoionization occurs when an atom or molecule absorbs a photon of enough energy to release an electron and form a positive ion. This will occur when the ionization potential of the molecule in electron volts (eV) is less than the energy of the photon. Several ionization sources are available for the PID, each having a different eV lamp and a different ionization potential. The selection of the appropriate ionization source is essential in obtaining useful data. Though it can be calibrated to a compound, the instrument cannot distinguish between detectable compounds in a mixture of gases. Therefore, the PID can only indicate an integrated response to the mixture; the primary use of the PID is as a quantitative instrument

3.0 SAMPLE PRESERVATION, CONTAINERS, HANDLING, AND STORAGE

The preservation of the sample, to be field screened by a PID, involves beginning with a clean container that has the ability to become airtight. A Mason Jar, or other airtight container with a ring lid, will act to properly contain the vapors which volatilize from the sample. The sample must be acquittal heated to cause the release of the vapor contained in the sample, but not over heated to cause the sample to over volatilize and potential break the airtight seal. Once the field sample has been screened, the sample will be treated as Investigation Derive Waste (IDW) which will require proper handling, storage, and disposal. Refer to the site-specific SAP for IDW procedures.

4.0 INTERFERENCES AND POTENTIAL PROBLEMS

The PID is a nonspecific total vapor detector; therefore, it cannot be used to identify unknown substances. The PID does not respond to certain low molecular weight hydrocarbons, such as methane and ethane. The PID does not detect a compound if the probe has a lower energy than the compound's ionization potential. Certain toxic gases and vapors, such as carbon tetrachloride and hydrogen cyanide, have high ionization potentials and cannot be detected with a PID. Strong winds and high humidity will affect measurement readings. A PID may become unusable under foggy or humid conditions. The lamp window must be periodically cleaned to ensure ionization of the compounds by the probe. Pulling liquids into the probe will result in poor readings and can damage the instrument.

5.0 EQUIPMENT APPARATUS

The following are some of the materials and equipment that are potentially needed for soil screening activities using the PID. Refer to the site Sampling and Analysis Plan to determine specific needs for any given project.

- PID
- Calibration equipment and gases (isobutylene)
- Mason Jars
- Aluminum Foil
- Field logbook, field data sheets and samples labels
- Chain of custody records and seals
- Sample and shipping containers
- Preservatives, as applicable
- Pails, tubs, or buckets
- Plastic sheeting
- Packing materials
- Sampling gloves
- Methanol
- Light source cleaning compound
- Mild, non-phosphate soap

6.0 REAGENTS

The following reagents may be needed when using a PID for field screening purposes:

- Isobutylene standards for calibration
- Methanol for cleaning ionization chamber (GC grade)
- Mild soap solution for cleaning unit surfaces
- Specific gas standards when calibrating to a specific compound (as applicable)
- Light source cleaning compound

7.0 PROCEDURES

The following procedures are applicable for static field screening of organic compounds utilizing a PID:

a) Conduct a fresh air calibration and multi-sensor span calibration on the instrument daily in accordance with manufacturer specifications before any headspace readings are performed. Re-calibrate the instrument throughout the day as needed.

b) Place the portion of soil sample to be screened inside a clean mason jar or other air-tight cylinder and then seal the jar using aluminum foil and the screw-on lid. Fill the jar at least 1/3 the way full (no more than ½ full) if enough sample is available.

c) Allow the jar to set for no more than ten minutes prior to taking a reading. *Note: If the ambient temperature is below 60 degrees Fahrenheit, headspace analysis shall be conducted in a heated environment (i.e., inside a building or vehicle).*

d) Pierce the aluminum foil with the probe tip of the PID; the jar shall not be reopened for the insertion of the probe tip. *Note: Care shall be taken to ensure that neither water droplets nor soil particulates enter the probe tip.*

e) The highest meter response shall be recorded as the volatile organic vapor concentration.

f) All headspace analysis shall be completed at an equivalent time period between 8-10 minutes for specific samples.

g) Record the PID readings in the field logbook along with other sampling information such as:

    - Method of screening (static)
    - Sample ID
    - Location
    - Depth of sample
    - Soil type description
    - Equipment used
    - Apparent moisture content (i.e., dry, moist, wet)
    - Color
    - Odor
    - Any other pertinent information

The following procedures are applicable for dynamic field screening of organic compound utilizing a PID:

a) Calibrate the instrument daily in accordance with manufacturer specifications before any headspace readings are performed. Re-calibrate the instrument throughout the day as needed.

b) Place the portion of soil sample to be screened inside a clean mason jar or other air-tight cylinder and then seal the jar using aluminum foil and the screw-on lid. Fill the jar at least 1/3 the way full (no more than ½ full) if enough sample is available.

c) Shake the soil in the jar in order to induce volatilization of compounds into the headspace; alternately, the jar may be heated to induce volatilization.

d) Allow the jar to set for no more than ten minutes prior to taking a reading.

e) Pierce the aluminum foil with the probe tip of the PID - the jar shall not be reopened for the insertion of the probe tip. *Note: Care shall be taken to ensure that neither water droplets nor soil particulates enter the probe tip.*

f) The highest meter response shall be recorded as the volatile organic vapor concentration.

g) All headspace analysis shall be completed at an equivalent time period between 10 to 15 minutes for specific samples.

h) Record the PID readings in the field logbook along with other sampling information such as:

    - Method of screening (static)
    - Sample ID
    - Location
    - Depth of sample
    - Soil type description
    - Equipment used
    - Apparent moisture content (i.e., dry, moist, wet)
    - Color
    - Odor
    - Any other pertinent information

    Note: Soil samples collected for field soil screening may not be used for laboratory analysis. Separate soil samples must be collected according to the soil sampling protocols outlined in the site-specific Sampling and Analysis Plan.

8.0 CALCULATIONS

No calculations are applicable to this SOP. The PID is a direct reading instrument.

9.0 QUALITY ASSURANCE/QUALITY CONTROL

There are no specific quality assurance activities which apply to these procedures. However, the following general QA procedures do apply:

- All data must be documented on field data sheets and/or in field logbooks.
- All instrumentation must be operated in accordance with operating instructions as supplied by the manufacturer, unless otherwise specified in the work plan.

- Equipment calibration activities must be documented and must occur prior to beginning sampling operations. Performance checks on the PID should be performed throughout the course of a day, and recalibration of the instrument should be performed as needed.

Refer to the site-specific SAP and/or QAPP for specific quality assurance/quality control measures that may be applicable for the given project.

10.0 DATA VALIDATION

Data validation requirements set forth in the site-specific SAP or QAPP shall be adhered to for any given project. Results of quality control samples will be evaluated for contaminants. This information will be utilized to qualify the environmental sample results in accordance with the project's data quality objectives as set forth in the site-specific SAP and/or QAPP.

11.0 HEALTH AND SAFETY

OSHA regulations should be adhered when working with potentially hazardous materials. Personnel performing work environmental work at WVDEP sites should have their 40 Hour Hazardous Waste Operations and Emergency Response (HAZWOPER) with 8 Hour refreshers as appropriate. Some level of Personal Protective Equipment (PPE) is generally required for all sampling and decontamination activities. The appropriate level of PPE for these activities may be found in the site-specific SAP and/or the Site Health and Safety Plan (HASP). Personnel should adhere to the safety requirements outlined in the site-specific plans.

Material Safety Data Sheets should be readily available on-site for all site specific contaminates and decontamination solvents or solutions as required by the Hazard Communication Standard requirements set forth in the OSHA regulations. IDW generated from sampling and decontamination activities requires proper handling, storage, and disposal. Refer to the site-specific SAP for IDW procedures.

12.0 REFERENCES

Guidance for Preparing Standard Operating Procedures (SOPs), EPA QA/G-6, US EPA, Office of Environmental Information, April 2007

US EPA, 2013, Field Analytical Technologies Encyclopedia, Available online at http://clu-in.org/characterization/technologies/; US Environmental Protection Agency, Washington, DC

MultiRAE User's Guide, RAE Systems by Honeywell, Revision D, March 2014

Photoionization Detector, *SOP# 2114*, US EPA, Environmental Response Team, October 1994

XRF Field Screening

SOP OEE-0102

Author	Revision No.	Effective Date	Description of Changes	Type of Change
Ruth Porter	0.0	8/3/2010	New SOP	Technical
Randal Lemons	1.0	2/19/2020	Revised Sample Preservation, Container, Handling, and Storage. General Corrections. Formatting	Technical, Editorial

XRF FIELD SCREENING

SOP OEE-0102

Table of Contents

1.0 SCOPE AND APPLICATION

This procedure is applicable to field screening of a variety of metals in surface and subsurface soils. This is a field screening method used for profiling an area, locating sources of contamination, determining the horizontal and vertical extent of contamination, and/or collecting preliminary data that may be used to design a sampling plan.

X-Ray Fluorescence Spectroscopy (XRF) is a nondestructive qualitative and quantitative analytical technique used to determine the chemical composition of samples. Primary X-rays are emitted from a sealed radioisotope source and are utilized to irradiate samples. In the samples, radiation knocks out an electron from the innermost shell of an atom. The atom is excited and releases its surplus energy almost instantly by filling the vacancy created with an electron from one of the higher energy shells. This rearrangement of electrons is associated with emission of X-rays characteristic of the given atom and represents an emission of fluorescent X-rays. Energies of the characteristic, fluorescent X-rays are converted within the detector into electric pulses, the amplitudes of which are linearly proportional to the energy. An electronic analyzer measures the pulse amplitudes which are the basis of a qualitative X-ray analysis. The number of equivalent counts at a given energy is representative of element concentration in a sample basis for quantitative analysis.

2.0 SUMMARY OF METHOD

Testing of samples may be done in-situ, in plastic bags with minimal preparation, or in the XRF cup with more extensive sample preparation. If the primary objective of the sampling event is to determine whether an element is present, then in-situ or bagged samples with little preparation would be the quickest and simplest way to proceed. If measuring accuracy of the concentration of metal present is the primary objective, then additional preparation of the sample is recommended. Precision and accuracy between samples is best achieved with prepared homogenous samples.

3.0 SAMPLE PRESERVATION, CONTAINERS, HANDLING, AND STORAGE

The preservation of the sample, to be field screened by an XRF, involves beginning with clean thin walled plastic bag for bagged samples. The soils placed in the bag should be dry and homogenized for the best testing results. The use of a pestal and mortar to break up large pieces of soil can assist with sample accuracy. Once the bagged field sample has been screened, and any laboratory control sample has been taken, the remaining sample will be treated as Investigation Derive Waste (IDW) which will require proper handling, storage, and disposal. Refer to the site-specific SAP for IDW procedures.

4.0 INTERFERENCES AND POTENTIAL PROBLEMS

Generally, the instrument precision is the least significant source of error in XRF analysis. User or application related error is most often the most significant source of error. Following are some of the components of user or application related errors.

4.1 Sample Placement

This is a potential source of error since the X-ray signal decreases as you increase the distance from the radioactive source. This type of error can be minimized by maintaining the same sample distance from the source. This SOP allows for the use of a thin plastic wrap (like Saran Wrap) that can be placed between the soil and the analyzer window to keep the window clean. This has little, if any, effect on the distance from the sample to the radioactive source; therefore, it does not cause a potential source of error due sample placement issues. However, for a few elements (namely Chromium, Vanadium, and Barium) testing through thin plastic may result in lower readings (~ 20%) for these elements.

4.2 Representative Nature of Samples

Heterogeneous samples can be a major source of error. This error can be minimized by either homogenizing a large volume of sample prior to analyzing an aliquot, or by analyzing several samples (in-situ) at each sampling point and then averaging the results.

4.3 Chemical Matrix Effects

Chemical matrix effects result from differences in concentrations of interfering elements. These effects appear as either spectral interferences (peak overlaps) or as X-ray absorption/enhancement phenomena. Both effects are common in soils contaminated with heavy metals. For example, Fe (iron) tends to absorb Cu (copper), reducing the intensity of Cu measured by the detector.

4.4 Physical Matrix Effects

Physical matrix effects are the result of variations in the physical character of the sample. They may include such parameters as particle size, uniformity, homogeneity and surface condition.

4.5 Moisture Content

The overall error from moisture may be a minor source of error when the moisture range is small (5-20%) or may be a major source of error when measuring on the surface of soils that are saturated with water.

5.0 EQUIPMENT APPARATUS

The following are some of the materials and equipment that are potentially needed for soil screening activities using the XRF. Refer to the site Sampling and Analysis Plan to determine specific needs for any given project.

- XRF
- Batteries and chargers
- Standardization clip
- Sieves
- Plastic bags
- Mortar and pestle
- Sample test stand, if desired
- Logbook

- Field data sheets and samples labels
- Chain of custody records and seals
- Sample and shipping containers
- Preservatives, as applicable
- Pails, tubs, or buckets
- Plastic sheeting
- Packing materials
- Sampling gloves

6.0 REAGENTS

Standardization of the XRF is performed utilizing the metal standardization clip; therefore, reagents are not generally used for site screening using the XRF. Reagents associated with decontamination of sampling equipment may be applicable if samples are not analyzed "in-situ". Refer to SOP OEE-0100 for general decontamination procedures for non-disposable sampling equipment.

7.0 PROCEDURES

7.1 General Procedures

a) Install a fully charged battery in the instrument and verify that the iPAQ is correctly seated on the top of the unit. If the iPAQ is properly connected, the amber light on the upper right side of the iPAQ will blink.

b) Turn both the XRF (back of the unit) and the iPAQ (top right-hand side) on. If the iPAQ fails to turn on, it may be necessary to perform a "soft reset". *(Note: Remove the iPAQ from the unit, insert the tip of the stylus into the small hole on the bottom left hand side of the iPAQ to perform a "soft reset." Re-seat the iPAQ back into the instrument.)*

c) Start the Innov-X Systems software by selecting the Start Menu from the upper right-hand corner of the iPAQ screen. Select the Innov-X software from the drop-down menu. (*Note: The red light on the end of the instrument will be on when it is on and ready for use. It will flash when the trigger is pulled indicating that the instrument is emitting radiation.)*

d) Select Start and the Main Menu will open.

e) Choose the test mode (Soil) from the menu. *(Note: It will take a minute or two for the instrument to go through a hardware initiation phase.)*

f) The instrument will prompt you to perform a standardization test. The instrument will not operate until a successful standardization test has been performed. Place the standardization clip securely over the sample window of the XRF and tap the message box to initiate standardization which will take about 1 minute.

g) When standardization is complete, the resolution of the analyzer will be displayed. Tap OK to acknowledge and clear the screen.

h) If you wish to enter a sample name or sample id, select EDIT→ Test Info. Enter information in text fields or select items from drop down menus. In the soil mode there are preset options such as Operator, Sample Method, Sample Number, Sample Depth and comments. These can be customized as necessary. Fill in the information for the sample prior to analysis. The analysis will be stored with this information. You will need to enter new sample information prior to each sample run. Select OK to close the test information window.

i) The analyzer is now ready to take measurements.

7.2 In-Site Analysis

These procedures are applicable for analysis of surface soils and can be used for vertical profiling of acetate sleeves retrieved by direct push technology.

a) Complete the procedures outlined in the General Procedures Section.

b) Clear the area selected for analysis of any surface debris or vegetation. Level the area so the XRF sample window will contact the area evenly. If desired, a thin plastic wrap (like Saran Wrap) can be placed between the soil and the analyzer window to keep the window clean. (*Note: Except for a few elements (namely Chromium, Vanadium, and Barium) testing through the thin plastic has little effect on the test results. Results for chromium, vanadium, and barium may be lower by 20 to 30%*.)

c) Hold the XRF to the sample. Make sure the sample is as flush against the analyzing window as is possible. To start the test, pull and hold the trigger. Releasing the trigger prematurely will abort the analysis. *(Note: The software lock may have to be disabled if the instrument has not been used for more than 5 minutes.)* After analysis is started, the message, "TEST IN PROGRESS" will appear with a timer. For the duration of the test, the red light on the XRF will blink and the "testing" icon will appear in the lower right-hand corner of the iPAQ. The results will be displayed on the screen after a short time.

d) Once the result screen opens, you can enter new sample information for the next sample as outlined in the General Procedures and then press the trigger to analyze the next sample. To exit the analysis screen, select FILE→ EXIT or tap the X in the upper right-hand corner of the screen.

7.3 Bagged Soil Sample Testing

a) A soil sample is collected in a thin plastic bag (i.e. a "baggie"). It is recommended that at least 100 grams of soil are placed in the baggie. When shooting the soil, a thickness of at least 0.5 inches of soil in the bag is recommended.

b) When placing soil in the baggie, remove vegetation, debris, and rocks from the soil to the extent practical. Mix the soil in the baggie to homogenize it. If greater accuracy is desired, dry soil may be passed through a 10-um sieve to better homogenize it. A mortar and pestle may be used to break the soil into smaller particles to ease its passage through the sieve. If wet soil is encountered, using a sieve is not an option in the field unless a method to dry the soil can be found.

c) Hold the XRF to the sample. Make sure the sample is as flush against the analyzing window as is possible. To start the test, pull and hold the trigger. Releasing the trigger prematurely will abort the analysis. *(Note: The software lock may have to be disabled if the instrument has not been used for more than 5 minutes.)* After analysis is started, the message, "TEST IN PROGRESS" will appear with a timer. For the duration of the test, the red light on the XRF will blink and the "testing" icon will appear in the lower right-hand corner of the iPAQ. The results will be displayed on the screen after a short time.

d) Once the result screen opens, you can enter new sample information for the next sample as outlined in the General Procedures and then press the trigger to analyze the next sample. To exit the analysis screen, select FILE→ EXIT or tap the X in the upper right-hand corner of the screen.

8.0 CALCULATIONS

No calculations are applicable to this SOP. The XRF is a direct reading instrument.

9.0 QUALITY ASSURANCE/QUALITY CONTROL

The analysis of soils by XRF should be considered as a screening tool. Data derived from the instrument should be used with discretion. The following general QA procedures apply:

- All data must be documented on field data sheets, in field logbooks, and/or downloaded to a computer.
- All instrumentation must be operated in accordance with operating instructions as supplied by the manufacturer, unless otherwise specified in the work plan.
- Equipment calibration activities must be documented and must occur prior to beginning sampling operations. Performance checks on the XRF should be performed throughout the course of a day, and re-standardization of the instrument should be performed as needed.
- Confirmation samples should be collected at a minimum rate of 10% and sent to a laboratory for analysis. In order to properly perform a comparative analysis of the field screening method with the lab data, it is important to send the soil to the lab that was field screened due to the potential problems noted in Section 4.0 of this SOP.

Refer to the site-specific SAP and/or QAPP for specific quality assurance/quality control measures that may be applicable for the given project.

10.0 DATA VALIDATION

Data validation requirements set forth in the site-specific SAP or QAPP shall be adhered to for any given project. Results of quality control samples will be evaluated for contaminants. This information will be utilized to qualify the environmental sample results in accordance with the project's data quality objectives as set forth in the site-specific SAP and/or QAPP.

Confirmation samples are recommended at a minimum rate of 10%. Ideally, the sample that was analyzed by XRF should be the same sample that is sent for laboratory analysis. When confirming an in-situ analysis, collect a sample from a six-inch by six-inch area for both an XRF measurement and confirmation analysis.

11.0 HEALTH AND SAFETY

OSHA regulations should be adhered when working with potentially hazardous materials. Personnel performing work environmental work at WVDEP sites should have their 40 Hour Hazardous Waste Operations and Emergency Response (HAZWOPER) with 8 Hour refreshers as appropriate. Some level of Personal Protective Equipment (PPE) is generally required for all sampling and decontamination activities. The appropriate level of PPE for these activities may be found in the site-specific SAP and/or the Site Health and Safety Plan (HASP). Personnel should adhere to the safety requirements outlined in the site-specific plans. The following is a summary of just some of the hazards associated with soil sampling and the use of the XRF for environmental analysis:

- Exposure to unknown contaminants.
- Heat/cold stress as a result of exposure to extreme temperatures and the use of PPE.
- Slip, trip, and fall.
- The XRF has a radiation source. The XRF should not be pointed at anyone or any body part, whether energized on de-energized.
- Except as explained in the Innov-X Manual, do not service the XRF. Failure to heed this warning could result in exposure to radiation or electrical shock.
- Ensure that the proper batteries are placed in the instrument. There is a danger of explosion if improper substitution of batteries is made.
- Do not disengage the “deadman” trigger unless the instrument is set up in the sampling table. When using the XRF in the “handheld” mode it is important that the “deadman” trigger be engaged in order to ensure that the analyzer is always attended while x-rays are being emitted.

Material safety data sheets should be readily available on-site for all site specific contaminates and decontamination solvents or solutions as required by the Hazard Communication Standard requirements set forth in the OSHA regulations. IDW generated from sampling and decontamination activities requires proper handling, storage, and disposal. Refer to the site-specific SAP for IDW procedures.

12.0 REFERENCES

Guidance for Preparing Standard Operating Procedures (SOPs), EPA QA/G-6, US EPA, Office of Environmental Information, April 2007

Innov-X Alpha Series XRF User Manual, Innov-X Systems Inc., August 2005

"*Field-Portable X-Ray Fluorescence*", U.S. EPA/ERT Quality Assurance Technical Information Bulletin, Vol. 1, No. 4, May 1991.

XRAY Fluorescence Operating Procedures, SOP# 1707, US EPA, Environmental Response Team, December 22, 1994

Groundwater Well Sampling Procedures

SOP OEE-0110

Author	Revision No.	Effective Date	Description of Changes	Type of Change
Ruth Porter	1.0	7/1/2010	Reformatted, added SOP ID #, and renumbered. Supersedes Revision 0.0. Additional detail provided.	Editorial Technical
Dave Long	2.0	9/21/2016	Revised procedures. Reformatted.	Editorial, Technical
Randal Lemons	3.0	2/19/2020	Edit wording, Correct equations, Reformatting	Editorial, Technical

GROUNDWATER WELL SAMPLING PROCEDURES
SOP OEE-0110

Table of Contents

1.0 SCOPE AND APPLICATION

The purpose of this standard operating procedure (SOP) is to provide general reference information on sampling of groundwater wells. Groundwater samples give an indication of the nature and extent of any groundwater contamination and provide data on groundwater quality. Groundwater sampling procedures are generally split into two tasks, purging and sampling. Purging is the process of removing water from the monitoring well prior to sampling and replacing it with groundwater from the adjacent formation. This ensures that a more representative sample of the actual aquifer condition is collected. Every effort must be made to ensure that the sample is representative of the zone of water being sampled. These procedures are designed to be used in conjunction with analyses for the most common types of ground water contaminants (i.e., volatile, semi-volatiles, and metals). These procedures may be varied or changed as required, dependent upon site conditions, equipment limitations or limitations imposed by the procedure. The procedures utilized at a site should be documented and included in the site investigation report.

2.0 SUMMARY OF METHOD

In order to obtain a representative groundwater sample for chemical analysis, it is important to either purge water from the monitoring well or take steps to ensure that only water meeting the data quality objectives (DQO’s) and work plan objectives is removed from the well during sampling. Purging is generally performed by removing a pre-determined number of well volumes (well-volume purging), or by removing groundwater until water quality parameters have stabilized. Purging is conducted to remove stagnant water in the well casing and/or immediately adjacent to the well screen before collecting the sample. This may be achieved in several ways. Commonly used methods include but are not limited to the use of bailers and submersible pumps. When utilizing submersible pumps, low flow (or low stress) purging/sampling is recommended. Low flow purging/sampling is also highly recommended when sampling for volatile organic compounds (VOC’s) and metals. Due to agitation, the tendency to mix formation water with stagnant water above the well screen, and the tendency to stir up fines in the bottom of the well, purging and sampling with a bailer should only be conducted as a last resort. Data is collected under the Voluntary Remediation Program or the UECA pathway to delineate the extent of contamination from sites and to formulate remedial actions utilizing risk-based standards; therefore, a high level of data accuracy and validation is required for these programs. As such, groundwater data collected for volatile organic compounds (VOC’s) and metals analysis utilizing bailers for purging and sampling may not be accepted in these programs. Note that passive sampling, minimal purge and no-purge methods do not attempt to purge the stagnant water in the well prior to sampling.

When purging, monitoring wells should be purged, at a minimum, the equivalent of three to five times the well volume of standing water or they should continue to be purged until specific conductance, temperature, and pH stabilize. For well-volume purging, the volume of water present in each well shall be computed based on the length of water column and well casing diameter. Once purging is completed, sampling may proceed. Care should be taken when choosing the sampling device as some will affect the integrity of the sample, depending on the analytical parameters of interest. If information about the contaminant levels in a well is known, then sampling should be performed in a progression from the least to most contaminated well.

3.0 SAMPLE PRESERVATION, CONTAINERS, HANDLING, AND STORAGE

The type of sample container, the preservative, holding time, and filtering requirements are all dependent upon the type of analysis to be performed upon the sample. This information should be clearly set forth in the Sampling and Analysis Plan (SAP) for the site. The sampler should consult the SAP for all pertinent information relating to the proper sample preservation, type of containers, handling, and storage procedures for their project. A pair of clean, new, non-powdered disposable gloves shall be worn each time a different location is sampled to prevent cross-contamination. Samples should be collected directly from the sampling device (i.e. bailer or pump) into appropriate laboratory cleaned containers, without contacting the sampling device. Samples shall be appropriately preserved, labeled, and placed in a cooler to be maintained at ≤6ºC, but without freezing the sample in accordance with the SAP requirements. The samples should be shipped with adequate packing and cooling to ensure that they arrive at the laboratory intact and still cold. Refer to Table 2 of this QAPP for information on sample containers, preservation, and holding times for common contaminants.

4.0 INTERFERENCES AND POTENTIAL PROBLEMS

4.1 General

The goal is to obtain a representative sample of the groundwater. Proper field sampling techniques need to be utilized in order to ensure that a representative sample is collected, and the sampler does not comprise the sample through their actions. Analysis can be compromised by field personnel in two primary ways; taking an unrepresentative sample, or by incorrectly handling the sample. There are several ways to introduce contaminants into a sample; that is why it is very important to following sampling protocols.

4.2 Purging

In a non-pumping well, there will be little or no vertical mixing of the water, thus stratification will occur. The well water in the screened section will mix with the ground water due to normal flow patterns, but the well water above the screened section will remain isolated, become stagnant, and may lack the contaminants representative of the ground water. Purging prior to sampling will help to ensure that stagnant water is not collected as a part of the sample by either removing the stagnant water above the well screen or by pumping at a low flow rate within the screened interval so as not to mix stagnant water with the formation water.

A non-representative sample can result from excessive pre-pumping of the monitoring well. Stratification of the leachate concentration in the ground water formation may occur, or heavier-than-water compounds may sink to the lower portions of the aquifer. Excessive pumping can dilute or increase the contaminant concentrations from what is representative of the sampling point of interest; therefore, it is important not to over purge a well.

Purging is generally conducted with the use of a pump or a bailer. Two commonly recognized purging methods include the low-stress approach (utilized during low-flow sampling) and the well-volume approach.

The low-stress approach utilizes a variable-speed, low-flow sampling pump. This method assumes that pumping within the screened zone at a low rate will not draw stagnant water down into the screened portion of the well. Drawdown is minimized during pumping and should not exceed .33 feet (4 inches). Pump placement depends upon the level of water within the well: for water levels above the screened interval, the pump is placed in the middle of the screened interval; for water levels within the screened interval, the pump is placed in the middle (or just below the middle) of the water column. The pump should be gently lowered into the water column. The pump is turned on at a low flow rate (usually ~ 100 ml/min) and increased as necessary until drawdown stabilizes (i.e., pumping rate is equal to or less than well recharge rate). If sampling for VOC's purging flow rate should not exceed 300 ml/min. Water level measurements must be taken frequently to determine drawdown stabilization; once the water level stabilizes, measurements are no longer needed. Water quality indicator parameters (pH, specific conductance, dissolved oxygen, oxidation-reduction potential, temperature and turbidity) are monitored approximately every 3-5 minutes after a minimum of one tubing volume (including pump and flow-through cell volumes) has been purged from the well. A flow-through cell allows these parameters to be measured without air contacting the sample prior to the reading for accurate measurements. Once the water quality indicator parameters in Section 7.2 below have stabilized over three successive readings, sampling may begin. Sampling should be conducted as soon as practical after purging and at the same pump level and pumping rate as purging. For VOC's, expected pumping rates are 200-300 ml/min.

The well-volume approach for purging wells is based on proper purging of the stagnant water above the screened interval and the stabilization of water quality indicator parameters. For monitoring wells with water levels above the screen, the pump should be set near the top of the water column and slowly lowered during the purging process, being careful not to expose the screen to air. For water columns within the well screen, the pump should be set below the water table such that drawdown during pumping does not allow air to enter the pump. The pump should not be allowed to draw sediments from the bottom of the well or produce excessive turbulence due to a high purging rate. A smooth, constant (laminar) flow rate is desired for both purging and sampling. Flow rates should be between 200-500 ml/min (except for VOC's, as noted above). Stabilization requirements still favor the water quality indicator parameters approach (as opposed to a pre-determined well volume) and are consistent with those for the low-stress approach. The parameters should be recorded for each well volume removed; when three successive readings have reached stabilization, sampling may commence. If a groundwater monitoring well has been sufficiently sampled and characterized, and if water quality indicator parameters are no longer needed as part of site characterization and/or monitoring, samples may be obtained based on a specific number of well volumes at the previous pumping rates.

All purging water will be handled as investigation derived waste (IDW) and shall be handled according to the instructions found in the site-specific site assessment plan (SAP)

5.0 EQUIPMENT APPARATUS

The following are some of the materials and equipment that are potentially needed for groundwater well sampling activities:

- Water level indicator
- Photoionization detector (PID)
- Logbook
- Calculator

- Field data sheets and samples labels
- Chain of custody records and seals
- Sample and shipping containers
- Preservatives, as applicable
- Pails, tubs, or buckets
- Plastic sheeting
- Packing materials and Ziploc plastic bags
- Decontamination solutions (i.e., tap water, non-phosphate soap, distilled water)
- Brushes
- Pails or tubs
- Clean, decontaminated or new unused bailers
- Nylon line, enough to dedicate to each well

6.0 REAGENTS

Reagents may be utilized for preservation of samples and for decontamination of sampling equipment. Refer to the SOP for the decontamination procedures and required reagents. Refer to the site-specific Sampling and Analysis Plan for the preservatives required for the specified analysis to be performed.

7.0 PROCEDURES

7.1 General Procedures

The following general procedures are applicable to all well sampling events.

a) Place plastic sheeting on the ground in the vicinity of the well to ensure that sampling equipment does not contact the ground surface.

b) Remove the well cap and check for volatile organics in the headspace using a PID. If concentrations are detected in the headspace above the action levels established in the Site Health and Safety Plan (HASP), appropriate personal protective equipment (PPE) will be required.

c) Water-level measurement will be made using an electronic water level meter capable of measuring water levels to the nearest .01 foot.

d) Typically, all depth measurements should be made from the top (the highest point) of the inner well casing (top-of-casing, TOC), also known as the well riser. The reference point location should be described in the field logbook and should be used in all subsequent sampling efforts. Check for well damage at each well that could indicate a shift in the reference point. Lower the water-level measurement tape and gauge the depth to water and total depth of the well. Care should be taken to assure that the water-level measurement device hangs freely in the monitoring well and is not adhering to the wall of the well casing. Take replicate measurements (at least 3) in each well to ensure accuracy. Record water level data in the field logbook. The water level meter should be left in the well during low flow purging and sampling.

e) As necessary (depending on the purging/sampling approach), determine the well volume using one of the formulas in Section 8.0 of this SOP. If more than 24 hours have passed since water levels were measured, re-gauge and record the static water level prior to purging.

7.2 Submersible Pump (Low Flow Sampling)

a) Calculate the total volume in the pump and tubing. Volume estimates per foot for common inside diameter tubing is presented in the following table:

Tubing Inside Diameter (inches)	Tubing Volume (gallon per foot)
¼	0.0003
3/8	0.0057
½	0.010

b) Connect the pump tubing to the flow-through cell and connect the multi-parameter probe to the cell. Connect the discharge from the flow-through cell to a purge water drum for later Investigation Derived Waste (IDW) disposal. Keep the flow-through cell out of direct sunlight.

c) Lower the pump slowly in the well to minimize the disturbance of the water column.

- Do not let the pump tubing, electrical cords, and support cable touch the ground as you are lowering the pump into place.
- Secure the pump at the desired depth using the support cable. The entire pump and tubing assembly should be supported by a stainless steel or Teflon coated cable. It is not advisable to use the tubing to support the pump.
- Place the pump intake as close to the middle of the screened interval for wells with water levels above the top of the screen. For wells with water levels below the top of the screen, the pump intake should be placed in the middle (or just below the middle) of the water column.
- The pump or water level probe should not be allowed to hit the bottom of the well before or during sampling because it will disturb sediment. It should be noted that at least three feet of water is needed to implement low flow sampling.

d) Record the location of the pump intake (feet below TOC) so that future sampling will occur at the same depth interval.

e) Start the pump at the lowest possible flow setting. Increase the pump rate gradually until a continuous flow is achieved from the discharge tubing. The discharge rate of the pump can be determined by using a graduated cylinder and a stopwatch. Record the flow rate in gallons per minute. Pumping rates should be kept at minimal flow to ensure minimal drawdown in the monitoring well. The flow rate should be maintained between 0.03 and 0.13 gallons per minute (.03-.08 gal/min. for VOC sampling) throughout the purging and sampling activities.

f) When a stable purge rate has been established (i.e., pumping rate is equal to or less than well recharge rate), begin recording water quality readings at a frequency of every three to five minutes.

g) Continue to purge the well until a minimum of one volume of the tubing plus pump volume have been removed and water quality parameters have stabilized within the following stabilization criteria over three consecutive readings. Record the purging and sampling data in the field logbook.

Parameter	Criteria
pH	+/- 0.1 standard units
Conductivity	+/- 3% of readings
Temperature*	+/- 1.0 degree Celsius
Dissolved Oxygen	+/- 0.3 mg/l or 10% of readings, whichever is greater
Turbidity*	+/- 10% of readings (less than 10 nephelometric turbidity units)
Eh/OORP	+/- 10 millivolts
**Turbidity, which is not an actual water quality indicator, should be measured at the start and end of pumping – low levels are desired, but stabilization isn't necessary. Temperature should be measured, but it is not a water quality indicator, so stabilization isn't necessary.*	

h) Once the water quality parameters have stabilized, collect the ground water sample by detaching the tubing from the flow-through cell. Under no circumstances should the ground water sample be collected from the flow-through cell discharge stream. Collect the samples in the following order:

   i. Volatile organic compounds (ensure that volatiles are immediately capped and have no headspace)
   ii. Semi-volatile organic compounds
   iii. Nitroaromatics
   iv. Herbicides/pesticides
   v. Metals
   vi. All other parameters

i) Samples for total metals analysis should be collected prior to sampling for dissolved metals. To collect samples for dissolved metals analysis, a 0.45µ filter should be added to the discharge line. Samples for dissolved metals analysis should be collected after 500 ml of water has passed through the in-line filter. Remove the filter following collection of samples for dissolved metals.

j) Preserve and filter according to the requirements set forth in the site-specific SAP. Label the sample containers using indelible pen, attach a chain-of-custody seal to each container lid, place the containers in plastic bags, and place them on ice in a cooler. Record sample collection date and time. Handle and store samples in accordance with approved QAPP and/or SAP.

k) Remove the water level meter (if not already removed) and then the pump from the monitoring well. Decontaminate the pump and dispose of the tubing if it is non-dedicated to the well. Protect equipment from contamination by storing on plastic sheeting.

l) Close and lock the well.

m) Record the following information in the field logbook:

   - Sample ID
   - Location
   - Purging and sampling data

- Color
- Odor
- Field screening instrument readings, if applicable
- Any other pertinent information

7.3 Bailer Method

[As noted above, bailers are not recommended for most purging/sampling situations, other than in low-permeability formations (see below). If bailers are to be used, justification must be provided in the SAP.]

a) Purge the well by manually bailing until a minimum of three well volumes have been removed and water quality parameters have stabilized within the following stabilization criteria over three consecutive readings. Record the purging and sampling data in the field logbook.

Parameter	Criteria
pH	+/- 0.1 standard units
Conductivity	+/- 3% of readings
Temperature*	+/- 1.0 degree Celsius
Dissolved Oxygen	+/- 0.3 mg/l
Turbidity*	+/- 10% of readings (less than 10 nephelometric turbidity units)
Eh/OORP	+/- 10 millivolts

b) Lower bailer slowly and gently into well, do not drop or splash bailer into the water column. Stop lowering at desired point adjacent to well screen. Withdraw a sample from the well, transfer the sample from the bailer directly into sample containers. Preserve and filter according to the requirements set forth in the site-specific SAP.

c) Collect the samples in the following order:

    i. Volatile organic compounds (ensure that volatiles are immediately capped and have no headspace)
    ii. Semi-volatile organic compounds
    iii. Nitroaromatics
    iv. Herbicides/pesticides
    v. Metals
    vi. All other parameters

d) Samples for total metals analysis should be collected prior to sampling for dissolved metals. To collect samples for dissolved metals analysis, a 0.45µ filter should be attached to a syringe (or other device to force water through the filter). Samples for dissolved metals analysis should be collected after 500 ml of water has passed through the filter. Discard the filter following collection of samples for dissolved metals.

e) Label appropriate sampling containers with sampling details and custody information.

f) Replace the well cap and lock the cover.

g) Record the following information in the field logbook:

- Sample ID
- Location
- Purging and sampling data
- Color
- Odor
- Field screening instrument readings (i.e., water quality, PID)
- Any other pertinent information

7.4 Sampling Wells in Low-Permeability Formations

Wells located in low-permeability formations (i.e., slow-recovery wells, wells that can be purged to dryness, etc.) require alternate sampling procedures than the methods listed above. One approach, for a well screened below the water table, is to remove the stagnant water in the casing to just above the top of the screened interval, to prevent the exposure of the gravel pack or formation to atmospheric conditions. The pumping rate should be as low as possible to minimize disturbance as much as possible in the well. A sample should then be secured from the water within the screened interval. Another approach is to use a dedicated pump located within the screened interval and purge only the pump and tubing volume before collecting the sample ("passive sampling"). Another type of passive sampling uses a passive diffusion bag sampler (PDBS) which is deployed in the screened interval of the monitoring well for two weeks or longer. Analytes of interest passively diffuse into deionized water contained within the sampler as the well equilibrates. It should be noted that only certain VOC's will diffuse into the PDBS. The PDBS is retrieved from the well and the sample is poured into appropriate sample containers. Other no-purge samplers include equilibrated grab samplers such as the Hydrasleeve and the Snap Sampler. These samplers are deployed in the screened interval of the monitoring well and the well is allowed to equilibrate – equilibration takes only minutes with the Hydrasleeve and days with the Snap Sampler. The Snap Sampler sample comes ready to be shipped to the lab when retrieved; the Hydrasleeve sample must be poured into appropriate containers before delivery to the lab. Use of these passive sampling and no-purge sampling techniques will require development of an SOP to be included in the SAP.

8.0 CALCULATIONS

If it is necessary to calculate the volume of the well, utilize the following equation:

$$r^2_b * h = V$$

Or if the variables are known:

$$r^2_{ic}h + [(r^2_b h - r^2_{oc}h) * ne] = V$$

Where:

Where:	r_{ic} =	radius inside diameter of casing
	r_b =	radius of borehole
	r_{oc} =	radius outside diameter of casing
	h =	water column height
	ne =	effective porosity of filter pack material (~ 35%)
	V =	Volume

9.0 QUALITY ASSURANCE/QUALITY CONTROL

The following general quality assurance procedures apply:

- All data must be documented on field data sheets and/or within the field logbook.
- All instrumentation should be operated and calibrated in accordance with the manufacturer's instructions unless specified otherwise in the site-specific SAP.
- The collection of an equipment rinsate blank is recommended to evaluate potential for cross-contamination from the purging and/or sampling equipment.
- The collection of duplicate samples will likely be a requirement set forth in the SAP and/or QAPP.
- Trip blanks are required for each cooler with samples for volatile organic compounds analysis.

Refer to the site-specific SAP and/or QAPP for specific quality assurance/quality control measures that may be applicable for the given project.

10.0 DATA VALIDATION

Data validation requirements set forth in the site-specific SAP or QAPP shall be adhered to for any given project. Results of quality control samples will be evaluated for contaminants. This information will be utilized to qualify the environmental sample results in accordance with the project's data quality objectives as set forth in the site-specific SAP and/or QAPP.

11.0 HEALTH AND SAFETY

OSHA regulations should be adhered when working with potentially hazardous materials. Personnel performing work environmental work at WVDEP sites should have their 40 Hour Hazardous Waste Operations and Emergency Response (HAZWOPER) with 8 Hour refreshers as appropriate. Some level of PPE is generally required for all sampling and decontamination activities. The appropriate level of PPE for these activities may be found in the site-specific SAP and/or the Site HASP. Personnel should adhere to the safety requirements outlined in the site-specific plans. The following is a summary of just some of the hazards associated with well sampling:

- Exposure to unknown contaminants
- Lifting injuries associated with moving equipment, coolers with samples, and retrieving pumps and bailers
- Heat/cold stress as a result of exposure to extreme temperatures and the use of PPE
- Slip, trip, and fall
- Potential electrical shocks associated with use of submersible pumps

Material safety data sheets should be readily available on-site for all site specific contaminates and decontamination solvents or solutions as required by the Hazard Communication Standard requirements set forth in the OSHA regulations. IDW generated from sample collection and decontamination activities requires proper handling, storage, and disposal. Refer to the site-specific SAP for IDW procedures.

12.0 REFERENCES

Guidance for Preparing Standard Operating Procedures (SOPs), EPA QA/G-6, US EPA, Office of Environmental Information, April 2007

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GROUNDWATER SAMPLING VIA DIRECT PUSH

SOP OEE-0111

Author	Revision No.	Effective Date	Description of Changes	Type of Change
Ruth Porter	0.0	7/1/2010	New SOP	Technical
Randal Lemons	1.0	2/20/20	Wording Edits and Formatting	Editorial

GROUNDWATER SAMPLING VIA DIRECT PUSH
SOP OEE-0111

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1.0 SCOPE AND APPLICATION

The purpose of this standard operating procedure (SOP) is to provide general reference information on sampling of groundwater using direct push (i.e. Geoprobe^{TM}) technology. The use of Geoprobe^{TM} at a site for groundwater sampling allows for assessment of the potential for groundwater contamination without the costly installation of monitoring wells.

These procedures are designed to be used in conjunction with analyses for the most common types of ground water contaminants (i.e., volatile, semi-volatiles, and metals). These procedures may be varied or changed as required, dependent upon site conditions, equipment limitations or limitations imposed by the procedure. The procedures utilized at a site should be documented and included in the site assessment report.

2.0 SUMMARY OF METHOD

The Geoprobe^{TM} is hydraulically powered and is generally mounted on a customized four-wheel drive vehicle. The base of the sampling device is positioned on the ground over the sampling location and the vehicle is hydraulically raised on the base. As the weight of the vehicle is transferred to the probe, the probe is pushed into the ground. A built-in hammer mechanism allows the probe to be driven through dense materials. Maximum depth penetration under favorable circumstances is approximately 50 feet. Slotted lengths of probe can be used to collect groundwater samples if the probe rods can be driven to the water table. Groundwater samples can be collected using a mini-well bailer, or a check valve.

3.0 SAMPLE PRESERVATION, CONTAINERS, HANDLING, AND STORAGE

The type of sample container, the preservative, holding time, and filtering requirements are all dependent upon the type of analysis to be performed upon the sample. This information should be clearly set forth in the Sampling and Analysis Plan (SAP) for the site. The sampler should consult the SAP for all pertinent information relating to the proper sample preservation, type of containers, handling, and storage procedures for their project. Samples should be collected directly from the sampling device into appropriate laboratory cleaned containers. Samples shall be appropriately preserved, labeled, and placed in a cooler to be maintained at ≤6ºC, but without freezing the sample in accordance with the SAP requirements. The samples should be shipped with adequate packing and cooling to ensure that they arrive at the laboratory intact and still cold.

4.0 INTERFERENCES AND POTENTIAL PROBLEMS

A preliminary site survey should be performed in order identify areas to be avoided with the Geoprobe^{TM}. All underground utilities should be located and marked. These areas were underground utilities are located should be avoided during sampling.

Decontamination of sampling tubes, probe rods, adaptors, non-expendable points and other equipment that contacts the soil and/or groundwater is necessary to prevent cross contamination of samples. During sampling, the bottom portion and outside of the sampling tubes can be contaminated with soil from other depth intervals. Care must be taken to prevent soil which does not represent the sampled interval form being carefully wiped from the outside surface of the sampling tube and the bottom 3 inches of the sample should be discarded before extruding the sample.

5.0 EQUIPMENT/APPARATUS

The following are some of the materials and equipment that are potentially needed for groundwater sampling activities:

- Water level indicator
- Photoionization detector (PID)
- Logbook
- Calculator
- Field data sheets and samples labels
- Chain of custody records and seals
- Sample and shipping containers
- Preservatives, as applicable
- Pails, tubs, or buckets
- Plastic sheeting
- Packing materials and Ziploc plastic bags
- Decontamination solutions (i.e., tap water, non-phosphate soap, distilled water)
- Brushes
- Polyethylene tubing
- Sampling gloves
- GeoprobeTM and associated equipment (i.e., rods, extractor, drive and pull caps, expandable point holders, drive points)
- Threaded drive points
- Mini-well bailer
- Stainless steel perforated well screen
- Stainless steel check valve

6.0 REAGENTS

Reagents may be utilized for preservation of samples and for decontamination of sampling equipment. Refer to the SOP for the decontamination procedures and required reagents. Refer to the site-specific Sampling and Analysis Plan for the preservatives required for the specified analysis to be performed.

7.0 PROCEDURES

These procedures relate to the sampling activities associated with collecting a groundwater sample from a GeoProbe™ and are not intended to address in detail the actual operation of the GeoProbe™. The operator should follow the SOP requirements established by the manufacturer for the GeoProbe™ model being utilized at the site.

7.1 General Procedures

i. Place plastic sheeting on the ground in the vicinity of the well to ensure that sampling equipment does not contact the ground surface.

ii. The GeoprobeTM operator will advance the direct push rods to the desired depth of the boring. The operator will adhere to the SOPs established by the manufacturer for operation of the equipment being utilized to perform the work.

(No*te: If contamination is observed in a perched aquifer during advancement of the rods, DO NOT push through into the next groundwater aquifer as you may introduce contamination.)*

iii. A water-level indicator should be used to determine if water has entered the slotted sections of the probe rod. If water is not detected in the probe rods, the operator will replace the drive cap and continue probing until water is reached.

iv. After the probe rods have been driven into the saturated zone, enough time should be allowed for the water level in the probe rods to stabilize prior to performing sampling.

v. Groundwater samples may now be collected utilizing a check valve, a mini-well bailer, or a peristaltic pump.

7.1.1 Check Valve Method

a. Clean, unused polyethylene tubing with a decontaminated stainless-steel check valve is then lowered down through the rods into the groundwater.

b. Groundwater is brought to the surface by lifting and lowering the tubing in the groundwater.

c. Once groundwater is brought to the surface, fill appropriate sample containers, seal, label, and place on ice. Take care not to overfill sample containers which would potentially dilute preservatives.

(*Note: At a minimum, groundwater temperature, pH, and specific conductivity will be measured and recorded during sampling. To minimize the potential for cross contamination, these measurements will be made on aliquots that are not submitted to the lab for analysis*.)

d. The GeoprobeTM operator will remove the rods and tubing and fill the boring with bentonite chips and/or clean soil cuttings. The stainless-steel rods, drive point assembly, and check valve will be decontaminated, and the tubing and contaminated soil cuttings will be disposed of as investigation derived waste.

e. Record the following information in the field logbook.

- Sample ID
- Location
- Purging and sampling data
- Color
- Odor
- Field Screening Instrument Readings, if applicable
- Any Other Pertinent Information

(Note: Due to the nature of this collection procedure, solids that are not representative of the groundwater's natural condition are introduced into the sample. Therefore, filtering of direct push groundwater samples for metals, or other contaminants that tend to adhere to solids is recommended. Refer to the Sampling and Analysis Plan requirements to determine the appropriate samples that should be filtered.)

7.1.2 Mini-Well Bailer Method

a. A clean unused mini-well bailer is lowered down through the rods into the groundwater to collect the water.

b. Once groundwater is brought to the surface, fill appropriate sample containers, seal, label, and place on ice. Take care not to overfill sample containers which would potentially dilute preservatives.

(*Note: At a minimum, groundwater temperature, pH, and specific conductivity will be measured and recorded during sampling. To minimize the potential for cross contamination, these measurements will be made on aliquots that are not submitted to the lab for analysis*.)

c. The GeoprobeTM operator will remove the rods and tubing and fill the boring with bentonite chips and/or clean soil cuttings. The stainless-steel rods, drive point assembly, and check valve will be decontaminated, and the tubing and contaminated soil cuttings will be disposed of as investigation derived waste.

d. Record the following information in the field logbook.

- Sample ID
- Location
- Purging and sampling data
- Color
- Odor
- Field Screening Instrument Readings, if applicable
- Any Other Pertinent Information

(Note: Due to the nature of this collection procedure, solids that are not representative of the groundwater's natural condition are introduced into the sample. Therefore, filtering of direct push groundwater samples for metals, or other contaminants that tend to adhere to solids is recommended. Refer to the Sampling and Analysis Plan requirements to determine the appropriate samples that should be filtered.)

8.0 CALCULATIONS

No calculations are applicable to this SOP.

9.0 QUALITY ASSURANCE/QUALITY CONTROL

The following general quality assurance procedures apply:

- All data must be documented on field data sheets and/or within the field logbook.
- All instrumentation should be operated and calibrated in accordance with the manufacturer's instructions unless specified otherwise in the site-specific SAP.
- The collection of an equipment rinsate blanks is recommended to evaluate potential for cross contamination.
- The collection of duplicate samples will likely be required for the project. Refer to the site-specific SAP /or Quality Assurance Project Plan (QAPP) for further information on collection of duplicate samples.
- Trip blanks are required if analytical parameters include analysis for volatile organic compounds.

Refer to the site-specific SAP and/or QAPP for specific quality assurance/quality control measures that may be applicable for the given project.

10.0 DATA VALIDATION

Data validation requirements set forth in the site-specific SAP or QAPP shall be adhered to for any given project. Results of quality control samples will be evaluated for the site specific contaminants. This information will be utilized to qualify the environmental sample results in accordance with the project's data quality objectives as set forth in the site-specific SAP and/or QAPP.

11.0 HEALTH AND SAFETY

OSHA regulations should be adhered when working with potentially hazardous materials. Personnel performing work environmental work at WVDEP sites should have their 40 Hour Hazardous Waste Operations and Emergency Response (HAZWOPER) with 8 Hour refreshers as appropriate. Some level of Personal Protective Equipment (PPE) is generally required for all sampling and decontamination activities. The appropriate level of PPE for these activities may be found in the site-specific SAP and/or the Site Health and Safety Plan (HASP). Personnel should adhere to the safety requirements outlined in the site-specific plans. The following is a summary of just some of the hazards associated with groundwater sampling using direct push technology.

- Exposure to unknown contaminants
- Lifting and carrying injuries
- Heat/cold stress as a result of exposure to extreme temperatures and the use of PPE
- Slip, trip, and falls
- Injury from moving equipment
- Underground utilities
- Loud noises

Material safety data sheets should be readily available on-site for all site specific contaminates and decontamination solvents or solutions as required by the Hazard Communication Standard requirements set forth in the OSHA regulations. Investigation derive waste (IDW) generated from the soil boring process, retrieving the sample, and decontamination activities requires proper handling, storage, and disposal. Refer to the site-specific SAP for IDW procedures.

12.0 REFERENCES

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Soil Sampling

SOP OEE-0120

Author	Revision No.	Effective Date	Description of Changes	Type of Change
Ruth Porter	1.0	7/1/2010	Reformatted, added SOP ID #, and renumbered. Supersedes Revision 0.0. Combined previous soil sampling SOP for surface and subsurface sampling, added sampling information	Editorial Technical
Dave Long	2.0	9/21/2016	Revised procedures. Reformatted.	Editorial, Technical
Randal Lemons	3.0	2/20/2020	Edit Wording, Reformatted. SOP ID # Update	Editorial

SOIL SAMPLING
SOP OEE-0120

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1.0 SCOPE AND APPLICATION

The purpose of this standard operating procedure (SOP) is to describe the procedures for the collection of surface and subsurface soil samples using equipment such as a continuous flight auger, a split spoon, backhoe, hand auger, shovel, trowel, and/or scoop. Refer to SOP OEE-0121 for soil sample collection procedures using direct push (i.e. Geoprobe^{TM}). Analysis of soil samples may determine whether concentrations of specific pollutants exceed established action levels, or if the concentrations of pollutants present a risk to public health or the environment. These procedures may be varied or changed as required, dependent upon site conditions, equipment limitations, or limitations imposed by the procedure. The procedures utilized at a site should be documented and included in the site specific site assessment report. Refer to SOP OEE-0122 for procedures for soil sampling of volatiles utilizing Method 5035. Refer to SOP OEE-0101 and OEE-0102 for procedures for field screening of soil with a photoionization detector (PID) and an X-Ray fluorescence (XRF) detector, respectively.

2.0 SUMMARY OF METHOD

Soil samples may be collected using a variety of methods and equipment depending on the depth of the desired sample, the type of sample required (disturbed vs. undisturbed), and the soil type. Surface and near-surface soils may be easily sampled using a spade, trowel, and scoop. Sampling at greater depths may be performed using a hand auger, continuous flight auger, a split-spoon, or a backhoe.

3.0 SAMPLE PRESERVATION, CONTAINERS, HANDLING, AND STORAGE

Chemical preservation of solids is generally not performed or recommended, except for Method 5035. However, samples should be cooled and protected from sunlight to minimize any potential reaction. The type of sample container, the preservative (if any), and holding times are all dependent upon the type of analysis to be performed upon the sample. Refer to Table 2 of this QAPP for information on sample containers, preservation and holding times for common contaminants. This information should be clearly set forth in the Sampling and Analysis Plan (SAP) for the site. The sampler should consult the SAP for all pertinent information relating to the proper sample preservation, type of containers, handling, and storage procedures for their project. A pair of clean, new, non-powdered disposable gloves shall be worn each time a different location is sampled to prevent cross-contamination. Samples should be collected directly from the sampling device into appropriate laboratory cleaned containers. Samples shall be appropriately preserved (if applicable), labeled, custody seals attached and placed in a cooler to be maintained at ≤6ºC, but without freezing the sample in accordance with the SAP requirements. The samples should be shipped with adequate packing and cooling to ensure that they arrive at the laboratory intact and still cold. Consider placing each sample container in a zip-lock bag to prevent ice/water in the cooler from dislodging or destroying the label (Sample vials and jars for each sample from Method 5035 sampling may be placed in the same zip-lock bag.)

4.0 INTERFERENCES AND POTENTIAL PROBLEMS

There are two primary potential problems associated with soil sampling: cross-contamination of samples and improper sample collection. Cross-contamination problems can be eliminated or minimized using dedicated sampling equipment. Additionally, strictly following decontamination procedures of the non-dedicated sampling equipment can prevent or reduce the chance of cross-contamination problems.

Improper sample collection can involve using contaminated equipment, disturbance of the matrix resulting in compaction of the sample, significant volatile loss for VOC sample collection or inadequate homogenization of the samples where required, resulting in variable, non-representative results. When sampling with a hand auger, non-cohesive sands may collapse in the borehole prior to reaching the sampling depth; also, in tight clays, the greater the depth attempted, the more difficult it is to recover a sample due to increased friction and torqueing of the hand auger extensions.

5.0 EQUIPMENT APPARATUS

The following are some of the materials and equipment that are potentially needed for soil sampling activities. Refer to the site Sampling and Analysis Plan to determine specific needs for any given project.

- Photoionization detector (PID)
- Logbook
- Field data sheets and samples labels
- Chain of custody records and seals
- Sample and shipping containers
- Preservatives, as applicable
- Pails, tubs, or buckets
- Plastic sheeting
- Packing materials and Ziploc plastic bags
- Decontamination solutions (i.e., tap water, non-phosphate soap, distilled water)
- Brushes
- Sampling gloves
- Shovel
- Spatula, scoops, and/or trowels
- Continuous flight (screw) auger
- Bucket auger
- Post hole auger
- Split spoons
- Backhoe

6.0 REAGENTS

Chemical preservation of solids is not generally recommended except for sampling for VOC analysis; therefore, reagents will likely be utilized only for decontamination of sampling equipment. Refer to the SOP for the decontamination procedures and required reagents. Refer to the SOP for Method 5035 for VOC soil sample collection. Refer to the site-specific Sampling and Analysis Plan for the preservatives, if any, required for other specified analyses to be performed.

7.0 PROCEDURES

7.1 General Procedures

a) Determine the extent of the sampling effort, the sampling methods to be employed, and the types and amounts of equipment and supplies required.

b) Obtain necessary sampling and monitoring equipment. Ensure that it has been decontaminated since its last use and ensure that the equipment is in good working condition.

c) Use stakes and/or flagging to identify and mark all sampling locations.

d) Ensure that WV811 and all local utilities have been called to perform a utility marking of the site.

7.2 Surface Soil Samples

The West Virginia Department of Environmental Protection Office of Environmental Enforcement (OEE) defines surface soil as the soil located from a depth of 0 to 2'. Collection of surface soil samples can be accomplished with tools such as spades, shovels, trowels, and scoops.

a) Clear any surface debris (e.g., concrete/asphalt, vegetation, roots, gravel/rocks, and twigs) from the sampling location.

b) Use a scoop, hand-auger, trowel, or shovel to collect a portion of soil from the 0-2' depth. Perform field screening as appropriate (see SOP OEE-0101 and OEE-0102 for Field Screening). (*Note: Soil samples collected for field soil screening may not be used for laboratory analysis.)* Whenever a vertical or near-vertical surface is sampled, such as when shovels or similar devices are used for surface or subsurface sampling, the surface should be dressed (scraped) to remove smeared soil and to expose a fresh surface for sampling. If Method 5035 is required for volatiles, submerge the coring device directly into a fresh face of the remaining soil contained in the sampling device and collect the sample, placing the soil in the appropriate sample jar for volatile organic analysis. Note, however, that if the soil is non-cohesive and crumbles when removed from the ground surface, consideration should be given to obtaining the soil plug for Method 5035 analysis directly from a newly exposed ground surface. For all other analysis, the soil may be homogenized in a plastic bag or in a stainless-steel bowl prior to placing the soil in the appropriate sample containers. (Note: Remove rocks, pebbles, and organic material from the soil sample prior to placing the soil in the sample containers).

c) Close the sample containers and affix labels (if not already present) to the containers and immediately place on ice.

d) Measure the depth of the samples using a ruler and record it in the field logbook.

e) Once the sampling is completed, dispose of disposable sampling equipment and plastic 5035 syringes. Decontaminate any non-disposable sampling equipment prior to the collection of the next sample.

f) Record the following information in the field logbook:

- Sample ID
- Location
- Depth of sample
- Soil type description
- Equipment used
- Apparent moisture content (i.e., dry, moist, wet)
- Color
- Odor
- Field screening instrument readings, if applicable
- Any other pertinent information

7.3 Sampling at Depth with Hand Augers and Thin Wall Tube Samplers

This system consists of an auger (typically, 4-inch stainless steel auger buckets with cutting heads are used) and/or a thin-wall tube sampler, a series of extensions, and a "T" handle. The auger is used to bore a hole to a desired sampling depth and is then withdrawn. Perform field screening as appropriate and as referenced in Section 7.2.2 above. Samples for Method 5035 analysis will be collected first, immediately and directly from the auger. Samples for other analysis may then be collected once the material is removed from the auger and homogenized. If a core sample is to be collected, the auger tip is then replaced with a thin wall tube sampler. The system is then lowered down the borehole and driven into the soil to the completion depth. The system is withdrawn, and the core is collected from the thin wall tube sampler.

The following procedure is used for collecting soil samples with the auger:

a) Clear the area to be sampled of any surface debris (e.g., twigs, rocks, etc.).

b) Attach the auger bit to a drill rod extension and attach the "T" handle to the drill rod.

c) Begin augering, periodically removing and depositing accumulated soils onto a plastic sheet spread near the hole or into a 55-gallon drum. This prevents accidental brushing of loose material back down the borehole when removing the auger or adding drill rods. Consider using a second, clean auger bucket for sampling once the sampling depth is attained.

d) After reaching the desired depth, slowly and carefully remove the auger from the hole.

e) If soil has sloughed from the sides of the auger hole, discard the top 1” of soil in the auger. When sampling directly from the auger, collect the sample after the auger is removed from the hole (note special considerations for Method 5035 sampling above) and proceed to Step k).

f) Remove auger tip from the extension rods and replace with a pre-cleaned thin wall tube sampler. Install the proper cutting tip.

g) Carefully lower the tube sampler down the borehole. Gradually force the tube sampler into the soil. Do not scrape the borehole sides. Avoid hammering the rods as the vibrations may cause the boring walls to collapse.

h) Remove the tube sampler and unscrew the drill rods.

i) Remove the cutting tip and the core from the device.

j) Discard the top 1” of the core as this may represent material collected before penetration of the layer of concern. Place the remaining core into the appropriate labeled sample container.

k) Perform field screening as appropriate. If Method 5035 is required for volatiles, collect this sample first, submerging the coring device directly into the soil contained in the sampling device and placing the soil in the appropriate sample jar for volatile organic analysis. For all other analysis, the soil may be homogenized in a plastic bag or in a stainless-steel bowl prior to placing the soil in the appropriate sample containers.

l) Once the sampling is completed, dispose of disposable sampling equipment and plastic 5035 syringes. Decontaminate any non-disposable sampling equipment prior to the collection of the next sample.

m) Record the following information in the field logbook:

- Sample ID
- Location
- Depth of sample
- Soil type description
- Equipment used
- Apparent moisture content (i.e., dry, moist, wet)
- Color
- Odor
- Field screening instrument readings, if applicable
- Any other pertinent information

n) Abandon the boring in accordance with applicable state regulations.

7.4 Sampling at Depth with a Split Spoon (Barrel) Sampler

Split spoon sampling is generally used to collect soil cores of 18 or 24 inches in length. A series of consecutive cores may be extracted with a split spoon sampler to give a complete soil column profile, or an auger may be used to drill down to the desired depth for sampling. For standard split spoon sampling, a drill rig is used to advance a borehole to the target depth. The drill string is then removed, and a standard split spoon is attached to a string of drill rod. The spoon is then lowered to the bottom of the borehole, and a safety hammer is used to drive the split spoon into the soil. After the spoon is filled it is retrieved to the surface, where it is removed from the drill string and opened for sample collection. Continuous split spoon samplers are also common. These are generally larger in diameter and longer in length than standard split spoons. The continuous split spoon is advanced into the soil column inside a hollow stem auger. After the auger string has been advanced into the soil column a distance equal to the length of the continuous sampler being used it is returned to the surface. The sampler is removed from inside the auger and opened for sampling. When split spoon sampling is performed for geotechnical purposes, all work should be performed in accordance with ASTM D1586-98, "Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils".

The following procedures are used for collecting soil samples with a split spoon:

a) Assemble the sampler by aligning both sides of barrel and then screwing the drive shoe on the bottom and the head piece on top.

b) Depending on the type of split spoon being used, the sampler is driven into the soil by the drilling rig, allowing the sample to be collected in the spoon.

c) As the spoon is being retrieved from the drill string, record in the site logbook or on field data sheets the length of the tube used to penetrate the material being sampled, and the number of blows required to obtain this depth.

d) Withdraw the sampler, and open by unscrewing the bit and head and splitting the barrel. Field screening (directly from the spoon) and Method 5035 sampling should be the first tasks performed after opening the spoon to reduce as much as possible the loss of volatiles from the sample. For screening, poke a small hole to the middle of the soil core and take readings with the PID. For all other analysis, the soil may be homogenized in a plastic bag or in a stainless-steel bowl prior to placing the soil in the appropriate sample containers. If a split sample is desired, a cleaned, stainless steel knife should be used to divide the tube contents in half, longitudinally. The standard split spoon sampler is typically available in 2 and 3 1/2-inch diameters. A continuous split spoon sampler may be necessary to obtain the required sample volume depending upon the analysis required.

e) The amount of soil recovery, blow counts (N-value for Standard Penetration Test), soil type/description, field screening results, sample interval, and depth of any groundwater encountered (first encounter and after boring completion) should all be recorded on the boring log.

f) Once the sampling is completed, dispose of disposable sampling equipment and plastic 5035 syringes. Decontaminate any non-disposable sampling equipment prior to the collection of the next sample.

g) Record the following information in the field logbook:
   - Sample ID
   - Location
   - Depth of sample
   - Soil type description
   - Equipment used
   - Apparent moisture content (i.e., dry, moist, wet)
   - Color
   - Odor
   - Field screening instrument readings, if applicable
   - Any other pertinent information

h) Abandon the boring as necessary in accordance with applicable state regulations.

7.5 Test Pit/Trench Excavation

The following procedures are used for collecting soil samples from test pits or trenches:

a) Backhoes may be used in the collection of surface and shallow subsurface soil samples. The trenches created by excavation with a backhoe offer the capability of collecting samples from very specific intervals and allow visual correlation with vertically and horizontally adjacent material. Using the backhoe, excavate a trench approximately three feet wide and approximately one-foot-deep below the cleared sampling location. Place excavated soils on plastic sheets. (Note: Trenches greater than five feet deep must be sloped or protected by a shoring system, as required by OSHA regulations.)

b) A shovel may be used to remove a one to two-inch layer of soil from the vertical face of the pit where sampling is to be done. Remember to dress (scrape) the vertical face if sampling is conducted directly from the trench/pit sidewall, to remove smeared soil from the backhoe bucket and expose a fresh face for screening and sampling. Field screening may be completed in accordance with SOP OEE-0101 and OEE-0102, as there is plenty of soil available for screening and sampling with test pits and trenches.

c) Samples may also be taken directly from the backhoe bucket using a shovel, trowel, scoop, or coring device after field screening. Field screening may be completed in accordance with SOP OEE-0101 and OEE-0102. For Method 5035 sampling, submerge the coring device directly into the soil in the backhoe bucket adjacent to the field screening location and collect the sample, placing the soil in the appropriate sample jar for volatile organic analysis. For all other analysis, the soil may be homogenized in a plastic bag or in a stainless-steel bowl prior to placing the soil in the appropriate sample containers.

d) Once the sampling is completed, dispose of disposable sampling equipment and plastic 5035 syringes. Decontaminate any non-disposable sampling equipment prior to the collection of the next sample.

e) Record the following information in the field logbook:

   - Sample ID
   - Location and depth of sample
   - Soil type description
   - Equipment used
   - Apparent moisture content (i.e., dry, moist, wet)
   - Color
   - Odor
   - Field screening instrument readings, if applicable
   - Any other pertinent information

f) Abandon the pit in accordance with applicable state regulations.

8.0 CALCULATIONS

No calculations are applicable to this SOP.

9.0 QUALITY ASSURANCE/QUALITY CONTROL

The following general quality assurance procedures apply:

- All data must be documented on field data sheets and/or within the field logbook.
- All instrumentation should be operated and calibrated in accordance with the manufacturer's instructions unless specified otherwise in the site-specific SAP.
- The collection of an equipment rinsate blank is recommended to evaluate potential for cross-contamination.
- The collection of duplicate samples will likely be required for the project. Refer to the site-specific SAP and/or QAPP for further information on collection of duplicate samples.
- Trip blanks are required for each cooler with samples for volatile organic compounds analysis.

Refer to the site-specific SAP and/or QAPP for specific quality assurance/quality control measures that may be applicable for the given project.

10.0 DATA VALIDATION

Data validation requirements set forth in the site-specific SAP or QAPP shall be adhered to for any given project. Results of quality control samples will be evaluated for contaminants. This information will be utilized to qualify the environmental sample results in accordance with the project's data quality objectives as set forth in the site-specific SAP and/or QAPP.

11.0 HEALTH AND SAFETY

OSHA regulations should be adhered when working with potentially hazardous materials. Personnel performing work environmental work at WVDEP sites should have their 40 Hour Hazardous Waste Operations and Emergency Response (HAZWOPER) with 8 Hour refreshers as appropriate. Some level of Personal Protective Equipment (PPE) is generally required for all sampling and decontamination activities. The appropriate level of PPE for these activities may be found in the site-specific SAP and/or the Site Health and Safety Plan (HASP). Personnel should adhere to the safety requirements outlined in the site-specific plans. The following is a summary of just some of the hazards associated with these soil sampling procedures:

- Exposure to unknown contaminants
- Lifting and carrying injuries
- Heat/cold stress as a result of exposure to extreme temperatures and the use of PPE
- Slip, trip, and fall
- Injury from moving equipment
- Underground utilities
- Loud noises.

Material safety data sheets should be readily available on-site for all site specific contaminates and decontamination solvents or solutions as required by the Hazard Communication Standard requirements set forth in the OSHA regulations. Investigation derive waste (IDW) generated from disturb contaminated soil from sampling and decontamination activities requires proper handling, storage, and disposal. Refer to the site-specific SAP for IDW procedures.

12.0 REFERENCES

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Soil Sampling Using Direct Push Drilling

SOP OEE-0121

Author	Revision No.	Effective Date	Description of Changes	Type of Change
Ruth Porter	0.0	7/1/2010	New SOP	Technical
Randal Lemons	1.0	2/21/2020	Wording Edits, SOP ID # Update, Formatting	Editorial

<u>SOIL SAMPLING USING DIRECT-PUSH DRILLING</u>

SOP OEE-0121

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1.0 SCOPE AND APPLICATION

The purpose of this standard operating procedure (SOP) is to provide general reference information on soil sampling using direct push (i.e. Geoprobe^{TM}) technology. Surface and subsurface soil sampling supplies information on subsurface lithology as well as providing data for use in evaluating the vertical and horizontal extent of contaminant impact.

These procedures are designed to be used in conjunction with analyses for the most common types of soil contaminants (i.e., volatile, semi-volatiles, and metals). These procedures may be varied or changed as required, dependent upon site conditions, equipment limitations or limitations imposed by the procedure. The procedures utilized at a site should be documented and included in the site report. Refer to SOP OEE-0122 for procedures for soil sampling of volatiles utilizing Method 5035. Refer to SOP OEE-0101 and OEE-0102 for procedures for field screening of soil with a photoionization detector (PID) and an X-Ray fluorescence (XRF) detector, respectively.

2.0 SUMMARY OF METHOD

Direct-push soil sampling devices are used to collect soil samples at specific depths below ground surface (bgs). Direct-push machines are hydraulically powered and are generally mounted on a customized four-wheel drive vehicle. The base of the sampling device is positioned on the ground over the sampling location and the vehicle is hydraulically raised on the base. As the weight of the vehicle is transferred to the probe, the probe is pushed into the ground. A built-in hammer mechanism allows the probe to be driven through dense materials. Maximum depth penetration under favorable circumstances may be greater than 100 feet.

Soil samples are collected using specially designed sample tubes. The sample tube is pushed and/or vibrated to a specified depth. In the simplest sampler, the piston-activated system, the interior plug of the sample tube is removed by inserting small diameter threaded rods. The sample tube is then driven an additional foot to collect the samples. The probe sections and sample tube are then withdrawn, and the sample is extruded from the tube. Latch-activated systems are like those that use piston-activation mechanisms, but they can collect samples more rapidly. Sampling rates can also be increased by using dual-tube samplers. The dual-tube sampling system is recommended for continuous sampling as the outer casing prevents sloughing and cross-contamination from other depths.

3.0 SAMPLE PRESERVATION, CONTAINERS, HANDLING, AND STORAGE

Chemical preservation of solids is not generally recommended, except for Method 5035. However, samples should be cooled and protected from sunlight to minimize any potential reaction. The type of sample container, the preservative (if any), and holding times are all dependent upon the type of analysis to be performed upon the sample. This information should be clearly set forth in the site-specific Sampling and Analysis Plan (SAP). The sampler should consult the SAP for all pertinent information relating to the proper sample preservation, type of containers, handling, and storage procedures for their project. Samples should be collected directly from the sampling device into appropriate laboratory cleaned containers. Samples shall be appropriately preserved (if applicable), labeled, and placed in a cooler to be maintained at

≤6ºC, but without freezing the sample in accordance with the SAP requirements. The samples should be shipped with adequate packing and cooling to ensure that they arrive at the laboratory intact and still cold.

4.0 INTERFERENCES AND POTENTIAL PROBLEMS

A preliminary site survey should be performed in order identify areas to be avoided with the Geoprobe™. All underground utilities should be located and marked. These areas were underground utilities are located should be avoided during sampling.

Decontamination of sampling tubes, probe rods, adaptors, non-expendable points and other equipment that contacts the soil is necessary to prevent cross-contamination of samples. During sampling, the bottom portion and outside of the sampling tubes can be contaminated with soil from other depth intervals. Care must be taken to prevent soil, which does not represent the sampled interval, form being include in the sample. The outside surface of the sampling tube should be carefully wiped, and the bottom 3 inches of the sample should be discarded before extruding the sample.

Obtaining enough volume of soil for analysis of multiple parameters from one sample location may present a problem. Most direct-push soil sampling systems recover a limited volume of soil and it is not possible to reenter the same hole and collect additional soil. When multiple analyses are to be performed on soil samples by this method, it is important that the relative importance of the analyses be identified. Identifying the order of importance will ensure that the limited sample volume will be used for the most crucial analyses. In some instances, it may be appropriate to push another boring very near the initial boring in order to have enough soil for all analysis. However, this should be clearly documented in the field notes and in the subsequent Site Assessment Report for the site.

5.0 EQUIPMENT APPARATUS

The following are some of the materials and equipment that are potentially needed for soil sampling activities. Refer to the site-specific Sampling and Analysis Plan to determine specific needs for any given project.

- Photoionization detector (PID)
- Logbook
- Field data sheets and samples labels
- Chain of custody records and seals
- Sample and shipping containers
- Preservatives, as applicable
- Pails, tubs, or buckets
- Plastic sheeting
- Packing materials and Ziploc plastic bags

- Decontamination solutions (i.e., tap water, non-phosphate soap, distilled water)
- Brushes
- Sampling gloves
- Direct-push system and associated equipment (i.e., rods, extractor, drive and pull caps, expandable point holders, drive points, piston rods and stops, sample tubes, vinyl end caps)

6.0 REAGENTS

Chemical preservation of solids is not generally recommended; therefore, reagents will likely be utilized only for decontamination of sampling equipment. Refer to the SOP for the decontamination procedures and required reagents. Refer to the site-specific Sampling and Analysis Plan for the preservatives, if any, required for the specified analysis to be performed.

7.0 PROCEDURES

These procedures relate to the sampling activities associated with collecting a soil sample from a Geoprobe™ and are not intended to address in detail the actual operation of the GeoProbe™. The operator should follow the SOP requirements established by the manufacturer for the GeoProbe™ model being utilized at the site. Other direct-push systems with generally similar operating procedures are also available for soil sampling. Ensure that WV811 and all local utilities have been called to perform a utility marking of the site prior to beginning work.

a) A decontaminated Geoprobe ™ sampling spoon with an acetate or clear PVC liner is prepared at the surface and driven into the ground.

b) The sample spoon is closed on the end with a drive point and advanced to the top of the desired sample interval.

c) A pin is removed from the top of the sampler and the drive point is lifted out, thereby opening the bottom of the sampler, allowing soil to enter the sample spoon when the spoon is advanced.

d) The hydraulic hammer advances the Geoprobe™ sampling spoon to fill the acetate liner inside the sampler.

e) The sample spoon is then retrieved from the hole and the liner extruded from the sampling spoon.

f) Immediately upon retrieval, the sample is opened, sliced into 6-inch lengths, and field screening with a photoionization detector is conducted. Field screening (directly from the liner) and Method 5035 sampling should be the first tasks performed after opening the spoon to reduce the loss of volatiles from the sample. For screening, poke a small hole to the middle of each 6-inch section of soil core and take readings with the PID. Based on screening results, staining and soil characteristics, a sample interval is quickly selected for volatiles analysis. Once the volatiles sample has been obtained, XRF screening, if applicable, may proceed along with completing boring logs and preparing samples for additional analysis.

g) Sample intervals to be sent for laboratory analysis are extruded from the acetate liners into the appropriate containers. If volatiles are being sampled, use the Encore or Terra Core samplers (Method 5035) to collect a soil sample directly from the opened acetate sleeve. Refer to the SOP for Method 5035, as needed. Samples that will be analyzed for VOC's should be directly placed into the appropriate sample container without homogenizing or mixing and immediately placed on ice. As appropriate, refer to the SOP for sampling method SW-846 5035. Non-volatile analytes may be placed in a stainless-steel bowl or plastic bag and thoroughly homogenized. Fill the appropriate sample containers with the remaining homogenized sample.

h) Record the following information in the field logbook:

   - Sample ID
   - Location
   - Depth of sample
   - Soil type description
   - Equipment used
   - Apparent moisture content (i.e., dry, moist, wet)
   - Color
   - Odor
   - Field screening instrument readings, if applicable
   - Any other pertinent information

i) Abandon the boring, as needed, in accordance with applicable state regulations.

8.0 CALCULATIONS

No calculations are applicable to this SOP.

9.0 QUALITY ASSURANCE/QUALITY CONTROL

The following general quality assurance procedures apply:

- All data must be documented on field data sheets and/or within the field logbook.
- All instrumentation should be operated and calibrated in accordance with the manufacturer's instructions unless specified otherwise in the site-specific SAP.
- The collection of an equipment rinsate blank is recommended to evaluate potential for cross-contamination.
- The collection of duplicate samples will likely be required for the project. Refer to the site-specific SAP and/or QAPP for further information on collection of duplicate samples.
- Trip blanks are required for each cooler with samples for volatile organic compounds analysis.

Refer to the site-specific SAP and/or QAPP for specific quality assurance/quality control measures that may be applicable for the given project.

10.0 DATA VALIDATION

Data validation requirements set forth in the site-specific SAP or QAPP shall be adhered to for any given project. Results of quality control samples will be evaluated for contaminants. This information will be utilized to qualify the environmental sample results in accordance with the project's data quality objectives as set forth in the site-specific SAP and/or QAPP.

11.0 HEALTH AND SAFETY

OSHA regulations should be adhered when working with potentially hazardous materials. Personnel performing work environmental work at WVDEP sites should have their 40 Hour Hazardous Waste Operations and Emergency Response (HAZWOPER) with 8 Hour refreshers as appropriate. Some level of Personal Protective Equipment (PPE) is generally required for all sampling and decontamination activities. The appropriate level of PPE for these activities may be found in the site-specific SAP and/or the site-specific Health and Safety Plan (HASP). Personnel should adhere to the safety requirements outlined in the site-specific plans. The following is a summary of just some of the hazards associated with soil sampling using direct push technology:

- Exposure to unknown contaminants
- Lifting and carrying injuries
- Heat/cold stress as a result of exposure to extreme temperatures and the use of PPE
- Slip, trip, and fall
- Injury from moving equipment
- Underground utilities
- Loud noises

Material safety data sheets should be readily available on-site for all site specific contaminates and decontamination solvents or solutions as required by the Hazard Communication Standard requirements set forth in the OSHA regulations. Investigation derive waste (IDW) generated from sample retrieval (soil cutting and acetate sleeves) and decontamination activities requires proper handling, storage, and disposal. Refer to the site-specific SAP for IDW procedures.

12.0 REFERENCES

Guidance for Preparing Standard Operating Procedures (SOPs), EPA QA/G-6, US EPA, Office of Environmental Information, April 2007

GeoprobeTM Operation, SOP# 2050, US EPA, Environmental Response Team, March 27, 1996

Field Sampling Procedures Manual, New Jersey Department of Environmental Protection, August 2005

Model 5400 Geoprobe™ Operations Manual, Geoprobe™ Systems, Salina, Kansas. July 27, 1990.

US EPA Region 4, 2014, *Operating Procedure – Soil Sampling*; SESD PROC-300-R1, U.S. Environmental Protection Agency Region 4, Athens, GA, 24 pp

US EPA, Contaminated Site Clean-up Information/Characterization and Monitoring/Direct-Push Technologies/Soil and Soil Gas Samplers, Available online at https://clu-in.org/characterization/technologies/soilandsoilgassamp.cfm; US Environmental Protection Agency, Washington, DC

Soil Sampling Method 5035

SOP OEE-0122

Author	Revision No.	Effective Date	Description of Changes	Type of Change
Ruth Porter	0.0	7/1/2010	Reformatted, added SOP ID # and renumbered, Additional detail provided. Supersedes Revision 0.0.	Technical, Editorial
Randal Lemons	1.0	2/21/2020	Wording Edits, SOP ID # Update, Formatting	Editorial

SOIL SAMPLING METHOD 5035

SOP OEE-0122

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1.0 SCOPE AND APPLICATION

The purpose of this standard operating procedure (SOP) is to provide general reference information on sample collection procedures utilizing Method 5035. The use of Method 5035 for the collection of volatiles samples is required for both the Voluntary Remediation and LUST programs. The procedures in this SOP may be varied or changed as required, dependent upon site conditions, equipment limitations or limitations imposed by the procedure. The procedures utilized at a site should be documented and included in the site investigation report.

2.0 SUMMARY OF METHOD

Method 5035 was adopted because of studies showing that sampling according to the previous methods resulted in significant losses of selected volatile organic compounds (VOCs). Method 5035 incorporates chemical preservatives and sample storage techniques to limit volatilization and biodegradation of VOCs. There are two collection options for Method 5035: an airtight coring device such as the Encore® sampler, or preserved vials (Terra Core™). The collection method determination should be based on holding time, laboratory-processing considerations, soil type (calcareous soils have special considerations when using the preserved vial option), and shipping considerations. Samples for VOC analysis are not homogenized.

3.0 SAMPLE PRESERVATION, CONTAINERS, HANDLING, AND STORAGE

Samples collected with the Encore® Sampler do not require preservation other than being cooled to ≤6ºC, but without freezing the sample. These samples should be extracted by the laboratory within 48 hours of the samples being collected. Samples collected by the Terra Core™ Method undergo chemical preservation. Three 40 ml vials are utilized in the Terra Core™ sampling method. Two of the vials have sodium bisulfate and the third has methanol as the preservative. After soil collection and preservation, the Terra Core™ samples should also be cooled to ≤6ºC, but without freezing the sample. Terra Core™ samples should be extracted by the laboratory within 14 days of the samples being collected.

The type of sample container, the preservative (if any), and holding times should be clearly set forth in the Sampling and Analysis Plan (SAP) for the site. The sampler should consult the SAP for all pertinent information relating to the proper sample preservation, type of containers, handling, and storage procedures for their project. Samples should be collected directly from the sampling device into appropriate laboratory cleaned containers. Samples shall be appropriately preserved (if applicable), labeled, and placed in a cooler to be maintained at ≤6ºC, but without freezing the sample in accordance with the SAP requirements. The samples should be shipped with adequate packing and cooling to ensure that they arrive at the laboratory intact and still cold.

4.0 INTERFERENCES AND POTENTIAL PROBLEMS

Holding times for samples collected with the Encore® sampling equipment is 48-hours. This creates the need for overnight shipment and/or hand delivery to the laboratory. It also requires immediate attention to the samples by the analytical laboratory.

When using the Terra Core™ Sampling method, calcareous soil samples may react upon contact with sodium bisulfate solution in the pre-preserved sample vial, causing VOC loss through effervescence and potential failure of the VOA vial septum through pressure buildup. Additionally, when soil samples are highly calcareous in nature, the sodium bisulfate preservative solution may not be strong enough to reduce the pH of the aqueous solution to below 2.0, potentially rendering the preservative useless.

5.0 EQUIPMENT APPARATUS

The following are some of the materials and equipment that are potentially needed for soil sampling activities. Refer to the site-specific Sampling and Analysis Plan to determine the needs for any given project.

- Encore® Sampler
- Terra Core™ sampler
- Sample containers (Encore® airtight container or Terra Core™ which will consist of 40-ml vials with appropriate preservative and stirring bar), plus additional minimum 2 oz. glass jar to collect sample for dry weight determination
- Photoionization detector (PID)
- Logbook
- Field data sheets and samples labels
- Chain of custody records and seals
- Sample and shipping containers
- Preservatives, as applicable
- Packing materials
- Decontamination solutions (i.e., tap water, non-phosphate soap, distilled water)
- Brushes
- Sampling gloves
- Plastic bags

6.0 REAGENTS

The Terra Core™ vials should come pre-prepared from the laboratory with the proper chemical preservatives (sodium bisulfate and methanol). Reagents for the decontamination of non-disposable sampling equipment used to collect the soil samples will be required. Refer to the SOP for the decontamination procedures and required reagents.

7.0 PROCEDURES

7.1 Encore® Sample Collection Method

a) Clear any surface debris (e.g., vegetation, rocks, twigs) from the sampling location.

b) Before taking the sample, hold the coring body and push plunger rod down until small o-ring rests against tabs. This will assure that plunger moves freely.

c) Depress locking lever on Encore® T-Handle. Place coring body, plunger end first, into open end of T-Handle, aligning the (2) slots on the coring body with the (2) locking pins in the T-Handle. Twist coring body clockwise to lock pins in slots. Check to ensure sampler is locked in place. Sampler is ready for use.

d) Turn T-Handle with T-up and coring body down. This positions plunger bottom flush with bottom of coring body (ensure that plunger bottom is in position). Using T-Handle, push sampler into soil until coring body is completely full. When full, small O-ring will be centered in T-Handle viewing hole. Remove sampler from soil. Wipe excess soil from coring body exterior.

e) Cap coring body while it is still on T-handle. Push cap over flat area of ridge. Push and twist cap to lock arm in place. Cap must be seated to seal sampler.

f) Remove the capped sampler by depressing locking lever on T-Handle while twisting and pulling sampler from T-Handle. Lock plunger by rotating extended plunger rod fully counterclockwise until wings rest firmly against tabs.

g) Place the capped sampler back into the Encore® sample zipper bag and label. Seal the bag and put on ice. Samples collected with the Encore® method should be analyzed within 48 hours or preserved by the laboratory within 48 hours. Collect sample for dry-weight determination in 2-oz. glass jar. This container should be airtight (septum lid) but should not contain any preservative. Place this sample in the cooler with the Encore® samples.

h) Record the following information in the field logbook:

- Sample ID
- Location
- Depth of sample
- Soil type description
- Equipment used
- Apparent moisture content (i.e., dry, moist, wet)
- Color
- Odor
- Field screening instrument readings, if applicable
- Any other pertinent information

7.2 TerraCore™ Sampling Method

a) A determination of whether the sample will be considered high (>200 µg/Kg) or low (0.5-200 µg/Kg) concentration should be performed. This may be based on DQOs, expected concentrations, or regulatory limits. If the expected concentrations cannot be estimated prior to sampling, and/or DQOs or other considerations indicate the need for both concentration levels, both low and high concentration aliquots should be collected. Refer to the Table below for appropriate sample containers for high/low sample concentrations.

Sample Container and Preservative Requirements for Samples Collected by the TerraCore™ Method

Concentration of Volatiles **Solid Type**	**<200 ug/kg**	**>200 ug/kg**	**Unknown Concentrations**
Non-Reactive	3-40 ml vials with 5 ml of organic free reagent water, 1 gram of $NaHSO_4$ and a magnetic stirring bar weighed to the nearest 0.01gram[1]	3-40 ml vials with 5 ml of methanol weighed to the nearest 0.01gram[1]	3-40 ml vials with 5 ml of organic free reagent water, 1 gram of $NaHSO_4$ and a magnetic stirring bar weighed to the nearest 0.01gram[1] AND 3-40 ml vials with 5 ml of methanol weight checked to the nearest 0.01gram[1]
Reactive	3-40 ml vials with 5 ml of organic free reagent water weighed to the nearest 0.01gram[1]	3-40 ml vials with 5 ml of methanol weighed to the nearest 0.01gram[1]	3-40 ml vials with 5 ml of organic free reagent water weighed to the nearest 0.01gram[1] AND 3-40 ml vials with 5 ml of methanol weighed to the nearest 0.01gram[1]
Unknown	3-40 ml vials with 5 ml of organic free reagent water, 1 gram of $NaHSO_4$ and a magnetic stirring bar weighed to the nearest 0.01gram[1] AND 3-40 ml vials with 5 ml of organic free reagent water weighed to the nearest 0.01gram[1]	3-40 ml vials with 5 ml of methanol weighed to the nearest 0.01gram[1]	3-40 ml vials with 5 ml of organic free reagent water, 1 gram of $NaHSO_4$ and a magnetic stirring bar weighed to the nearest 0.01gram[1] AND 3-40 ml vials with 5 ml of organic free reagent water weighed to the nearest 0.01gram[1] AND 3-40 ml vials with 5 ml of methanol weighed to the nearest 0.01gram[1]

[1] The vials will be pre-weighed by the laboratory to the nearest 0.01gram. If the required weight check is performed in the field, a variance of up to 0.2 grams is allowed. If the required weight check is performed in the laboratory, a variance of up to 0.01 gram is allowed. Weight checks should be performed within 24 hours of use.

b) Prior to adding solid to any vial, the individual vial should be checked to ensure that the weight of the vial and preservative have been written on the vial by the laboratory.

c) Clear any surface debris (e.g., vegetation, rocks, twigs) from the sampling location.

d) Have ready a 40ml glass volatile organic analysis (VOA) vial containing the appropriate preservative. With the plunger seated in the handle, push the Terra Core™ into freshly exposed soil until the sample chamber is filled. A filled chamber will deliver approximately 5 grams of soil.

e) Wipe all soil or debris from the outside of the Terra Core™ sampler. The soil plug should be flush with the mouth of the sampler. Remove any excess soil that extends beyond the mouth of the sampler.

f) Rotate the plunger that was seated in the handle top 90° until it is aligned with the slots in the body. Place the mouth of the sampler into the 40ml VOA vial containing the appropriate preservative and extrude the sample by pushing the plunger down. Quickly place the lid back on the 40ml VOA vial. Repeat steps 4-6 for additional sample vials as necessary.

   Note: When capping the 40ml VOA vial, be sure to remove any soil or debris from the threads of the vial.

g) Place the containers in a plastic bag and seal. Store sample on ice at approximately 4°C. Collect sample for dry-weight determination in 2-oz. glass jar. This container should be airtight (septum lid) but should not contain any preservative. Place this sample in the cooler with the Terra Core™ sample vials. Deliver the cooler to the laboratory.

h) Record the following information in the field logbook:

   - Sample ID
   - Location
   - Depth of sample
   - Soil type description
   - Equipment used
   - Apparent moisture content (i.e., dry, moist, wet)
   - Color
   - Odor
   - Field screening instrument readings, if applicable
   - Any other pertinent information

8.0 CALCULATIONS

No calculations are applicable to this SOP.

9.0 QUALITY ASSURANCE/QUALITY CONTROL

The following general quality assurance procedures apply:

- All data must be documented on field data sheets and/or within the field logbook.
- All instrumentation should be operated and calibrated in accordance with the manufacturer’s instructions unless specified otherwise in the site-specific SAP.

- The collection of duplicate samples will likely be required for the project. Refer to the site-specific SAP and/or QAPP for further information on collection of duplicate samples.
- Trip blanks are required for each cooler with samples for volatile organic compounds analysis.

Refer to the site-specific SAP and/or QAPP for specific quality assurance/quality control measures that may be applicable for the given project.

10.0 DATA VALIDATION

Data validation requirements set forth in the site-specific SAP or QAPP shall be adhered to for any given project. Results of quality control samples will be evaluated for contaminants. This information will be utilized to qualify the environmental sample results in accordance with the project's data quality objectives as set forth in the site-specific SAP and/or QAPP.

11.0 HEALTH AND SAFETY

OSHA regulations should be adhered when working with potentially hazardous materials. Personnel performing work environmental work at WVDEP sites should have their 40 Hour Hazardous Waste Operations and Emergency Response (HAZWOPER) with 8 Hour refreshers as appropriate. Some level of Personal Protective Equipment (PPE) is generally required for all sampling and decontamination activities. The appropriate level of PPE for these activities may be found in the site-specific SAP and/or the site specific Health and Safety Plan (HASP). Personnel should adhere to the safety requirements outlined in the site-specific plans. The following is a summary of just some of the potential hazards associated with this SOP.

- Exposure to unknown contaminants
- Exposure to chemical reagents and preservatives
- Heat/cold stress as a result of exposure to extreme temperatures and the use of PPE
- Slip, trip, and fall

Material safety data sheets should be readily available on-site for all decontamination solvents or solutions as required by the Hazard Communication Standard requirements set forth in the OSHA regulations. Investigation derive waste (IDW) generated from sample retrieval and decontamination activities requires proper handling, storage, and disposal. Refer to the site-specific SAP for IDW procedures.

12.0 REFERENCES

Guidance for Preparing Standard Operating Procedures (SOPs), EPA QA/G-6, US EPA, Office of Environmental Information, April 2007

Field Sampling Procedures Manual, New Jersey Department of Environmental Protection, August 2005

Test Methods for Evaluation of Solid and Hazardous Wastes, SW 846 Method 5035, US Environmental Protection Agency, Washington, DC 1998.

US EPA Region 4, 2014, *Operating Procedure – Soil Sampling*; SESD PROC-300-R1, U.S. Environmental Protection Agency Region 4, Athens, GA, 24 pp

DWWM – OEE – Tanks Unit

UST/LUST Documents in ApplicationXtender

12/16/2020

By

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ET1, ERPM2, ERS1

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Document Revision

The following table contains the revision history of this Standard Operating Procedure:

Version	Date	Author	Modification Made
0	12/16/2020		N/A - Original

Electronic Filing of UST/LUST Documents in ApplicationXtender

I. PURPOSE AND APPLICABILITY

This is the Application Xtender (AX) standard operating procedure (SOP) to be used as a guide by WVDEP staff, for consistency in indexing and filing of underground storage tank/leaking underground storage tank (UST/LUST) related documents in Application Xtender.

II. SUMMARY OF METHOD

Documents related to Division of Water and Waste Management's (DWWM) - Office of Environmental Enforcement (OEE) – Tanks Unit - UST/LUST programs are based on the federal Resource Conservation and Recovery Act (RCRA). All facilities subject to UST/LUST regulations will have written documentation associated with them. Types of documents will vary greatly and are further described in the "definitions" section of this SOP.

Proper maintenance and preservation of these above-mentioned documents (or "facility files") is central to tracking facility compliance, accurately generating federally required reports, and allocating agency resources.

III. DEFINITIONS

A. Document Types – The following is a list of document types associated with the UST/LUST Program. It includes a brief description of each document type. While the list is comprehensive, it potentially will not capture every document associated with a UST, due to the program's broad scope. If an individual responsible for filing a document into AX is unsure as to the document type, they must consult with their immediate supervisor for guidance. If "keywords" are associated with a specific document type, their use is mandatory.

1. Closures – this includes all documents related to closure of a UST. This includes closure authorizations, closure assessments, intent to close forms, closure plans, closure reports, closure spreadsheets, and closure report approvals. The use of this document type is limited to Prevention and Corrective Action staff.

2. Complaints – this refers specifically to the complaint form. The complainant name and contact information are considered confidential and must be redacted from all public documents in AX. The use of this document type is limited to Prevention and Corrective Action staff.

3. Corrective Action Plans – this document type specifically refers Corrective Action Plans (CAP) and revised CAP, associated approval letters, CAP implementation reports, presumptive remedies, and CAP public notices, affidavit of publication related to the CAP, submitted to Correction Action staff to achieve compliance pursuant to 40CFR280.66. Plans of Corrective Action (POCA) submitted pursuant to a formal administrative enforcement order will be filed with the Order. The use of this document type is limited to Corrective Action staff.

4. Correspondence – This document type includes wide ranging written communications to and from the constituents of the West Virginia Department of Environmental Protection (WVDEP), the regulated community, United States Environmental Protection Agency (USEPA), and other state agencies. The communications may be paper or electronic (email). Examples of correspondence can be responses to an NOV or inspection report, responses to a written inquiry from the regulated community or citizens, memos, letters, notices of intent, UECA Transfer Memos, UECA agreements, and correspondence to and from USEPA concerning a specific facility. This document type does not include correspondence related to formal enforcement Orders. Note that unless expressly designated as a correspondence to be filed, internal WVDEP communications via email are not filed in Application Xtender. The use of this document type is not limited to a specific work group. All documents in this document type are to be converted to .pdf format before upload into AX. The use of this document type is not limited to a specific work group.

5. Financial Responsibility – this includes bonds, and other proofs of insurance that a facility may supply to demonstrate financial responsibility. The use of this document type is limited to Tanks Administrative staff.

6. Historical File – this includes batch scanned documents, usually organized by facility, that have multiple file types within. The use of this document type is discouraged except when filing material older than 10 years, that has been imported as one document (Precision Archive Files). The use of this document type is limited to Prevention and Corrective Action staff.

7. Inspection/Site Visit – this document type includes inspection reports documenting regulatory compliance inspections conducted by Prevention staff, and site visits by Corrective Action staff; can include maps, photos, and other ancillary documents used during the visit, and Project Status Checklists (PSCL). The use of this document type is limited to Prevention and Corrective Action staff.

8. Installation – this document type includes the UST installation form, Compatibility Form, site maps, and may include testing reports done at the time of installation, upgrade, or retrofitting. The use of this document type is limited to Prevention staff.

9. Monitoring Report – this document type is specifically for reports related to ongoing monitoring at a leak site which shall include groundwater or other types of quarterly/semi-annual/annual reports, free product removal and recovery reports, CAP quarterly monitoring reports, submitted to Corrective Action staff, along with associated approval letters. The use of this document type is limited to Corrective Action staff.

10. No Further Action – this document type includes documents related to leak sites achieving No Further Action (NFA) and can include Monitoring Well Abandonment letters and logs, documents/reports requesting an NFA, Final Reports, NFA letters, Land Use Covenants (LUCs), and Certificates of Completion (COC). The use of this document type is limited to Corrective Action staff.

11. Notice of Violation – this document type includes Notices of Violation (NOV), NOV Cover letters, Inspection of Violation (IOV) IOV cover letters, Notices of non-compliance, and requests for enforcement. The use of this document type is limited to Prevention and Corrective Action staff.

12. Notification – this document type is specifically for UST Notification Form which includes the facility identification number, deeds, bankruptcy filings, and tax tickets. The use of this document type is limited to Prevention and Corrective Action staff.

13. Operator Training – this refers to certificates of training and is limited to Prevention staff.

14. Orders – this document type includes all drafts, revised, and final communications associated with enforcement of and compliance with administrative enforcement Orders issued by Environmental Enforcement, and documents associated with Civil or Criminal Actions initiated by Environmental Enforcement or the USEPA. This can include responses to Orders, proof of compliance, reports required by a formal Order, demands for payment and actual payments. Plans of Corrective Action (POCA) received by EE as required by an Order are not placed into AX as a standalone document but are included with EE's response letter as an attachment. Enforcement related documents that are associated with an enforcement action that is <u>not final</u> must be filed as "confidential". See Secondary ID below for indexing instructions. The use of this document type is limited to Administrative Enforcement staff.

15. Release Incident Report – this document type includes formal reports to detail a suspected or confirmed release. These reports shall include leak data entry form, Incident Report (IR), Confirmed Release Notice to Comply (CRNC), Review of Confirmed Release (RCR). The use of this document type is limited to Prevention and Corrective Action staff.

16. Site Assessment - this document type includes submissions related to assessment of a leak site. Reports included are Initial Abatement Measures

and Site Check, Initial Site Characterization Report (ISCR), Site Characterization Report (SCR), Supplemental SCR, Primary Site Assessment, Supplemental Site Assessment, Fast Track Reports, Human Health and Ecological Risk Assessments (HHERA), Remedial Action Work Plans, Monitoring Well construction documentation, associated approval letters, analytical data, and State Lead Priority sheets. The use of this document type is limited to Prevention and Corrective Action staff.

17. Suspected Release – Suspected Release Notice to Comply (SRNC), Review of Suspected Release. The use of this document type is limited to Prevention and Corrective Action staff.

18. Testing – documents related to testing results which may include catholic protection, tightness, and leak detection tests. The use of this document type is limited to Prevention staff.

IV. PERSONNEL QUALIFICATIONS/RESPONSIBILITIES

All applicable employees must have prior training in the usage of AX regarding indexing and document retrieval capabilities of the program. An AX Training Guide and training videos are available on the WVDEP SharePoint. A general knowledge of the workflow and procedures within the Tanks Program is also required.

Responsibility of Entry into AX – For outgoing documents that are not uploaded into the UST/LUST database for auto-indexing, the work group that generated the item is responsible for forwarding it to the Secretary 2 for indexing, except the documents generated for administrative orders which are to be indexed by the Administrative Enforcement staff generating the document.

For incoming documents, it is the responsibility of the primary recipient to whom the correspondence is addressed to forward it to the Secretary 2 for indexing, except documents received related to administrative orders, they will be indexed by the Administrative Enforcement staff.

If an individual responsible for indexing documents into AX is unsure if a document they have received needs to be indexed, they must consult with their immediate supervisor.

V. PROCESS

A. General preparation - All staff indexing and filing of UST/LUST related documents in AX shall adhere to this SOP.

1. Documents will be free of staples, Post-It notes, highlighter marks or any writing beyond that of basic routing instruction prior to scanning into AX.

2. Only final versions of documents in PDFs shall be uploaded into AX.

3. Outgoing documents such as inspection reports and correspondences transmitted via US Certified Mail may be entered into AX before receiving the certified mail receipt from the post office. The receipt must be appended to the document upon delivery confirmation.

B. Indexing

1. The Primary ID field will be the Facility ID number for all documents. If this number does not appear on the document to be filed or is not known by the person filing the document, it may be acquired by searching the UST/LUST database or by contacting UST/LUST Administrative staff.

2. The Secondary ID field is reserved for Administrative Enforcement Order numbers and CAP (Civil Administrative Penalties) numbers issued by DWWM's Office of Environmental Enforcement, or Docket Numbers for Civil Actions. If this number does not appear on the document to be filed or is not known by the person filing the document, it may be acquired by contacting DWWM's Office of Environmental Enforcement. Not all documents will use this field.

3. The Leak ID field will be the ID number assigned by the Tanks database at the time of entry into the Tanks database. If this number does not appear on the document to be filed or is not known by the person filing the document, it may be acquired by searching the Tanks database or by contacting UST/LUST Administrative staff. Not all documents will use this field.

4. All further required information will populate automatically once you input the Facility ID number into the Primary ID field in AX. If the information does not populate automatically after inputting the Facility ID number, the person filing the document must use the ERIS responsible party table to enter information verbatim.

5. A Document Date must be assigned to each document that is indexed into AX.

    a. Outgoing Document Date– The document date for correspondence will be the date displayed on the document cover letter or signature line. The exception to this will be Inspection Reports and formal enforcement documents.

    b. Incoming Document Date – The document date for an incoming document received by WVDEP will be the date that the document is received by WVDEP. Paper documents shall be stamped with a "received on" date. Electronic documents should e-stamped with a received date.

    c. This is not to be the date entered into the computer for older documents. This date is to be the "received" date stamped on the document. If there is not a stamped date on the document, then enter the date that is on the document cover page.

d. The document date for an inspection report will be the date which the inspection was conducted as opposed to the date the inspection report was transmitted. This date can be found in the body of the cover letter or on the inspection form.

e. The document dates for formal enforcement documents are the date the enforcement action becomes "final." These dates are as follows as:

   i. Unilateral Orders – the document date is the date the Order is received by the responsible party.

   ii. Consent Orders – the document date is the date that the Division Director signs the Order.

   iii. Civil Administrative Penalties (CAPs) – either the CAP is paid in full, or the date the informal hearing decision is received by the responsible party, or 20 days after the receipt of the original CAP if the responsible party does not initially respond.

f. If the individual indexing the document is unsure of the document date that is to be assigned, they are to consult with their immediate supervisor.

6. A Document Type must be assigned to each document that is indexed into AX. Further discussion of assigned document types can be found in section III of this SOP.

7. Document Status may be "public" or "confidential." The default Document Status is "public" unless otherwise noted in this SOP or the document itself is physically marked with the word "confidential." Documents containing Personal Identifiable Information (PII) such as home addresses or phone numbers, documents containing confidential business information (CBI) such as trade secrets, processes, operations, sales, shipments, customer lists, financial information and documents related to enforcement actions that are not final such as draft and revised Orders, Notice of Civil Administrative Penalties, enforcement referrals, etc. are to be filed as "confidential". If needed, consult with managers or supervisors to evaluate the documents for the correct Document Status. Enforcement related documents that are associated with an enforcement action that is <u>not final</u> must be filed as "confidential".

8. Program Association – indicates from which section within Tanks a document originated. For leak-related items, Corrective Action is used. Everything else will fall under Prevention.

VI. RECORDS MANAGEMENT

A. All documents scanned into Application Xtender will be held for a period of no less than 90 days and then may be disposed of after spot checking and comparison.

B. For further information related to records management please be guided by the Records Retention policy for DWWM – Tanks.

VII. RESOURCES

A. Access to Application Xtender to include functioning log in credentials.

B. Access to a document scanner.

C. Access to and a basic understanding of written documents associated with the Tanks Program.

VIII. FREQUENCY

A. Documents/batches must be filed into AX on a continuous and ongoing basis. Documents/batches shall be indexed immediately upon uploading into AX as opposed to setting "idle" in the "upload batches" queue. Documents created in or uploaded to the TANKS database are automatically indexed into AX each day.

IX. QUALITY CONTROL AND QUALITY ASSURANCE

Tanks Unit Staff provides a spot check review of all UST/LUST documents placed in AX. A comparison is made between the document filed, and the instructions contained within this SOP on how that document type should be indexed. Document Type descriptions in this SOP will be utilized. Any discrepancies that may be found are brought to the attention of the person who indexed the document and or supervisory staff. Corrections shall be completed in a timely manner.

X. REFERENCE

ROUTING SLIP:

Amaris Elliott Amaris Elliott	DWWM/EE/Tanks Corrective Action	12/17/2020
Author	Division/Section/Unit	Date
Randal Lemons	DWWM/EE/Tanks Corrective Action	12/17/2020
Peer Reviewer	Division/Section/Unit	Date
Melissa McCune Melissa McCune	DWWM/OEE/Tanks Corrective Action	12/17/2020
Manager/Supervisor	Division/Section/Unit	Date
Ruth Porter Ruth M. Porter	DWWM/OEE/Tanks	12/17/2020
Manager/Supervisor	Division/Section/Unit	Date
Joseph M. Sizemore Joseph M. Sizemore	DWWM/OEE/HW-Tanks	2/9/2021
Manager/Supervisor	Division/Section/Unit	Date
Jimmy H. Bandy		5/12/2021
Manager/Supervisor	Division/Section/Unit	Date

For Internal Use Only

<u>APPENDIX D</u>- UST PREVENTION FORMS AND REPORTS

revised 2/2018

West Virginia
Department of Environmental Protection
NOTIFICATION FOR UNDERGROUND STORAGE TANKS

WV Department of Environmental Protection
Division of Water & Waste Management - EE/Tanks
601 57th ST., Charleston, WV 25304
PHONE: (304)926-0470 FAX: (304)926-0457

State Use Only	ID #
Date notification received:	
Date entered in Database:	
Data entry clerk initials	
Date Contacted: ________________________	
Name of Contact: ________________________	
Comments/clarification:	

PART I: PURPOSE OF NOTIFICATION

New	Amendment	Closure
☐ New Facility ☐ Previously Deferred System	☐ Change in Tank(s) ☐ Change in Piping ☐ Change in Service	☐ Temporary ☐ Permanent ☐ Tank ☐ Piping
Change of Owner	**Change of Address**	**Other (specify)**
☐ Owner ☐ Operator	☐ Owner ☐ Operator	

______ # of additional sheets attached

______ # of tanks at facility

______ # of tanks closed ______ # of tanks remaining

PART II: OWNERSHIP INFORMATION			PART III: FACILITY INFORMATION		
Owner Name			Facility Name and Identifier		
Address			Address		
County			County		
City	State	Zip	City	State	Zip
Owner Phone ( )	FAX ( )		Facility phone ( )		
Email Address			Latitude *(decimal degrees)*	Longitude *(decimal degrees)*	

PART IV: OPERATOR INFORMATION

Operator Name	Phone ( )			Fax ( )
Address	City	State	Zip	Email Address

PART V: CONTACT PERSON IN CHANGE OF TANKS

Primary Contact	Title			Phone ( )
Address	City	State	Zip	Email Address

PART VI: OWNER CERTIFICATION

I certify that under penalty of law that I have personally examined and am familiar with the information in Section I through Section XVI of this notification form and all attached documents (except change of owner, operator, or address information only needs to certify section I through V and any attached documents), and based upon my inquiry of those individuals immediately responsible for obtaining the information, I believe the information is true, accurate, and complete.

_______________________________ _______________________________

Printed Name *Official Title of Signatory*

_______________________________ _______________________________

Owner/authorized representative signature *Date signed*

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PART VII: TYPE OF OWNER		PART VIII: TYPE OF FACILITY	
☐ Federal Government	☐ Commercial	☐ Gas Station	☐ Trucking/Transportation
☐ State Government	☐ Private	☐ Contractor	☐ Auto Dealership
☐ Local Government		☐ Railroad	☐ Commercial Airport or Airline
☐ Unknown/Abandoned (for state use only)		☐ Industrial	☐ Residential
IX: Indian Country		☐ Federal Military	☐ Utilities
This section does not apply to West Virginia.		☐ Federal Non-Military	☐ Farm
		☐ Petroleum Distributor	☐ Other (explain)

PART X: FINANCIAL RESPONSIBILITY

☐ I have met the financial responsibility requirements (in accordance with 40 CFR Subpart H) by using the following mechanism(s).

☐ Self Insured	☐ Letter of Credit	☐ Guarantee
☐ Surety Bond	☐ Local Government Financial Test	☐ Trust Fund
☐ Commercial Insurance	☐ Bond Rating Test	☐ Other (describe)
☐ Risk Retention Group	☐ State Fund	______________

☐ I do not have to meet the financial responsibility requirements because 40CFR part 280 Subpart H is not applicable to me (e.g., if you are a state or federal owner).

PART XI: DESCRIPTION OF UNDERGROUND STORAGE TANK (complete for all tanks/piping at this location.)

Tank ID #						
Compartments; list as 1a, 1b, 2a, 2b etc.:						
1.Tank Status (check only one)						
Currently In Use	☐	☐	☐	☐	☐	☐
Temporarily Out of Service	☐	☐	☐	☐	☐	☐
Permanently Closed	☐	☐	☐	☐	☐	☐
Abandoned (for state use only)	☐	☐	☐	☐	☐	☐
2. Date of Installation (mm/yyyy)						
3. Estimated Capacity gallons						
4. Compartmentalized	☐	☐	☐	☐	☐	☐
5. Check if Repaired enter repair date (mm/yyyy)	☐	☐	☐	☐	☐	☐
6. Field Constructed	☐	☐	☐	☐	☐	☐
7. Manifold	☐	☐	☐	☐	☐	☐
Piping or tank manifold?						
Which tank is it manifold to?						
8. Tank Attributes						
8.*a* Material of Construction	Check the appropriate box and circle DW for double walled or SW for Single walled					
Asphalt Coated: DW SW	☐	☐	☐	☐	☐	☐
Bare Steel: DW SW	☐	☐	☐	☐	☐	☐
fiberglass/polyurethane-coated: DW SW	☐	☐	☐	☐	☐	☐
Jacketed: DW SW	☐	☐	☐	☐	☐	☐
Fiberglass Reinforced Plastic: DW SW	☐	☐	☐	☐	☐	☐
Concrete: DW SW	☐	☐	☐	☐	☐	☐
Other (specify):	☐	☐	☐	☐	☐	☐
Unknown	☐	☐	☐	☐	☐	☐

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NOTIFICATION FOR UNDERGROUND STORAGE TANKS

Tank ID #						
Compartments; list as 1a, 1b, 2a, 2b etc.:						
8. Tank Attributes (CONTINUED)						
8.*b* Secondary Containment						
Double-Walled	☐	☐	☐	☐	☐	☐
Excavation Liner	☐	☐	☐	☐	☐	☐
None	☐	☐	☐	☐	☐	☐
Other (specify):	☐	☐	☐	☐	☐	☐
Unknown	☐	☐	☐	☐	☐	☐
8.*c* Corrosion Protection Method						
Cathodic ally Protected Steel (impressed current)	☐	☐	☐	☐	☐	☐
Cathodic ally Protected Steel (sacrificial anodes)	☐	☐	☐	☐	☐	☐
Coated and Cathodic ally Protected Steel (impressed current)	☐	☐	☐	☐	☐	☐
Coated and Cathodic ally Protected Steel (sacrificial anodes)	☐	☐	☐	☐	☐	☐
Interior Lining	☐	☐	☐	☐	☐	☐
Non-Corrosive Materials	☐	☐	☐	☐	☐	☐
Noncorrodible Tank Jacket	☐	☐	☐	☐	☐	☐
None	☐	☐	☐	☐	☐	☐
Other (specify):	☐	☐	☐	☐	☐	☐
8.d Overfill Protection Installed						
Automatic Shutoff	☐	☐	☐	☐	☐	☐
Flow Restrictor	☐	☐	☐	☐	☐	☐
High-level Alarm	☐	☐	☐	☐	☐	☐
Other (specify):	☐	☐	☐	☐	☐	☐
8.e Spill Prevention Installed						
Single Walled	☐	☐	☐	☐	☐	☐
Double walled	☐	☐	☐	☐	☐	☐
8.f Release Detection Method						
Manual Tank Gauge	☐	☐	☐	☐	☐	☐
Automatic Tank Gauge	☐	☐	☐	☐	☐	☐
Inventory Control	☐	☐	☐	☐	☐	☐
Tightness testing	☐	☐	☐	☐	☐	☐
Vapor Monitoring (attach VM site assessment) *Enter Vapor Monitoring Equipment Used:*	☐	☐	☐	☐	☐	☐
Groundwater Monitoring (attach GWM site assessment)	☐	☐	☐	☐	☐	☐
Interstitial monitoring (required if installed after 6/30/08)	☐	☐	☐	☐	☐	☐
SIR	☐	☐	☐	☐	☐	☐
UST serves an emergency generator and was installed before 7/1/08.	☐	☐	☐	☐	☐	☐
Other (specify):	☐	☐	☐	☐	☐	☐

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PART XII: DESCRIPTION OF UNDERGROUND STORAGE TANK SUBSTANCE STORED						
Tank ID #						
Compartments; list as 1a, 1b, 2a, 2b etc.:						
1. Substance Stored						
1.a Substance						
Gasoline (containing ≤ 10% ethanol)						
Gasoline (containing ≥ 10% ethanol) *Enter Percentage*						
Diesel						
Diesel Containing < 20% Bio-Diesel						
Diesel Containing > 20% Bio-Diesel *Enter Percentage*						
Kerosene						
Heating Oil						
Used Oil						
Other (specify):						
Hazardous Substance *CERCLA Name of CAS Number*						
Mixture of Substances *Please Specify Substances here*						

PART XIII: DESCRIPTION OF UNDERGOUND STORAGE TANK PIPING						
Tank ID #						
Compartments; list as 1a, 1b, 2a, 2b etc.:						
1. Date of Installation (mm/yyyy						
2. Check if Repair enter repair date (mm/yyyy)						
3. Number of STP's						
4. Number of Piping Runs						
5. Piping Attributes						
5.*a* Material of Construction	Check the appropriate box and circle DW for double walled or SW for Single walled					
Copper: DW SW						
Steel: DW SW						
Galvanized Steel: DW SW						
Jacketed Steel: DW SW						
Fiberglass Reinforced Plastic: DW SW						
Flexible Plastic: DW SW						
Polyflexible: DW SW						
Metal Piping Flex Connector Installed: DW SW						
Flexible Nonmetallic: DW SW						
Aboveground Piping Only: DW SW						
Airport Hydrant Piping: DW SW						
No Piping						
Other (specify):						
Unknown						

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Tank ID #						
Compartments; list as 1a, 1b, 2a, 2b etc.:						
5. Piping Attributes (CONTINUED)						
5.b Secondary Containment	Secondary containment must be double walled is installed after 7/1/2008					
Double Walled						
Secondary containment						
Other (specify):						
None						
5.c Corrosion Protection Method						
Impressed Current						
Sacrificial Anode						
Isolation from Soil						
Noncorrosive Material						
Metal Flex Connector Isolated/Booted						
Metal Flex Connector Cathodic Protected						
Other (specify):						
5.d Catastrophic Release Detection Method						
Mechanical Line Leak Detector						
Electronic Line Leak Detector						
Other (specify):						
None						
5.e Release Detection Method						
Electronic Interstitial Monitoring						
Visual Interstitial Monitoring						
Line Tightness Test						
Statistical Inventory Reconciliation						
Ground Water Monitoring (must attach GWM site assessment)						
Vapor Monitoring (must attach VM site assessment) *Enter Vapor Monitoring equipment used:*						
None Required because piping is safe suction.						
Other (specify):						
5.f Piping Delivery Type						
Pressure						
"Safe" Suction (no valve at tank)						
U.S. Suction (valve at tank)						
Gravity Feed						

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XIV. DESCRIPTION OF DISPENSER(S)						
Tank ID #						
Compartments; list as 1a, 1b, 2a, 2b etc.:						
1. Total Number of Dispensers	______	______	______	______	______	______
2. Dispenser #'s *(connected to tank)*						

Dispenser #						
Replaced after 6/30/08 *(check for YES)*	☐	☐	☐	☐	☐	☐
4. Dispenser Attributes						
4.a Dispenser UDC Containment Materials	Check the appropriate box and single DW for double walled and SW for single walled					
Steel: DW SW	☐	☐	☐	☐	☐	☐
FRP: DW SW	☐	☐	☐	☐	☐	☐
Thermoplastic: DW SW	☐	☐	☐	☐	☐	☐
Other (specify): DW SW	☐	☐	☐	☐	☐	☐
None	☐	☐	☐	☐	☐	☐
4.b Method of Leak Detection?						
Monthly (visual) interstitial Monitoring	☐	☐	☐	☐	☐	☐
Continuous (electronic) Interstitial Monitoring	☐	☐	☐	☐	☐	☐
Other Monitoring (specify):						

Dispenser list continued (use if your facility supports more than six dispensers)

Dispenser #						
Replaced after 6/30/08 *(check for YES)*	☐	☐	☐	☐	☐	☐
4. Dispenser Attributes						
4.a Dispenser UDC Containment Materials	Check the appropriate box and single DW for double walled and SW for single walled					
Steel: DW SW	☐	☐	☐	☐	☐	☐
FRP: DW SW	☐	☐	☐	☐	☐	☐
Thermoplastic: DW SW	☐	☐	☐	☐	☐	☐
Other (specify): DW SW	☐	☐	☐	☐	☐	☐
None	☐	☐	☐	☐	☐	☐
4.b Method of Leak Detection?						
Monthly (visual) interstitial Monitoring	☐	☐	☐	☐	☐	☐
Continuous (electronic) Interstitial Monitoring	☐	☐	☐	☐	☐	☐
Other Monitoring (specify):						

Dispenser list continued (use if your facility supports more than twelve dispensers)

Dispenser #						
Replaced after 6/30/08 *(check for YES)*	☐	☐	☐	☐	☐	☐
4. Dispenser Attributes						
4.a Dispenser UDC Containment Materials	Check the appropriate box and single DW for double walled and SW for single walled					
Steel: DW SW	☐	☐	☐	☐	☐	☐
FRP: DW SW	☐	☐	☐	☐	☐	☐
Thermoplastic: DW SW	☐	☐	☐	☐	☐	☐
Other (specify): DW SW	☐	☐	☐	☐	☐	☐
None	☐	☐	☐	☐	☐	☐
4.b Method of Leak Detection?						
Monthly (visual) interstitial Monitoring	☐	☐	☐	☐	☐	☐
Continuous (electronic) Interstitial Monitoring	☐	☐	☐	☐	☐	☐
Other Monitoring (specify):						

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XV. CLOSURE OR CHANGE IN SERVICE INFORMATION

Tank ID #						
Compartments; list as 1a, 1b, 2a, 2b etc.:						
1. Closure of Change in Service						
1.a Closure or change in service						
Estimated date the UST was last used for storing a regulated substance	______	______	______	______	______	______
Check box if this is a change in service to a nonregulated tank	☐	☐	☐	☐	☐	☐
2.b Tank Closure						
Estimated date the tank was closed (mm/dd/yyyy)	______	______	______	______	______	______
Tank removed from ground	☐	☐	☐	☐	☐	☐
Tank filled with inert material *Describe the inert material*	☐	☐	☐	☐	☐	☐
3.c Piping Closure						
Estimated date the piping was closed (mm/dd/yyyy)	______	______	______	______	______	______
Piping removed from ground	☐	☐	☐	☐	☐	☐
Piping filled with inert material *Describe the inert material*	☐	☐	☐	☐	☐	☐
4.d Site Assessment						
Check here if site assessment was completed	☐	☐	☐	☐	☐	☐
Check here if evidence of release was detected	☐	☐	☐	☐	☐	☐
Date Office of Environmental Remediation was notified of release (if applicable)	______	______	______	______	______	______

XVI. CERTIFICATION OF INSTALLATION (complete for UST systems installed after 12/22/1988)

1.a Installer of Tank and Piping			
Installer is certified by tank & piping manufacturer	YES ☐	NO ☐	*Certified installer comments* :
Installer is certified by the WVDEP	YES ☐	NO ☐	
Installation inspected by registered engineer	YES ☐	NO ☐	
Manufacture's installation checklist completed (attach copy of each)	YES ☐	NO ☐	
Other Method of Certification of Installation (specify):			

Enter additional comments here :

Signature of WVDEP Certified UST Worker Certifying Proper Installation, Repair, Upgrade, Closure, or Change in Service of UST System

Printed Name ______________________ *Company* ______________________ *Position* ______________________

WVDEP Certification # ______________________

☐ I certify that work was performed in accordance with industry standards and the State and Federal UST Rule. Furthermore, I certify that I was on site performing or providing direct oversight of work performed in accordance with 33CSR30-3 requirements.

Signature ______________________ *Date* ______________________

Notification for Underground Storage Tanks

INSTRUCTIONS AND GENERAL INFORMATION

Please type or print in ink. Also, be sure you have signatures in ink for sections VIII and XI. Complete a notification form for each location containing underground storage tanks. If more than 5 tanks are owned at this location, you may photocopy pages 3 through 6 and use them for additional tanks. The primary purpose of this notification form is to provide information about the installation, existence, changes to, and closure of underground storage tank systems (USTs) that store or have stored petroleum or hazardous substances. The information you provide will be based on reasonably available records, or in the absence of such records, your knowledge or recollection. Federal law requires UST owners to use this notification form for all USTs storing regulated substances that are brought into use after May 8, 1986, or USTs in the ground as of May 8, 1986 that have stored regulated substances at any time since January 1, 1974. The information requested is required by Section 9002 of the Solid Waste Disposal Act (SWDA), as amended.

Who Must Notify?

40 CFR part 280, as amended, requires owners of USTs that store regulated substances (unless exempted) to notify implementing agencies of the existence of their USTs. Owner is defined as:

• In the case of an UST in use on November 8, 1984, or brought into use after that date, any person who owns an UST used for storage, use, or dispensing of regulated substances: or

• In the case of an UST in use before November 8, 1984, but no longer in use on that date, any person who owned the UST immediately before its discontinuation.

Also, owners of previously deferred UST systems with field constructed tanks and airport hydrant fuel distribution systems in the ground as of October 13, 2015 must submit a one-time notification of existence by October 13, 2018. Owners of UST systems with field constructed tanks and airport hydrant fuel distribution systems brought into use after October 13, 2015 are considered new facilities and must follow the same notification requirements as all other UST owners.

What USTs Are Included?

An UST system is defined as any one or combination of tanks that is used to contain an accumulation of regulated substances, and whose volume (including connected underground piping) is 10 percent or more beneath the ground. Regulated USTs store petroleum or hazardous substances (see What Substances Are Covered below). This includes UST systems with field-constructed tanks and airport hydrant fuel distribution systems.

What Tanks Are Excluded From Notification (see § 280.10 and § 280.12)?

- Tanks removed from the ground before May 8, 1986;
- Farm or residential tanks of 1,1 00 gallons or less capacity storing motor fuel for noncommercial purposes;
- Tanks storing heating oil for use on the premises where stored;
- Septic tanks;
- Certain pipeline facilities regulated under chapters 601 and 603 of Title 49;
- Surface impoundments. pits, ponds, or lagoons;
- Storm water or wastewater collection systems;
- Flow-through process tanks;
- Liquid traps or associated gathering lines directly related to oil or gas production and gathering operations;
- Tanks on or above the floor of underground areas, such as basements or tunnels;
- Tanks with a capacity of 110 gallons or less;
- Wastewater treatment tank systems;
- UST systems containing radioactive material that are regulated under the Atomic Energy Act of 1954;
- UST systems that are part of an emergency generator system at nuclear power generation facilities regulated by the Nuclear Regulatory Commission under 10 CFR part 50.

What Substances Are Covered?

The notification requirements apply to USTs containing petroleum or certain hazardous substances. Petroleum includes gasoline, used oil, diesel fuel, crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute). Hazardous substances are those found in Section 101 (14) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980, with the exception of those substances regulated as hazardous waste under Subtitle C of the Resource Conservation and Recovery Act.

When And Who To Notify?

Owners who bring USTs into use after May 8, 1986 must submit this notification form to the implementing agency within 30 days of bringing the UST into use. If the implementing agency requires notification of any amendments to the facility, send information to the implementing agency immediately. Penalties: Any owner who knowingly fails to notify or submits false information shall be subject to a civil penalty not to exceed $10 ,000 for each tank for which notification is not given or for which false information is given.

UST Compliance Inspection
WV DEP Tanks Program

Printed:
Attendees:
Inspection Result: **Inspection Date:**
Partial Inspection:

Facility ID:		**Inspector**	
Facility Name		**Insp. Type**	
Facility Address		**Location**	
		Notification Required	

CONTACTS

Contact Type	Contact Information
Class A/B Operator	
Class A/B Operator	
Tank Owner	

OPERATOR TRAINING

Are all Class A, B and C Operator designated on a list at the facility?		Are all Classes A, B and C Operators trained by a WVDEP approved vendor?	
Are Class A and B Operators Training Certificates available onsite?		Does the facility have written Class C operator procedures?	
Is this a WVDEP approved unmanned facility?		Is class C operator contact information posted?	
		Are emergency procedures and contact info posted?	

WALKTHROUGH INSPECTIONS

Walkthrough inspection records for the past 2 months and 10 of the last 12 months?		Last annual walkthrough inspection date	

FINANCIAL RESPONSIBILITY

Is financial responsibility required?		Financial responsibility met?	
Third Party Liability Coverage		All Active/Temp Closed Tanks Covered	
Corrective Action Coverage		Number of Tanks Covered	

Financial Responsibility Comments:

Type	Insurance Company	Effective	Expires/Cancelled
Insurance			
Insurance			
Insurance			

INSPECTOR COMMENTS

TANK INFORMATION

Facility: #

Tanks	Tank 1	Tank 2
Capacity		
Tank Status		
Installation Date		
Tank Age (in years)		
Tank Construction Material		
AST Tank		
Compartment Tank		
GPS coordinates of tank		

COMPARTMENT/PIPING INFORMATION

Compartments	Tank 1	Tank 2
Compartment status		
Federally regulated		
Capacity		
Manifold tank		
Pipe construction material		
Pipe containment method		
Emergency generator tank		
Pipe type		
Product		
CAS #		

DISPENSER INFORMATION

Dispensers	Dispenser #1	Dispenser #2	Dispenser #3
Dispenser ID			
Compartments			

CORROSION PROTECTION

Tank Corrosion Protection	Tank 1	Tank 2
Tank Construction Material		
Corrosion Protection Method		
Tank CP requirement		
Current passing CP test date		
Any unexplained or unresolved failing CP test results?		
Was test performed by a WV class D or E certified worker?		
Has the tank been repaired since the last CP test?		

Pipe Corrosion Protection	Tank 1	Tank 2
Pipe Construction Material		
CP method		
Piping CP requirement		
Has the piping been repaired since the last CP test?		

STP Corrosion Protection	Tank 1	Tank 2
Pipe Construction Material		

Dispenser Corrosion Protection	Dispenser #1	Dispenser #2	Dispenser #3
Flex connector, piping extensions, and/or other metal fittings present?			
Is soil currently in contact with metal components?			

Spill/Overfill Details	Tank 1	Tank 2
Are vent lines installed properly?(proper height, undamaged, etc...)		

Facility: #

Local Fill	Tank 1	Tank 2
Are all deliveries less than 25 gallons?		
Does tank compartment have a remote fill?		
Spill prevention type(§280.20(c)(1)(i))		
Is the spill bucket clean, dry, and free of debris?		
Spill bucket capacity (gallons)		
The spill bucket will contain drips or spills when the delivery hose is disconnected (§280.20(c)(1)(i))?		
Is the bucket operating properly(no holes/cracks)?(280.20(c)(1)(i))		
Inspected monthly or at each delivery?(§280.36(a))		

Overfill Control	Tank 1	Tank 2
Overfill type(§280.20(c)(1)(ii))		
Overfill presence is verified?(280.20(c)(1)(ii))		
Is the overfill device operating properly?(§280.20(c)(1)(ii))		

LEAK DETECTION

Tanks	Tank 1	Tank 2
Primary leak detection method		
Requirement		
Equipment operating properly		
Last passing tank tightness test		

Piping (3 GPH)	Tank 1	Tank 2
Piping type		
Leak detection method		
Requirement		
Equipment operating properly		
Compatible with substance		
Last passing LLD function check		

Piping (.2 GPH)	Tank 1	Tank 2
Leak detection method		
Requirement		
Equipment operating properly		
Last passing line tightness test		
Annual RD operability test date		

Piping Sumps	Tank 1	Tank 2
Sump requirements		
Piping sump containment		
Is there evidence of a suspected release?		

Dispensers	Dispenser #1	Dispenser #2	Dispenser #3
Sump requirements			
Dispenser sump containment			
Sump construction material			
Is there evidence of a suspected release?			

Automatic Tank Gauge	Tank 1	Tank 2

Facility: #

Automatic Tank Gauge	Tank 1	Tank 2

TRANSPORTER/FUEL DELIVERY INFORMATION

Delivery Information	Tank 1	Tank 2
Any deliveries with expired/no registration certificate?		

Name	Supplier/Transporter	Address	Phone

SITE DIAGRAM

No Site Diagram Created

ISSUES

The issues below require immediate attention. Delivery prohibition may be imposed.

In order prevent further enforcement, the issues below should be resolved as soon as possible.

Facility: #

Required Corrective Action:

Comply with above cited regulation(s).

PHOTOS

Inspection performed by:

WV DEP Tank Inspector

INSPECTION OF VIOLATION

WVDEP/Division of Water and Waste Management
Office of Environmental Enforcement
Tanks Corrective Action Unit

601 57th Street SE
Charleston, WV 25304
304-926-0470

Facility			
Facility:		**Contact:**	
Address		**Phone:**	
		Email:	
Owner - Operator			
Owner:		**Operator:**	
Address:		**Address:**	
Owner:		**Operator:**	
(at time of leak)		(at time of leak)	
Responsible Party			
Responsible Party:		**Contact:**	
Address:		**Phone:**	
		Email:	

To the tank owner and operator:

An inspection has been made of the above facility to determine compliance with the Notice of Violation issued on and the remedial measure requirements stated therein.

Violation(s)

Notices

The issuance of this notice may result in further enforcement action(s) in accordance with West Virginia Code 22-12.

Service Accepted and Acknowledged:

Inspector/Project Manager:

Date:

NOTICE OF VIOLATION

WVDEP/Division of Water and Waste Management
Office of Environmental Enforcement
Tanks Program

601 57th Street SE
Charleston, WV 25304
(304) 926-0470

Responsible Party		Facility	
Responsible Party:		**Facility:**	
Address:		**Address**	
Facility Owner - Operator			
Owner:		**Operator:**	
Address:		**Address:**	

Information received from an inspection conducted on or about at the above facility has revealed that the responsible party listed above is in violation of the provisions of Chapter 22, Article 17, Section 6 of the Code of West Virginia and/or Section(s):

Violation(s)

Therefore, pursuant to the authority in Chapter 22, Article 17 of the Code of West Virginia, the responsible party is hereby notified that the owner/operator is in VIOLATION of the provision of the Code of West Virginia as described above. In order to correct these violations, it is necessary to follow the required corrective actions for each violation.

Issuer Contact Information:	Name: Address: Email: Phone: Fax:

The issuance of this Notice may result in further enforcement action(s) in accordance with West Virginia Code 22-17.
By , submit your written response including actions taken to correct violations to the Inspector/Project Manager at the address listed above. Please contact the inspector if you have any questions regarding this notice.

Inspector/Project Manager:

Date:

ATG Testing Report Form

The applicable portions of this form must be completed and provided to the facility owner/operator within 30 days of the test date, along with written test procedures, data collection logs, and printouts from test equipment (if applicable). Facility must keep this page along with page 2 as applicable on record for submittal to the WVDEP upon request. Each page must identify the facility and contain the WVDEP certified worker's signature. WVDEP certified worker must be present on site during testing.

When pressure/vacuum testing, any loss in pressure/vacuum during the test shall be considered a failed test, regardless of the manufacturer's criteria for declaring a passed test.

A. Facility Information

WVDEP FACILITY ID#:

Facility Name:	Site Address:	
Facility Contact:	Phone:	Date of Testing:

B. Testing Contractor Information

To the best of my knowledge, the facts stated in this document are accurate and in full compliance with legal requirements.

Company:	Print Name of Tester:	WVDEP Certification #:	**Tester's Signature:**	**Date:**
Address:	City:	Phone number:	**Email address:**	

E. Automatic Tank Gauge Functionality Test **(Required annually if present)**

AUTOMATIC TANK GAUGE ☐ **Pass** ☐ **Fail**	
ATG Manufacturer:	ATG Model:
Detected leak will trigger an alarm? ☐ Yes ☐ No	Battery Backup Functional? ☐ Yes ☐ No
ATG software properly programmed? ☐ Yes ☐ No	Is the ATG equipped with CITLDS? ☐ Yes ☐ No

TEST PROCEDURE – Briefly describe procedure(s) used to test the probes (i.e. PEI/RP1200, manufacturer's testing procedure, etc.)

Probe and Testing information

Tank #	**ID:**	**ID:**	**ID:**	**ID:**	**ID:**	**ID:**	**ID:**
Product Stored							
Manufacturer							
Model							
Measured Product Level (in.)							
ATG Product Level (in.)							

Facility Name: Facility ID #:

Measured Water Level (in.)							
ATG Water Level (in.)							
Measured product and water levels match ATG values?	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
Is the probe in a good state of repair?	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
Is the ATG console clear of alarms?	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
Float(s) move freely	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
V. TEST RESULT	☐ **Pass** ☐ **Fail**	☐ **Pass** ☐ **Fail**	☐ **Pass** ☐ **Fail**	☐ **Pass** ☐ **Fail**	☐ **Pass** ☐ **Fail**	☐ **Pass** ☐ **Fail**	☐ **Pass** ☐ **Fail**

Any “No” answer in a required row indicates the probe fails. Failed probes and ATGs must be reported to WVDEP and repaired or replaced immediately.

COMMENTS:

Tester Signature: Date: Print Name: Phone: Contact:

REV. 8/5/2019

Interstitial Monitoring Testing Report Form

The applicable portions of this form must be completed and provided to the facility owner/operator within 30 days of the test date, along with written test procedures, data collection logs, and printouts from test equipment (if applicable). Facility must keep this page along with pages 2-3 as applicable on record for submittal to the WVDEP upon request. Each page must identify the facility and contain the WVDEP certified worker's signature. WVDEP certified worker must be on site during all testing.

When pressure/vacuum testing, any loss in pressure/vacuum during the test shall be considered a failed test, regardless of the manufacturer's criteria for declaring a passed test.

A. Facility Information

WVDEP FACILITY ID#:		
Facility Name:	Site Address:	
Facility Contact:	Phone:	Date of Testing:

B. Testing Contractor Information

To the best of my knowledge, the facts stated in this document are accurate and in full compliance with legal requirements.				
Company:	Print Name of Tester:	WVDEP Certification #:	**Tester's Signature:**	**Date:**
Address:	City:	Phone number:	**Email address:**	

F. Testing of Sumps and Under-Dispenser Containment (UDC) **(Required at install and every three years if used for interstitial monitoring)**

If not using one of the test methods listed below, containment sumps being hydrostatically tested must be filled to at least 6 inches above the highest penetration, fitting or joint and allowed to stand at least 15 minutes before beginning the test. The test must last at least one hour. A liquid level change of 1/8" or more indicates a failure and must be reported immediately to WVDEP.

Test Method Developed By: ☐ UDC Manufacturer; ☐ Industry Standard ☐ Other *(Specify)*:	Test Equipment Used:
Test Method Used: ☐ Pressure ☐ Vacuum ☐ Hydrostatic ☐ Other *(Specify)*:	Equipment Precision:
Reason for Test: ☐ Required Routine 3-year Test ☐ Suspected Release ☐ Other *(Specify)*:	

Dispenser #s, product, Tank #	**ID:**	**ID:**	**ID:**	**ID:**	**ID:**	**ID:**	**ID:**
STP/UDC/Other sump	☐ STP ☐UDC ☐OTHER	☐ STP ☐UDC ☐OTHER	☐ STP ☐UDC ☐OTHER	☐ STP ☐UDC ☐OTHER	☐ STP ☐UDC ☐OTHER	☐ STP ☐UDC ☐OTHER	☐ STP ☐UDC ☐OTHER
Installed after 4/11/2016?	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
Sump depth (inches):							
Height from sump bottom to top of highest sump penetration:							
Portion of sump tested[1.]							
Wait time between applying pressure/vacuum/water and starting test	minutes	minutes	minutes	minutes	minutes	minutes	minutes
Test start date/time:							
Initial reading:							

1. If the entire depth of the sump is not tested, specify how much was tested.

____

Facility Name: Facility ID#: Tester Signature:

Test end date/time:							
Final reading:							
Change in reading:							
Pass/Fail threshold or criteria:							
Test Result:	☐ **Pass** ☐ **Fail**	☐ **Pass** ☐ **Fail**	☐ **Pass** ☐ **Fail**	☐ **Pass** ☐ **Fail**	☐ **Pass** ☐ **Fail**	☐ **Pass** ☐ **Fail**	☐ **Pass** ☐ **Fail**
Were sensors properly replaced and verified as functional after testing?	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ N/A

G. Testing of Sensor Functionality: (Required annually if used for interstitial monitoring)

Dispenser #s, product, Tank #	**ID:**	**ID:**	**ID:**	**ID:**	**ID:**	**ID:**	**ID:**
Sensor Location							
Sensor Number							
Manufacturer							
Model							
Sensor Type	☐ Discriminating ☐ Non-Discriminating	☐ Discriminating ☐ Non-Discriminating	☐ Discriminating ☐ Non-Discriminating	☐ Discriminating ☐ Non-Discriminating	☐ Discriminating ☐ Non-Discriminating	☐ Discriminating ☐ Non-Discriminating	☐ Discriminating ☐ Non-Discriminating
Test Liquid	☐ Water ☐ Product	☐ Water ☐ Product	☐ Water ☐ Product	☐ Water ☐ Product	☐ Water ☐ Product	☐ Water ☐ Product	☐ Water ☐ Product
Is the ATG console clear of alarms?	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
Is the sensor properly positioned?	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
Is the sensor in a good state of repair?	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
Does the sensor trigger an alarm?	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
Is the sensor correctly identified on the ATG?	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
TEST RESULT	☐ **Pass** ☐ **Fail**	☐ **Pass** ☐ **Fail**	☐ **Pass** ☐ **Fail**	☐ **Pass** ☐ **Fail**	☐ **Pass** ☐ **Fail**	☐ **Pass** ☐ **Fail**	☐ **Pass** ☐ **Fail**
Were sensors properly replaced and verified as functional after testing?	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ N/A
Test Method	☐ **Manufacturer** ☐ **Industry Standard** ☐ **Other*(Specify Method Here)*:**						

Facility Name: Facility ID#:

CONTINUED FOR ADDITIONAL SENSORS

Dispenser #s, product, Tank #	**ID:**	**ID:**	**ID:**	**ID:**	**ID:**	**ID:**	**ID:**
Sensor Location							
Sensor Number							
Manufacturer							
Model							
Sensor Type	☐ Discriminating ☐ Non-Discriminating	☐ Discriminating ☐ Non-Discriminating	☐ Discriminating ☐ Non-Discriminating	☐ Discriminating ☐ Non-Discriminating	☐ Discriminating ☐ Non-Discriminating	☐ Discriminating ☐ Non-Discriminating	☐ Discriminating ☐ Non-Discriminating
Test Liquid	☐ Water ☐ Product	☐ Water ☐ Product	☐ Water ☐ Product	☐ Water ☐ Product	☐ Water ☐ Product	☐ Water ☐ Product	☐ Water ☐ Product
Is the ATG console clear of alarms?	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
Is the sensor properly positioned?	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
Is the sensor in a good state of repair?	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
Does the sensor trigger an alarm?	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
Is the sensor correctly identified on the ATG?	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
TEST RESULT	☐ **Pass** ☐ **Fail**	☐ **Pass** ☐ **Fail**	☐ **Pass** ☐ **Fail**	☐ **Pass** ☐ **Fail**	☐ **Pass** ☐ **Fail**	☐ **Pass** ☐ **Fail**	☐ **Pass** ☐ **Fail**
Were sensors properly replaced and verified as functional after testing?	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ N/A

COMMENTS:

Tester Signature: Date: Print Name: Phone: Contact:

Spill and Overfill Testing Report Form

The applicable portions of this form must be completed and provided to the facility owner/operator within 30 days of the test date, along with written test procedures, data collection logs, and printouts from test equipment (if applicable). Facility must keep this page along with pages 2-3 as applicable on record for submittal to the WVDEP upon request. Each page must identify the facility and contain the WVDEP certified worker's signature and WVDEP certified worker must be onsite during testing.

When pressure/vacuum testing, any loss in pressure/vacuum during the test shall be considered a failed test, regardless of the manufacturer's criteria for declaring a passed test.

A. Facility Information

WVDEP FACILITY ID#:		
Facility Name:	Site Address:	
Facility Contact:	Phone:	Date of Testing:

B. Testing Contractor Information

To the best of my knowledge, the facts stated in this document are accurate and in full compliance with legal requirements.

Company:	Print Name of Tester:	WVDEP Certification #:	**Tester's Signature:**	**Date:**
Address:	City:	Phone number:	**Email address:**	

C. Testing of Spill Buckets (Required every three years)

☐ **Spill bucket(s) not tested**

Test Method Developed By: ☐ Bucket Manufacturer ☐ Industry Standard ☐ Other *(Specify Method Here)*:	Test Equipment Used:
Test Method Used: ☐ Pressure ☐ Vacuum ☐ Hydrostatic ☐ Other *(Specify)*:	Equipment Precision:

	Bucket #	**Bucket #**	**Bucket #**	**Bucket #**	**Bucket #**	**Bucket #**	**Bucket #**
Bucket depth:							
Wait time between applying pressure/vacuum/water & starting test:							
Test start time:							
Initial reading:							
Test end time:							
Final reading:							
Change in reading:							
Pass/Fail threshold/criteria:							
Test Result:	☐ **Pass** ☐ **Fail**	☐ **Pass** ☐ **Fail**	☐ **Pass** ☐ **Fail**	☐ **Pass** ☐ **Fail**	☐ **Pass** ☐ **Fail**	☐ **Pass** ☐ **Fail**	☐ **Pass** ☐ **Fail**

D. Overfill Prevention Evaluation (Required every three years)

	Tank #	**Tank #**	**Tank #**	**Tank #**	**Tank #**	**Tank #**
Tank Capacity						
Tank Diameter						
Product Stored						

Spill and Overfill Testing Report Form - Page 2 of 3

Facility Name: Facility ID : Tester Signature:

Overfill Manufacturer							
Overfill Model							
Test Method	☐ Overfill Manufacturer ☐ Industry Standard ☐ Other*(Specify Method Here)*:						
Product delivery method	☐ Pressurized ☐ Gravity	☐ Pressurized ☐ Gravity	☐ Pressurized ☐ Gravity	☐ Pressurized ☐ Gravity	☐ Pressurized ☐ Gravity	☐ Pressurized ☐ Gravity	☐ Pressurized ☐ Gravity
Overfill Type	☐ Ball Float ☐ Drop Tube Shutoff ☐ Alarm	☐ Ball Float ☐ Drop Tube Shutoff ☐ Alarm	☐ Ball Float ☐ Drop Tube Shutoff ☐ Alarm	☐ Ball Float ☐ Drop Tube Shutoff ☐ Alarm	☐ Ball Float ☐ Drop Tube Shutoff ☐ Alarm	☐ Ball Float ☐ Drop Tube Shutoff ☐ Alarm	☐ Ball Float ☐ Drop Tube Shutoff ☐ Alarm

Ball Float Verification	**Tank #**	**Tank #**	**Tank #**	**Tank #**	**Tank #**	**Tank #**
Test Method	☐ Manufacturer ☐ Industry Standard ☐ Other*(Specify Method Here)*:					
Tank top fittings vapor tight and leak free?	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**
Ball float cage free of debris?	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**
Ball free of holes and cracks and moves freely in cage?	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**
Vent hole in pipe open and near top of tank?	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**
Is this a suction-piping system?*	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**
Tank capacity % when flow is restricted? Not greater than 90%						
Test Result:**	☐ **Pass** ☐ **Fail**	☐ **Pass** ☐ **Fail**	☐ **Pass** ☐ **Fail**	☐ **Pass** ☐ **Fail**	☐ **Pass** ☐ **Fail**	☐ **Pass** ☐ **Fail**

*** If "Yes," Ball floats must be replaced with another type of overfill prevention equipment. **If Ball Float fails, it must be replaced with another type of overfill prevention equipment**

Drop Tube Shut Off Device	**Tank #**	**Tank #**	**Tank #**	**Tank #**	**Tank #**	**Tank #**
Test Method	☐ Manufacturer ☐ Industry Standard ☐ Other*(Specify Method Here)*:					
Drop tube removed from tank?	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**
Drop Tube and Float free of debris?	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**
Float and Poppet move freely?	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**
Poppet enters flow path when float is engaged?	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**
Bypass Valve in the drop tube is open and free of blockage (if present)?	☐ **Yes** ☐ **No** ☐ **N/A**	☐ **Yes** ☐ **No** ☐ **N/A**	☐ **Yes** ☐ **No** ☐ **N/A**	☐ **Yes** ☐ **No** ☐ **N/A**	☐ **Yes** ☐ **No** ☐ **N/A**	☐ **Yes** ☐ **No** ☐ **N/A**
Tank Capacity % when flow is stopped? (not greater than 95%						
Test Result:	☐ **Pass** ☐ **Fail**	☐ **Pass** ☐ **Fail**	☐ **Pass** ☐ **Fail**	☐ **Pass** ☐ **Fail**	☐ **Pass** ☐ **Fail**	☐ **Pass** ☐ **Fail**

Facility Name: Facility ID #:

Overfill Alarm	**Tank #**	**Tank #**	**Tank #**	**Tank #**	**Tank #**	**Tank #**
Test Method	☐ Manufacturer ☐ Industry Standard ☐ Other *(Specify Method Here)*:					
Visible or Audible to delivery driver?	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**
Probe and Float in good condition?	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**
Float moves freely?	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**
Does simulated overfill trigger alarm?	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**
Tank Capacity when alarm is triggered? %						
Test Result:	☐ **Pass** ☐ **Fail**	☐ **Pass** ☐ **Fail**	☐ **Pass** ☐ **Fail**	☐ **Pass** ☐ **Fail**	☐ **Pass** ☐ **Fail**	☐ **Pass** ☐ **Fail**

Tester Signature: Date: Print Name: Phone: Contact:

CATHODIC PROTECTION — IMPRESSED CURRENT

WEST VIRGINIA UNDERGROUND STORAGE TANKS

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Environmental Enforcement/ UST Unit
http://www.dep.wv.gov/WWE/ee/ust/Pages/default.aspx

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REV. 3/23/2010

- This form must be utilized to evaluate underground storage tank (UST) impressed current cathodic protection systems in the State of West Virginia.
- A copy of this completed form must be kept available & submitted by the owner /operator to the WVDEP UST Section upon request.
- A site drawing depicting the UST cathodic protection system and all reference electrode placements must be completed.

I. UST OWNER:		II. UST FACILITY	
Contact Name:	**Phone:**	**Name:**	**Facility ID:**
Address:		**Address:**	
City:	**State:**	**City:**	**County:**

III. REASON SURVEY WAS CONDUCTED (mark only one)

☐Routine – 3 year ☐Routine – within 6 months of installation /upgrade/modification
☐Re-survey upon achievement of steady-state polarization immediately following upgrade/modification (complete Section XI)

IV. CATHODIC PROTECTION TESTER'S EVALUATION (mark only one)

☐**PASS**	All protected structures at this facility pass the cathodic protection and continuity survey (indicate all criteria applicable by completion of Section V). No further action is necessary at this time. Next test is due in 3 years.
☐**FAIL**	One or more protected structures at this facility fail the cathodic protection and/or continuity survey. Refer to a corrosion expert for further evaluation OR permanently close.
☐**INCONCLUSIVE**	If any potential does not meet criteria or if any structure is discontinuous, a corrosion expert must evaluate the survey and complete Section VI.

Tester Name:			**WV DEP Certification Number:**
Company Name:			**Certifying Organization & number(e.g., NACE):**
Address:			**Certification Type (e.g., CP Tester, CP Technician):**
City:	**State:**	**Zip:**	**Phone:**

CP Tester's Signature:	**Date Signed:**	**Date CP Survey Performed:**

V. CRITERIA APPLICABLE TO TESTER'S EVALUATION (mark all that apply)

☐ **850 mV Instant OFF**	Structure-to-soil potential more negative than -850 mV with respect to a $Cu/CuSO_4$ reference electrode with protective current temporarily interrupted (instant-off).
☐ **100 mV Polarization**	Structure tested exhibits at least 100 mV of cathodic polarization.

VI. CORROSION EXPERT'S EVALUATION IF REQUIRED (mark only one)

The survey must be evaluated by a corrosion expert when: a) supplemental anodes or other changes in the construction of the impressed current system are made; b) a stray current may be affecting buried metallic structures; c) an inconclusive result was indicated in Section IV; or d) when required by WVDEP.

☐**PASS**	All protected structures at this facility are judged to have adequate cathodic protection and therefore pass the cathodic protection and continuity survey. Indicate all criteria applicable: ☐ -850 mV Instant OFF ☐ 100 mV Polarization
☐**FAIL**	One or more protected structures at this facility do not pass the cathodic protection and/or continuity survey and it is judged that adequate cathodic protection is not currently being provided to the UST system (indicate what action is necessary by completion of Section VII).

Corrosion Expert's Name:	**WVDEP Class D Cert. #:**	**NACE Int'l Cert. Type / Professional Engineer (PE) Specialty:**		
Company Name:		**NACE Int'l Cert. Number or RPE Number / State:**		
Address:	**City:**	**State:**	**Zip:**	**Phone:**
Corrosion Expert's Signature:				**Date:**

VII. ACTION REQUIRED AS A RESULT OF CORROSION EXPERT EVALUATION (mark only one)

☐**NONE**	Cathodic protection is adequate. No further action is necessary at this time.
☐**UPGRADE & RETEST**	Cathodic protection is not adequate. Immediately upgrade per industry standard or corrosion expert design OR permanently close. If upgraded, system must be retested within 6 months after the upgrade.

Date next cathodic protection survey due (required every 3 years and within 6 months of upgrades)

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CATHODIC PROTECTION — IMPRESSED CURRENT

VIII. DESCRIPTION OF UST SYSTEM

TANK #	PRODUCT STORED (PREMIUM, DIESEL, ETC.)	TANK CAPACITY (GAL)	CONSTRUCTION MATERIAL			FLEX CONNECTORS (Bonded, isolated, booted, anode, N/A)
			TANKS	PIPING	SIPHON LINE	
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						

IX. IMPRESSED CURRENT RECTIFIER DATA (complete all that are applicable)

Rectifier Manufacturer:	Note: In order to conduct an effective evaluation of the cathodic protection system, a complete evaluation of the rectifier is necessary.
Rectifier Model:	Rectifier Serial Number:
Previous Rectifier Output as Left at Last Test Volts Amps	Rated DC Output: Volts Amps

EVENT	DATE	TAP SETTINGS		DC OUTPUT		HOUR METER	COMMENTS
		COARSE	FINE	VOLTS	AMPS		
"AS FOUND"							
"AS LEFT"							

X. IMPRESSED CURRENT POSITIVE & NEGATIVE CIRCUIT MEASUREMENTS (output amperage)

Complete if the system is designed to allow such measurements (i.e. individual lead wires for each anode are installed and measurement shunts are present).

CIRCUIT											TOTAL
ANODE (+)											
TANK (-)											

XI. DESCRIPTION OF CATHODIC PROTECTION SYSTEM UPGRADES AND/OR MODIFICATIONS

Cathodic protection systems must be evaluated within 6 months after any upgrades and/or modifications. Complete this section if any upgrades or modifications were made to the cathodic protection system in response to a "failed" evaluation. Certain upgrades/modifications as determined by WVDEP are required to be designed and/or evaluated by a corrosion expert (completion of Section VI required).

☐ Supplemental anodes for an impressed current system were needed (attach corrosion expert's design).
☐ Repairs or replacement of rectifier was needed (explain in "Remarks/Other" below).
☐ Repair or replacement of anode header cables were needed (explain in "Remarks/Other" below).
☐ Impressed current tanks/piping are not electrically continuous (explain upgrades/modifications completed in "Remarks/Other" below).
☐ Adjustments were made to the rectifier output.

Remarks/Other:

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CATHODIC PROTECTION — IMPRESSED CURRENT

XII. UST FACILITY SITE DRAWING

Attach detailed drawing of the UST and cathodic protection systems. Sufficient detail must be given in order to clearly indicate where the reference electrode was placed for each structure-to-soil potential that is recorded on the survey forms. Any pertinent data must also be included. At a minimum you should indicate the following: All tanks, piping and dispensers; All buildings and streets; All anodes and wires; Location of CP test stations; Each reference electrode placement must be indicated by a code (e.g., 1,2,3… T-1, T-2, P-1, P-2… etc.) corresponding with the appropriate line number in Section XIV of this form.

AN EVALUATION OF THE CATHODIC PROTECTION SYSTEM IS NOT COMPLETE WITHOUT AN ACCEPTABLE SITE DRAWING.

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CATHODIC PROTECTION — IMPRESSED CURRENT

XIII. IMPRESSED CURRENT CATHODIC PROTECTION SYSTEM CONTINUITY SURVEY

- This section may be utilized to conduct measurements of continuity on underground storage tank systems that are protected by CP systems.
- When conducting a fixed cell – moving ground survey, the reference electrode must be placed in the soil at a remote location and left undisturbed.
- Conduct point-to-point test between any two structures for which the fixed cell-moving ground survey is inconclusive or indicates possible isolation.
- For impressed current systems, the protected structure must be continuous with all other protected structures in order to pass the continuity survey.

FACILITY NAME:

NOTE: The survey is not complete unless all other applicable parts of this form are also completed

DESCRIBE LOCATION OF "FIXED REMOTE" REFERENCE ELECTRODE PLACEMENT:

STRUCTURE "A" 1	STRUCTURE "B" 2	STRUCTURE "A" 3 FIXED REMOTE INSTANT OFF VOLTAGE	STRUCTURE "B" 4 FIXED REMOTE INSTANT OFF VOLTAGE	POINT-TO-POINT 5 VOLTAGE DIFFERENCE	ISOLATED/ 6 CONTINUOUS/ INCONCLUSIVE
(example) PLUS TANK BOTTOM	(example) PLUS STEEL PRODUCT LINE @ STP	(example) -915 mV	(example) -908 mV		(example) INCONCLUSIVE
(example) PLUS TANK BOTTOM	(example) PLUS STEEL PRODUCT LINE @ STP			(example) 1 mV	(example) CONTINUOUS

COMMENTS:

1) Describe the cathodically protected structure {"A"} that you are trying to show is continuous (e.g., plus tank bottom).
2) Describe the "other" protected structure {"B"} that you are attempting to demonstrate is continuous (e.g., plus steel product line @ STP).
3) Record the fixed remote instant off structure-to-soil potential of the protected structure {"A"} in millivolts (e.g., -915 mV).
4) Record the fixed remote instant off structure-to-soil potential of the "other" protected structure {"B"} in millivolts (e.g., -908 mV).
5) Record the voltage observed between structure "A" and structure "B" when conducting "point-to-point" testing (e.g., 1 mV).
6) Document whether the test indicated the protected structure was isolated, continuous or inconclusive, according to the chart below.

Isolated	**Continuous**	**Inconclusive**
Voltage difference is >10 mV	**Voltage difference is ≤1 mV**	**Voltage difference is > 1 mV but ≤10 mV**

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CATHODIC PROTECTION — IMPRESSED CURRENT

XIIIb. IMPRESSED CURRENT CATHODIC PROTECTION SYSTEM CONTINUITY SURVEY-- Continued

STRUCTURE "A" 1	STRUCTURE "B" 2	STRUCTURE "A" 3 FIXED REMOTE INSTANT OFF VOLTAGE	STRUCTURE "B" 4 FIXED REMOTE INSTANT OFF VOLTAGE	POINT-TO-POINT 5 VOLTAGE DIFFERENCE	ISOLATED/ 6 CONTINUOUS/ INCONCLUSIVE

Additional Comments:

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CATHODIC PROTECTION — IMPRESSED CURRENT

XIV. CATHODIC PROTECTION SYSTEM SURVEY

- This section may be used to conduct a survey of an impressed current protection system by obtaining structure-to-soil potential measurements.
- The reference electrode must be placed locally in a minimum of 3 locations in the soil directly over the tested structure and as far away from any active anode as practical to obtain a valid structure-to-soil potential.
- Both "on" and "instant off" potentials must be measured for each structure that is intended to be under cathodic protection.
- The "instant off" potential must be -850 mV or more negative or the 100 mV polarization criterion must be satisfied in order to pass.

FACILITY NAME:

NOTE: The survey is not complete unless all other applicable parts of this form are also completed

LOCATION CODE1	STRUCTURE 2	CONTACT POINT 3	REFERENCE CELL PLACEMENT 4	ON VOLTAGE5	INSTANT OFF VOLTAGE6	100 mV POLARIZATION		PASS / FAIL9
						ENDING VOLTAGE7	VOLTAGE8	
(example) T-1	(example) PLUS TANK	(example) TANK BOTTOM	(example) SOIL @ REG. TANK STP MANWAY	(example) -1070mV	(example) -875 mV			(example) PASS
(example) P-2	(example) DIESEL PIPING	(example) DISPENSER 7/8	(example) SOIL @ DIESEL TANK STP MANWAY	(example) -810 mV	(example) -680 mV	(example) -575 mV	(example) -105 mV	(example) PASS

COMMENTS:

1) Designate numerically or by code on the site drawing each "local" reference electrode placement (e.g., 1, 2, 3… T-1, T-2, P-1, P-2…etc.).
2) Describe the structure that is being tested (e.g., plus tank; premium piping; diesel submersible pump flex connector; etc.).
3) Describe where the structure being tested is contacted with the test lead (e.g., plus tank bottom; diesel piping @ dispenser 7/8; etc.).
4) Describe the exact location where reference electrode is placed for each measurement (e.g., soil @ regular tank STP manway; soil @ dispenser 2, etc.).
5) {Applies to all tests} Record the structure-to-soil potential (voltage) observed with the current applied (e.g., -1070 mV).
6) Record the structure-to-soil potential (voltage) observed when the current is interrupted (e.g., -680 mV).
7) {Applies to 100 mV polarization test only} Record the voltage observed at the end of the test period (e.g., -575 mV).
8) {Applies to 100 mV polarization test only} Subtract the ending voltage from the instant off voltage [e.g., -680mV - (-575 mV) = -105 mV].
9) Indicate if the tested structure passed/failed one of the two acceptable criteria (-850 mV instant off or 100 mV polarization) based on your interpretation of data.

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CATHODIC PROTECTION — IMPRESSED CURRENT

XIV. CATHODIC PROTECTION SYSTEM SURVEY-- Continued

LOCATION CODE1	STRUCTURE 2	CONTACT POINT 3	REFERENCE CELL PLACEMENT 4	ON VOLTAGE5	INSTANT OFF VOLTAGE6	100 mV POLARIZATION		PASS / FAIL9
						ENDING VOLTAGE7	VOLTAGE8	

Additional Comments:

IMPRESSED CURRENT CATHODIC PROTECTION SYSTEM
60-DAY RECORD OF RECTIFIER OPERATION

- This form may be utilized to document that the cathodic protection system rectifier is checked for operation at least once every 60 days.
- Checked for operation is taken to mean that it was confirmed the rectifier was receiving power and is “turned-on”.
- Any significant variance should be reported to the corrosion professional so that any upgrades and/or adjustments necessary can be made.

UST OWNER		UST FACILITY	
NAME:		NAME:	ID #
MAILING ADDRESS:		PHYSICAL ADDRESS:	
CITY:	STATE:	CITY:	COUNTY:

IMPRESSED CURRENT RECTIFIER DATA

Rectifier Manufacturer:	Rated DC Output: VOLTS AMPS
Rectifier Model:	Rectifier Serial Number:
What is the ‘as designed’ or last recommended rectifier output? VOLTS AMPS	

60-DAY LOG OF RECTIFIER OPERATION

DATE INSPECTED	RECTIFIER TURNED ON?	TAP SETTINGS		DC OUTPUT		HOUR METER	INSPECTOR INITIALS	COMMENTS
		COARSE	FINE	VOLTS	AMPS			

CATHODIC PROTECTION — GALVANIC

WEST VIRGINIA UNDERGROUND STORAGE TANKS

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Division of Water and Waste Management
Environmental Enforcement/ UST Unit
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REV. 3/23/2010

- This form must be utilized to evaluate underground storage tank (UST) galvanic cathodic protection (CP) systems in the State of West Virginia.
- A copy of this completed form must be submitted by the owner /operator to the WVDEP UST Section within 30 days of testing.
- A site drawing depicting the UST cathodic protection system and all reference electrode placements must be completed.

I. UST OWNER:			II. UST FACILITY	
Contact Name:		Phone:	**Name:**	**Facility ID:**
Address:			**Address:**	
City:	**State:**		**City:**	**County:**

III. REASON SURVEY WAS CONDUCTED (mark only one)

☐Routine – 3 year ☐Routine – within 6 months of installation/upgrade/modification
☐Re-survey upon achievement of steady-state polarization immediately following upgrade/modification (complete Section IX)

IV. CATHODIC PROTECTION TESTER'S EVALUATION (mark only one)

☐**PASS**	All protected structures at this facility pass the cathodic protection and continuity survey (indicate all criteria applicable by completion of Section V). No further action is necessary at this time. Next test is due in 3 years.
☐**FAIL**	One or more protected structures at this facility fail the cathodic protection and/or continuity survey. Refer to a corrosion expert for further evaluation OR permanently close.
☐**INCONCLUSIVE**	If the remote and the local do not both indicate the same test result on all protected structures (both pass or both fail), inconclusive is indicated and/or if the continuity survey indicates inconclusive or continuous results, a corrosion expert must evaluate the survey and complete Section VI.

Tester Name:			**WVDEP Certification Number:**
Company Name:			**Certifying Organization & Number (e.g., NACE):**
Address:			**Certification Type (e.g., CP Tester, CP Technician):**
City:	**State:**	**Zip:**	**Phone:**

CP Tester's Signature:	**Date Signed:**	**Date CP Survey Performed:**

V. CRITERIA APPLICABLE TO TESTER'S EVALUATION (mark all that apply)

☐ **850 mV ON**	Structure-to-soil potential more negative than -850 mV with respect to a $Cu/CuSO_4$ reference electrode with protective current applied (This criterion is applicable to any galvanic protected structure).
☐ **850 mV Instant OFF**	Structure-to-soil potential more negative than -850 mV with respect to a $Cu/CuSO_4$ reference electrode with protective current temporarily interrupted (This criterion is applicable only to those galvanic systems where the anodes can be disconnected).
☐ **100 mV Polarization**	Structure tested exhibits at least 100 mV of cathodic polarization. (This criterion is applicable only to those galvanic systems where the anodes can be disconnected).

VI. CORROSION EXPERT'S EVALUATION IF REQUIRED (mark only one)

The survey must be conducted and/or evaluated by a corrosion expert when: a) an inconclusive is indicated for any protected structure since both the local and the remote structure-to-soil potentials do not result in the same outcome; b) upgrades to steel piping protected by galvanic systems are conducted; c) supplemental anodes are added to the tanks and/or piping without following an accepted industry code; or d) when required by WVDEP.

☐**PASS**	All protected structures at this facility are judged to have adequate cathodic protection and therefore pass the CP and continuity survey. Indicate all criteria applicable: ☐ -850 mV ON ☐ -850 mV Instant OFF ☐ 100 mV Polarization
☐**FAIL**	One or more tested structures at this facility do not pass the CP and/or continuity survey and it is judged that adequate CP is not currently being provided to the UST system (indicate what action is necessary by completion of Section VII).

Corrosion Expert's Name:	**WVDEP Class D Cert. #:**	**NACE Int'l Cert. Type / Professional Engineer (PE) Specialty:**		
Company Name:		**NACE Int'l Cert. Number or RPE Number / State:**		
Address:	**City:**	**State:**	**Zip:**	**Phone:**
Corrosion Expert's Signature:				**Date:**

VII. ACTION REQUIRED AS A RESULT OF EXPERT'S EVALUATION (mark only one)

☐**NONE**	Cathodic protection (CP) is adequate. No further action is necessary at this time.
☐**UPGRADE & RETEST**	Cathodic protection is not adequate. Immediately upgrade per industry standard or corrosion expert design OR permanently close. If upgraded, system must be retested within 6 months after the upgrade.

Next cathodic protection survey due (required every 3 years and within 6 months of upgrades)

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Environmental Enforcement/ UST Unit

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CATHODIC PROTECTION — GALVANIC

VIII. DESCRIPTION OF UST SYSTEM

TANK #	PRODUCT STORED (PREMIUM, DIESEL, ETC.)	TANK CAPACITY (GAL)	CONSTRUCTION MATERIAL			FLEX CONNECTORS (Bonded, isolated, booted, anode, N/A)
			TANKS	PIPING	SIPHON LINE	
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

IX. DESCRIPTION OF CATHODIC PROTECTION SYSTEM UPGRADES AND/OR MODIFICATIONS

Cathodic protection systems must be evaluated within 6 months after any upgrades and/or modifications. Complete this section if any upgrades or modifications were made to the cathodic protection system in response to a “failed” evaluation. Certain upgrades/modifications as determined by WVDEP are required to be designed and/or evaluated by a corrosion expert (completion of Section VI required).

☐ Supplemental anodes for a Sti-P3 tank were added (attach corrosion expert’s design or document industry standard used).

☐ Supplemental anodes for metallic pipe or flex-connectors were added (attach corrosion expert’s design or document industry standard used).

☐ Galvanically protected tanks/piping not electrically isolated (explain upgrades/modifications completed in “Remarks/Other” below).

Remarks/Other:

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CATHODIC PROTECTION — GALVANIC

X. UST FACILITY SITE DRAWING

Attach detailed drawing of the UST and cathodic protection systems. Sufficient detail must be given in order to clearly indicate where the reference electrode was placed for each structure-to-soil potential that is recorded on the survey forms. Any pertinent data must also be included. At a minimum you should indicate the following: All tanks, piping and dispensers; All buildings and streets; All anodes and wires; Location of CP test stations; Each reference electrode placement must be indicated by a code (e.g., 1,2,3… T-1, T-2, P-1, P-2… etc.), corresponding with the appropriate line number in Section XII of this form.

AN EVALUATION OF THE CATHODIC PROTECTION SYSTEM IS NOT COMPLETE WITHOUT AN ACCEPTABLE SITE DRAWING.

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CATHODIC PROTECTION — GALVANIC

XI. GALVANIC (SACRIFICIAL ANODE) CATHODIC PROTECTION SYSTEM CONTINUITY SURVEY

- This section may be utilized to document measurements of continuity on underground storage tank systems that are protected by CP systems.
- When conducting a fixed cell – moving ground survey, the reference electrode must be placed in the soil at a remote location and left undisturbed.
- Conduct point-to-point test between any two structures for which the fixed cell-moving ground survey is inconclusive or indicates possible continuity.
- For galvanic systems, the structure that is to be protected must be isolated from any other metallic structure in order to pass the continuity survey.

FACILITY NAME:

NOTE: The survey is not complete unless all other applicable parts of this form are also completed

DESCRIBE LOCATION OF "FIXED REMOTE" REFERENCE ELECTRODE PLACEMENT:

STRUCTURE "A" 1	STRUCTURE "B" 2	STRUCTURE "A" 3 FIXED REMOTE VOLTAGE	STRUCTURE "B" 4 FIXED REMOTE VOLTAGE	POINT-TO-POINT 5 VOLTAGE DIFFERENCE	ISOLATED/ 6 CONTINUOUS/ INCONCLUSIVE
(example) PREMIUM TANK BOTTOM	(example) PREMIUM TANK FILL RISER	(example) -921 mV	(example) -915 mV		(example) INCONCLUSIVE
(example) PREMIUM TANK BOTTOM	(example) PREMIUM TANK FILL RISER			(example) 17 mV	(example) ISOLATED

COMMENTS:

1) Describe the cathodically protected structure {"A"} that you are trying to show is isolated from unprotected structures (e.g., premium tank).
2) Describe the unprotected structure {"B"} that you are attempting to demonstrate is isolated from the protected structure (e.g., Premium tank fill riser).
3) Record the measured structure-to-soil potential of the protected structure {"A"} in millivolts (e.g., -921 mV).
4) Record the measured structure-to-soil potential of the unprotected structure {"B"} in millivolts (e.g., -915 mV).
5) Record the voltage observed between structure "A" and structure "B" when conducting "point-to-point" testing (e.g., 17 mV).
6) Document whether the test indicated the protected structure was isolated, continuous or inconclusive, according to the chart below.

Isolated	**Continuous**	**Inconclusive**
Voltage difference is >10 mV	**Voltage difference is ≤1 mV**	**Voltage difference is > 1 mV but ≤10 mV**

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CATHODIC PROTECTION — GALVANIC

XII. CATHODIC PROTECTION SYSTEM SURVEY

- This section must be used to document a survey of a galvanic system by obtaining structure-to-soil potential measurements.
- At a minimum the reference electrode must be placed in the soil at both ends and the middle centerline of each tank and both ends of each piping run.
- STIP3 tank alternative: In lieu of the above method, a reading may be taken over the center of the tank midline and 1 remote reading at least 30' away from the structure being tested.
- Both the local and the remote voltage must be -850 mV or more negative in order to pass.
- Inconclusive is indicated when both the local & remote structure-to-soil potentials do not result in the same outcome (Both must pass or both fail)
- If the 100 mV polarization method is used to verify adequate CP on a system for which anodes can be disconnected, please use page 5 of the **CATHODIC PROTECTION IMPRESSED CURRENT form.**

FACILITY NAME:		**NOTE: The survey is not complete unless all other applicable parts of this form are also completed**

DESCRIBE LOCATION OF REMOTE REFERENCE ELECTRODE PLACEMENT:	

LOCATION CODE1	**STRUCTURE** 2	**CONTACT POINT** 3	**REFERENCE CELL PLACEMENT** 4	**LOCAL VOLTAGE**5	**Remote VOLTAGE**6	**PASS / FAIL /INCONCLUSIVE**7
(example) T-2	(example) PREM TANK	(example) TANK BOTTOM	(example) SOIL @ PREM TANK STP MANWAY	(example) -928 mV	(example) -810 mV	(example) INCONC.
(example) P-1	(example) PLUS PIPING	(example) DISPENSER 5/6	(example) SOIL UNDER DISPENSER 5/6	(example) -890 mV	(example) -885 mV	(example) PASS

COMMENTS:

1) Designate numerically or by code on the site drawing each "local" reference electrode placement (e.g., 1,2,3… T-1, T-2, P-1, P-2…etc.).
2) Describe the structure that is being tested (e.g., plus tank; premium piping; diesel submersible pump flex connector; etc.).
3) Describe where contact with the structure being tested is made (e.g., T1 test lead, plus tank bottom; diesel piping @ dispenser 7/8;PP4, etc.).
4) Describe the exact location where reference electrode is placed for each measurement (e.g., soil @ regular tank STP manway; soil @ dispenser 2, etc.).
5) Record the structure-to-soil potential measured with the reference electrode placed "local" in millivolts (e.g., -865 mV, -920 mV, etc.).
6) Record the structure-to-soil potential measured with the reference electrode placed "remote" (copy voltage that was obtained during continuity survey).
7) Indicate if the tested structure passed or failed the -850 mV "on" criterion based on your interpretation of data.

UST WALKTHROUGH INSPECTIONS CHECKLIST

Site Name	**Site Address**	**Facility ID #**

> Initial each box to indicate the equipment was inspected, as described. Use NA if the equipment inspection does not apply to the site.
> Take action for any alarms, damaged equipment and non-normal operating conditions; note actions taken on page two. Immediately report all fails of any monitoring equipment to WVDEP

YEAR:	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Date of Inspection ☐												
REQUIRED MONTHLY												
Spill bucket(s) checked for damage and cracks*. Liquid and/or debris removed.												
Fill pipe(s) checked for obstructions. Removed, if found.												
Fill cap(s) securely fitted on fill pipe(s).												
Leak Detection equipment checked for alarms and normal operating condition.												
For Double walled spill prevention equipment with interstitial monitoring check for a leak in the interstitial area												
Leak detection records are reviewed for non-leaking results and kept for twelve months. Suspected leaks were reported.												
REQUIRED ANNUALLY												
Containment sump(s) checked for damage and presence of liquid in containment area or environment.												
Liquid/debris has been removed.												
For Double walled sumps with interstitial monitoring check for leak in the interstitial area												
If using **hand held monitoring devices (gauge stick, bailer, etc.)**, checked condition to ensure proper operability and serviceability.												

*If a tank receives deliveries at intervals greater than 30 days, the spill bucket check may instead be conducted prior to each delivery. To be eligible for this option, include a copy of each delivery receipt with this form. If spill bucket is cracked it must be reported to WVDEP immediately.

Monthly and Annual Walk through Report Form - Page 2 of 2 **Facility ID: ________________________________**

Date	Action Taken

WV UNDERGROUND STORAGE TANK SYSTEM INSTALLATION/UPGRADE REQUEST

Tank Owner: ____________________ Operator Name: ____________________

Address: ____________________ Address: ____________________

City /State/Zip: ____________________ City/State/Zip: ____________________

Phone(s): ____________________ Phone(s): ____________________

If land owner is different from tank owner enter name and address (**MUST attach copy of lease agreement**): ____________________

Class A Worker: ____________________ Cert. #: __________ Phone: __________

Project Manager: ____________________ Phone: __________ Cell: __________

Facility Name: ____________________ ☐ New ☐ Existing (**enter DEP ID#**) __________

Physical Address: ____________________ County: __________ City: __________ Zip: __________

GPS Coordinates: ____________________ Tax District: __________ Map: __________ Parcel: __________

Travel Directions: ____________________

Date work to start: __________ # Tanks to be installed: __________ # piping runs: __________ Estimated Total Length of Piping (Ft): __________

System upgraded? __________ # of Tanks upgraded: __________ # piping runs: __________ Which piping runs? __________

ATTENTION: All new and replaced tanks and/or piping must be secondarily contained. New or replaced dispenser systems must be provided with dispenser pans. All systems installed under these requirements must be monitored monthly, liquid-tight, compatible with the substance conveyed, and be tightness-tested every three years.

Tank pit subject to flooding/high water? Anchoring method: Type backfill: Depth Overburden: Observation wells in tank pit? How many?

TANK #					
Brand					
Model					
Construction material					
Double Walled? (Y/N)					
Substance Stored					
Total Volume					
Vol each Compartment					
Dimensions					
Type of manifold (Tank, piping, or none)					
CP factory or field installed (NA if no CP)					

Will all system components be compatible with alternative fuels? If not, which components?

With which fuels have components been approved for use?

PIPING					
Pressure or Suction?					
Brand, Model,Diameter					
Double Walled? (Y/N)					
Construction material					
Manifold piping CP?					

PROPOSED RELEASE DETECTION METHODS (mark all that apply):

☐ Manual Tank Gauging
☐ Tank Tightness with Inventory Controls
☐ Automatic Tank Gauging (brand/model): __________
☐ Vapor Monitoring (requires site assessment)
☐ Groundwater Monitoring (requires site assessment)
☐ Interstitial Monitoring (type): __________
☐ SIR (Statistical Inventory Reconciliation)
Vendor: __________
☐ Automatic Line Leak Detectors (type): __________
☐ Line Tightness Testing
☐ Other Approved Method: __________

SPILL PREVENTION:
☐ Spill Buckets ☐ Other (describe): __________

OVERFILL PREVENTION:
☐ Fill Shut Off ☐ Alarm

Owner, please sign below:

Date: __________ Signature: ____________________ Print Name: ____________________

***Include site plans showing location of tank system and components, underground utilities, nearby buildings, water supplies, wells, roads, and waterways. Additional information may be included on back or attached to this form.**

UNDERGROUND STORAGE TANK ALTERNATIVE FUEL INSTALLATION/CONVERSION APPLICATION

Environmental Enforcement
601 57th Street SE
Charleston, WV 25304
Telephone: 304-926-0470; Fax 304-926-0457

FOR DEP USE ONLY
Reviewer ___________
Date ___________

West Virginia Department of Environmental Protection

For new installs or upgrades, submit this form with the WV UST System Installation Request Form and the Notification Form For Underground Storage Tanks if your tank will hold alternative fuels at greater than E10 or B20. This form must be submitted 30 days prior to the install or conversion of your tank system.

1. Owner Information

Name:		Company Name:	
Address:			
County:	Zip:	Phone:	E-Mail:
Rep Name:	Rep Phone:		Rep E-Mail:

2. Facility Information

Facility ID:		Facility Name:	
Address:			
County:	Zip:	Phone:	
Operator Name:		Operator Email:	

Storage Tank & Piping Information - Sections 3 - 5 should be completed in full by the storage tank system owner or owner's authorized representative. When citing manufactures approval for a UST component, you must provide a copy of the manufacturer's certification for the component. The approval must be in writing, indicate an affirmative statement of compatibility, specify the range of alternative fuel blends the component is compatible with, and be from the equipment manufacturer.

3. Tank Information

Tank ID ___________ ☐ New Tank ☐ Existing Tank → Date Installed _________ Capacity __________________ (gallons)

Tank Type: ☐ Steel ☐ Fiberglass ☐ Other_____________ Fuel Blend(>E10): ☐ E15 ☐ E85 ☐ Other______________

Compartmentalized: ☐ Yes ☐ No Count:___________ Biodiesel Blend (>B20) ______________ (fill in with blend label)

Components	New or Existing Component	Model/Brand	Equipment Manufacturer	UL Listed or Verified by Manufacturer for the Fuel Stored
Storage tank	☐ New ☐ Existing			☐ Listed ☐ Unknown ☐ Verified ☐ NA
Internal Tank Lining	☐ New ☐ Existing			☐ Listed ☐ Unknown ☐ Verified ☐ NA
ATG Probe, Float / Sensor	☐ New ☐ Existing			☐ Listed ☐ Unknown ☐ Verified ☐ NA
Tank Interstitial Sensor	☐ New ☐ Existing			☐ Listed ☐ Unknown ☐ Verified ☐ NA
Spill Bucket	☐ New ☐ Existing			☐ Listed ☐ Unknown ☐ Verified ☐ NA
Drop Tube	☐ New ☐ Existing			☐ Listed ☐ Unknown ☐ Verified ☐ NA
Overfill Auto Shutoff Valve	☐ New ☐ Existing			☐ Listed ☐ Unknown ☐ Verified ☐ NA
Ball Float Valve	☐ New ☐ Existing			☐ Listed ☐ Unknown ☐ Verified ☐ NA

Please see next page to supply piping information that is connected to this tank/compartment.

UNDERGROUND STORAGE TANK ALTERNATIVE FUEL INSTALLATION/CONVERSION APPLICATION

Facility ID: ________________
Tank ID: ________________

4. Pipe Information

Product Pipe Information: ☐ New ☐ Existing ☐ Mixed (New & Existing) Existing Install Date ___________

Product Pipe Configuration: ☐ Single wall ☐ Double wall Type: ☐ Steel ☐ Fiberglass ☐ Other___________

Components	New or Existing Component	Model/Brand	Equipment Manufacturer	UL Listed or Verified by Manufacturer for the Fuel Stored
Product Pipe	☐ New ☐ Existing			☐ Listed ☐ Unknown ☐ Verified ☐ NA
Pipe Fitting / Valve Material	☐ New ☐ Existing			☐ Listed ☐ Unknown ☐ Verified ☐ NA
Pipe Sealant / Adhesive	☐ New ☐ Existing			☐ Listed ☐ Unknown ☐ Verified ☐ NA
Gasket / Seals	☐ New ☐ Existing			☐ Listed ☐ Unknown ☐ Verified ☐ NA
Flex Connector / Swing Joint	☐ New ☐ Existing			☐ Listed ☐ Unknown ☐ Verified ☐ NA
Submersible Turbine Pump	☐ New ☐ Existing			☐ Listed ☐ Unknown ☐ Verified ☐ NA
Mechanical Line Leak Detector	☐ New ☐ Existing			☐ Listed ☐ Unknown ☐ Verified ☐ NA
Electronic Line Leak Detector	☐ New ☐ Existing			☐ Listed ☐ Unknown ☐ Verified ☐ NA
Tank Sump	☐ New ☐ Existing			☐ Listed ☐ Unknown ☐ Verified ☐ NA
Tank Sump Sensor	☐ New ☐ Existing			☐ Listed ☐ Unknown ☐ Verified ☐ NA
Sump Penetration Fittings	☐ New ☐ Existing			☐ Listed ☐ Unknown ☐ Verified ☐ NA
Transition Sump	☐ New ☐ Existing			☐ Listed ☐ Unknown ☐ Verified ☐ NA
Transition Sump Sensor	☐ New ☐ Existing			☐ Listed ☐ Unknown ☐ Verified ☐ NA

Please see next page to supply dispenser information that this piping is connected to.

UNDERGROUND STORAGE TANK ALTERNATIVE FUEL
INSTALLATION/CONVERSION APPLICATION

Facility ID: ________________
Tank ID: ________________

5. Dispenser Information - If needed, attach an additional completed copy of section 5 for each additional dispenser unit installed to the storage tank system via the same piping.

Dispenser Number: __________	Dedicated Dispenser Hose: ☐ Yes ☐ No	Blended Dispenser: ☐ Yes ☐ No
	Sump Under Dispenser: ☐ Yes ☐ No	

Components	New or Existing Component	Model/Brand	Equipment Manufacturer	UL Listed or Verified by Manufacturer for the Fuel Stored
Dispenser	☐ New ☐ Existing			☐ Listed ☐ Unknown ☐ Verified ☐ NA
Suction Pump	☐ New ☐ Existing			☐ Listed ☐ Unknown ☐ Verified ☐ NA
Dispenser Pump	☐ New ☐ Existing			☐ Listed ☐ Unknown ☐ Verified ☐ NA
Dispenser Sump Sensor	☐ New ☐ Existing			☐ Listed ☐ Unknown ☐ Verified ☐ NA
Sump Penetration Fittings	☐ New ☐ Existing			☐ Listed ☐ Unknown ☐ Verified ☐ NA
Flex Connector	☐ New ☐ Existing			☐ Listed ☐ Unknown ☐ Verified ☐ NA
Emergency (Shear) Valve	☐ New ☐ Existing			☐ Listed ☐ Unknown ☐ Verified ☐ NA
Gasket / Seals	☐ New ☐ Existing			☐ Listed ☐ Unknown ☐ Verified ☐ NA
Blending Valve	☐ New ☐ Existing			☐ Listed ☐ Unknown ☐ Verified ☐ NA
Check Valve	☐ New ☐ Existing			☐ Listed ☐ Unknown ☐ Verified ☐ NA
Meter	☐ New ☐ Existing			☐ Listed ☐ Unknown ☐ Verified ☐ NA
Fuel Filters	☐ New ☐ Existing			☐ Listed ☐ Unknown ☐ Verified ☐ NA
Break-Away Device	☐ New ☐ Existing			☐ Listed ☐ Unknown ☐ Verified ☐ NA
Nozzle(s) / Swivel(S)	☐ New ☐ Existing			☐ Listed ☐ Unknown ☐ Verified ☐ NA
Hose(s)	☐ New ☐ Existing			☐ Listed ☐ Unknown ☐ Verified ☐ NA

Please see next page to certify that the information in this form is accurate..

Facility ID: ________________
Tank ID: ________________

6. Owner Certification - (*Required*)

I certify under penalty of law that I have personally examined and am familiar with the information submitted in Section 1 through 5 of this Storage Tank Alternative Fuel form and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. My signature represents to the WVDEP that I own the UST's or are a representative of the tank owner having legal authority to sign on behalf of the owner.

Owner/ Authorized Representative Name (*Print*)	Telephone Number
Owner/Authorized Representative Signature	Date

Retain a copy of this form for your information and send it to the following address:

Underground Storage Tanks
Environmental Enforcement
601 57th Street SE
Charleston, WV 25304
Telephone: 304-926-0470; Fax 304-926-0457

Please attach manufacturers certifications for each component that is verified by the manufacturer to be compatible with alternative fuels. Failure to submit the appropriate documentation may result in the request for alternative fuels to be denied. As necessary, the WVDEP may request additional information to determine if UST components are compatible with alternative fuels.

UST Intent to Close Notification

West Virginia Department of Environmental Protection

PLEASE SUBMIT TO dep.ast@wv.gov USING FILE NAME FORMAT OF Facility ID.INTENT_to_CLOSE (i.e. 0105999.INTENT_to_CLOSE)

1. Facility Information			
Name:		Facility ID:	
Address:			
County:	City:	Zip:	Phone:

2. Owner Information		3. Class B Information	
Name:		Name:	
Address:		Phone:	
State:	Phone:	Email:	
Zip:	Email:	Cert. #:	Expiration Date:

4. Anticipated date of closure: ____________ ☐ 30 Day waiver being requested

5. Check the appropriate box for the type of closure intended.

   ☐ Tank(s) ☐ Piping ☐ Both

6. Are new tank being installed? *If yes, identify how many?* ☐ Yes ☐ No ____________

7. How many tanks are being closed? ____________

8. List all tanks being closed in the appropriate table below. Provide information on product stored in the tank. If closed in place, also provide the type of inert material used to fill the tank.

Removed (pulled)	
Tank Name (T1, T2, etc.)	Product

Closed in Place		
Tank Name (T1, T2, etc.,)	Product	Fill Material

9. If piping is being closed, identify the runs. If closed in place, provide the type of material used to fill the piping.

Removed (pulled)	
Piping Run (P1, P2, etc.)	Product

Closed in Place		
Piping Run (P1, P2, etc.)	Product	Fill Material

UST CLOSURE AUTHORIZATION (STATE USE ONLY)

Inspector ____________ **CAU PM** ____________ **Closure #:** ____________

CLOSURE ACTIVITIES MAY OCCUR BETWEEN THE DATES OF ____________

Your site has been assigned the above referenced closure number. Refer to this number for future correspondence concerning this closure. The closure is not to begin until the closure date has been scheduled with the Tanks inspector. You must utilize the WVDEP UST Closure Report Form. Closure reports are due within 60 days of the closure.

UST CLOSURE AUTHORIZATION

WV Department of Environmental Protection
Division of Water and Waste Management
Office of Environmental Enforcement / Tanks Unit

601 57th Street SE
Charleston, WV 25304
304-926-0470

https://dep.wv.gov/WWE/ee/tanks/ust/Pages/default.aspx

Facility Name: **Physical Location:** **Facility ID:**

Owner: **Class B Worker:** **Certification**

Email: **Email:** **Phone:**

This office received your notice of UST system permanent closure in accordance with 40CFR 280.71(a) on .
CLOSURE ACTIVITIES MAY OCCUR BETWEEN THE DATES OF AND .
Your site has been assigned closure number . Please refer to this number for future correspondence concerning this closure. The closure is not to begin until the date has been scheduled with the undersigned inspector. The UST closure report and all associated documents must be submitted to dep.ast@wv.gov within 60 days after the closure occurs.

Waiver of 30 days? ☑ Check here for piping upgrade ☐ # of tanks to install:

Tanks to close

Tank	Compartment	Status

Should you have any questions, please contact
or send correspondence to:

Signature: ______________________ Date: ______________________

Refer to Appendix D and Appendix B of the Corrective Action Guidance Document (CAGD) for forms, analytical tables, and the closure guidance memo for UST closures. You can download the documents for your UST closure from https://dep.wv.gov/WWE/ee/tanks/lustmain/Pages/default.aspx.

You will need the following documents:

Appendix D
- Appendix D.1 Closure Form Summary
- Appendix D.2 UST/LUST Closure Guidance Memo
- Appendix D.3 UST Intent to Close Form
- Appendix D.4 UST Closure Report Form
- Appendix D.4.1 Closure Report Tank Information
- Appendix D.4.2 Closure Report Piping Information
- Appendix D.4.3 UST Notification Form

Appendix B
- Appendix B.4 Tier 1 Spreadsheet
- Appendix B.5 Tier 2 Spreadsheet
- Appendix B.6 Tier 3 Spreadsheet

UST Closure Report

Environmental Enforcement
601 57th Street SE
Charleston, WV 25304
Telephone: 304-926-0470; Fax: 304-926-0488

Facility ID: ____________________
Closure Number: ____________________
Closure Date: ____________________
Leak # (if applicable): ____________________

West Virginia Department of Environmental Protection

Owners who have permanently closed an underground storage tanks must use this template to notify DEP that closure is complete.
The UST Closure Report must be submitted to WVDEP no later than sixty (60) days after the closure has been completed.
Submit an electronic copy of the report to DEP.AST@wv.gov.

PLEASE SUBMIT TO dep.ast@wv.gov USING FILE NAME FORMAT OF Facility ID.County.YYYY.MM (i.e. 0105999.barbour.2018.07)

1. Owner Information

Name:		Company Name:
Address:		
County:		Phone:
State:	Zip:	E-Mail:

2. Operator Information ☐ *same as owner*

Name:		Company Name:
Address:		
County:		Phone:
State:	Zip:	E-Mail:

3. Facility Information

Name:		
Address:		
County:	Zip:	Phone:

4. Class B Information

Name:		
Phone:	Certification #	
E-mail:	Issued on:	Expires on:

5. Certification

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment.

_______________________________ *Signature of Class B*　　_______________ *Class B Number*　　_______________ *Date*

_______________________________ *Signature of UST owner*　　_______________ *Date*

UST Closure Report

Closure Date: ________________

I. General Closure Questions

1. What part of the UST system is being closed?

   ☐ UST only ☐ Piping only ☐ UST and piping

   ☐ Other (identify): ________________________________

   If piping is being closed, identify the run below.

2. How many USTs are:

   You must complete and attach a tank information sheet for each tank or piping run being closed.

   at the facility? ________________ being closed? ________________ being installed? ________________

3. Was free product found at the site or facility during closure activities?

   ☐ Yes ☐ No

4. What backfill was used to fill the excavation pit after closure activities?

   ☐ Sand ☐ Gravel ☐ Soil: . ____________________

   ☐ Other (identify) ___________________________

II. Site Description and History

1. Are there any existing leak ID's associated with the site or facility?

   ☐ Yes ☐ No

   If yes, provide the leak ID(s) below.

   ____________________, ____________________, ____________________.

2. Is there any free product associated with the above leak ID(s)?

   ☐ Yes ☐ No

   If yes, indicate location(s) and indicate if product is at the water table.

3. What is the site currently used for?

   ☐ Gasoline station ☐ Hospital ☐ Airport

   ☐ Petroleum distributor ☐ Public/private school ☐ Utility

   ☐ Vacant or abandoned ☐ State/federal government ☐ Chemical facility

   ☐ Other (identify): ____

UST Closure Report

III. Site Geology

1. General topography/terrain of the site. Mark all that apply.

   ☐ Flat terrain

   ☐ Hilly terrain

   ☐ Karst terrain

   ☐ Other (identify): ____________________

2. What is the predominate native soil type at the site?

   Native soil type: Non-soil like material

3. Briefly provide any additional information on geological features you believe that is important for the Agency to understand the site.

IV. Site Hydrology

1. Adjacent to waterway?

   ☐ Yes ☐ No

   If yes, identify the type of waterway.

   ☐ Stream

   ☐ River

   ☐ Pond

   ☐ Lake

   ☐ Wetland

   ☐ Other (identify): ____________________

   If yes, provide name (if applicable) of the waterway: ____

2. Briefly provide any additional information on hydrological features you believe that is important for the Agency to understand the site.

UST Closure Report

V. Property Information

1. Are there any on or off-property building foundations that are within 30 lateral feet and/or 5 vertical feet from the on-property contaminated soil? *(if yes, show location on site map)*

   ☐ Yes ☐ No ☐ Not applicable ☐ Unknown

2. Are there any significant building foundation openings (e.g. dirt floor, sump, etc.) within 30 lateral feet and/or 5 vertical feet of contaminated soil?

   ☐ Yes ☐ No ☐ Not applicable ☐ Unknown

3. Are there any preferential pathways (e.g. crawlspace under buildings, underground culverts or utility lines)?

   ☐ Yes ☐ No ☐ Not applicable ☐ Unknown

   If yes, please describe the building foundation openings and/or preferential pathways below.

VI. Data Presentation and Documentation

1. Generally, describe the contaminants found in the soil (or groundwater) above action levels. (select all that apply)

   ☐ No contamination above action levels

   ☐ BTEX ☐ TBA ☐ MTBE

   ☐ PAHs ☐ RCRA 8 metals ☐ Other (identify): ____________________

2. Which tier is the closure data being compared to? *Tier 1 is default for all sites. To use Tiers 2 or 3, site must meet requirements in the CAGD.*

   ☐ Tier 1 ☐ Tier 2 ☐ Tier 3

3. Please provide justification below if tier 2 or 3 are selected. Attach the appropriate analytical table to the closure report.

4. Briefly provide any additional information on the soil sampling that you believe is important. Do not explain the data results in detail (that information can be obtained from the data tables and site maps); however, feel free to provide a general summary of the data such as “all samples were above action levels”, “only north wall was above action levels”, etc.

UST Closure Report

VII. Conclusions and Recommendations

1. Do soil samples indicate that contamination is above soil action levels?

☐ Yes ☐ No

If applicable, does water sample indicate that contamination is above ground water action levels?

☐ Yes ☐ No

2. Is an NFA being requested?

☐ Yes ☐ No ___ Not applicable

3. Briefly describe any interim measures that should be taken or mark none, if applicable. ☐ None

4. Briefly provide any additional information that you believe is important for the Agency to know.

VIII. Attachments

Please indicate all attachment being submitted with this document. *(Note: Required attachments are highlighted in red.)*

☐ Analytical table

Tier 1
Tier 2
Tier 3
Other: ____________________

☐ Site Map

☐ Notification form (signed by owner & class B)

☐ Other (list below)

☐ Tank/piping information sheet(s)

☐ Waste manifests

☐ Disposal certificate

☐ Cleaning certificate

☐ Photos

☐ Laboratory analytical with chain of custody

☐ Field data collection sheets

UST Closure Report

IX. Site Map

All site maps must be drawn to scale, show North arrow, and map legend.

Site map(s) drawn to scale illustrating the following:

a. Location of all present and former USTs, piping and dispensers;
b. Direction of surface gradient;
c. Known locations of sewer and utility line, basements, and other subsurface structures;
d. Show tank pit location and dimensions;
e. Sample location(s);
f. Footprint of other structures (buildings, canopies, roads, utilities, etc..);
g. Roads, rivers, streams, springs, water wells, etc.;
h. If applicable, locations free product was discovered;
i. Location of bio-piles (if applicable)

UST Closure Report

Tank Information

Closure Date: ____________________

I. Tank Background Information

☐ Tank not closed

1. Identify the UST (T1, T2, etc.) ____________________
2. What was the construction material of the UST?
   - ☐ Steel
   - ☐ Fiberglass Reinforced Plastic (FRP)
   - ☐ Composite
   - ☐ Other (specify): ____________________
3. How many compartments are in the UST?

   ____

Fill out the below compartment sections as necessary. Use the additional information section if the UST has more than three compartments.

Compartment One

Capacity: ____________________

What substance was stored within the UST prior to closure activities?

☐ Gasoline < 10% ethanol	☐ Diesel	☐ Kerosene	☐ Aviation Fuel
☐ Gasoline > 10% ethanol	☐ Biodiesel	☐ Oil	
☐ Other (specify): ____________________			

Compartment Two

Capacity: ____________________

What substance was stored within the UST prior to closure activities?

☐ Gasoline < 10% ethanol	☐ Diesel	☐ Kerosene	☐ Aviation Fuel
☐ Gasoline > 10% ethanol	☐ Biodiesel	☐ Oil	
☐ Other (specify): ____________________			

Compartment Three

Capacity: ____________________

What substance was stored within the UST prior to closure activities?

☐ Gasoline < 10% ethanol	☐ Diesel	☐ Kerosene	☐ Aviation Fuel
☐ Gasoline > 10% ethanol	☐ Biodiesel	☐ Oil	
☐ Other (specify): ____________________			

Additional Information

Provide any additional information you think the agency should know about the background of the UST.

II. Excavation

1. What was the volume of material removed from the excavation pit? ____________________

2. Was any excavated material bio-piled on site?
Excavated material may not be placed back in pit unless the material is below the DeMinimis (100pm TPH) level as defined in the Solid Waste Rule.

   ☐ Yes ☐ No

   If yes, what was the volume of material left on site? ____________________

3. Was the excavated material removed from site and disposed of at a proper facility?

   ☐ Yes ☐ No

   If yes, provide the destination facility information. (attach waste manifest)

   Name: ____________________

   Address: ____________________

4. Provide the dimensions of the excavated pit.

   Length __________ Width __________ Depth __________

5. Was it necessary to over excavated to remove noticeable contamination?

   ☐ Yes ☐ No

6. Was it necessary to remove water from the excavation pit?

   ☐ Yes ☐ No

   If yes, did the water recharge?

   ☐ Yes ☐ No

7. Was a sheen present on any water located in the excavation pit?

   ☐ Yes ☐ No

8. How was the water deposed of? (*attach any approvals or permits required for disposal)*

9. Approximate the volume of disposed water. ____________________(gallons)

Additional Information

Provide any additional information you think the agency should know about the excavation.

III. Tank Purging and Cleaning

1. Describe the vapor purging method used.
   Attach procedure when selecting other.

   ☐ Venturi ☐ Dry Ice ☐ Inert gas

   ☐ Not applicable

   ☐ Other (specify and attach): ______________________

2. Describe the tank cleaning methods used.
   Attach procedure when selecting other.

   ☐ Spray washer

   ☐ Scraping/wiping

   ☐ Other (specify): ______________________

IV. Disposal

1. Was the UST closed in place?

   ☐ Yes ☐ No

   If yes , what inert material was used to fill the UST?

   ☐ Foam

   ☐ Concrete

   ☐ Bentonite

   ☐ Sand

   ☐ Other (specify): ______________________

   If no , describe the disposition of the UST.

   ☐ Disposal

   ☐ Recycling

   ☐ Other (describe): ______________________

2. Describe disposal of the residual material from the tank(s).

   Volume: ____________ (gallons)

   ☐ Reused

   ☐ Sent for Recycling

   ☐ Sent for Disposal

   ☐ Other (specify):

   If disposed of, provide the location of disposal. ______________________

3. Describe disposal of substance(s) used to clean the tank(s).

   Volume: ____________ (gallons)

   ☐ Sent for Recycling

   ☐ Sent for Disposal

   ☐ Other (specify): ______________________

   If disposed of, provide the location of disposal. ______________________

V. Hazardous Waste Information

1. Was tank contents handled as hazardous waste (HW)? (If yes, answer questions 2 & 3 below)

   ☐ Yes ☐ No

   Amount: ________________

   Provide the EPA number. ____________________________

2. Provide the facility information where the waste is being taken.

   Name: ____

   Address: ____

3. Provide the transporter information.

   Name: ____

   EPA ID (HW) ____

VI. Residual Contents

1. Fill in the following information regarding residual contents.

   Volume: ________________

   Provide the EPA ID (if applicable). ____________________________

2. Provide the facility information where the waste is boing taken.

   Name: ____

   Address: ____

3. Provide the transporter information.

   Name: ____

   ID (HW): ____

Additional Information

Provide any additional information on waste characterization, tank contents disposal and/or tank disposal you feel the Agency should know.

UST Closure Report

Piping Information

Closure Date: ____________________

I. Associated Piping

☐ Piping not closed.

1. Identify the piping run. ____________________
2. What was the construction material of the piping?
   - ☐ Steel
   - ☐ Fiberglass Reinforced Plastic (FRP)
   - ☐ Composite
   - ☐ Other (specify): ____________________
3. Piping substance prior to closure activities?
   - ☐ Gasoline < 10% ethanol ☐ Diesel ☐ Kerosene ☐ Aviation Fuel
   - ☐ Gasoline > 10% ethanol ☐ Biodiesel ☐ Oil
   - ☐ Other (specify): ____________________
4. Was the piping closed in place?
   - ☐ Yes ☐ No

   <u>If yes</u>, what inert material was used to fill the piping?
   - ☐ Foam
   - ☐ Concrete
   - ☐ Bentonite
   - ☐ Sand
   - ☐ Other (specify): ____________________

   <u>If no</u>, describe the disposition of the piping.
   - ☐ Disposal
   - ☐ Recycling
   - ☐ Other (specify): ____________________
5. Was free product found along the piping run?
   - ☐ Yes ☐ No
6. Was it necessary to over excavate to remove noticeable contamination from along the piping run?
   - ☐ Yes ☐ No

Additional Information

Provide any additional information you think the agency should know about this piping closure.

APPENDIX E : LUST CORRECTIVE ACTION FORMS, CHECKLISTS, AND TEMPLATES

LEAKING UNDERGROUND STORAGE TANK SITE VISIT REPORT

WVDEP Division of Water and Waste Management
Office of Environmental Enforcement
Tanks Corrective Action Unit

601 57th Street SE
Charleston, WV 25304
304-926-0470

west virginia department of environmental protection

Is this site visit in response to an emergency? Leak #: Closure #:

Owner (at time of leak)

Owner:

Address: **Phone:**

City: **State:** **Zip:**

Responsible Party

Responsible party: **Contact:**

Address: **Phone:**

City: **State:** **Zip:**

Operator (at time of leak)

Operator:

Address:

City: **State:** **Zip:**

Facility Information

Facility Name: **Contact Name:** **Facility ID:**

Address: **Phone:**

City: **County:** **Zip:**

Site Visit

Assigned Project Manager: **Site Contact:** **Consultant:**

Reason For Visit: **Inspection Completed Date:** **Arrival Time:** **Departure Time:**

Confirmed Release Date: **Investigation Completed** **Cleanup Initiated Date:** **Cleanup Completed**

Additional Comments

Sent Via:

Signature: ______________________________ Date: ______________________________

ID:
Date:
Sub:
Imp:
Imnt:
Ptnl:

West Virginia Department of Environmental Protection

INCIDENT REPORT

Initial Report

Notification Date:

Discovery:

Spill/Discovery Date:

Reporting Person Name:

Reporting Person Phone:

Reporting Person Role:

Case Information

Leak ID:

Investigator:

Most Recent Status:

Priority Code:

WPA

Closure #:

Owner (at time of leak)

Owner:

Address:

Phone:

City:

State:

Zip:

Responsible Party

Responsible party:

Contact:

Address:

Phone:

City:

State:

Zip:

Operator (at time of leak)

Operator:

Address:

City:

State:

Zip:

Facility Information

Facility Name:

Contact Name:

Facility ID:

Address:

Phone:

City:

County:

Zip:

Site History

Status	Date	Comments
Cleanup Initiated: Petroleum		
Confirmed Release		

Release Information

Substance: **Source:** **Cause:**

Release Comments:

Impact to Receptors

Receptor Type	Impact	Contaminant

Additional Leak/Complaint Information

Action Taken

Additional Comments

VRP: ☐ **UECA:** ☐ **Insurance Trust Fund:** ☐

Completed By: ____________________ **Completed Date:** ____________________

CONFIRMED RELEASE NOTICE TO COMPLY

WVDEP Division of Water and Waste Management
Office of Environmental Enforcement
Tanks Corrective Action Unit

601 57th Street SE
Charleston, WV 25304
304-926-0470

west virginia department of environmental protection

Confirmed Release Date: **Leak ID:**

A release has occurred from a regulated underground storage tank system at the facility referenced below:

Owner (at time of leak)

Owner:

Address:

City: **State: Zip:**

Responsible Party

Responsible party:

Address:

City: **State: Zip:**

Operator (at time of leak)

Operator:

Address:

City: **State: Zip:**

Facility Information

Facility Name: **Facility ID:**

Address:

City: **County:** **Zip:**

Required Initial Response

The Tank owner/operator must perform the following initial response actions within 24 hours of a release:

1. Report the release as required by §280.61 to the WVDEP Spill Line at 1-800-642-3074.
2. Remove as much of the regulated substance from the UST system as is necessary to prevent further release to environment.
3. Check adjacent structure to identify fire, explosion, and vapor hazards.
4. Investigate to determine the possible presence of free product at existing monitoring points and report the results to WVDEP.
5. Comply with all other provisions of the initial abatement measures and site check.
6. Comply with all other provisions of the initial abatement measures and site check.

Reports Due

The tank owner/operator must submit the following reports to WVDEP within the specified timeframe:

Report	Due Date	Received Date
280.62 Initial Abatement Measure and Site Check Report		
UST Closure Report		

Report Submittals

All Reports/correspondence must reference the Leak ID and WV ID and be mailed and e-mailed to the following locations:

Project Manager

Address:
Email:
Phone:
Fax:

WVDEP-Tanks, 601 57th Street SE, Charleston, WV 25304
Attn: TANKS - CORRECTIVE ACTION UNIT
Email: dep.ast@wv.gov

Additional Comments

WARNING: If you are the owner and/or operator and you fail to accomplish the above -described measures within the time specified, the Director may issue an Administrative Order and/or may commence a Civil Action in the Circuit Court, including a temporary or permanent injunction in accordance with West Virginia Code §22-17-15, and you may be liable for a civil penalty in accordance with §22-17-16.

Sent Via: Certified Mail

Signature: ______________________ Date: ______________________

Initial Abatement Measures and Site Check

Submit Date: ______________
Facility or Tank ID: ______________
Leak ID: ______________

I. Release Information

1. Elapsed time over which the release occurred (if known): ______________

2. Volume of material released (estimate in gallons): ______________

II. Nature of the Release

1. Source

- ☐ Tank Select
- ☐ Submersible Turbine Pump (STP) Select
- ☐ Piping Select
- ☐ Delivery Problem Select
- ☐ Dispenser Select
- ☐ Unknown
- ☐ Other (describe): ______________

2. Cause (check all that apply)

- ☐ Corrosion
- ☐ Spill
- ☐ Overfill
- ☐ Installation problems
- ☐ Vehicle damage
- ☐ Unknown
- ☐ Physical/mechanical damage
- ☐ Other (describe): ______________

3. Media Impacted (check all that apply)

- ☐ Soil
- ☐ Surface water
- ☐ Groundwater
- ☐ Not Applicable
- ☐ Vapor

Was free product present? ☐ Yes ☐ No

Briefly describe the specifics of any free product found.

4. Provide a brief description of the release event.

Initial Abatement Measures and Site Check

III. Substance

1. Substance(s) confirmed to be released (check all that apply)

- ☐ Gasoline
- ☐ Oil (new)
- ☐ Brine
- ☐ Methanol
- ☐ Diesel
- ☐ Aviation fuel
- ☐ Crude
- ☐ Distillates
- ☐ Kerosene
- ☐ Ethanol flex fuel
- ☐ Condensates
- ☐ Sodium hydroxide
- ☐ Used oil
- ☐ Biodiesel
- ☐ Other produced fluids
- ☐ Unknown
- ☐ Other (specify): ____________________

2. Volume of material released (estimate in gallons): ____________________

IV. Initial Response

1. What initial response and corrective actions have been taken to date? (check all that apply)

- ☐ Emptied product from tank
- ☐ Initiated early cleanup
- ☐ Replaced leak component(s)
- ☐ Investigated for presence of and initiated removal of free product
- ☐ Visually inspected aboveground and/or exposed underground releases and took action to prevent further migration of materials
- ☐ Other (identify): ____________________

2. As briefly as possible, provide additional details about the initial response and corrective actions taken to date. Add attachment, if necessary.

3. Was a tightness test(s) performed on the tank or piping in response to the release?

- ☐ Yes (attach test results)
- ☐ No
- ☐ Not applicable

4. What are the anticipated actions to be taken within 30 calendar days? (check all that apply & provide schedule)

- ☐ Empty tank
- ☐ Permanently close tank
- ☐ Replace/repair defective components
- ☐ Excavate soil
- ☐ Perform site characterization
- ☐ Unknown
- ☐ None
- ☐ Other (identify below)

5. Was analytical data collected? ☐ Yes ☐ No

If yes, attach a table of the analytical data (use WVDEP template where applicable).

Attach a copy of the complete laboratory analytical data.

Initial Abatement Measures and Site Check

V. Soil Borings

1. Were soil borings collected? ☐ Yes ☐ No
If soil borings were collected attach boring logs. If "no", skip question 2 unless you know the information.

2. What is the predominate soil type? ______________________________

VI. AST Only - this section should only be filled out for releases from aboveground storage tanks.

1. Is the tank located in a zone of peripheral concern (ZPC), a zone of critical concern (ZCC), or a source water protection area (SWPA)?
☐ Yes ☐ No

If yes, what areas is the tank located in (mark all that apply) ☐ ZCC ☐ ZPC ☐ SWPA

2. Did the release from the AST system impact a waterway above a water intake? (If yes, notification to water intake must be made).
☐ Yes ☐ No

If yes, identify the stream and water intake: ______________________________

3. Be advised that affected water supplies and water supplies with the potential to be affected must be sampled. Has sampling of the affected water supply occurred?
☐ Yes ☐ No

If yes, provide analytical data as an attachment to the report. *Use the WVDEP provided analytical attachment sheet.*

VII. Attachments

Please indicate all attachment being submitted with this document.

☐ Boring Logs ☐ Waste Manifests ☐ Site Map
☐ Analytical Data Tables ☐ Laboratory Analytical Data
☐ Other (list below) ☐ UST equipment tests (i.e. spill bucket, sump, tank/piping tests, etc.)

Initial Abatement Measures and Site Check

VIII. Site Map

Attach a site map to this document

Site map(s) drawn to scale illustrating the following:

a. Location of all present and former tanks, piping and dispensers in area of release;
b. Footprint of surface and/or subsurface soil contamination (if known);
c. Footprint of other on-site structures (buildings, canopies, roads, utilities, etc..);
d. Location of the release(s)
e. Known locations of sewer and utility line, basements, and other subsurface structures
f. Monitoring wells that will be used for sampling (if applicable);
g. Location of all wells (if present)
h. Soil sample location(s) (if applicable)
i. Location and type of receptors (i.e. adjacent buildings, homes, etc.)
j. North arrow, bar scale, and map legend

LUST PROJECT STATUS CHECKLIST

WVDEP Division of Water and Waste Management
Office of Environmental Enforcement
Tanks Corrective Action Unit

601 57th Street SE
Charleston, WV 25304
304-926-0470

west virginia department of environmental protection

Project Manager: Leak #: Closure #: Date:

Owner (at time of leak)

Owner:

Address: **Phone:**

City: **State:** **Zip:**

Responsible Party

Responsible party: **Contact:**

Address: **Phone:**

City: **State:** **Zip:**

Operator (at time of leak)

Operator:

Address:

City: **State:** **Zip:**

Facility Information

Facility Name: **Contact Name:** **Facility ID:**

Address: **Phone:**

City: **County:** **Zip:**

Release Status

	Release Status	Date
☐	Confirmed Release	
☐	Cleanup Initiated	
☐	Site Investigation Completed	
☐	Site Cleanup Completed	
☐	No Further Action (NFA) Issued	
☐	Emergency Response	
☐	Corrective Action Plan Approved	

Release Status
☐ State Lead
☐ Risk-Based Remediation
☐ Voluntary Remediation Program
☐ UECA
Priority

☐	Corrective Action Plan Implemented		

Correspondence

	Correspondence	Requested	Received
☐	280.62 Initial Abatement Measure and Site Check Report		
☐	280.63 Initial Site Characterization		
☐	280.64 Free Product Recovery Report initial and monthly thereafter		
☐	280.65 Site Investigation Report		
☐	280.66 Corrective Action Plan		
☐	Free Product Report		
☐	Monitoring Report		
☐	Other: Fast Track Report		
☐	UST Closure Report		

Comments

Initial Site Characterization

Submission Date: ______________
Facility ID: ______________
Leak ID: ______________
Date of Release: ______________

I. Release Information

1. Substance(s) confirmed to be released (check all that apply).

- ☐ Gasoline
- ☐ Oil (new)
- ☐ Brine
- ☐ Methanol
- ☐ Diesel
- ☐ Aviation fuel
- ☐ Crude
- ☐ Distillates
- ☐ Kerosene
- ☐ Ethanol flex fuel
- ☐ Condensates
- ☐ Sodium hydroxide
- ☐ Used oil
- ☐ Biodiesel
- ☐ Other produced fluids
- ☐ Unknown
- ☐ Other (specify): ______________

2. Source of release (check all that apply).

- ☐ Tank Select
- ☐ Submersible Turbine Pump (STP) Select
- ☐ Piping Select
- ☐ Delivery Problem Select
- ☐ Dispenser Select
- ☐ Unknown
- ☐ Other (describe): ______________

3. Volume of material released (estimate in gallons). ______________

4. Elapsed time over which the release occurred (if known): ______________

5. Media impacted (check all that apply).

- ☐ Soil
- ☐ Surface water
- ☐ Vapor
- ☐ Groundwater
- ☐ Not Applicable

6. Provide a brief description of the release event.

Initial Site Characterization

II. Initial response

1. What initial response and corrective actions have been taken to date? (check all that apply)

- ☐ Emptied substance from tank
- ☐ Repaired leaking component(s)
- ☐ Replaced leak component(s)
- ☐ Initiated early cleanup
- ☐ Conducted initial site characterization
- ☐ Permanently closed tank system
- ☐ Investigated for presence of and initiated removal of free product

2. Was free product discovered?

☐ Yes ☐ No

3. As briefly as possible, provide additional details about the initial response and corrective actions taken to date. Add attachment if necessary.

III. Sample Information

1. Is there analytical information available?

☐ No ☐ Yes (Attach table of analytical data).

2. Select the soil sample collection method used.

- ☐ Encore/Terracore (5035)
- ☐ Excavator bucket
- ☐ Direct push tube
- ☐ Shovel/trowel
- ☐ Screw auger
- ☐ Not applicable
- ☐ Other (describe): ____________________

3. Attach a table of analytical data (use WVDEP template where applicable). Attach complete lab analytical report.

IV. Site Geology and Hydrology

1. Is the site located in Karst Topography?

☐ Yes ☐ No

2. Depth to bedrock (*feet*): __________ ☐ Estimated ☐ Known

3. Depth to groundwater? __________ ☐ Estimated ☐ Known

4. Groundwater flow direction: __________ ☐ Estimated ☐ Known

5. What is the predominate soil type? __________ *(Describe the general soil lithology by filling in the below*

Depth range in feet	Lithology Type	Notes
> 0'-8'		
> 8'		

Initial Site Characterization

IV. Site Geology and Hydrology (continued)

6. The above soil lithology information is based on:
Attach soil boring log if available

☐ Literature search ☐ Known ☐ Other (identify): ______________________

7. As Briefly as possible, provide an additional details about geology and/or hydrology of the site that you feel is important for the Agency to understand.

V. Site Receptors

1. List all receptors within a quarter mile of the facility or leak site. *If necessary, create and attach a table that contains the below information to accommodate more than ten receptors.*

Distance from facility (feet)	Direction from facility (example: S, NW)	Receptor Name	Receptor Type (example: school, residential, drinking water well)

VI. Property Information

1. Is the facility or site of release currently used for residential or non-residential purposes?

☐ Residential ☐ Non-residential

Current occupancy and use of the properties immediately adjacent to the facility. *If necessary, create and attach a table that contains the below information to accommodate more properties*

Direction from Facility (example: S, NW)	Adjacent Property Name	Adjacent Property Use (residential or non-residential)

VII. Attachments

1. Please indicate all attachments being submitted with this document

- ☐ Boring logs
- ☐ Waste manifests
- ☐ Site map
- ☐ Analytical data tables
- ☐ Laboratory Analytical Data
- ☐ Other (list below)
- ☐ UST equipment tests (i.e. spill bucket, sump, tank/piping tests, etc.)

VIII. Site Map

Attach a site map to this document

Site map(s) drawn to scale illustrating the following:

a. Location of all present and former tanks, piping and dispensers in the area of the release;
b. Footprint of surface and/or subsurface soil contamination;
c. Footprint of other structures (buildings, canopies, roads, utilities, etc..);
d. Location of the release(s)
e. Known locations of sewer and utility line, basements, and other subsurface structures
f. Location and type of receptors
g. Location of monitoring wells and all others wells that may be impacted by the release (if present);
h. Soil sample location(s) (if collected)
i. Groundwater data (if collected)
j. Potentiometric map, if appropriate
j. North arrow, bar scale, and map legend

Free Product Recovery Attachment Sheet

Facility or Tank ID: ____________ Leak ID: ____________

I. Free Product Report

1. Is this the initial free product report? (if yes, go to question #3)

   ☐ Yes ☐ No

2. Has the free product recovery plan changed from what was last reported to the agency? If Yes, briefly describe the changes.

   ☐ Yes ☐ No

3. Are any changes to the initial free product recovery method being planned as part of future activities? Any changes to the initial recovery plan should be brought to the attention of the assigned TCAU PM, as well as being clearly outlined in this free product recovery report.

   ☐ Yes ☐ No

II. Type of Free Product

1. Describe the material (check all that apply)

☐ Gasoline	☐ Oil (new)	☐ Brine	☐ Methanol
☐ Diesel	☐ Aviation fuel	☐ Crude	☐ Distillates
☐ Kerosene	☐ Ethanol flex fuel	☐ Condensates	☐ Sodium hydroxide
☐ Used oil	☐ Biodiesel	☐ Other produced fluids	☐ Unknown

☐ Other (specify): ____________

III. Description of Release

1. Source

☐ Tank	(bottom)	☐ Submersible turbine pump (STP)	(STP fittings)
☐ Piping	(pipping run)	☐ Delivery problem	(overfill at tank)
☐ Dispenser	Select	☐ Unknown	

☐ Other (describe): ____________

2. Cause (check all that apply)

☐ Corrosion	☐ Spill	☐ Overfill
☐ Installation problems	☐ Vehicle damage	☐ Unknown
☐ Physical/mechanical damage		

☐ Other (describe): ____________

Free Product Recovery Attachment Sheet

IV. Description of Release (continued)

3. Media impacted (check all that apply).

☐ Soil ☐ Surface water ☐ Vapor

☐ Groundwater ☐ Not applicable

4. Briefly describe any additional information you want to provide, if any, concerning the release that is not addressed in the previous questions.

5. Where was free product discovered (check all that apply)?

☐ Excavation pit ☐ Borehole ☐ Off-site

☐ Well ☐ On-site

☐ Other (describe): ______________________

6. Provide description of the location where free product is at (i.e. MW-1, MW-2, etc.).

____

7. Describe the maximum thickness of free product measured or observed in wells, boreholes, excavations, or any other location where free product was observed.

☐ > 6/10th of a foot ☐ < 6/10th of a foot ☐ Sheen only

8. Have any unusual conditions occurred at the site?

☐ Recovery wells being pumped dry ☐ Suspicion of additional sources of free product

☐ Other (describe): ______________________

V. Free Product Recovery Information

1. If different than consultant listed on the transmittal form, provide the name, address, and phone number of firm(s) involved in the free product recovery.

☐ Same

Company Name: ______________________

Address: ______________________

____

Phone Number: ______________________

2. Identify any permits required/obtained for free product recovery/treatment

☐ NPDES ☐ Air permit

☐ None ☐ Other (specify): ______________________

2.a If applicable, what is the permit number? ______________________

3. Frequency of free product recovery (must be on-going to prevent spread of product)

☐ One time ☐ Daily ☐ Continuously ☐ Weekly ☐ Monthly

☐ Other (describe): ______________________

Free Product Recovery Attachment Sheet

V. Free Product Recovery Information (continued)

4. Description of free product recovery method

☐ Absorbent material ☐ Mechanical skimmer (floating, pneumatic pump, belt skimmer)
☐ Bailer ☐ Passive skimmers (filter canister, absorbent bailer)
☐ Vacuum truck ☐ Dual phase recovery ☐ Excavation
☐ Other (describe): ______________________

5. Description of how recovered product/water/soil will be or is stored until it can properly be disposed.

☐ Drums ☐ Temporary stockpile (soils)
☐ Frac tank ☐ No on-site storage
☐ Other (describe): ______________________

6. Description of how recovered product/water/soils will ultimately be or is being disposed (final disposal documentation will be required).

☐ Surface discharge (NPDES permit required) ☐ Public owned treatment works (POTW)
☐ Recycling facility ☐ Disposal facility
☐ Other (describe): ______________________

7. Provide specific information on location of disposal of recovered product/water/soils (i.e. provide landfill, disposal facility name and location)

8. Briefly summarize any additional information that you feel the Agency needs to know, if any, that is not asked in this document.

9. Complete the table on the free product recovery attachment sheet to show historical free product recovery information. *Attach multiple sheets as necessary to provide a complete history.*

VI. Site map

Attach a site map to this document.

Site Map(s) drawn to scale illustrating the following:

a. Location of all present and former tanks, piping and dispensers near the release;
b. Location of release(s);
c. Known location of sewer and utility lines, basements, and other subsurface structures;
d. Location(s) of any existing wells;
e. Location(s) where recovery is being performed (free product/water/solid locations);
f. Groundwater elevations, gradients, and flow direction;
g. Monitoring wells that will be used for sampling;
h. North arrow, bar scale, and map legend

Free Product Recovery Attachment Sheet

Well ID	Date	Top of casing elevation	Groundwater elevation	Depth to water (ft)	Depth to product (ft)	Thickness of product (ft)	Quantity of product removed During this Event (gal)	Total quantity of product recovered to date (gal)

Fast Track to Remediation

Submission Date: ____________
Facility or Tank ID: ____________
Leak ID: ____________

I. General Information

1. Was the leak from an underground or aboveground storage tank? ☐ UST ☐ AST
2. On what date did the release occur? ____________
3. When was the release first reported? ____________
4. The release was reported to the : ☐ WVDEP Spill Line ☐ WVDEP Tanks Corrective Action Unit
5. Are there any additional release associated with the site? If so, list all additional lead id# associated with the site.

   ____

6. What is the site currently used for?

   ☐ Gasoline station ☐ Hospital ☐ Railroad
   ☐ Petroleum distributor ☐ Public/private school ☐ Utility
   ☐ Auto dealership ☐ State/federal government ☐ Oil & Gas site
   ☐ Truck/transporter ☐ Airport ☐ Chemical facility
   ☐ Vacant or abandoned ☐ Other (identify): ____________

II. Site Information

1. Has the tank system(s) (tanks, piping, dispenser, etc.) associated with the site been? (mark all that apply)

   ☐ Permanently closed ☐ Removed from site ☐ Closed in place
   ☐ Currently in use ☐ Temporarily out of service
   ☐ Other (identify): ____________

2. Is there any free product (e.g. LNAPL) at the site?

   ☐ Yes ☐ No

   If yes, indicate location(s) and indicate if product is only in the soil or is also in the groundwater. (Note: Fast Track cannot be used if free product is in the groundwater).

3. Has any excavation or remediation activities been completed at the site?

   ☐ Yes ☐ No

   If yes, please describe.

Fast Track to Remediation

II. Site Information (*continued*)

4. Are there utility lines on the property? If so, please describe what kind of utility lines are present and the approximate depth of each utility line (if known).

Utility Line	Depth (ft-bgs)	Comments
Water Line		
Gas Line		
Sanitary Sewer Line		
Storm Sewer Line		
Electric Line		
Communications Line		

5. How is the site currently being used?

☐ Residential ☐ Non-residential

6. How is the site currently zoned?

☐ Residential ☐ Mixed ☐ Commercial

☐ Non-residential ☐ Industrial ☐ Unknown

☐ Other (identify): ______________________

7. What is the future use of the property?

☐ Residential ☐ Non-residential ☐ Unknown

8. Does the property currently have an existing deed restriction preventing the property from being used as residential?

☐ Yes ☐ No

9. Are there any on or off-property building foundations that are within 30 lateral feet and/or 5 verticle feet from the on-property contaminated soil? *(if yes, show location on site map)*

☐ Yes ☐ No

10. Are there any significant building foundation openings (e.g. dirt floor, sump, etc.) within 30 lateral feet and/or 5 vertical feet of contaminated soil?

☐ Yes ☐ No

11. Are there any preferential pathways (e.g. crawlspace under buildings, underground culverts or utility lines)? I*f yes, please describe.*

☐ Yes ☐ No

12. What is the predominate soil type at the site? Select ______________ (attach soil boring logs)

13. The above soil lithology information is based on:

☐ Literature Search ☐ Known ☐ Other (identify): ______________

14. Is the soil lithology in the area of contamination at least a silt loam or a soil type similar to silt loam or one with less saturated hydraulic conductivity?

☐ Yes ☐ No

If yes, soil lithology is not likely to be a limiting factor in use of the soil action levels.
If no, soil lithology may be limiting factor if volatiles contaminants are a concern (refer to flowshart and instructions in Appendix H)

Fast Track to Remediation

III. Nature of the Confirmed Release

1. How was the release discovered?

- ☐ During closure
- ☐ During upgrade
- ☐ During owner/operator inspection
- ☐ During repair
- ☐ Other (identify): ______________________________

2. Source:

- ☐ Tank
- ☐ Submersible Turbine Pump (STP)
- ☐ Piping
- ☐ Delivery Problem
- ☐ Dispenser
- ☐ Unknown
- ☐ Other (describe): ______________________________

3. Has the release been stopped?

- ☐ Yes
- ☐ No

4. Has the source of the initial release been repaired, replaced or removed?

- ☐ Yes
- ☐ No

IV. Substance

1. Substance suspected or confirmed to be released (check all that apply)

- ☐ Gasoline
- ☐ Oil (new)
- ☐ Brine
- ☐ Methanol
- ☐ Diesel
- ☐ Aviation fuel
- ☐ Crude
- ☐ Distillates
- ☐ Kerosene
- ☐ Ethanol flex fuel
- ☐ Condensates
- ☐ Sodium hydroxide
- ☐ Used Oil
- ☐ Biodiesel
- ☐ Other produced fluids
- ☐ Unknown
- ☐ Other (specify): ______________________________

2. Volume of material released (provide estimate in gallons): ____________

V. Contamination and Disposal

1. What is the extent of contaminated soil that was removed in ft (Length x Width x Depth).

Length: ____________ Width: ____________ Depth: ____________

2. Provide information on the disposal location of contaminated soil. (attach disposal documents)

Fast Track to Remediation

VI. Site Specific Geology

1. Indicate the predominant soil type in the area of contamination at the depth ranges below

Depth range in feet	Lithology Type
0'-8'	Select
> 8'	Select

2. Indicate the type of material used to backfill the excavation area and the approximate depths of the material.

Depth range in feet	Lithology Type
0'-8'	Select
> 8'	Select

3. Was groundwater encountered? (note: FastTrack is not appropriate for sites where groundwater is encountered)

☐ No ☐ Yes (A groundwater investigation is necessary if contamination was in contact with or near water)

VII. Receptor Information

1. Is the facility or site of release used for residential or non-residential purposes?

☐ Residential ☐ Non-residential

2. List all receptors within a quarter mile of the facility or leak site. *If necessary, create and attach a table that contains the below information to accommodate more than ten receptors.*

Distance from facility (feet)	Direction from facility (example: S, NW)	Receptor name	Receptor type (example: school, residential, drinking water well)

VIII. Adjacent Property Information

1. Current occupancy and use of the properties immediately adjacent to the facility. *If necessary, create and attach a table that contains the below information to accommodate more properties*

Direction from facility (example: S, NW)	Adjacent property name	Adjacent property use (residential or non-residential)

Fast Track to Remediation

IX. Analytical

1. Attach a table of the analytical data (please use WVDEP template where applicable).
2. Attach a copy of the complete laboratory analytical data.

X. Attachments

Please indicate all attachments being submitted with this document.

- ☐ Boring logs
- ☐ Waste manifests
- ☐ Analytical data tables
- ☐ Laboratory analytical data
- ☐ Other (list below)
- ☐ Site map

XI. Site Map

Attach a site map to this document

Site map(s) must be drawn to scale illustrating the following:

a. Site boundary, identify street and buildings
b. Location of present and former tanks, piping
c. Location of release
d. Footprint of area of excavation
e. Known locations of utilities, basement, and other subsurface structures
f. Sampling locations
g. North arrow, bar scale, and map legend

Site Investigation Report

Submission Date: ____________
Facility or Tank ID: ____________
Leak ID: ____________

I. Associated Leaks

1. What is the current leak ID for this report? ____________

2. List all previous leak IDs associated with the site and indicate if they are open ("O") or closed ("C")

____

3. Is this the initial site investigation report or a supplemental site investigation report or the site?

☐ Initial ☐ Supplemental

If supplemental, what is the date of initial investigation report? ____________

II. Release Information

1. Substance(s) confirmed to be released (check all that apply).

☐ Gasoline	☐ Oil (new)	☐ Brine	☐ Methanol
☐ Diesel	☐ Aviation fuel	☐ Crude	☐ Distillates
☐ Kerosene	☐ Ethanol flex fuel	☐ Condensates	☐ Sodium hydroxide
☐ Used oil	☐ Biodiesel	☐ Other produced fluids	☐ Unknown

☐ Other (specify): ____________

2. Source of release (check all that apply).

☐ Tank	Select	☐ Submersible Turbine Pump (STP)	Select
☐ Piping	Select	☐ Delivery Problem	Select
☐ Dispenser	Select	☐ Unknown	

☐ Other (describe): ____________

3. Volume of material released (estimate in gallons): ____________

4. Elapsed time over which the release occurred (if known): ____________

5. Media Impacted (check all that apply)

☐ Soil	☐ Surface water
☐ Groundwater	☐ Vapor
☐ Not applicable	☐ Other (describe): ____________

6. Provide a brief description of the release event.

Site Investigation Report

III. Initial Response

1. What initial response and corrective actions have been taken to date? (check all that apply)

- ☐ Emptied substance from tank
- ☐ Repaired leaking component(s)
- ☐ Replaced leak component(s)
- ☐ Initiated early cleanup
- ☐ Conducted initial site characterization
- ☐ Permanently closed tank system
- ☐ Investigated for presence of and initiated removal of free product

2. Was free product discovered? ☐ Yes ☐ No

3. As briefly as possible, provide additional details about the initial response and corrective actions taken to date. Add attachment if necessary.

IV. Site Description and History

1. Describe the tank system (tanks, piping, dispenser, etc.). (mark all that apply, brief explanation may be provided)

- ☐ Permanently closed
- ☐ Removed from site
- ☐ Closed in place
- ☐ Currently in use
- ☐ Temporarily out of service
- ☐ Other (describe below):

1. What is the site currently used for?

- ☐ Gasoline station
- ☐ Hospital
- ☐ Railroad
- ☐ Petroleum distributor
- ☐ Public/private school
- ☐ Utility
- ☐ Auto dealership
- ☐ State/federal government
- ☐ Oil & Gas site
- ☐ Truck/transporter
- ☐ Airport
- ☐ Chemical facility
- ☐ Vacant or abandoned
- ☐ Other (identify): ______________________

Site Investigation Report

IV. Site Description and History (continued)

2. Is there a tank system closure associated with this release?

☐ Yes ☐ No

If yes, briefly describe the closure including what tank(s) system (tank, piping, etc.) that were closed, removal of contaminated soil, and general description of findings of confirmation sampling (i.e. sampling showed exceedance of soil actions levels). Provide data in a table as an attachment.

3. What initial response and corrective actions have been taken to date? (check all that apply)

☐ Emptied product from tank

☐ Initiated early cleanup

☐ Replaced leak component(s)

☐ Investigated for presence of and initiated removal of free product

☐ Visually inspected aboveground and/or exposed underground releases and took action to prevent further migration of materials

☐ Other (identify): ______________________

4. As briefly as possible, provide additional details about the initial response and corrective actions taken to date. Add attachment, if necessary.

5. Is there any free product (e.g. LNAPL) at the site?

☐ Yes ☐ No

If yes, indicate location(s) and indicate if product is on the water table.

Site Investigation Report

IV. Site Description and History (continued)

6. Has any excavation or remediation activities been completed at the site?

☐ Yes ☐ No

If yes, please describe.

V. Assessment Methodology

As applicable, describe sampling performed at the site. As attachments, provide map(s) showing all sampling locations, groundwater flow, etc. and analytical data in tables.

1. Was surface sampling performed? (If yes, complete the "Surface" sheet.)

☐ Yes ☐ No

2. Were subsurface samples collected? (If yes, complete the "Subsurface" sheet.)

☐ Yes ☐ No

3. Were groundwater grab samples collected using direct push technology? (If yes, complete the "Direct Push" sheet.)

☐ Yes ☐ No

If yes, provide location on site map and attach boring logs.

4. Were temporary wells installed using direct push technology? (If yes, complete the ""Temporary Well" sheet.)

☐ Yes ☐ No

5. Were permanent wells installed? (If yes, complete the "Permanent Wells" sheet.)

☐ Yes ☐ No

If yes, how many? ________________ (provide locations on site map and attach boring logs)

6. Was surface water sampling performed? (If yes, complete the "Surface Water" sheet.)

☐ Yes ☐ No

7. Was sediment sampling performed? (If yes, complete the "Sediment" sheet.)

☐ Yes ☐ No

If yes, how many sediment samples were collected? ________________ (provide location on site map)

Site Investigation Report

VI. Property Information

1. What is the estimated acreage of the site? ______________________

2. Is the site currently used for residential or non-residential purposes?

   ☐ Residential ☐ Non-residential

3. Current occupancy and use of the properties immediately adjacent to the facility. *If necessary, create and attach a table that contains the below information to accommodate more properties*

Direction from Facility (example: S, NW)	Adjacent Property Name	Adjacent Property Use (residential or non-residential)

4. Are there utility lines on the property? If so, please describe what kind of utility lines are present and the approximate depth of each utility line (if known).

Utility Line	Depth (ft-bgs)	Comments
Water Line		
Gas Line		
Sanitary Sewer Line		
Storm Sewer Line		
Electric Line		
Communications Line		

5. How is the site currently zoned?

   ☐ Residential ☐ Mixed ☐ Commercial

   ☐ Non-residential ☐ Industrial ☐ Unknown

   ☐ Other (identify): ______________________________

6. What is the future use of the property?

   ☐ Residential ☐ Non-residential ☐ Unknown

7. Does the property currently have an existing deed restriction preventing the property being used as residential?

   ☐ Yes ☐ No ☐ Unknown

8. Are there any on or off-property building foundations that are within 30 lateral feet and/or 5 vertical feet from the on-property contaminated soil? *(if yes, show location on site map)*

   ☐ Yes ☐ No

Site Investigation Report

VI. Property Information (continued)

9. Are there any significant building foundation openings (e.g. dirt floor, sump, etc.) within 30 lateral feet and/or 5 vertical feet of contaminated soil?

☐ Yes ☐ No

If yes, please describe

10. Are there any preferential pathways (e.g. crawlspace under buildings, underground culverts or utility lines)?

☐ Yes ☐ No

If yes, please describe

11. What was the previous use of the site?

☐ Residential ☐ Non-residential

VII. Site Geology

1. General topography/terrain of the site. Mark all that apply. Provide topo map (identify the site) as an attachment.

☐ Flat terrain ☐ Hilly terrain ☐ Karst

☐ Other (identify): ____________________

2. Site elevation above mean sea level (in feet): ____________________

3. Depth to bedrock (ft)? ____________________

☐ Estimated ☐ Known

4. What is the predominate soil type at the site? Select ____________________ (attach soil boring logs)

5. The above soil lithology information is based on:

☐ Literature search ☐ Known ☐ Other (identify): ____________________

6. Is the soil lithology in the area of contamination at least a silt loam or a soil type similar to silt loam or one with less saturated hydraulic conductivity?

☐ Yes ☐ No

If yes, soil lithology is not likely to be a limiting factor in use of the soil action levels.
If no, soil lithology may be limiting factor if volatiles contaminants are a concern (refer to flowchart and instructions in Appendix

Site Investigation Report

VII. Site Geology (continued)

7. Briefly provide any additional geology information you believe that is important for the Agency to understand for the site.

VIII. Site Hydrology

1. What is the depth range for water? ____________________

2. What is the groundwater flow direction at the site? Select ____________________

3. Groundwater flow direction is?

☐ Known ☐ Estimated (based upon topography or surface water)

4. Adjacent to waterway?

☐ Yes ☐ No

If yes, please identify the type of waterway.

☐ Stream ☐ River ☐ Wetland

☐ Pond ☐ Lake

☐ Other (identify): ______________________________

If yes, provide name (if known) of the waterway. ______________________________

5. Are there other potential sources of contamination that this release may be attributed to and/or affected by?

☐ Yes ☐ No

If yes, briefly explain

6. Briefly provide any additional hydrology information you believe that is important for the Agency to understand for the site.

Site Investigation Report

IX. Data Presentation and Documentation

1. Has the release been fully delineated? (both horizontally and vertically)

☐ Yes ☐ No

2. Is the contamination limited to the site?

☐ Yes ☐ No

If no, Briefly describe what is known about the extent of the off-site contamination.

3. Generally, describe the contaminants found in the soil above action levels.

☐ No contamination above action levels

☐ BTEX ☐ Chlorides ☐ SVOCs ☐ MTBE

☐ PAHs ☐ VOCs ☐ RCRA 8 metals ☐ TBA

☐ Other (identify): ____________________

4. Briefly provide any additional information on the soil sampling that you believe is important. Do not explain the data results in detail (that information can be obtained from the data tables and site maps); however, feel free to provide a general summary of the data such as "all samples were above action levels", "only SB-1 was above action levels",

5. Generally describe the contaminants found in the water above groundwater drinking water standards.

☐ Not Applicable ☐ No Contamination Found Above Standards

☐ MTBE ☐ TBA ☐ PAHs ☐ Chlorides ☐ VOCs

☐ SVOCs ☐ Other (identify): ____________________

6. Generally describe the contaminants found in the groundwater above action levels.

☐ Not Applicable ☐ No Contamination Found Above Standards

☐ MTBE ☐ TBA ☐ PAHs ☐ Chlorides ☐ VOCs

☐ SVOCs ☐ Other (identify): ____________________

IX. Data Presentation and Documentation (continued)

7. Briefly provide any additional information on the groundwater sampling that you believe is important. Do not explain the data results in detail (that information can be obtained from the data tables and site maps); however, feel free to provide a general summary of the data such as "all samples were above groundwater standard for benzene", "only MW-1 was above GW for benzene", No samples were above GW standards but an exceedance of an action level was note in MW-1", etc.

8. Generally describe the contaminants found in surface water and/or sediments.

☐ Not Applicable ☐ MTBE ☐ TBA ☐ PAHs

☐ Chlorides ☐ VOCs ☐ SVOCs

☐ Other (identify): ______________________

9. Briefly provide any additional information on the surface water or sediment sampling that you believe is important. Do not explain the data results in detail (that information can be obtained from the data tables and site maps); however, feel free to provide a general summary of the data.

XI. Summary of Findings (provide concise bulleted list)

NOTE: The Tanks CAU recognizes that very few conclusions or recommendations may be derived from a situation where contamination has gone off-site and further investigative work is needed. However, some conclusions may be reached concerning the extent of on-site contamination and a recommendation made for further work. It is understood that recommendations regarding Corrective Actions may not be provided at this point. However, interim measures are strongly recommended in this situation and should be documented in the Site Investigation Report.

Site Investigation Report

XII. Conclusions

1. Site fully delineated? ☐ Yes ☐ No

2. Soil contamination above action levels? ☐ Yes ☐ No

3. Groundwater (GW)

Above GW and/or DW standards? ☐ Yes ☐ No

Above GW action levels? ☐ Yes ☐ No

4. Was surface water impacted? ☐ Yes ☐ No

5. Was sediment Impacted? ☐ Yes ☐ No

6. Briefly provide any additional information related to the conclusion for this report that you believe is important.

XIII. Recommendations

1. Is additional investigation necessary?

☐ Yes ☐ No

If yes, check all areas requiring additional investigation.

☐ Surface Soil ☐ Subsurface soil ☐ Surface water

☐ Sediment ☐ Groundwater

☐ Other (describe below):

Site Investigation Report

XIII. Recommendations (continued)

2. Briefly describe any interim measures that should be taken.

3. Briefly provide any additional information related to the recommendations for this site that you believe is important.

XIII. Attachments

Note which attachments have been appended to this report

- ☐ Tables of analytical data
- ☐ Required map(s) in XIV
- ☐ Lab analytical
- ☐ Boring logs
- ☐ Other (identify below):

XIV. Site Maps

All site, adsorbed phase, and/or groundwater maps must be drawn to scale, show North arrow, and map legend.

Site map(s) drawn to scale illustrating the following:

a. Location of all present and former tanks, piping and dispensers in the area of the release;
b. Footprint of surface and/or subsurface soil contamination;
c. Footprint of other structures (buildings, canopies, roads, utilities, etc..);
d. Location of the release(s);
e. Known locations of sewer and utility line, basements, and other subsurface structures;
f. Location and type of receptors;
g. Location of monitoring wells and all other wells that may be impacted by the release;
h. Groundwater concentration and potentiometric maps, as applicable;
i. Adsorbed phase concentration maps, as applicable;
j. Surface water and sediment sample locations, as applicable

Quarterly Groundwater Monitoring Report

Reporting Period
Quarter: ____________________
Year: ____________________

Submission Date: ____________________
Facility or Tank ID: ____________________
Leak ID: ____________________

I. Site History

1. What is the site currently used for?

☐ Gasoline station ☐ Hospital ☐ Railroad ☐ Truck/transporter
☐ Petroleum distributor ☐ Public/private school ☐ Utility ☐ Airport
☐ Auto dealership ☐ State/federal government ☐ Oil & Gas site ☐ Chemical facility
☐ Vacant or abandoned ☐ Other (identify): ____________________

2. What was the site previously used for?

☐ Gasoline station ☐ Hospital ☐ Railroad ☐ Truck/transporter
☐ Petroleum distributor ☐ Public/private school ☐ Utility ☐ Airport
☐ Auto dealership ☐ State/federal government ☐ Oil & Gas site ☐ Chemical facility
☐ Vacant or abandoned ☐ Other (identify): ____________________

II. Sensitive Receptors

List all receptors within a quarter mile of the facility or leak site. *If necessary, create and attach a table that contains the below information to accommodate more than ten receptors.*

Distance from facility (feet)	Direction from facility (example: S, NW)	Receptor Name	Receptor Type (example: school, residential, drinking water well)

III. Activities Completed During this Quarter

1. Was groundwater sampling performed on all wells?

☐ Yes ☐ No

2. Was groundwater sampling limited to a set of wells?

☐ Yes ☐ No

If yes, identify which wells were not sampled and why.

Quarterly Groundwater Monitoring Report

III. Activities Completed During this Quarter (continued)

3. Were all wells gauged?

☐ Yes ☐ No, explain below

4. What is the range for depth to groundwater (feet below top of casing)? ____________________

5. What is the general groundwater flow direction? Select

6. Were VOC samples for groundwater samples collected using a low flow or equivalent method?

☐ Yes ☐ No, explain below

7. Groundwater samples were collected via:

☐ Bailer ☐ Syringe sampler ☐ Hyrdosleeve ☐ Passive diffusion bag
☐ Bladder pump ☐ Submersible pump ☐ Peristaltic pump ☐ SNAP or kenner sampler
☐ Other (identify): ____________________

8. Samples were collected for? (mark all that apply) (Place data in WVDEP analtyical tables, as appropriate)

☐ BTEX ☐ MTBE ☐ TBA ☐ VOCs (8260)
☐ PAHs ☐ SVOCs (8270) ☐ RCRA 8 metals ☐ Chlorides
☐ Other (identify): ____________________

9. Briefly provide any additional information on the groundwater sampling that you believe is important.

Quarterly Groundwater Monitoring Report

IV. Results Discussion

1. Generally, describe the contaminants found in wells above groundwater or drinking water standards?
Complete the groundwater analytical attachment.

☐ Not Applicable ☐ No Contamination Found Above Standards

☐ VOCs ☐ BTEX ☐ PAHs ☐ Chlorides

☐ MTBE ☐ TBA ☐ SVOCs

☐ Other (identify): ____________________

2. Briefly provide any additional information on the groundwater sampling that you believe is important. Do not explain the data results in detail (that information can be obtained from the data tables and site maps); however, feel free to provide a general summary of the data such as "all samples were above groundwater standard for benzene", "only MW-1 was above GW for benzene", No samples were above GW standards but an exceedance of an action level was note in MW-1", etc.

V. Recommendation

1. Check all applicable recommendations.

☐ Continue quarterly monitoring well sampling

☐ Continue to perform remediation activities per approved CAP

☐ Submit Corrective Action Plan (CAP) or revised CAP

☐ Requesting No Further Action (NFA)

☐ Other (identify): ____________________

2. Briefly provide any additional information related to the recommendations for this site that you believe is important.

Quarterly Groundwater Monitoring Report

VI. Attachments

Please indicate all attachment being submitted with this document.

- ☐ Analytical data tables
- ☐ Boring logs, as applicable
- ☐ Required sitemap(s)
- ☐ Laboratory analytical data
- ☐ General location map
- ☐ Monitoring well logs, as applicable
- ☐ Other (list below)

VII. Attachments

All site, adsorbed phase, and /or groundwater maps must be drawn to scale, show north arrow, and map legend.

Site map(s) drawn to scale illustrating the following:

a. Location of all present and former tanks, piping and dispensers in the area of the release;
b. Footprint of surface and/or subsurface soil contamination;
c. Footprint of other structures (buildings, canopies, roads, utilities, etc..);
d. Location of the release(s);
e. Known locations of sewer and utility line, basements, and other subsurface structures;
f. Location and type of receptors;
g. Location of monitoring wells and all other wells that may be impacted by the release;
h. Groundwater concetration and potentiometric maps;
i. Adsorbed phase concentration maps, if applicable

AIR SPARGING

Facility or Tank ID: ____________________ Leak ID: ____________________

Do not proceed unless a site characterization has been completed that fully delineates the extent of contamination.

I. Applicability Determination (initial screening)	Effective	Somewhat Effective	Ineffective
1. Is free product present at the site? Air sparging cannot be performed in presence of free product. Free product must be removed before air sparging can be used at a site.	☐ NO		☐ YES
2. Provide a general description of the **Intrinsic Permeability (k)*** of soils in the area of remediation measured in cm^2. ☐ Based on soil type ☐ Calculated ☐ Field/lab test *Stratified soils may require special consideration in design to ensure less-permeable stratum are addressed. This will require documentation.*	☐ $k \geq 1x10^{-9}$	☐ $1x10^{-9} \geq k \geq 1x10^{-10}$	☐ $k < 1x10^{-10}$
3. What is the general boiling point range in Celsius (°C) for chemicals subject to remediation at this site? *For complex mixtures, select the boiling point range that is most representative of the chemicals of concern to be remediated by using this remedy.*	☐ < 250	☐ ≥ 250 - ≤ 300	☐ ≥ 300
4. What is the total dissolved iron (mg/l) concentration at the site?	☐ < 10	☐ ≥ 10 - ≤ 20	☐ > 20
5. Is the soil free of impermeable layers or other conditions that would disrupt air flow?	☐ Yes	☐ Maybe	☐ No
6. What is the vapor pressure range in millimeters (mm) of mercury for the chemicals being remediated? *For complex mixtures, select the vapor pressure range that is most representative of the chemicals of concern to be remediate.*	☐ ≥ 1	☐ > 0.5 - < 1.0	☐ < 0.5
7. What is the **Henry Laws Constant**** (atm)for the chemicals being remediated? *For complex mixtures, select the Henry's law constant range that is most representative of the chemicals of concern to be remediated.*	☐ > 150	☐ ≥ 100 - < 150	☐ < 100

* Intrinsic permeability is a measure of the ability of soils to transmit fluids and is an important factor in determining the effectiveness of air sparging.

** Here is a link to an EPA website with common Henry Law Constants for various chemicals. Choose Hpx (partial pressure/mole fraction)

https://www3.epa.gov/ceampubl/learn2model/part-two/onsite/esthenry.html

AIR SPARGING

I. Applicability Determination (initial screening continued)	Effective	Somewhat Effective	Ineffective
8. The air sparge well used for pilot testing is in an area of contamination that is best described as: **Note:** *Pilot testing is required. Testing the system in areas of low contamination may provide insufficient data but testing in high areas of contamination can induce migration of contamination.*	☐ Moderate	☐ Low	☐ High
9. What is the radius of influence (ROI) in feet for the proposed extraction wells?	☐ > 20	☐ > 5 - ≤ 20	☐ < 5
II. Air Sparge Design			
1. Has the radius of influence (ROI) been calculated for each soil type to the site in the area of contamination?	☐ YES		☐ NO
2. Is the proposed well density appropriate, given the total area to be cleaned up and the radius of influence of each well?	☐ YES		☐ NO
3. Will the proposed air sparging pressure be sufficient to overcome the hydraulic head and capillary forces?	☐ YES		☐ NO
4. Will the air sparge flow rates provide sufficient vapor/dissolved phase partitioning of constituents to achieve cleanup?	☐ YES		☐ NO
5. Is the proposed well configuration appropriate for the site conditions present?	☐ YES		☐ NO
6. Is the air compressor selected appropriate for the desired sparge pressure?	☐ YES		☐ NO
7. Do the proposed well screen intervals match with the contaminant plume location at the site?	☐ YES		☐ NO

III. Other Remedial Technologies

1. What other remedial technology will be used in conjunction with air sparging?

☐ Soil vapor extraction ☐ Aggressive fluid vapor recovery

☐ Dual phase extraction ☐ Other (identify): ____________________

IV. Evaluation of Operation and Maintenance

The air sparge system should not be started prior to the start of the SVE or other remedial technology being utilized with the air sparge.

Manifold valving adjustments should be checked and adjusted as necessary during the first week of operation.

Monitoring for sparge pressure and flows, vacuum readings (for SVE, DPE, etc.), groundwater depth, vapor concentrations, dissolved oxygen levels, carbon dioxide levels, and pH should be performed for the first week of operation.

Weekly to biweekly monitoring of groundwater pH and levels of contaminates, carbon dioxide, and dissolved oxygen should be performed follow startup.

Weekly to biweekly monitoring of the effluent stack for levels of contaminants, oxygen, and carbon dioxide should be performed following startup .

All monitoring information should be provided in the CAP monitoring report.

V. Sitemap

Attach a site map to this document

1. Site map(s) drawn to scale illustrating the following:
    a. Location of all present and former tanks, piping and dispensers in area of release;
    b. Footprint of surface and/or subsurface soil contamination;
    c. Footprint of other structures (buildings, canopies, roads, utilities, etc..);
    d. Location of treatment systems;
    e. Location of extraction and air sparging wells;
    f. Monitoring wells that will be used for sampling;
    g. Groundwater flow direction;
    h. North arrow, bar scale, and map legend

CAP Analytical Parameters Attachment

Well/Sample Location	Parameters to be Monitored

Comments

SOIL EXCAVATION

Facility or Tank ID: ______________________ Leak ID: ________________________

To utilize excavation as a presumptive remedy, the excavation soil must be disposed of at an approved landfill.

If the answer to any of the questions in section I is NO, then excavation of the soil is not applicable as a sole remedy. Excavation in conjunction with another remedy may be applicable; however, you may want to consider an in situ remedial technology instead.

To determine if soil excavation is a practical method of remediation for your site, complete the following worksheet.

I. Applicability of Excavation as a Remedy	Effective	Ineffective as only method
1. Is the contamination found at depths <u>less</u> than 25 feet?	☐ YES	☐ NO
2. Is contaminated soil found at a sufficient distance from buildings, building foundations, roads, or other structures to allow removal without damaging the structure?	☐ YES	☐ NO
3. Is contaminated soil found at a distance away from private or public utility lines?	☐ YES	☐ NO
4. Is the area of contamination free of slopes or other physical constraints which may make excavation impractical or unsafe?	☐ YES	☐ NO
5. Is the excavation material unrestricted or otherwise safe for disposal in a landfill?	☐ YES	☐ NO

If the answer to all questions above are YES, then proceed to the following questions to further determine the practicality of excavation.

I.a Applicability of Excavation as a Remedy	Effective	Somewhat effective
1. Will the depth of the excavation remain clear of groundwater or the capillary fringe?	☐ YES	☐ NO
2. Can contaminated soils be removed without the need to dewater?	☐ YES	☐ NO
3. Can excavation of contaminated soil be performed without the need for extensive excavation support?	☐ YES	☐ NO
4. Is the soil contamination located in single, discrete location? *Answer* ***<u>NO</u>*** *if multiple discrete locations will require excavation*	☐ YES	☐ NO
5. Can excavation of contaminated solid be achieved without creating odor related issues?	☐ YES	☐ NO

If the answer to any of the questions in I.a above is NO, excavation may not be practical, but may be utilized with the proper design and site management. Additional information will be needed for any questioned answered with a "no". Proceed to section II.

SOIL EXCAVATION

II. General Questions

1. Provide the name and location of the landfill where the contaminated soil will be disposed.

   You must attach a copy of the landfill approval.

   Name: ______________________________

   Location: ______________________________

   ____

2. Briefly describe the field screening methods used to distinguish contaminated from uncontaminated soil.

   ☐ PID ☐ FID ☐ Conductance meter ☐ pH meter

   ☐ Other (describe): ______________________________

III. Evaluation

1. Provide a brief summary of the number of confirmation samples and proposed analytical parameters that the samples will be analyzed to show the site has been remediated.

IV. Sitemap

Attach a site map to this document

Site map(s) drawn to scale illustrating the following:

a. Location of all present and former tanks, piping and dispensers in area of the release;
b. Footprint of surface and/or subsurface soil contamination;
c. Footprint of other structures (buildings, canopies, roads, utilities, etc..);
d. Footprint of the final dimensions of excavation(s) with contour lines (maximum 2-foot contour intervals) showing the final depths of the excavation(s);
e. Layout and dimensions (length, width, and depth) in imperial units of the final excavation. If multiple pits were excavated, reference each separately;
f. Location of stockpiled overburden soil and stockpiled contaminated soil, if any;
g. Proposed location of confirmation samples;
h. North arrow, bar scale, and map legend

Aggressive Fluid Vapor Recovery

Facility or Tank ID: ____________________ Leak ID: ____________________

Do not proceed unless a site characterization has been completed that fully delineates the extent of contamination.

I. Applicability Determination (Initial Screening)	Effective	Somewhat Effective	Ineffective
1. Provide a general description of the **intrinsic permeability (k)*** of soils in the area of remediation measured in cm^2. ☐ Based on soil type ☐ Calculated ☐ Field/lab test *Stratified soils may require special consideration in design to ensure less-permeable stratum are addressed. This will require documentation.*	☐ $k \geq 1x10^{-8}$	☐ $1x10^{-8} \geq k \geq 1x10^{-11}$	☐ $k < 1x10^{-11}$
2. What is the general boiling point range in °C for chemicals subject to remediation at this site? *For complex mixtures, select the boiling point range that is most representative of the chemicals of concern to be remediated by using this remedy.*	☐ < 250	☐ ≥ 250 - ≤ 300	☐ ≥ 300
3. What is the depth to groundwater in feet based on the shallowest well in area where remediation is being performed? *If water-table elevation fluctuate significantly, special design provisions must be made to accommodate them.*	☐ > 10	☐ ≥ 3 - ≤ 10	☐ < 3
4. What is the moisture content (%) of soil in area of remediation?	☐ < 50	☐ ≥ 50 - ≤ 80	☐ > 85
5. What is the vapor pressure range in mm of the chemicals being remediated? *For complex mixtures, select the vapor pressure range that is most representative of the chemicals of concern to be remediated by using this remedy.*	☐ ≥ 1	☐ > 0.5 - < 1.0	☐ < 0.5
6. What is the Henry's law constant** (atm) for the chemicals being remediated? *For complex mixtures, select the Henry's law constant range that is most representative of the chemicals of concern to be remediated by using this remedy.*	☐ > 150	☐ ≥ 100 - < 150	☐ < 100
II. Aggressive Fluid Vapor Recovery System Design			
1. What is the radius of influence (ROI) in feet for the proposed extraction wells? *The wells must be identified by showing the ROI on a site diagram.*	☐ > 20	☐ > 5 - ≤ 20	☐ < 5
2. Has the radius of influence (ROI) been calculated for each soil type at the site? *For more complex sites with multiple treatment depth intervals and/or the need for multiple extraction wells, subsurface airflow modeling must be conducted to determine well placement.*	☐ YES		☐ NO
3. Is the proposed well density appropriate, given the total area to be cleaned up and the radius of each well?	☐ YES		☐ NO

** Intrinsic permeability is a measure of the ability of soils to transmit fluids and is the single most important factor in determining the effectiveness of AFVR.*

*** Here is a link to an EPA website with common Henry's Law Constant for various chemicals. Choose Hpx (partial pressure/mole fraction)*
https://www3.epa.gov/ceampubl/learn2model/part-two/onsite/esthenry.html

Aggressive Fluid Vapor Recovery

II. Aggressive Fluid Vapor Recovery System Design (continued)

4. Describe the system.
   - ☐ Single pump system ☐ Dual pump system

   Identify and number the wells (on the site map) to be utilized for the AFVR.
5. What is the proposed extraction time period for each well? ____________________
6. How many extractions are planned? __________
7. What is the planned frequency of extractions?
   - ☐ Once ☐ Weekly ☐ Monthly ☐ Quarterly for ___________ quarters
   - ☐ Other (specify): ________________

III. Evaluation of Operation and Maintenance

What is the estimate of time the achieve cleanup of the site with the anticipated extraction flow rates?

__________ days

At a minimum, the following should be monitored and provided in CAP Monitoring report : flow measurements, vacuum readings, and vapor concentrations, carbon dioxide and oxygen concentrations.

Weekly monitoring of the system is recommended, but in no case should the monitoring of flow measurements, vacuum readings, and vapor concentrations, carbon dioxide and oxygen concentrations be less than every two weeks. This information should be provided in the CAP monitoring report.

List the monitoring and analytical parameters that are proposed for quarterly sampling as part of the CAP monitoring report.
Use the CAP Analytical Parameters Attachment

Example

Well Name	Substance(s)
MW - 1	BTEX, MTBE
MW - 3	BTEX, MTBE

IV. Sitemap

Attach a site map to this document

Site map(s) drawn to scale illustrating the following:

a. Location of all present and former tanks, piping and dispensers in area of release;
b. Footprint of surface and/or subsurface soil contamination;
c. Footprint of other structures (buildings, canopies, roads, utilities, etc..);
d. Location of treatment system;
e. Location of extraction wells;
f. Location of monitoring wells that will be used for sampling;
g. Groundwater flow direction;
h. North arrow, bar scale, and map legend

Dual-Phase Extraction

Facility or Tank ID: ______________________ Leak ID: ________________________

Do not proceed unless a site characterization has been completed that fully delineates the extent of contamination.

I. Applicability Determination (Initial Screening)	Effective	Somewhat Effective	Ineffective
1. Provide a general description of the **intrinsic permeability (k)*** of soils in the area of remediation measured in cm^2. ☐ Based on soil type ☐ Calculated ☐ Field/lab test *Stratified soils may require special consideration in design to ensure less-permeable stratum are addressed. This will require documentation.*	☐ $k \geq 1x10^{-8}$	☐ $1x10^{-8} \geq k \geq 1x10^{-11}$	☐ $k < 1x10^{-11}$
2. What is the general boiling point range in °C for chemicals subject to remediation at this site? *For complex mixtures, select the boiling point range that is most representative of the chemicals of concern to be remediated by using this remedy.*	☐ < 250	☐ ≥ 250 - ≤ 300	☐ ≥ 300
3. What is the depth in feet to groundwater based on the shallowest well in area where remediation is being performed? *If water-table elevation fluctuate significantly, special design provisions must be made to accommodate them.*	☐ > 10ft	☐ ≥ 3 - ≤ 10	☐ < 3
4. What is the moisture content (%) of soil in area of remediation?	☐ < 50	☐ ≥ 50 - ≤ 80	☐ > 85
5. What is the vapor pressure range in mm of the chemicals being remediated? *For complex mixtures, select the vapor pressure range that is most representative of the chemicals of concern to be remediated by using this remedy.*	☐ ≥ 1	☐ > 0.5 - < 1.0	☐ < 0.5
6. What is the Henry's law constant** (atm) for the chemicals being remediated? *For complex mixtures, select the Henry's law constant range that is most representative of the chemicals of concern to be remediated by using this remedy.*	☐ > 150	☐ ≥ 100 - < 150	☐ < 100

* *Intrinsic permeability is a measure of the ability of soils to transmit fluids and is the single most important factor in determining the effectiveness of DPE.*

** *Here is a link to an EPA website with common Henry's Law Constant for various chemicals. Choose H_{px} (partial pressure/mole fraction)*
https://www3.epa.gov/ceampubl/learn2model/part-two/onsite/esthenry.html

____

Dual-Phase Extraction

II.a DPE System Design	Effective	Somewhat Effective	Ineffective
1. What is the radius of influence (ROI) for the proposed extraction wells in feet? *The wells must be identified by showing the ROI on a site diagram.*	☐ > 20 ft.	☐ > 5 - ≤ 20	☐ < 5
2. Has the radius of influence (ROI) been calculated for each soil type at the site? *For more complex sites with multiple treatment depth intervals and/or the need for multiple extraction wells, was subsurface airflow modeling conducted to determine well placement.*	☐ YES		☐ NO
3. Is the proposed well density appropriate, given the total area to be cleaned up and the radius of each well?	☐ YES		☐ NO
4. Is the blower selected appropriate for the site conditions?	☐ YES		☐ NO
5. Is wellhead vacuum determined from field pilot studies and between 3 and 100 inches of water?	☐ YES		☐ NO
6. Is the vapor extraction flow rate between 2 and 50 cfm per well?	☐ YES		☐ NO
7. Are groundwater extraction rates sufficient to capture groundwater with constituent concentration above cleanup goal?	☐ YES		☐ NO

Answering "no" to more than one question in Section II.a. indicates that DPE may not be very effective for the site.

II.b DPE System Design			
1. Are air injection of passive inlet wells proposed?	☐ YES		☐ NO
2. Is the proposed air injection/inlet well design appropriate for this site?	☐ YES		☐ NO
3. Are surface sealing materials proposed appropriate for this site?	☐ YES		☐ NO

Dual-Phase Extraction

III. Evaluation of Operation and Maintenance

1. What is the estimate of time the achieve cleanup of the site with the anticipated extraction flow rates?

   _______________ days

Daily monitoring of the DPE system must be performed for the first week of operation. At a minimum, the following should be monitored and provided in CAP Monitoring report : flow measurements, vacuum readings, and vapor concentrations, carbon dioxide and oxygen concentrations.

Weekly monitoring of the DPE system is recommended, but in no case should the monitoring of flow measurements, vacuum readings, and vapor concentrations, carbon dioxide and oxygen concentrations be less than every two weeks. This information should be provided in the CAP monitoring report.

List the monitoring and analytical parameters that will be sampled quarterly as part of the CAP monitoring report. *Use the Cap Analytical Parameters Attachment sheet.*

Example

Well Name	Substance(s)
MW - 1	BTEX, MTBE
MW - 3	BTEX, MTBE

III. Sitemap

Attach a sitemap to this document

Sitemap(s) drawn to scale illustrating the following:

a. Location of all present and former tanks, piping and dispensers in area of release;
b. Footprint of surface and/or subsurface soil contamination;
c. Footprint of other structures (buildings, canopies, roads, utilities, etc..);
d. Location of treatment systems;
e. Location of extraction wells;
f. Location of monitoring wells that will be used for sampling;
g. Groundwater flow direction;
h. North arrow, bar scale, and map legend

Chemical Oxidation

Facility or Tank ID: ______________________ Leak ID: ________________________

Do not proceed unless a site characterization has been completed that fully delineates the extent of contamination.

Do not proceed unless you have obtained a UIC permit or a Rule Authorization letter from the WVDEP Groundwater program authorizing injection of materials into the subsurface. Attach the authorization to this document.

What chemical oxidant are you using?
If using a chemical oxidant that does not appear in the below list, submit a traditional CAP.

☐ Hydrogen peroxide ☐ Ozone ☐ Persulfate
☐ Fenton's reagent ☐ Permanganate ☐ Percarbonate

Please list additional chemicals that may be used to activate the chemical oxidant.

____

I. Applicability Determination (Initial Screening)	Effective	Somewhat Effective	Ineffective
1. Provide a general description of the **intrinsic permeability (k)*** of soils in the area of remediation measured in cm^2. ☐ Based on soil type ☐ Calculated ☐ Field/lab test *Stratified soils may require special consideration in design to ensure less-permeable stratum are addressed. This will require documentation.*	☐ $k \geq 1x10^{-8}$	☐ $1x10^{-8} \geq k \geq 1x10^{-10}$	☐ $k < 1x10^{-10}$
2. Is the treatment zone area soils homogenous (i.e. no stratified soils)?	☐ YES		☐ NO
3. Have all recoverable volumes of free product been removed from the treatment area? *Do not proceed with chemical oxidation if recoverable volumes of free product are present in the treatment area.*	☐ YES		☐ NO
4. Does the site exhibit limestone geology? *If yes, Fenton's Reagent may not be used.*	☐ YES		☐ NO
5. Has it been confirmed that active utilities and/or UST system components are not located in the immediate treatment area?	☐ YES		☐ NO
6. Have samples been collected at the site to determine the natural oxidant demand of the site? *Chemical oxidants may preferentially react with naturally occurring organic soils and/or certain metals thus reducing the amount of oxidant available to react with contaminants.*	☐ YES		☐ NO

* Intrinsic permeability is a measure of the ability of soils to transmit fluids and is an important factor in determining the effectiveness of chemical oxidation.

____

Chemical Oxidation

I. Applicability Determination (Initial Screening)	Effective	Somewhat effective	Ineffective
7. Is the soil profile determined from boring logs generally free of natural organic material (e.g., layers of peat or humic material)?	☐ YES		☐ NO
8. Is the soil temperature expected to be 10°C or higher during remediation?	☐ YES		☐ NO
9. Is the pH of site groundwater between 5 and 9?	☐ YES		☐ NO
10. Is the dissolved iron concentration in the site groundwater < 10 mg/L?	☐ YES		☐ NO
II.a Oxidation Design			
1. What is the radius of influence of the proposed injection points/wells? *Must be identified by showing the ROI on a site diagram.*	☐ > 25 ft.	☐ > 5 ft. but ≤ 25 ft.	☐ < 5 ft.
2. Are the density and configuration of the injection points/wells adequate to uniformly disperse the treatment chemicals through the target treatment zone, given site geology and hydrologic conditions?	☐ YES		☐ NO
3. Is the capacity of the chemical oxidation treatment system sufficient to generate and deliver oxygen at the required design rate?	☐ YES		☐ NO
4. Are monitoring wells adequately distributed between oxygen delivery locations to collect groundwater to evaluate the performance of the chemical oxidation system?	☐ YES		☐ NO

II.b Oxidation Design

1. How will the oxidant be introduced into the treatment area? (*select all that apply*)

☐ Direct push technology ☐ Injection wells

☐ Existing monitoring wells ☐ Other (specify): ______________________

2. Estimate the treatment area (length x width x depth) in square feet. ______________

Length: __________

Width: __________

Depth: __________

Chemical Oxidation

II.b Oxidation Design (continued)

3. How many injection points will be used? ____________________
4. Will any injections be performed at multiple depths?

☐ Yes ☐ No

If yes, which injection point(s) and what are the depths of injections?

5. What is the injection approach?

☐ Single point ☐ Circular ☐ Multi point ☐ Random

☐ Other (describe):

6. If utilizing wells for injection, what will be the screen interval? ____________________
7. What is the calculated mass (in lbs.) of contaminants requiring biodegradation? ____________________
8. What is the mass (in lbs.) of dissolved oxygen required to biodegrade the contaminants? ____________

III. Sampling

1. What is the estimate of time to achieve cleanup of the site? ____________________

Sampling of dissolved oxygen, redox potential, and pH should be performed on at least a monthly basis to evaluate the effectiveness of chemical oxidant treatment.

Does the compliance sampling plan specifically exclude sampling from oxygen delivery wells when collecting data to evaluate chemical oxidation system performance? ***Note** : It is preferred that wells used as injection points are not also used for compliance sampling. It they are, a minimum of 1 month must pass between injection and sampling and/or additional sampling may be required.*

List the monitoring and analytical parameters that will be sampled quarterly as part of the CAP monitoring report.

Use the CAP Analytical Attachment Sheet.

Example

Well Name	Substance(s)
MW - 1	BTEX, MTBE
MW - 3	BTEX, MTBE

IV. Sitemap
Attach a site map to this document Site map(s) drawn to scale illustrating the following: a. Location of all present and former tanks, piping and dispensers in area of release; b. Footprint of surface and/or subsurface soil contamination; c. Footprint of other structures (buildings, canopies, roads, utilities, etc..); d. Location of injection points/wells; e. Monitoring wells that will be used for sampling; f. Groundwater flow direction; g. North arrow, bar scale, and map legend

SOIL VAPOR EXTRACTION

Facility or Tank ID: ______________________ Leak ID: ________________________

Do not proceed unless a site characterization has been completed that fully delineates the extent of contamination.

I. Applicability Determination (Initial Screening)	Effective	Somewhat Effective	Ineffective
1. Provide a general description of the **intrinsic permeability (k)*** of soils at the site in the area of remediation in cm^2 . ☐ Based on soil type ☐ Calculated ☐ Field/lab test *Stratified soils may require special consideration in design to ensure less-permeable stratum are addressed. This will require documentation.*	☐ $k \geq 1x10^{-8}$	☐ $1x10^{-8} \geq k \geq 1x10^{-10}$	☐ $k < 1x10^{-10}$
2. What is the general boiling point range in °C for chemicals subject to remediation at this site? *For complex mixtures, select the boiling point range that is most representative of the chemicals of concern to be remediated by using this remedy.*	☐ < 250	☐ ≥ 250 - ≤ 300	☐ ≥ 300
3. What is the depth to groundwater based on the shallowest well in area where remediation is being performed? *Groundwater at 10' or less will require special consideration in design of the SVE system. This will require documentation.*	☐ > 10ft	☐ ≥ 3 - ≤ 10	☐ < 3ft
4. What is the moisture content (%) of soil in area of remediation? *High moisture content reduces soil permeability by restricting air flow. This is of particular concern in the capillary fringe and may require special design requirements if contaminants are within the capillary fringe.*	☐ < 30	☐ ≥ 30 - ≤ 50	☐ > 50
5. What is the vapor pressure range in mm of the chemicals being remediated? *For complex mixtures, select the vapor pressure range that is most representative of the chemicals of concern to be remediated by using this remedy.*	☐ ≥ 1	☐ < 1.0 - > 0.5	☐ < 0.5
6. What is the Henrys law constant** (atm) for the chemicals being remediated? *For complex mixtures, selec t the Henry's law constant range that is most r epresentative of the chemicals of concern to be remediated by using this remedy.*	☐ > 150	☐ < 150 - ≥ 100	☐ < 100

* *Intrinsic permeability is a measure of the ability of soils to transmit fluids and is the single most important factor in determining the effectiveness of SVE.*

** Here is a link to an EPA website with common Henry's Law Constant for various chemicals. Choose H_{px} (partial pressure/mole fraction)
https://www3.epa.gov/ceampubl/learn2model/part-two/onsite/esthenry.html

Calculation of effective, moderately effective and ineffective results. See guidance document for more on SVE.

____

SOIL VAPOR EXTRACTION

II.a SVE System Design	Effective	Somewhat Effective	Ineffective
1. What is the radius of influence (ROI) for the proposed extraction wells? *The wells must be identified by showing the ROI on a site diagram.*	☐ > 20 ft.	☐ > 5 ft. but ≤ 20 ft.	☐ < 5 ft.
2. Has the radius of influence (ROI) been calculated for each soil type at the site?	☐ YES		☐ NO
3. Is the proposed well density appropriate, given the total area to be cleaned up and the radius of influence for each well?	☐ YES		☐ NO
4. Is the blower selected appropriate for the site conditions?	☐ YES		☐ NO
5. Is the type of well proposed appropriate for the site conditions present?	☐ YES		☐ NO
6. Do the proposed well screen intervals match soil conditions at the site?	☐ YES		☐ NO
II.b SVE System Design			
1. Is air injection of passive inlet wells proposed?	☐ YES		☐ NO
2. Is the proposed air injection/inlet well design appropriate for this site?	☐ YES		☐ NO
3. Are proposed surface sealing materials appropriate for this site?	☐ YES		☐ NO
4. Will groundwater depression be necessary?	☐ YES		☐ NO
5. If groundwater depression is necessary, are the pumping wells correctly spread?	☐ YES		☐ NO
6. Is a vapor treatment system required?	☐ YES		☐ NO
7. If a vapor treatment system is required, is the proposed system appropriate for the contaminate concentration at the site?	☐ YES		☐ NO

SOIL VAPOR EXTRACTION

III. Evaluation of Operation and Maintenance

1. What is the estimate of time to achieve cleanup of the site with the anticipated extraction flow rates?

    ______________ days

Daily monitoring of the SVE system must be performed for the first well of operation. At a minimum, the following should be monitored: flow measurements, vacuum readings, and vapor concentrations from each extraction vent, the manifold, and the effluent stack.

Monitoring of the SVE system every two weeks is recommended, but in no case should the monitoring of flow measurements, vacuum readings, and vapor concentrations from each extraction vent, the manifold, and the effluent stack be less than monthly.

List the monitoring and analytical parameters that will be sampled quarterly as part of the CAP monitoring report.

Use the CAP Analytical Attachment Sheet.

Example

Well Name	Substance(s)
MW - 1	BTEX, MTBE
MW - 3	BTEX, MTBE

IV. Sitemap

Attach a site map to this document

Site map(s) drawn to scale illustrating the following:

a. Location of all present and former tanks, piping and dispensers;
b. Footprint of surface and/or subsurface soil contamination;
c. Footprint of other structures (buildings, canopies, roads, utilities, etc..);
d. Location of treatment systems;
e. Extraction wells;
f. Monitoring wells that will be used for sampling;
g. Groundwater flow direction;
h. North arrow, bar scale, and map legend

Low Temperature Thermal Desorption (LTTD)

Facility or Tank ID: ______________________ Leak ID: ______________________

Do not proceed unless a site characterization has been completed that fully delineates the extent of contamination.

I. Applicability of LTTD	Practical	Not Practical
1. Is the contaminated soil <u>free</u> from high concentration of heavy metals? *There may be limitations on disposal of soils with heavy metals and an air pollution permit may be necessary due to emissions of toxic heavy metals.*	☐ YES	☐ NO
2. Is the contaminated soil <u>free</u> of chlorinated compounds? *Use of LTTD on chlorinated compounds can lead to the formation of dioxins; therefore, LTTD is not recommended for soils with chlorinated compounds.*	☐ YES	☐ NO

II. Evaluation of LTTD Effectiveness	Pretreatment	No Pretreatment
1. Do the contaminated soils have high plasticity?	☐ YES	☐ NO
2. Do contaminated soils contain large (>2”) rocks or debris?	☐ YES	☐ NO
3. Is the contaminated soil moisture content > 35% and/or in contact with the groundwater?	☐ YES	☐ NO
4. Is the volatile concentration of the contaminated soil > 2% by weight (i.e. 2000 Btu/lb)?	☐ YES	☐ NO
5. Are chemicals being treated highly volatile?	☐ YES	☐ NO

If the answer to any of the above questions is yes, then the soils require pretreatment or this remedy may not be used.
If answers to all questions are no, you may proceed to the next section.

II.a Evaluation of LTTD Effectiveness	Test Burn	No Test Burn
1. Do the contaminated soils have a high concentration of humic material?	☐ YES	☐ NO
2. Are contaminant octanol/water partition coefficients relatively high?	☐ YES	☐ NO

If the answer to any of the above questions is yes, then a pilot test or “test burn” must be conducted to demonstrate that LTTD is an applicable remedial technology.
If the test shows it is not applicable, the remedy cannot be used.
If the results of the pilot test indicate that LTTD is applicable, you may proceed to determine if LTTD is practical to use.
If the answer to all questions are no, you may proceed to determine if LTTD is practical to use.

Low Temperature Thermal Desorption (LTTD)

III. Evaluation of the Practicality of Using LTTD	Not Practical	Somewhat Practical
1. Is the depth of contaminated soil at 25 feet or greater below land surface?	☐ YES	☐ NO
2. Does contaminated soil extend off site?	☐ YES	☐ NO
3. Does any contamination extend beneath the building, near building foundations, or in areas where excavation cannot be performed?	☐ YES	☐ NO

If the answer to any of the above questions is yes, then excavation of the soil is not practical; therefore, LTTD is not practical. Consider an in situ remedial technology instead.

If the answer to any question above was no, proceed

III.a Evaluation of the Practicality of Using LTTD	Practical	Not Practical
1. Is sufficient land area available for operation of equipment and temporary storage (staging) of contaminated soil and treated soil?	☐ YES	☐ NO
2. Will surrounding land use permit operation of an onsite system in the neighborhood?	☐ YES	☐ NO

If the answer to any of the above questions is no, then excavated soils must be transported to an off-site facility for treatment.

IV.b Evaluation of the Practicality of Using LTTD	Effective	Somewhat effective
1. Has the proposed desorption unit successfully treated similar solid materials with similar contamination levels?	☐ YES	☐ NO
2. Is the proposed ultimate disposal of the soil (e.g., return to excavation, disposal at landfill) acceptable?	☐ YES	☐ NO

If the answer to any of the above questions is no, then additional information may be requested by WVDEP to evaluate whether LTTD is likely to be an effective remedial technology.
If the answers to the above questions are yes, the remedy should be effective.

Low Temperature Thermal Desorption (LTTD)

V. Design

1. What type of thermal desorption device will be utilized?

   ☐ Direct fired ☐ fired

   ☐ Other (describe): ____________________

2. What is the volume that the desorption device will handle? ____________

3. What is the anticipated operating temperature of the system? (°F) ____________

4. Has WVDEP Solid Waste approved the soil to be placed back into the excavation area?

   ☐ Yes ☐ No *(If no, soil must be disposed of at a WVDEP approved facility)*

5. Were permits for the soil treatment and/or disposal required and obtained?

   ☐ Yes ☐ No ☐ Not Applicable

   If yes, please describe below.

6. Were permits for air emissions required and obtained?

   ☐ Yes ☐ No ☐ Not Applicable

   If yes, please describe below.

VI. Evaluation

1. Provide a brief summary of the number of confirmation samples and proposed analytical parameters that the samples will be analyzed against to show the site has been remediated.

Low Temperature Thermal Desorption (LTTD)

VI. Evaluation (continued)

2. Provide information how you will evaluate the effectiveness of the system?

VI. Sitemap

Attach a site map to this document

Site map(s) drawn to scale illustrating the following:

a. Location of all present and former tanks, piping and dispensers;
b. Footprint of surface and/or subsurface soil contamination;
c. Footprint of other structures (buildings, canopies, roads, utilities, etc.);
d. Layout and dimensions (length, width, and depth) of the final excavation. (if multiple pits were excavated, reference each separately);
e. Location of stockpiled overburden soil and stockpiled contaminated soil, if any;
f. Proposed location of confirmation samples;
g. North arrow, bar scale, and map legend

UECA-LUST Program

West Virginia Department of Environmental Protection
Office of Environmental Remediation

Notice of Intent to Enter UECA-LUST Program

Part 1: Site Information

Facility Information	LEAK #	WV ID #	CLOSURE # (if applicable)	
	FACILITY NAME		PHONE	
	ADDRESS	CITY	ZIP	COUNTY
Responsible Party	NAME	CONTACT PERSON	TITLE	
	EMAIL		PHONE	
	ADDRESS	CITY	STATE	ZIP

Part 2: UECA-LUST Program Applicant Information

The following party will be responsible for achieving No Further Action through the UECA-LUST Program.

UECA-LUST Program Applicant	☐ Responsible Party (as listed above)		☐ Different (information below)	
	NAME	COMPANY	TITLE	
	EMAIL		PHONE	
	ADDRESS	CITY	STATE	ZIP

Part 3: Licensed Remediation Specialist

If a Licensed Remediation Specialist has already been selected for this project, please indicate below.

Licensed Remediation Specialist	☐ Unknown		☐ Known (information below)	
	NAME	COMPANY	LRS #	
	EMAIL		PHONE	
	ADDRESS	CITY	STATE	ZIP

Part 4: Certification

By signing below, the UECA-LUST Applicant certifies that the subject leak is eligible to be remediated under the provisions of the UECA-LUST Program and acknowledges understanding the UECA-LUST Program requirements.

Applicant Signature: ______________________________ **Date:** ____________________

Title: ______________________________

Upon acceptance into the UECA-LUST Program, the applicant will have thirty (30) days to complete and finalize the UECA-LUST Agreement.

UECA-LUST Program Overview and Notice of Intent to Enter UECA-LUST Program Instructions

UECA-LUST Program Overview

The UECA-LUST Program is a voluntary program that is offered by WVDEP to owners and operators of leaking underground storage tanks (responsible parties), property owners, or other stakeholders to complete required remediation and achieve closure (No Further Action) using risk-based principles, when traditional LUST standards are not practical. Any LUST site may enter into the UECA-LUST Program; however, this program is most beneficial for more complicated sites that may have free product, extensive or deep soil contamination, groundwater contamination, or vapor intrusion impacts.

UECA-LUST Program Requirements

The following are requirements for entering and participating in the UECA-LUST Program:

1. Facility in Good Standing
   The site cannot be associated with any outstanding violations, administrative orders, or legal actions by WVDEP.

2. Licensed Remediation Specialist
   The applicant must obtain the services of a West Virginia Licensed Remediation Specialist (LRS).
   An LRS is an individual certified by WVDEP as qualified to supervise the assessment and remediation of contaminated sites and employed by the UECA-LUST Applicant at usual and customary professional rates.

3. WVDEP Reimbursement
   The applicant must reimburse WVDEP for its reasonable administrative costs at 3.5 times the hourly rate of the employee(s) assigned to the site, plus any direct expenses associated with the project. Direct expenses may include sampling supplies, laboratory analysis, travel, etc.

4. UECA-LUST Agreement
   The applicant must assess and remediate impacts associated with the leak in accordance with a schedule outlined in the UECA-LUST Agreement. If the responsible party (RP) fails to pursue closure of the subject leak in accordance with the UECA-LUST Agreement schedule, the WVDEP Office of Environmental Remediation reserves the right to withdraw the site from the UECA-LUST Program and return the leak to the WVDEP LUST Program under the authority of the Underground Storage Tank Act (W. Va. Code § 22-17-1, et seq.).

5. Property Owner Permission
   If the applicant is not the current property owner of the affected property, the applicant must obtain permission to enter the program from the current property owner(s), who will also be required to sign both the UECA-LUST Agreement and the Land Use Covenant.

6. Off-site Property Contamination
   If contamination has migrated to an off-site property (most commonly in groundwater), the off-site contamination must also be addressed in the UECA-LUST Program. The off-site contamination can be addressed by remediating to residential standards, implementing a governmental use restriction, or through a Land Use Covenant recorded on the property deed as part of the remedy. The off-site property owner(s) should be contacted early in the UECA-LUST process to determine current and future property use. If the property owner(s) agrees to place a Land Use Covenant on their property deed, they must also sign and record a Land Use Covenant.

Land Use Covenants

Sites that achieve closure by applying risk-based principles in the UECA-LUST Program generally must record a Land Use Covenant to the affected property deed(s), in accordance with the Uniform Environmental Covenants Act (W. Va. Code § 22-22B-1, et seq.), as part of the remedy. A Land Use Covenant is a legal instrument that imposes one or more activity and use limitations where residual petroleum impacts remain on a property. Common activity and use limitations include:

a) Residential Land Use
Properties that are remediated to industrial standards (rather than more stringent residential standards) may only be used for nonresidential purposes (e.g. commercial, industrial, or manufacturing activities).

b) Groundwater Usage
When contaminants in groundwater are in excess of drinking water standards, use of the groundwater is prohibited, except for monitoring or remediation purposes.

c) Excavation, Drilling, or Penetration of the Land Surface
When certain engineering controls, such as a soil cap, are used as a remedy for the site, excavation, drilling, or penetration of the land surface is prohibited without a knowledgeable contractor to safely handle potentially contaminated soil.

d) Building Construction
When vapor intrusion from contaminated soil and/or groundwater is a concern, new building construction may be prohibited, unless vapor barriers and/or ventilation systems are installed.

For more information about Land Use Covenants, visit the Office of Environmental Remediation's website (https://dep.wv.gov/dlr/oer/landusecovenants/Pages/default.aspx).

Notice of Intent Form Submittal

Return the signed and completed Notice of Intent Form to the following WVDEP email addresses:

Tanks Corrective Action Unit / LUST Program: DEP.AST@wv.gov

Office of Environmental Remediation / UECA-LUST Program: DEPOERFileCopy@wv.gov

The Tanks Corrective Action Unit / LUST Program will review the Notice of Intent within thirty (30) days and contact the Office of Environmental Remediation (OER) regarding acceptance. If the Notice of Intent is accepted by the Tanks Corrective Action Unit / LUST Program, OER will provide a UECA-LUST Agreement template to the applicant to complete. Applicants will have thirty (30) days to complete and finalize the UECA-LUST Agreement.

Coordination with WVDEP LUST Program

A LUST RP must continue to perform all tasks required by the Tanks Corrective Action Unit until such time a signed UECA-LUST Agreement is in place. Failure to do so may result in enforcement actions, which could prevent entry into the UECA-LUST Program. Upon submittal of a UECA-LUST Agreement by the RP, the LUST Program may provide an extension of time to complete tasks while the RP is awaiting on WVDEP to process and sign the UECA-LUST Agreement.

Contact Information

For additional information and inquiries, or assistance with completing the Notice of Intent Form, please contact the WVDEP Office of Environmental Remediation:

Office of Environmental Remediation
West Virginia Department of Environmental Protection
601 57th Street SE
Charleston, WV 25304
Phone: 304-926-0499
Email: DEPOERFileCopy@wv.gov

Application Instructions

Program Overview

The Voluntary Remediation Program (VRP) encourages voluntary remediation and redevelopment of contaminated or potentially contaminated sites in West Virginia by providing financial incentives and limiting liability under environmental laws and rules. The program is authorized by W.V. Code §22-22 (Voluntary Remediation and Redevelopment Act), regulated by 60CSR3 (Voluntary Remediation and Redevelopment Rule), and administered by the Office of Environmental Remediation (OER).

W.V. Code §22-22	Voluntary Remediation and Redevelopment Act https://www.wvlegislature.gov/wvcode/code.cfm?chap=22&art=22
60CSR3	Voluntary Remediation and Redevelopment Rule (last revised 6/1/2020) http://apps.sos.wv.gov/adlaw/csr/readfile.aspx?DocId=53312&Format=PDF

Licensed Remediation Specialists

A Licensed Remediation Specialist (LRS) must be contracted by an applicant for preparation of an application and supervision of the remediation. A LRS is tested, certified, and licensed by WVDEP. The LRS is responsible for all remediation activities at a site and has a duty to protect the safety, health, and welfare of the public in the performance of his or her professional duties.

A list of Licensed Remediation Specialists for hire is located on OER's webpage:
https://apps.dep.wv.gov/oer/l_list4.cfm

Pre-Application Conference

All potential applicants may request a pre-application conference with WVDEP staff prior to submission of an application. The conference will include a discussion of the conditions of the site and the potential future use of the site. Brownfield applicants, as defined by Section 2.8 in the Voluntary Remediation and Redevelopment Rule (60 CSR 3), are required to participate in a pre-application conference.

To request a pre-application conference, contact the Office of Environmental Remediation (304-926-0499).

Application Fee

The application fee must be submitted in the form of a check payable to the West Virginia Department of Environmental Protection. Applications cannot be reviewed prior to receipt of the correct application fee. The check must be submitted with a cover letter containing the applicant's name, site name, site address, and county. The application fee and cover letter must be mailed to:

Attention: Jessica Henson
Office of Environmental Remediation
West Virginia Department of Environmental Protection
601 57th Street SE
Charleston, WV 25304

To determine the application fee for a site, refer to Section 7 of the application.

WITHDRAWALS: If an applicant withdraws an application prior to determination of eligibility to participate by WVDEP or if WVDEP rejects the application and the applicant does not re-submit a revised application within twenty-five (25) days, the applicant will receive a refund of one-half the application fee paid. The application fee is non-refundable if an applicant fails to enter into a Voluntary Remediation Agreement within thirty-one (31) days of the acceptance of an application.

Application Submittal

Submit an electronic copy of the completed, signed application and required attachments to DEPOERFileCopy@wv.gov. NOTE: Scanned signatures are required and accepted on applications.

If the electronic copy cannot be emailed, it may be placed on digital media and mailed with the application fee as indicated below.

Mail the application fee with cover letter to:

Attention: Jessica Henson
Office of Environmental Remediation
West Virginia Department of Environmental Protection
601 57th Street SE
Charleston, WV 25304

Application Review and Process

The WVDEP will review the application within forty-five (45) days of receipt of the application and the application fee, and unless an extension of time is agreed to and confirmed in writing, will approve the application, approve the application with corrections, or deny the application. The WVDEP will provide their determination to the applicant in writing.

Upon acceptance of an application, WVDEP will enter into a Voluntary Remediation Agreement (VRA) with the applicant within thirty-one (31) days after the application has been accepted. If an agreement has not been negotiated by this time, either party may withdraw from negotiations. However, if it becomes impractical to reach an agreement within thirty-one (31) days, the time limit may be extended by mutual agreement and confirmed in writing.

A WVDEP project manager is assigned to each project as the WVDEP designated representative at the site. The project manager will work with the applicant and LRS to properly remediate the site and ultimately issue a Certificate of Completion.

Voluntary Remediation Program Application

Section 1 – PROGRAM ELIGIBILITY

		YES	NO
1.	Has the site been listed or proposed to be listed on the National Priorities List developed by the USEPA pursuant to Title I of the Comprehensive Environmental Response, Compensation, and Liability Act?	☐	☐
2.	Is the site subject to a unilateral order issued by the USEPA pursuant to §104 through §106 of the Comprehensive Environmental Response, Compensation, and Liability Act?	☐	☐
3.	Is the site subject to a unilateral enforcement order under §3008 or §7003 of the Resource Conservation and Recovery Act?	☐	☐
4.	Is the site subject to a unilateral enforcement order for corrective action issued pursuant to any provision of Chapter 22 of the West Virginia Code?	☐	☐
5.	Was the release which is subject to remediation created through gross negligence or willful misconduct by the applicant?	☐	☐

If you answered “yes” to any of the above questions, contact the Office of Environmental Remediation (304-926-0499) for assistance.

Section 2 – APPLICANT INFORMATION

Applicant

Applicant's Legal Name

Aliases or Other Names By Which Applicant Is Known or Does Business

Address	City	State	Zip Code

Type of Entity
☐ Private Business ☐ Non-Profit Corporation ☐ Federal Government ☐ State Government ☐ Local Government
☐ Other:

Relationship to Property
☐ Owner ☐ Operator ☐ Prospective Purchaser ☐ Prospective Operator ☐ Other:

Contact Name	Contact Title

Phone	Alternate Phone	Email

Co-Applicant 1 (if applicable)

Co-Applicant's Legal Name

Aliases or Other Names By Which Co-Applicant Is Known or Does Business

Address	City	State	Zip Code

Type of Entity
☐ Private Business ☐ Non-Profit Corporation ☐ Federal Government ☐ State Government ☐ Local Government
☐ Other:

Relationship to Property
☐ Owner ☐ Operator ☐ Prospective Purchaser ☐ Prospective Operator ☐ Other:

Contact Name	Contact Title

Phone	Alternate Phone	Email

Co-Applicant 2 (if applicable)

Co-Applicant's Legal Name

Aliases or Other Names By Which Co-Applicant Is Known or Does Business

Address	City	State	Zip Code

Type of Entity
☐ Private Business ☐ Non-Profit Corporation ☐ Federal Government ☐ State Government ☐ Local Government
☐ Other:

Relationship to Property
☐ Owner ☐ Operator ☐ Prospective Purchaser ☐ Prospective Operator ☐ Other:

Contact Name	Contact Title

Phone	Alternate Phone	Email

Billable Party

Billable Party	Phone

Mailing Address	City	State	Zip Code

Billable Party Contact Name	Billable Party Contact Title	Billable Party Contact Email

Legal Right to Perform Work Required

One or more of the following forms of proof of the applicant's legal right to perform the work required is attached to the application:

☐ Property Deed ☐ Property Access Agreement

Financial Capabilities

Provide a brief description of the applicant's financial capabilities to successfully complete the voluntary remediation and satisfy any contractual obligations entered into by the applicant that relate to the voluntary remediation.

One or more of the following forms of proof of the applicant's financial capability is attached to the application.

☐ Annual Report or Prospectus for a Publicly Held Company
☐ Letter of Credit or financial reference from Financial Institution
☐ Grant Award
☐ Other:

Is a party other than the applicant providing the proof of financial capability?

☐ No	
☐ Yes	Demonstrate the relationship to the applicant.

Confidentiality Claim

Information obtained by WVDEP for the Voluntary Remediation Program is available to the public unless the applicant demonstrates that the information or parts thereof, if made public, would divulge methods, processes, or activities entitled to protection as trade secrets (any information protected from disclosure under WV Code §29B-1-4(1)).

☐ Applicant asserts a confidentiality claim.
☐ Applicant does not assert a confidentiality claim.

If asserting a confidentiality claim, specify the items for which confidentiality is being claimed.

Section 3 – TECHNICAL CAPABILITIES

LRS Contact Information

LRS Name	Company	LRS Number

Address	City	State	Zip Code

Phone	Alternate Phone	Email

Experience

Has the LRS previously managed West Virginia Voluntary Remediation Program projects?

☐ Yes List the three most recent projects that the LRS has managed.

VRP #	Project Name	COC Issued
		☐
		☐
		☐

☐ No Provide a brief description of any experience applicable to this project.

Section 4 – SITE DESCRIPTION

Physical Location

Site Name			Size (acres)
Physical Address	City	Zip Code	County
Driving Directions (if necessary)			

GIS Data

Collection Point

☐ Center of Site ☐ Main/Front Door ☐ Main Entrance/Front Gate ☐ Other:

Latitude (decimal degrees)	Longitude (decimal degrees)	Horizontal Datum	Accuracy (≤5 meters required)

Additional Locational Data

☐ At least one site map identifying the VRP project site boundaries is attached to the application and also provided as a georeferenced digital file (kml, shp, or dwg).

If necessary, provide a brief description of any other identifying information that will serve to clearly and concisely identify the property.

Legal Description

Provide tax map information for each tax map parcel within the site boundaries.

District	Address/Description	Map No.	Parcel No.	Deed Book	Page No.	Acres

Survey

☐ A survey of the property has been made and is attached to the application. (optional)

Property Owner

☐ Applicant is property owner.

☐

Owner			
Address	City	State	Zip Code
Owner Contact Name	Owner Contact Title		
Phone	Alternate Phone	Email	

☐ The site has more than one current property owner, and additional property owner information is attached to the application.

Operator

☐ n/a ☐ Applicant is operator. ☐ Property owner is operator.

☐

Operator			
Address	City	State	Zip Code
Operator Contact Name	Operator Contact Title		
Phone	Alternate Phone	Email	

☐ The site has more than one current operator, and additional operator information is attached to the application.

Section 5 – EXISTING ENVIRONMENTAL INFORMATION

Site Identification

List all WVDEP and USEPA identification numbers assigned to the site (solid waste, UST/LUST, CERCLIS, RCRIS, UIC, etc.).

Issuing Agency	Type	Identification Number

Environmental Permits

List all past, present, and pending permits issued by WVDEP or USEPA relating to the site.

Issuing Agency	Type	Permit ID	Issue Date	Expiration Date

Site Assessment

Have any environmental site assessments, sample collections, or analyses been performed on the site?

☐ Yes ☐ No

The following environmental site assessments, sample collections, or analyses have been performed and are attached to the application:

☐ Phase I ☐ Phase II ☐ Other:

Past Proceedings

Has the property (or any activity conducted on the property) ever been the subject of an administrative (e.g. consent order), civil, or criminal investigation related to protection of the environment?

☐ No	
☐ Yes	Provide a brief explanation and dates of actions.

Section 6 – REMEDIATION OBJECTIVES

Post-Remediation Use

Future Property Use (check all that apply)

☐ Agricultural ☐ Commercial ☐ Industrial ☐ Recreational ☐ Residential ☐ School ☐ Vacant
☐ Unknown ☐ Other:

Redevelopment

☐ In Progress ☐ Imminent ☐ n/a	Provide a brief description of redevelopment plans.

Section 7 – FEE CALCULATION

(A) Size of Property

Total Square Feet of Surface Area of Property (rounded to nearest 1,000 square feet)	Total Acres (total square feet divided by 43,560)

Determine the points for size of property:

- ☐ **< 1 acre** (10 points)
- ☐ **≥ 1 acre, but < 5 acres** (20 points)
- ☐ **≥ 5 acres** (30 points)

(B) Years of Operation

Years Property Operated for Any Non-Residential Activity (Treat partial years as complete years.)

Determine the points for years of operation:

- ☐ **≤ 10 years** (10 points)
- ☐ **> 10 years, but < 20 years** (20 points)
- ☐ **≥ 20 years** (30 points)
- ☐ **Undetermined** (30 points)

(C) NAICS Code

North American Industry Classification System (NAICS) Code(s) for Activities Conducted on the Property

Review the tables below. If more than one NIACS Code applies, use the one which results in the greatest number of points.

Table A

316	Leather and Allied Product Manufacturing
322	Paper Manufacturing
324	Petroleum and Coal Products Manufacturing
325	Chemical Manufacturing
326	Plastics and Rubber Products Manufacturing
331	Primary Metal Manufacturing
332	Fabricated Metal Product Manufacturing
333	Machinery Manufacturing
334	Computer and Electronic Product Manufacturing
335	Electrical Equipment, Appliance, and Component Manufacturing
336	Transportation Equipment Manufacturing
339	Miscellaneous Manufacturing

Table B

113	Forestry and Logging
211	Oil and Gas Extraction
212	Mining (except Oil and Gas)
213	Support Activities for Mining
221	Utilities
311	Food Manufacturing
312	Beverage and Tobacco Product Manufacturing
313	Textile Mills
314	Textile Product Mills
315	Apparel Manufacturing
321	Wood Product Manufacturing
323	Printing and Related Support Activities
327	Nonmetallic Mineral Product Manufacturing
337	Furniture and Related Product Manufacturing
486	Pipeline Transportation
488	Support Activities for Transportation
511	Publishing Industries (except Internet)
526	Waste Management and Remediation Services

Determine the points for NAICS Code:

- ☐ **NAICS Code not in Table A or B** (10 points)
- ☐ **NAICS Code in Table B** (20 points)
- ☐ **NAICS Code in Table A** (30 points)
- ☐ **NAICS Code undetermined** (30 points)

Total Points

Part A Points	Part B Points	Part C Points	Total Points
+	+	=	

Determine application fee based on total score:

- ☐ **30 or 40** ($1,000.00)
- ☐ **50 or 60** ($3,000.00)
- ☐ **70, 80, or 90** ($5,000.00)

Section 8 – STATEMENT OF AFFIRMATION

I certify that I am fully authorized to act on behalf of the applicant. I affirm that the information provided in this application and its attachments, to the best of my knowledge and belief, is true, complete, and accurate. Upon approval of this application, I will execute a Voluntary Remediation Agreement (VRA) within thirty-one (31) days of the date of WVDEP's acceptance letter.

Applicant Print Name: ____________________ Title: ____________________

____________________ ____________________
Signature Date

Co-Applicant 1 Print Name: ____________________ Title: ____________________

____________________ ____________________
Signature Date

Co-Applicant 2 Print Name: ____________________ Title: ____________________

____________________ ____________________
Signature Date

I certify that I have prepared and/or approved the site assessment provided with this application.

LRS Print Name: ____________________

____________________ ____________________
Signature Date

ATTACHMENTS

Indicate the items attached to the application.

Required Attachments

- ☐ Proof of Legal Right to Perform Work Required (Section 2)
- ☐ Proof of Financial Capability (Section 2)
- ☐ Site Map(s) and Georeferenced Digital File(s) (Section 4)
- ☐ Environmental Site Assessment(s) (Section 5)
- ☐ Conceptual Site Model Worksheet

Conditional Attachments

- ☐ Survey of Property (Section 4)
- ☐ Additional Property Owner Information (Section 4)
- ☐ Additional Operator Information (Section 4)
- ☐ Other:
- ☐ Other:
- ☐ Other:
- ☐ Other:
- ☐ Other:

Conceptual Site Model Worksheet

Section 1 – SITE CHARACTERISTICS

Geologic Setting

Geologic Setting Characteristics
☐ Alluvial Setting ☐ Fractured Rock ☐ Karst ☐ None Listed

Soil

Soil Type (check all that apply)
☐ Gravel ☐ Sand ☐ Silt ☐ Clay ☐ Fill Material

Groundwater

Depth to Groundwater Range (feet)	Groundwater Flow Direction	Underlying Aquifer
		☐ Confined ☐ Perched ☐ Unconfined ☐ Unknown

Are there any known discharge points from the underlying aquifer? ☐ Yes ☐ No

Distance from Known Discharge Points to Site (miles)

Surface Water

List each local surface water body (lake, pond/impoundment, river, spring/seep, stream, wetlands).

Type	Name or Identifying Information	Distance from Site (feet)

Site Activities

Past or Current Site Activities
☐ Deep/Surface Mining ☐ Injection or Extraction Wells ☐ Monitoring Wells ☐ Waste Storage/Disposal

Section 2 – SITE USE

Historical Site Use

Land Use (check all that apply)

☐ Agricultural ☐ Commercial ☐ Industrial ☐ Recreational ☐ Residential ☐ School ☐ Vacant
☐ Other:

List past and current property owners/operators, a description of operations, and the approximate dates of ownership/operation.

Approximate Dates	Owner/Operator Name	Description of Operations

Current Site Use

Land Use (check all that apply)

☐ Agricultural ☐ Commercial ☐ Industrial ☐ Recreational ☐ Residential ☐ School ☐ Vacant
☐ Other:

If necessary, provide additional current site use description.

Future Site Use

Land Use (check all that apply)

☐ Agricultural ☐ Commercial ☐ Industrial ☐ Recreational ☐ Residential ☐ School ☐ Vacant
☐ Unknown ☐ Other:

If necessary, provide additional future site use description.

Historical Adjacent Property Use

Land Use (check all that apply)

☐ Agricultural ☐ Commercial ☐ Industrial ☐ Recreational ☐ Residential ☐ School ☐ Vacant
☐ Other:

If necessary, provide additional historical adjacent property use description.

Current Adjacent Property Use

Land Use (check all that apply)

☐ Agricultural ☐ Commercial ☐ Industrial ☐ Recreational ☐ Residential ☐ School ☐ Vacant
☐ Other:

If necessary, provide additional current adjacent property use description.

Section 3 – CONTAMINANT SOURCE CHARACTERISTICS

Nature of Contamination

Provide a brief description of the type, source, and extent of the contamination.

Evidence of Contamination

Known or Suspected Source(s) of Contamination (check all that apply)

- ☐ Analytical data
- ☐ Free product or sheen on groundwater surface
- ☐ Free product or sheen on ponded water
- ☐ Free product or sheen on surface water body
- ☐ Odor
- ☐ Other:
- ☐ Oil, tar, or other non-aqueous phase contaminant (≥1,000 sq ft)
- ☐ Ponded contaminants
- ☐ Stained saturated soil or backfill
- ☐ Stressed biota (fish kills, stressed vegetation, etc.)

Source(s) of Contamination

Known or Suspected Source(s) of Contamination (check all that apply)

- ☐ Aboveground Storage Tank System (AT)
- ☐ Adjacent Property (AP)
- ☐ Burial or Dumping of Wastes (BD)
- ☐ Other (OT):
- ☐ Drums or Storage Containers (DS)
- ☐ Industrial Accident (IA)
- ☐ Routine Industrial Operations (IO)
- ☐ Surface Spill or Discharge (SD)
- ☐ Underground Storage Tank System (UT)
- ☐ Unknown (UK)

Contaminants

For each contaminant, indicate: Source(s) of contamination as labeled above (AT, AP, BD, etc.)
Known (K) and suspected (S) contamination for each media affected

Contaminant	Source(s)	Soil	Groundwater	Surface Water	Sediments	Air
Example	*BD, IO*	*K*	*K*	*S*		
Chlorinated Solvents						
Dioxins						
Metals						
PCBs						
Pesticides / Herbicides						
Petroleum						
SVOCs						
VOCs						
Other:						
Other:						
Other:						
Other:						

Section 4 – INTERIM REMEDIAL ACTIONS

Interim Remedial Actions

Are there any interim remedial actions that have or will take place on the site?

☐ No

☐ Yes Specify the remedial actions.

Remedial Action	Planned	Initiated	Completed
Containing contamination	☐	☐	☐
Excavating contaminated soil	☐	☐	☐
Providing temporary water supplies	☐	☐	☐
Recovering free product	☐	☐	☐
Removing regulated substance from storage tank(s)	☐	☐	☐
Removing storage tank(s)	☐	☐	☐
Other:	☐	☐	☐
Other:	☐	☐	☐

Section 5 – AFFECTED MEDIA, TRANSPORT MECHANISMS, EXPOSURE PATHWAYS, AND RECEPTORS

Affected Media

Affected or Potentially Affected Media (check all that apply)

☐ Soil ☐ Groundwater ☐ Surface Water ☐ Sediments ☐ Air

Transport Mechanisms

Identify contaminant transport mechanisms.

Contaminant	Erosion/Runoff	Fugitive Dust	Leaching	Volatilization
	☐	☐	☐	☐
	☐	☐	☐	☐
	☐	☐	☐	☐
	☐	☐	☐	☐

Local Water Supplies

Indicate the supply for each local water need and the distance of the supply from the site.

Local Water	Surface	Downstream Distance (feet)	Well	Downgradient Distance (feet)
Public Water System	☐		☐	
Private Residential	☐		☐	
Agricultural	☐		☐	
Industrial / Commercial	☐		☐	

Is the groundwater connected to or part of an aquifer that serves as a source of drinking water? ☐ Yes ☐ No

Other Surface Water Use

Surface Water Use (check all that apply)

☐ Boating ☐ Fish and Wildlife Habitat ☐ Recreational Fishing ☐ Subsistence Fishing ☐ Swimming ☐ Not Used

☐ Other:

Exposure Pathways

Current and Future Exposure Pathways (check all that apply)

Inhalation

- ☐ Soil Particles
- ☐ Vapors released from Groundwater
- ☐ Vapors released from Soil

Dermal Contact

- ☐ Groundwater
- ☐ Sediments
- ☐ Soil
- ☐ Surface Water

Ingestion

- ☐ Groundwater
- ☐ Sediments
- ☐ Soil
- ☐ Surface Water
- ☐ Aquatic Organisms
- ☐ Plants
- ☐ Terrestrial Animals

Receptors

Current and Future Receptors (check all that apply)

Human

- ☐ Residential
- ☐ Commercial / Industrial
- ☐ Construction / Outdoor Maintenance Worker
- ☐ Recreational / Trespasser
- ☐ Other:

Ecological

- ☐ Aquatic
- ☐ Terrestrial

NO FURTHER ACTION

WVDEP Division of Water and Waste Management
Office of Environmental Enforcement
Tanks Corrective Action Unit

601 57th Street SE
Charleston, WV 25304
304-926-0470

west virginia department of environmental protection

Leak ID:

A review of the information provided in compliance with the Confirmed Release Notice to Comply issued on for the facility referenced below has been completed.

Owner (at time of leak)

Owner:

Address: **Phone:**

City: **State:** **Zip:**

Responsible Party

Responsible party: **Contact:**

Address: **Phone:**

City: **State:** **Zip:**

Operator (at time of leak)

Operator:

Address:

City: **State:** **Zip:**

Facility Information

Facility Name: **Contact Name:** **Facility ID:**

Address: **Phone:**

City: **County:** **Zip:**

Review of Confirmed Release

Based on the information that you have provided, the Tanks Corrective Action Unit has determined that you have successfully met the requirements of 40CFR280 Subpart F. Therefore, "NO FURTHER ACTION" is required at this time for the above referenced site.

Report Submittals

All Reports/correspondence must reference the Leak ID and WV ID and be mailed and e-mailed to the following locations:

Address: Email: Phone: Fax:	WVDEP-Tanks, 601 57th Street SE, Charleston, WV 25304 Attn: TANKS - CORRECTIVE ACTION UNIT Email: dep.ast@wv.gov

Additional Comments

Sent Via:

Signature: ______________________ Date: ______________________

APPENDIX F- UST-LUST CLOSURE MEMO

west virginia department of environmental protection

MEMORANDUM

TO: Underground Storage Tank (UST) Owners, Operators, & Class B Certified Workers

FROM: West Virginia Department of Environmental Protection
Division of Water & Waste Management/EE
Tanks Prevention & Corrective Action Units

SUBJECT: UST/LUST Closure Guidance Memo

DATE: Revised September 17, 2018

PLEASE READ ALL DIRECTIONS CAREFULLY. FAILURE TO COMPLY WITH THE LAWS AND/OR REGULATIONS MAY RESULT IN ENFORCEMENT ACTION. AN INDIVIDUAL HOLDING A WVDEP CLASS B CERTIFICATION MUST BE ON SITE PERFORMING OR SUPERVISING THE CLOSURE OR CHANGE-IN-SERVICE. In accordance with 33CSR30 Section 3.2, the Class B certified worker is responsible for ensuring that the closure in conducted in accordance with all applicable rules, regulations, and policies established by the Secretary. 40CFR280 Subpart G must be complied with fully for closures or change-in-service.

I) REPORTING CONTAMINATION

If evidence (visual, olfactory, field screening, analytical data, etc.) of a release is found in the form of contaminated soils, contaminated groundwater, or free product as a liquid or vapor, it is the responsibility of the tank owner/operator to report the release immediately. **ALL RELEASES** (i.e. any product found outside of the UST system represents a release) must be reported, even if it will be immediately remediated as part of the closure.

Release shall be immediately reported to the WVDEP spill line at **1-800-642-3074**. Additionally, during DEP office hours, the Tanks Corrective Action unit shall be notified of a confirmed release by calling 304-926-0499, ext. 1817. Ultimately, the tank owner/operator is responsible for reporting releases; however, the release can be called in by the Class B certified worker or other designee of the owner/operator.

Failure to report a release is a violation of federal and state regulations and may result in enforcement action.

II) <u>CLOSURE PLANNING</u>

Since the possibility of encountering contamination at a closure is high, UST owners/operators shall develop plans for handling contaminated soils and/or water prior to beginning the actual closure. The Tanks Corrective Action Unit (TCAU) strongly recommends that owners/operators submit proposed bio-pile treatment plans or make arrangements for disposal of contaminated soil at an appropriate landfill prior to beginning tank closure activities in order to minimize delays and work stoppages if contamination is encountered.

Excavated backfill material generated during the removal of the tank(s) and/or piping shall be placed on, and covered, with plastic. The use of 6-mil plastic for short term storage (72 hours or less) for placement of tanks for cleaning or contaminated soil prior to disposal is acceptable. Measures shall be taken to prevent any surface runoff from entering or washing away the excavated backfill material (e.g., berms, straw bales, etc.). It some cases it may be advantageous to separate excavated soil based on visual observations or field screening into non-impacted and impacted piles.

In accordance with the Solid Waste rules, petroleum contaminated soils are considered a "special waste" and must be handled as such. **<u>Be advised, p</u>etroleum contaminated soils (whether removed from the ground or lying loose within the excavation) must be properly handled and disposed of at an approved landfill.** Alternatively, the material may be placed in a biopile in accordance with section XIII of this guidance. Field screening with a properly calibrated photoionization detector may be utilized for determining if soil is by definition a petroleum contaminated soil (i.e. 100 ppm petroleum hydrocarbons) or not. Alternatively, stockpile samples may be collected and sent to a laboratory for analysis. If material is placed back into the excavation, documentation showing that the material does not meet the definition of petroleum contaminated soil shall be included in the closure report. Closure sampling data must be reflective of contamination remaining at the site.

Additionally, any **<u>accumulated water with a sheen observed</u> <u>within the excavation zone</u>** at the time of closure **<u>must be removed, containerized, treated and properly disposed</u>** to protect groundwater. The excavation should be observed to determine whether groundwater recharge occurs during the remainder of the permanent closure process. Any water removed shall be properly containerized, treated, and disposed in accordance with applicable regulatory requirements. The tank owner/operator has the option of on-site treatment after obtaining a NPDES permit for the treatment and discharge of the contaminated water. Alternatively, the owner/operator may have the contaminated water transported to an appropriate permitted facility for treatment/disposal.

Any permit, receipt, or letter documenting the disposal or treatment of contaminated water shall include the amount of water disposed of and/or treated, the assigned leak number for the site, and any analytical results required for the NPDES permit or by the permitted facility.

<u>After removal of the tanks and piping</u>**<u>, it is highly recommended that the excavation be backfilled with soil</u>** not gravel or sand. The Tier 2 and Tier 3 soil action levels which offer greater flexibility on corrective action take into consideration the depth of contamination and the presence of an appropriate soil covering. There must be a minimum of 5-foot of vertical separation between contamination and a receptor (i.e. person, house, etc.) utilizing a soil like silt loam or one with less hydraulic conductivity than silt loam to utilize the Tier 2 or Tier 3 standard for certain volatiles without having to perform mitigation. It is highly recommended that any excavation area is

backfilled with soil that is a **SILT LOAM** or a soil type like silt loam or one with less soil saturated hydraulic conductivity. The use of gravel or sand as backfill material may lead to further need for soil remediation than would be necessary if the excavation was backfilled with soil.

III) FEEs

All fees must be paid before the closure may begin. Exceptions may be allowed for later payment if the tank owner/operator is under a WVDEP administrative order or under court order for the tank removal.

IV) NOTIFICATION

At least thirty (30) days before beginning either permanent closures or change-in-service the owner or operator must complete and submit an "Intent to Close" form to DEP.AST@wv.gov to schedule the date the closure will begin. A waiver of the thirty (30) day notification period may be granted for good cause shown.

V) HANDLING OF TANK CONTENTS, LIQUID CONTENTS/TANK BOTTOMS

A) The Division of Water & Waste Management strongly advocates the reuse or recycling of the contents. Legitimate recycling is reuse as a fuel and/or returned to a product tank. Mixtures of gasoline and minimal* amounts of water, destined to be used as is or used to produce a fuel, are not wastes.

*NOTE: Minimal, for the sake of this document, shall be defined as a quantity of water in a container of less than or equal to 110 gallons not exceeding 20% of the total fuel/water mixture (20% water/80% fuel). A container with the capacity of greater than 110 gallons may contain a quantity of water not to exceed 10% of the total fuel/water mixture (10% water/90% fuel). Waste mixtures of fuel and water that exceed the 10% or 20% water/fuel limits may be phase separated, at the site of generation, to remove the water phase. The water phase would then be evaluated on its own merit (i.e. waste characterization and disposal).

A) Claims that gasoline is reusable as a fuel must be supported by the following:

1) Gasoline to be reused must be managed in a product-like manner, in good containers that are environmentally protective. Management in poor condition and/or leaking containers is an indication that the fuels are wastes instead of product. The container holding the material shall be properly labeled as to its contents.
2) The BTU value of the gasoline shall be at least 5000 BTUs.
3) The generator must have a known market for the material.
4) The generator must maintain records of the disposition of the gasoline.
5) Shipments of the materials must meet all DOT rules and regulations, including proper labeling, placarding and transport vehicle requirements.
6) Gasoline or gasoline/water mixtures that are claimed to be product cannot contain tank bottoms.

B) If the tank contents are not being reused as product or fuel as outlined in (A) above, appropriate testing must be performed on the material to determine if the material is a hazardous waste (the material may be declared a hazardous waste without testing at the owner's discretion):

a) Wastes determined to be hazardous wastes must be managed as such in accordance with 40 CFR 262 (i.e. proper containers, labeled as hazardous waste, dated, limited storage times, etc.).

b) Hazardous Waste EPA Identification Number: Each site in West Virginia where hazardous wastes are generated must have an EPA identification number. If the site does not already have a number, a temporary number can be obtained by calling the Division of Water & Waste Management, Office of Waste Management at (304) 926-0495. This number is required to properly ship hazardous waste off-site. Please have the following information before you call:

A. Tank owner's name
B. Location of the tank(s)
C. Amount of waste
D. Waste type (benzene, lead, ignitable, etc.)
E. Contractor name and phone number
F. Transporter's EPA Identification Number
G. Name of disposal facility
H. Disposal facility's EPA Identification Number

C) Industrial Waste (lab analysis proves the waste is not a hazardous waste):

a) This waste must be disposed of at a facility permitted to accept non-hazardous industrial wastes.

VI) TANK SYSTEM EMPTIED

The Regulations provide that the American Petroleum Institute Practices 1604 and 2016 may be used to comply with the closure requirements. All relevant and applicable OSHA and NIOSH Safety Standards must be followed while performing closure activities.

The tank and piping must be emptied. The UST system is empty when all materials have been removed using commonly accepted practices. Observe the precautions in API 1604 (Section 4 Permanent Closure and Change in Service). The liquids and tank bottom residues must be removed from the tank by using explosion-proof or air driven pumps. Piping shall be drained into the tank. It may be necessary to remove the last few inches of liquid from the bottom of the tank with a hand pump or vacuum truck. Safety precautions must be followed (See API 1604).

VII) PURGING OF VAPORS

The tank must be purged of flammable vapors or inerted. This shall be done by following API 1604 Permanent Closure and Change in Service. It is important to recognize that the tank may continue to be a source of flammable vapors even after following the vapor freeing procedures. For this reason, caution must be used when working around the tank. Follow API 1604 Section 4. Continued vapor monitoring and safe handling and storage procedures must be applied to the tank to protect human health and the environment (See API 1604). A tank closure shall not be started unless the Class B certified worker has equipment present on site to perform these activities.

VIII) CLEANING

The tank system must be cleaned by removing all liquids and accumulated tank bottom sludge. Personnel cleaning the tank system shall be adequately trained, outfitted, and familiar with the safety precautions necessary when performing this work (see API 2016). For tanks that have contained leaded gasoline it is essential that tank bottoms removal be performed with precautions specified in API 2016. Tank bottoms may be removed by various methods depending on the tank. The simplest method is to wash, brush or sweep the tank bottoms into piles; shovel the tank bottoms into buckets or wheelbarrows; sweep and wash down the tank with a water hose stream; and remove the remaining moisture by using an absorbent. Vacuum trucks may also be used. Any waste material (tank bottoms or absorbent material) must be disposed of properly (see Section V). Care must be taken during tank bottoms removal to minimize the release of vapors from the tank bottoms. After tank cleaning, it is recommended that the tank be processed for scrap metal.

IX) TANK REMOVAL PROCEDURES

For tank removal follow the removal procedure in API 1604.

X) SITE ASSESSMENT

Site assessments must be performed according to Section 280.72. Sampling must be performed to measure for the presence of a release where contamination is most likely to be present. If there is obvious contamination from a release (e.g. stained soils) a sample must be collected from this area. All samples shall be collected from native soil, sampling of non-soil like backfill material is not acceptable. **Sample depths to the nearest foot and soil type must be documented** and included in the closure report. If sampling depths are not documented, all data will be compared against the more conservative Tier 1 action level. Closure sampling data must be reflective of the soils remaining in the pit. At a minimum, samples shall be collected as:

One (1) sample in the native soil below each tank;
One (1) discrete sample in native soil from each of the four (4) pit walls from the tank pit;
One (1) from under each dispenser in native soil; and
One (1) sample from native soil every 15 feet along the product piping.

To get maximum flexibility out of the tiered standard, collection of additional closure samples at varying depths is highly recommended. During a piping closure, sometimes the piping may be pulled through the piping chase. This should first be discussed with the UST inspector for the facility. Closure of piping in this manner does not relieve the tank owner/operator from the requirement to sample in the native soil every 15 foot along the piping run. The Class B certified worker performing the tank and/or piping closure shall perform or oversee all the closure sampling.

Any **accumulated water with a sheen observed within the excavation zone** at the time of closure **must be removed** to protect groundwater. The excavation should be observed to determine whether groundwater recharge occurs during the remainder of the permanent closure process. Any water removed shall be properly disposed, recycled, or treated as appropriate. The tank owner/operator has the option of on-site treatment after obtaining a NPDES permit for the treatment and discharge of the contaminated water. Alternatively, the owner/operator may have the contaminated water transported to an appropriate permitted facility for treatment/disposal. If the excavation recharges with water, a water sample shall be collected in lieu of a floor soil sample. If the water does not recharge, then floor samples of the soil shall be collected as described above.

If accumulated water in the excavation zone does not have a sheen or other obvious signs of contamination, removal of the water may not be necessary. A pit water sample may be taken in lieu of a floor sample. However, if the pit is completely filled with water, the pit will need to be dewatered in order to collect wall samples. It is not acceptable to only collect a pit water sample for the floor and walls. The walls must be sampled. Additionally, you must collect piping and/or dispenser samples. If you have sampling questions, please don’t hesitate to contact the Tanks Inspector for the county where the closure is occurring.

Further analysis may be required if a release is confirmed. A site sketch of the facility showing the locations of the sample collection points is to be submitted with the closure documentation. **Soil sampling protocol for volatile organics (such as BTEX, MTBE, and TBA) must follow the requirements of SW846 Method 5035 utilizing vials with preservatives for collection of VOCs.** For assessment all soil and/or groundwater must be analyzed for:

<u>GASOLINE</u> (leaded gasoline, unleaded gasoline, aviation gasoline, jet fuel, racing fuel, etc.)

- BTEX using SW846 8260
- Tertiary butyl alcohol (TBA) using SW846 8260
- Methyl tertiary butyl ether (MTBE) using SW846 8260
- Lead (as applicable) using SW846 6010

Note: Samples must be analyzed for lead if the gasoline is a leaded gasoline such as commonly found in some aviation and racing fuels.

<u>DIESEL</u> (diesel, kerosene, fuel/heating oil, lubricating oils, and used oils)

- BTEX using SW846 8260
- Polyaromatic hydrocarbons (PAHs) using SW846 8270
- RCRA metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver) using SW846 6010, as applicable

Note: For used oil, metals must be analyzed in addition to the other parameters listed above. Ethylene glycol or a chlorinated solvent scan may be required if the possibility that these compounds have been added to a use oil tank.

For all samples, the method's detection levels must be less than or equal to the groundwater standards and soil action levels, as appropriate. The samples must constantly be kept cool at 42 degrees F (6 degrees C) and shall be analyzed within 14 days. A properly completed chain of custody form must accompany the sample to the laboratory. The laboratory performing the analysis must be certified by the WVDEP Division of Water & Waste Management. When an analytical method is referenced, the most recently promulgated method must be followed.

XI) <u>REPORTS</u>

The WVDEP UST Closure Report form shall be used for submitting all tank and piping closure reports. All sections of the report are to be completed in their entirety and all applicable attachments submitted with the report. The Closure Report should be sent electronically to DEP.AST@wv.gov where it will be distributed to the appropriate staff. UST closure sampling shall be performed as soon as possible after the tank closure activities have begun. Sampling must be commenced within 48 hours of starting closure activities. Closure reports are due within sixty (60) days of the closure sampling.

The closure report at a minimum shall contain the following items; notification form, tank closure form, tank contents disposal and/or reuse/recycling records, tank system (including piping) disposal receipts, copies of lab analysis results and chain of custody form.

ANALTICAL DATA must be put into a Table and show at a minimum the following: sample description, sample depth, analytical parameter, units, sample concentration, and the action level. USE the appropriate DEP Analytical Table for reporting closure sample data.

XII) MAINTAINING RECORDS

Tank owners/operators must maintain the closure record in accordance with Part 280.34(b)(5) that can demonstrate compliance with these closure requirements. The results of the excavation zone assessment must be maintained by you for at least three (3) years after completion of the permanent closure or may be mailed to the West Virginia Department of Environmental Protection, Division of Water & Waste Management, Office of Environmental Enforcement, Tanks Unit if they cannot be maintained at the closed facility.

XIII) MANAGING PETROLEUM CONTAMINATION

In accordance with requirement of 40CFR280.66 (d)), owners and operators may, in the interest of minimizing environmental petroleum contamination and promoting more effective cleanup, begin cleanup before a corrective action plan is requested or approved provided they:

1) Notify the implementing agency of their intention to being cleanup;

2) Comply with any conditions imposed by the implementing agency, including halting cleanup or mitigating adverse consequences from cleanup activities; and

3) Incorporate these self-initiated cleanup measures in the corrective action plan that is submitted to the implementing agency for approval.

4) If the owner/operator has received preapproval at an appropriate landfill for contaminated soil, they may proceed with over excavation and proper disposal of contaminated soils even if the amount exceeds eighteen (18) cubic yards.

The Tanks Corrective Action Unit encourages the tank owner/operator to begin remediation immediately upon the discovery of a release. As such, low impact sites may utilize FastTrack to facilitate a speedy remediation by limiting the amount of paperwork necessary to go from a release occurred to the issuance of a No Further Action (NFA) letter. Refer to the Corrective Action Guidance Document for more information on FastTrack.

When minor soil contamination is found, an amount that does not exceed 18 cubic yards (or cover an area of 18 feet x 18 feet x 1.5-2 feet) may be over-excavated and treated on site in an aboveground bio-pile treatment cell (though off-site disposal is preferred), so long as the following requirements are strictly adhered to.

1. The biopile shall be constructed and located in an area that will prevent impacts to surface and groundwater resources, and not cause nuisance complaints from neighbors.

2. The soils shall be placed on a minimum of 40 mil black plastic to prevent infiltration into the existing ground.

3. The soils shall be placed such that no area exceeds 1.5-2 feet in depth.

4. The soils shall be securely covered always with a minimum of 40 mil black plastic, to prevent precipitation infiltration and to maintain appropriate moisture content.

5. After 6 months from the date of the release, the bio-pile shall be evaluated; if the soil does not exhibit obvious petroleum contamination as determined through olfactory, and recording PID readings, or other screening methods, a representative sample shall be obtained from near the bottom of the center area of the bio-pile, (from approximately 6 inches above the plastic liner) and submitted to a West Virginia certified laboratory for analysis per the parameters outlined in Section X Site Assessment of this document. If the bio-pile still shows evidence of contamination through the screening or sample analysis, then the treatment cell shall remain in effect. At the end of the of a second six (6) month period, the soils must be evaluated and analyzed as noted above. <u>No bio-pile shall remain in place for longer than eighteen (18) months.</u>

6. A copy of the results of the soils analyses shall be forwarded to the designated CAU Project Manager for the county where the facility is located. The submitted analyses reports shall be identified by the name of the facility; the tank owner/operator; the leak number; the West Virginia Facility ID number; and the closure number.

7. If space for treating the contaminated soils cannot be found on site or the quantity of contaminated soils exceeds 18 cubic yards, additional excavation may not proceed until a Corrective Action Plan (CAP) with site-specific details is submitted to the CAU PM. The CAP for off-site landfarming must include:

   A. Estimated volume of soil be stockpiled off site;
   B. Proposed method of treatment;
   C. Copy of a topographic map specifying the bio-pile location;
   D. Diagram of the soils treatment area;
   E. Acknowledgement and agreement signed by the property owner on which the bio-pile is proposed to be located
   F. **<u>In all instances</u>**, if groundwater is encountered, the appropriate CAU Project Manager must be contacted as soon as possible and a groundwater investigation will be required.

XIV. <u>CORRECTIVE ACTION PLANS</u>

The Tank owner/operator must prepare and submit a Corrective Action Plan (CAP) within one hundred twenty (120) days of a release when requested by WVDEP. Not all confirmed releases will require submittal of a CAP. In some cases, the contamination at a site may be minor and would not require the submittal of a CAP (i.e. FastTrack) and in other cases the tank owner/operator may choose to use a <u>presumptive remedy</u> instead of submitting a CAP, if appropriate. A "presumptive remedy" refers to a technology or technique where experience has shown the remedy to be a proven solution for specific types of sites and/or contaminant classes. Refer to the Corrective Action Guidance Document for more information on presumptive remedies.

The Agency encourages the use of presumptive remedies. The use of these remedies streamlines the selection of clean up technologies and shifts the time and resources to the actual corrective action process, it improves consistency, reduces costs, and increases the speed at which sites are remediated.

NOTICE

Failure to abide by these instructions may result in the initiation of enforcement actions against the owner, operator, Class B certified worker, and/or anyone who perform closure work for which they are not certified. Failure to adhere to these instructions may be grounds for the suspension or revocation of a certified worker's license.

<u>APPENDIX G</u>- UST-LUST WORKPLAN TEMPLATE

WEST VIRGINIA
FY2020 – FY2022 RCRA SUBTITLE I UNDERGROUND STORAGE TANK PROGRAM WORKPLAN

Goal 1: Core Mission: Deliver real results to provide Americans with clean air, land, and water, and ensure chemical safety.			
Objective 1.3 Revitalize Land and Prevent Contamination - Provide better leadership and management to properly clean up contaminated sites to revitalize and return the land back to communities.			
			PRC: 302DJ6
Workplan Component: **Compliance**	**Work Years/Allocated Funding:** **FY 2020: $323,843/3.5 FTEs** **FY 2021: $323,843/3.5 FTEs** **FY 2022: $323,843/3.5 FTEs**	**West Virginia Contact:** ***Ruth M. Porter, Tanks Program Manager*** ***304-926-0499 x 1007*** ***Ruth.M.Porter@wv.gov*** ***Megan Browning, Grants Manager,*** ***304-926-0499 x 1281*** ***Megan.D.Browning@wv.gov***	**EPA Contacts:** **Program: SPM** **Grants: Evelyn Velazquez 215-814-5412**
Environmental Outcomes	**Measures**	**Outputs for FY20-22 (Commitments)**	**Status/Comment**
To reduce the risks to human health and the environment from Underground Storage Tank (UST) releases by properly managing petroleum and hazardous substances.	A. By the end of FY 2022, develop a baseline for the new technical compliance rate (TCR) for both release detection and release prevention. In subsequent years attempt to increase the percentage of UST facilities that are in compliance with the TCR with both release detection and release prevention by 0.5% over the previous year's target.	A1. West Virginia will report Technical Compliance Rate (TOC) for the reporting period A2. West Virginia will report the number of Active federally-regulated facilities A3. West Virginia will report the number of USTs in temporary closure. A4. West Virginia will report the number of Active Hazardous Substance USTs. A5. West Virginia will report any observable trends in confirmed releases. A6. West Virginia will report inspection information in the attached UST Inspection Tracking Chart (Table 1). A7. West Virginia may report any other outputs.	A1. % in compliance for spill prevention: % in compliance for overfill prevention: % in compliance for corrosion protection: % in compliance with RD: Technical compliance rate: % in compliance for operator training: % in compliance with FR % in compliance with walkthrough A2. A3. A4. A5. A6. A7.

Goal 1: Core Mission: Deliver real results to provide Americans with clean air, land, and water, and ensure chemical safety.			
Objective 1.3 Revitalize Land and Prevent Contamination - Provide better leadership and management to properly clean up contaminated sites to revitalize and return the land back to communities.			
			PRC: 302DJ6
Workplan Component: **Compliance/Monitoring and Enforcement**	**Work Years/Allocated Funding:** **FY 2020: $323,843/3.5 FTEs** **FY 2021: $323,843/3.5 FTEs** **FY 2022: $323,843/3.5 FTEs**	**West Virginia Contact:** ***Ruth M. Porter, Tanks Program Manager*** ***304-926-0499 x 1007Ruth.M.Porter@wv.gov*** ***Megan Browning, Grants Manager,*** ***304-926-0499 x 1281*** ***Megan.D.Browning@wv.gov***	**EPA Contacts:** **Program: SPM** **Grants: Evelyn Velazquez**
Environmental Outcomes	**Measures**	**Outputs for FY20-22 (Commitments)**	**Status/Comment**
To reduce the risks to human health and the environment from Underground Storage Tank (UST) releases by properly managing petroleum and hazardous substances.	B. Number of TOC inspections conducted **Note**: This assumes that 100% of SOC inspections include FR Number of other types of inspections conducted **Note**: West Virginia may count EPA UST inspections (either a UST-only inspection or an inspection done as part of a multi-media inspection) conducted in the West Virginia toward the 3-year inspection requirement of the Energy Policy Act. Inspection or targeting strategy Number of enforcement actions taken and amount of penalties collected	B1. West Virginia will report the number of Technical Compliance Rate (TOC) inspections performed. B2. West Virginia will describe its inspection or targeting criteria if EPA believes the West Virginia will not achieve the 3-year inspection requirement (include number of inspections). West Virginia will strive to meet the 3-year inspection requirement providing that grant allocations are sufficient to hire and maintain the necessary inspection staff. B3. West Virginia will report the number of enforcement actions taken and the amount of penalties collected. B4. West Virginia will seek to support Region 3 and OUST initiatives as best as limited resources allow. B5. Annually, at end-of-year, West Virginia will submit a printout of its universe of USTs. The printout will include: (1) facility identifying information, and (2) the date of last inspection.	B1. B2. B3. B4. B5. (EOY only) B6. B7.

		B6. West Virginia will report enforcement information in the attached UST Enforcement Tracking Chart (Table 2). B7. West Virginia may report any other outputs	
Goal 1: Core Mission: Deliver real results to provide Americans with clean air, land, and water, and ensure chemical safety.			
Objective 3.2: Preserve Land – Conserve resources and prevent land contamination by reducing waste generation, increasing recycling, and ensuring proper management of waste and petroleum products.			
			PRC: 302DJ6
Workplan Component: **Compliance/Energy Policy Act**	**Work Years/Allocated Funding:** **FY 2020: $323,843/3.5 FTEs** **FY 2021: $323,843/3.5 FTEs** **FY 2022: $323,843/3.5 FTEs**	**West Virginia Contact:** ***Ruth M. Porter, Tanks Program Manager*** ***304-926-0499 x 1007Ruth.M.Porter@wv.gov*** ***Megan Browning, Grants Manager,*** ***304-926-0499 x 1281*** ***Megan.D.Browning@wv.gov***	**EPA Contacts:** **Program: SPM** **Grants: Evelyn Velazquez**
Environmental Outcomes	**Measures**	**Outputs for FY20-22 (Commitments)**	**Status/Comment**
To reduce the risks to human health and the environment from Underground Storage Tank (UST) releases by properly managing petroleum and hazardous substances.	C. In accordance with the timelines and details of the Energy Policy Act Grant Guidelines, implement appropriate regulatory and program capabilities to comply with the provisions of the Energy Policy Act of 2005.	C1. West Virginia will implement the requirements of the Energy Policy Act Grant Guidelines in these areas: a) Secondary Containment or Financial Responsibility (for manufacturers & installers) b) Delivery Prohibition c) Operator Training Program d) Public Record e) Three-year Inspection f) Certification of compliance prior to grant award, amendment, or increase. C2. West Virginia may report any other outputs.	C1. a) b) c) d) e) f) C2.

Goal 1: Core Mission: Deliver real results to provide Americans with clean air, land, and water, and ensure chemical safety.			
Objective 3.2: Preserve Land – Conserve resources and prevent land contamination by reducing waste generation, increasing recycling, and ensuring proper management of waste and petroleum products.			
			PRC: 302DJ6
Workplan Component: **Compliance/Energy Policy Act**	**Work Years/Allocated Funding:** **FY 2020: $323,843/3.5 FTEs** **FY 2021: $323,843/3.5 FTEs** **FY 2022: $323,843/3.5 FTEs**	**West Virginia Contact:** ***Ruth M. Porter, Tanks Program Manager*** ***304-926-0499 x 1007Ruth.M.Porter@wv.gov*** ***Megan Browning, Grants Manager,*** ***304-926-0499 x 1281*** ***Megan.D.Browning@wv.gov***	**EPA Contacts:** **Program: SPM** **Grants: Evelyn Velazquez**
Environmental Outcomes	**Measures**	**Outputs for FY20-22 (Commitments)**	**Status/Comment**
To reduce the risks to human health and the environment from Underground Storage Tank (UST) releases by properly managing petroleum and hazardous substances.	C. In accordance with the timelines and details of the Energy Policy Act Grant Guidelines, implement appropriate regulatory and program capabilities to comply with the provisions of the Energy Policy Act of 2005.	C1. West Virginia will implement the requirements of the new 2015 UST Amendments. C2. West Virginia may report any other outputs.	C1. C2.

Goal 1: Core Mission: Deliver real results to provide Americans with clean air, land, and water, and ensure chemical safety.			
Objective 3.2: Preserve Land – Conserve resources and prevent land contamination by reducing waste generation, increasing recycling, and ensuring proper management of waste and petroleum products.			
			PRC: 302DJ6
Workplan Component: **Program Development/Implementation**	**Work Years/Allocated Funding:** **FY 2020: $323,843/3.5 FTEs** **FY 2021: $323,843/3.5 FTEs** **FY 2022: $323,843/3.5 FTEs**	**West Virginia Contact:** ***Ruth M. Porter, Tanks Program Manager*** ***304-926-0499 x 1007Ruth.M.Porter@wv.gov*** ***Megan Browning, Grants Manager,*** ***304-926-0499 x 1281*** ***Megan.D.Browning@wv.gov***	**EPA Contacts:** **Program: SPM** **Grants: Evelyn Velazquez**
Environmental Outcomes	**Measures**	**Outputs for FY20-22 (Commitments)**	**Status/Comment**

To reduce the risks to human health and the environment from Underground Storage Tank (UST) releases by properly managing petroleum and hazardous substances.	D. Consider and implement any innovative methods to improve program performance (e.g., Multi-Site Agreements, etc.) Coordinate with Water programs to optimize potential protections to human health and the environment. Maintain / expand program knowledge & expertise.	D1. West Virginia will report any innovative methods used to improve program performance. D2. West Virginia will discuss coordination with Water Programs. D3. West Virginia will attend and participate in National Tanks Conferences, EPA Region 3 All-States Meetings, and UST Inspector Workshops, as scheduled. D4. West Virginia may report any other outputs.	D1. D2. D3. D4.

<table>
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<tr><td colspan="3"></td><td>PRC: 302DJ6</td></tr>
<tr><td>Workplan Component:
Administrative & Program Planning</td><td>Work Years/Allocated Funding:
FY 2020: $323,843/3.5 FTEs
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Ruth M. Porter, Tanks Program Manager
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<tr><td>Environmental Outcomes</td><td>Measures</td><td>Outputs for FY20-22
(Commitments)</td><td>Status/Comment</td></tr>
<tr><td>To reduce the risks to human health and the environment from Underground Storage Tank (UST) releases by properly managing petroleum and hazardous substances.</td><td>E. Develop and maintain administrative and planning functions sufficient to implement an effective UST program.</td><td>E1. West Virginia will ensure the quality of data management systems and eliminate data entry backlogs via periodic data reviews, training, and database improvements.

E2. West Virginia will report Semi-Annual Measures data into the LUST4 database within 7 calendar days of the end of the semi-annual reporting period.

E3. West Virginia will submit narrative Self-Assessment Reports within 30 days after the end of the semi-annual reporting period (by April 30 and October 31), and participate in semi-annual reviews.

E4. West Virginia will support regional and EPA strategic planning efforts.

E5. West Virginia will allocate In-Kind funding to support staff attendance at UST inspector workshops, All-States Meetings, and other EPA training.</td><td>E1.

E2.

E3.

E4.

E5.</td></tr>
</table>

Goal 1: Core Mission: Deliver real results to provide Americans with clean air, land, and water, and ensure chemical safety.			
Objective 1.3 Revitalize Land and Prevent Contamination - Provide better leadership and management to properly clean up contaminated sites to revitalize and return the land back to communities.			
			PRC: 302DJ6
Workplan Component: Administrative & Program Planning	**Work Years/Allocated Funding:** **FY 2020: $323,843/3.5 FTEs** **FY 2021: $323,843/3.5 FTEs** **FY 2022: $323,843/3.5 FTEs**	**West Virginia Contact:** ***Ruth M. Porter, Tanks Program Manager*** ***304-926-0499 x 1007Ruth.M.Porter@wv.gov*** ***Megan Browning, Grants Manager,*** ***304-926-0499 x 1281*** ***Megan.D.Browning@wv.gov***	**EPA Contacts:** **Program: SPM** **Grants: Evelyn Velazquez**
Environmental Outcomes	**Measures**	**Outputs for FY20-22 (Commitments)**	**Status/Comment**
To reduce the risks to human health and the environment from Underground Storage Tank (UST) releases by properly managing petroleum and hazardous substances.	E (cont'd). Develop and maintain administrative and planning functions sufficient to implement an effective UST program.	E6. West Virginia will prepare and maintain current, EPA-approved QMP & QAPP. West Virginia will also review the existing EPA-approved plan by year-end and report on need to revise/update the plan. Note: List approval/due dates	E6.
		E7. West Virginia will work toward implementation of the provisions of the newly revised UST regulations including taking appropriate steps to adopt new regulations, apply for state program approval, and update MOAs. Regions will implement the new regulations in Indian country.	E7.
		E8. West Virginia will request documentation during inspections to determine whether facilities storing higher blends of ethanol or biofuels are in compliance with EPA's compatibility requirements. West Virginia will also verify compliance with compatibility requirements during installation of any new UST system components.	E8.
		E9. West Virginia may report other outputs.	E9.

Goal 1: Core Mission: Deliver real results to provide Americans with clean air, land, and water, and ensure chemical safety.			
Objective 1.3 Revitalize Land and Prevent Contamination - Provide better leadership and management to properly clean up contaminated sites to revitalize and return the land back to communities.			
			PRC: 302DJ6
Workplan Component: Miscellaneous Program Activities	**Work Years/Allocated Funding:** **FY 2020: $323,843/3.5 FTEs** **FY 2021: $323,843/3.5 FTEs** **FY 2022: $323,843/3.5 FTEs**	**West Virginia Contact:** ***Ruth M. Porter, Tanks Program Manager*** ***304-926-0499 x 1007Ruth.M.Porter@wv.gov*** ***Megan Browning, Grants Manager,*** ***304-926-0499 x 1281*** ***Megan.D.Browning@wv.gov***	**EPA Contacts:** **Program: SPM** **Grants: Evelyn Velazquez**
Environmental Outcomes	**Measures**	**Outputs for FY20-22 (Commitments)**	**Status/Comment**
To reduce the risks to human health and the environment from Underground Storage Tank (UST) releases by properly managing petroleum and hazardous substances.	F. Describe the measure for any West Virginia-specific activity not addressed elsewhere	F1. West Virginia may report other West Virginia-specific outputs not previously covered.	F1.

Table 1: UST Inspection Tracking Chart

Active federally-regulated UST facilities in District: **[__#__]**	**Reporting Periods** (non-cumulative)								**Annual Total FY[__]**			
	1st half FY[__]				**2nd half FY[__]**							
Inspection Type	**District Inspections**	**3rd Party Inspections** (completed)	**Total**	**Frequency** [universe / (inspections x 2)]	**District Inspections**	**3rd Party Inspections** (completed)	**Total**	**Frequency** [universe / (inspections x 2)]	**District Inspections**	**3rd Party Inspections** (completed)	**Total**	**Frequency** (universe / inspections)
Significant Operational Compliance (SOC) **Note: Assumes 100% includes FR**												
# of follow-up inspections	-		-		-		-					

Table 2: UST Enforcement Tracking Chart

	Reporting Periods (non-cumulative)	
Enforcement Type	**1st half FY[__]**	**2nd half FY[__]**
Informal Actions		
NOVs		
Directive Letters		
Field Directives		
Letters of Agreement		
Letters of Warning		
Notices of Non-Compliance		
Other (Define)		
Formal Actions		
Field Citations		
Complaints		
Consent Orders		
Emergency Compliance		
Administrative Complaints		
Unilateral Orders		
Field Orders		
Penalties Collected	$	$

The Enforcement Tracking Chart above is to be used to track UST facility enforcement only. States are requested to report a single number for each enforcement type category (Informal Action/ Formal Action) or, alternatively, to break actions down into their subcategories. The use of State-specific subcategories is acceptable.

The minimum requirement for an enforcement action to qualify as an Informal Action is that the action must require the facility to return to compliance within a specified time period and to notify the State. For example, leaving a copy of the inspection report that requires the following actions by the facility would qualify as an Informal Action: (1) the facility must return to compliance within a certain period of time, and (2) the facility must certify to the State that it has returned to compliance. To leave a copy of an inspection report that does not require the above actions, does not qualify as an Informal Action.

WEST VIRGINIA
FY2020 – FY2022 RCRA SUBTITLE I: LEAKING UNDERGROUND STORAGE TANK PROGRAM WORKPLAN

Goal 1: Core Mission: Deliver real results to provide Americans with clean air, land, and water, and ensure chemical safety.			
Objective 1.3 Revitalize Land and Prevent Contamination - Provide better leadership and management to properly clean up contaminated sites to revitalize and return the land back to communities.			
			PRC #: 302D87
Workplan Component: **Achievement of LUST Corrective Action Goals**	**Work Years/Allocated Funding:** **FY 2020: 5.1/$586,143** **FY 2021: 5.1/$586,143** **FY 2022: 5.1/$586,143**	**West Virginia Contact:** ***Melissa McCune, Program Manager,*** ***304-574-4465 x 1021042158*** ***Melissa.D.McCune@wv.gov*** ***Megan Browning, Grants Manager,*** ***304-926-0499 x 1281*** ***Megan.D.Browning@wv.gov***	**EPA Contacts:** **Program: SPM** **Grants: Evelyn Velazquez 215-814-5412**
Environmental Outcomes	**Measures**	**Outputs for FY20-22 (Commitments)**	**Status/Comment**
To control the risks to human health and the environment by mitigating the impact of accidental or intentional releases and by cleaning up and restoring contaminated sites or properties to appropriate levels.	A. By the end of FY 2022, reduce the regional backlog of LUST cleanups (confirmed releases that have not yet been cleaned up) that do not meet state risk-based standards for human exposure and groundwater migration by 1% per year to a maximum of 10%. **Note**: *We are using the national goal number from the FY2018 – 2022 EPA Strategic Plan*	A1. West Virginia will complete an amount of LUST site cleanups to achieve grant-supported and overall goals. Cleanups supported by federal grant: 40 __ FY20 40 __ FY21 40 __ FY22 West Virginia will strive to meet the backlog reduction requirement providing that grant allocations are sufficient to hire and maintain the necessary staff and monies are available to address sites with no viable responsible parties (RP). A2. West Virginia will report the number of confirmed releases and indicate the percentage change from the prior year's number. A3. Report percent backlog as a number A4. West Virginia may report other outputs.	A1. A2. Number of confirmed releases: % change from prior year (+/-): A3. [Open sites]/[Historical confirmed releases] = % backlog A4.

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<tr><td colspan="3"></td><td>PRC #: 302D87</td></tr>
<tr><td>Workplan Component:
Reduction of LUST Site Backlog</td><td>Work Years/Allocated Funding:
FY 2020: 5.1/$586,143
FY 2021: 5.1/$586,143
FY 2022: 5.1/$586,143</td><td>Melissa McCune, Program Manager,
304-574-4465 x 1021042158
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(Commitments)</td><td>Status/Comment</td></tr>
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To control the risks to human health and the environment by mitigating the impact of accidental or intentional releases and by cleaning up and restoring contaminated sites or properties to appropriate levels.	B. By the end of FY 2020, reduce the regional backlog of LUST cleanups (confirmed releases that have not yet been cleaned up) that do not meet state risk-based standards for human exposure and groundwater migration by 1% per year to a maximum of 10%. **Note**: *We are using the national goal number from the FY2018 – 2022 EPA Strategic Plan*	B1. West Virginia will analyze LUST site backlog data to develop a program which meets the national goals of reducing backlog. B2. West Virginia will provide EPA with the following information, as available, on the backlog: Facility identification number Date of confirmed release Coordinates of facility, if/when available Address of the facility, if/when available Note sites with no apparent viable RP (State Lead) B3. West Virginia will pursue innovative processes (e.g., Pay-for-Performance, Multi-Site Agreements, RBDM, TRIAD, etc.) to expedite cleanups. B4. West Virginia will attend and participate in National Tanks Conferences, EPA Region 3 All-States Meetings, and LUST Technical Workshops, as scheduled. B5. West Virginia may report other outputs.	B1. B2. [Open sites]/[Historical confirmed releases] = % backlog B3. B4. B5.

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<tr><td colspan="3"></td><td>PRC #: 302D87</td></tr>
<tr><td>Workplan Component:
Managing Negative Impacts from Fuel Additives and Alternative Fuels</td><td>Work Years/Allocated Funding:
FY 2020: 5.1/$586,143
FY 2021: 5.1/$586,143
FY 2022: 5.1/$586,143</td><td>Melissa McCune, Program Manager,
304-574-4465 x 1021042158
Melissa.D.McCune@wv.gov
Megan Browning, Grants Manager,
304-926-0499 x 1281
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Program: SPM
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(Commitments)</td><td>Status/Comment</td></tr>
<tr><td>To control the risks to human health and the environment by mitigating the impact of accidental or intentional releases, and by cleaning up and restoring contaminated sites or properties to appropriate levels.</td><td>C. By the end of FY 2020, reduce the regional backlog of LUST cleanups (confirmed releases that have not yet been cleaned up) that do not meet state risk-based standards for human exposure and groundwater migration by 1% per year to a maximum of 10%.

Note: We are using the national goal number from the FY2018 – 2022 EPA Strategic Plan</td><td>C1. West Virginia will monitor, track, and report on LUST sites by priority code:
1) free product, vapor issues, or significant groundwater contamination,
2) soil and groundwater; and,
3) soils only

C2. West Virginia will support regional efforts to ascertain impacts from oxygenates and alternative fuels, and to develop program tools to prevent and remediate negative impacts.

C3. West Virginia may report other outputs.</td><td>C1.

C2.

C3.</td></tr>
</table>

Goal 1: Core Mission: Deliver real results to provide Americans with clean air, land, and water, and ensure chemical safety.			
Objective 1.3 Revitalize Land and Prevent Contamination - Provide better leadership and management to properly clean up contaminated sites to revitalize and return the land back to communities.			
			PRC #: 302D87
Workplan Component: Land Revitalization	**Work Years/Allocated Funding:** **FY 2020: 5.1/$586,143** **FY 2021: 5.1/$586,143** **FY 2022: 5.1/$586,143**	***Melissa McCune, Program Manager,*** ***304-574-4465 x 1021042158*** ***Melissa.D.McCune@wv.gov*** ***Megan Browning, Grants Manager,*** ***304-926-0499 x 1281*** ***Megan.D.Browning@wv.gov***	**EPA Contacts:** **Program: SPM** **Grants: Evelyn Velazquez**
Environmental Outcomes	**Measures**	**Outputs for FY20-22 (Commitments)**	**Status/Comment**
To control the risks to human health and the environment by mitigating the impact of accidental or intentional releases and by cleaning up and restoring contaminated sites or properties to appropriate levels.	D. By the end of FY 2020, reduce the regional backlog of LUST cleanups (confirmed releases that have not yet been cleaned up) that do not meet state risk-based standards for human exposure and groundwater migration by 1% per year to a maximum of 10%. **Note**: *We are using the national goal number from the FY2018 – 2022 EPA Strategic Plan*	D1. West Virginia will seek to integrate a redevelopment approach into its LUST site cleanup program and to take advantage of funding opportunities made available from Brownfields legislation for abandoned LUST sites. D2. West Virginia will seek to share and promote redevelopment success stories, as appropriate. D3. West Virginia will work to enhance community engagement during redevelopment of abandoned LUST sites, as appropriate. D4. West Virginia may report other outputs.	D1. D2. D3. D4.

Goal 1: Core Mission: Deliver real results to provide Americans with clean air, land, and water, and ensure chemical safety.			
Objective 1.3 Revitalize Land and Prevent Contamination - Provide better leadership and management to properly clean up contaminated sites to revitalize and return the land back to communities.			
			PRC #: 302D87
Workplan Component: Administrative & Program Planning	**Work Years/Allocated Funding:** **FY 2020: 5.1/$586,143** **FY 2021: 5.1/$586,143** **FY 2022: 5.1/$586,143**	***Melissa McCune, Program Manager,*** ***304-574-4465 x 1021042158*** ***Melissa.D.McCune@wv.gov*** ***Megan Browning, Grants Manager,*** ***304-926-0499 x 1281*** ***Megan.D.Browning@wv.gov***	**EPA Contacts:** **Program: SPM** **Grants: Evelyn Velazquez**
Environmental Outcomes	**Measures**	**Outputs for FY20-22 (Commitments)**	**Status/Comment**
To control the risks to human health and the environment by mitigating the impact of accidental or intentional releases and by cleaning up and restoring contaminated sites or properties to appropriate levels.	E. West Virginia will develop and maintain administrative and planning functions sufficient to implement an effective LUST program.	E1. West Virginia will maintain an effective Cost Recovery program in accordance with 40 CFR part 31, OSWER Directive 9650.10A, and with other applicable regulations or guidance. West Virginia will report the amount of federal LUST trust funds recovered.	E1.
		E2. West Virginia will ensure the quality of data management systems and eliminate data entry backlogs via periodic data reviews, training, and database improvements.	E2.
		E3. West Virginia will foster and enhance partnerships with Water Programs to address petroleum groundwater contamination.	E3.
		E4. West Virginia will support State Program Approval efforts, as needed.	E4.
		E5. West Virginia will report Semi-Annual Measures data into the LUST4 database within 7 calendar days of the end of the semi-annual reporting period.	E5.

Goal 1: Core Mission: Deliver real results to provide Americans with clean air, land, and water, and ensure chemical safety.			
Objective 1.3 Revitalize Land and Prevent Contamination - Provide better leadership and management to properly clean up contaminated sites to revitalize and return the land back to communities.			
			PRC #: 302D87
Workplan Component: Administrative & Program Planning	**Work Years/Allocated Funding:** **FY 2020: 5.1/$586,143** **FY 2021: 5.1/$586,143** **FY 2022: 5.1/$586,143**	***Melissa McCune, Program Manager,*** ***304-574-4465 x 1021042158*** ***Melissa.D.McCune@wv.gov*** ***Megan Browning, Grants Manager,*** ***304-926-0499 x 1281*** ***Megan.D.Browning@wv.gov***	**EPA Contacts:** **Program: SPM** **Grants: Evelyn Velazquez**
Environmental Outcomes	**Measures**	**Outputs for FY20-22 (Commitments)**	**Status/Comment**
To control the risks to human health and the environment by mitigating the impact of accidental or intentional releases and by cleaning up and restoring contaminated sites or properties to appropriate levels.	E (cont'd.). West Virginia will develop and maintain administrative and planning functions sufficient to implement an effective LUST program.	E6. West Virginia will submit a narrative Self-Assessment Report within 30 days after the end of the semi-annual reporting period (by April 30 and October 31) and participate in semi-annual reviews. E7. West Virginia will allocate In-Kind funding to support staff attendance at National Tanks Conferences, EPA Region 3 All-States Meetings, and LUST Technical Workshops, as scheduled. E8. West Virginia will support regional and EPA strategic planning efforts. E9. West Virginia will prepare and maintain current, EPA-approved QMP & QAPP. West Virginia will also review the existing EPA-approved plans by year-end and report on need to revise/update the plans. E10. West Virginia may report other outputs.	E6. E7. E8. E9. E10.

Goal 1: Core Mission: Deliver real results to provide Americans with clean air, land, and water, and ensure chemical safety.			
Objective 1.3 Revitalize Land and Prevent Contamination - Provide better leadership and management to properly clean up contaminated sites to revitalize and return the land back to communities.			
			PRC #: 302D87
Workplan Component: Miscellaneous Program Activities	**Work Years/Allocated Funding:** **FY 2020: 5.1/$586,143** **FY 2021: 5.1/$586,143** **FY 2022: 5.1/$586,143**	***Melissa McCune, Program Manager,*** ***304-574-4465 x 1021042158*** ***Melissa.D.McCune@wv.gov*** ***Megan Browning, Grants Manager,*** ***304-926-0499 x 1281*** ***Megan.D.Browning@wv.gov***	**EPA Contacts:** **Program: SPM** **Grants: Evelyn Velazquez**
Environmental Outcomes	**Measures**	**Outputs for FY20-22 (Commitments)**	**Status/Comment**
To control the risks to human health and the environment by mitigating the impact of accidental or intentional releases and by cleaning up and restoring contaminated sites or properties to appropriate levels.	F. Describe the measure for any West Virginia-specific activities or special projects not addressed elsewhere.	F1. West Virginia may report other West Virginia-specific outputs not previously covered.	F1.

SAMPLING AND ANALYSIS PLAN
GUIDANCE AND TEMPLATE

Leaking Underground Storage Tank (LUST) Program

This Sampling and Analysis Plan (SAP) guidance and template is intended to assist tank owners and consultants in documenting the procedural and analytical requirements for site-specific projects that require the submittal of an SAP. The template combines the basic elements of a Quality Assurance Project Plan (QAPP) and a Field Sampling Plan (FSP) or Site Assessment Work Plan and meets the requirements under the West Virginia Department of Environmental Protection (WVDEP) Leaking Underground Storage Tank (LUST) Quality Assurance Program Plan (QAPrP) and the WVDEP Quality Management Plan (QMP).

The format is designed for use in projects generating a limited number of samples collected over a relatively short period of time. This template is not appropriate for on-going monitoring events, for remediation, UST closures, or removal activities. Exceptions to all of these requirements will be considered on a case-by-case basis but should be discussed with the Tanks Corrective Action Unit (TCAU) Project Manager before the SAP is submitted for approval.

This guidance is a modified version of the Sampling and Analysis Guidance and Template developed by Region 9, Environmental Protection Agency (EPA) dated May 2014. The template provides item-by-item instructions for each section. If appropriate, the language from any section may be used as written or modified to reflect project-specific requirements. Not all sections will apply to all projects. A brief description of what the section is about is provided for all sections and should be deleted prior to submittal of the SAP.

Some sections, such as those describing sampling procedures, contain example language which can be used with or without modification. If these procedures do not meet project needs, they should be replaced by a description of the sampling procedures to be followed for the project. Alternatively, where appropriate, a standard operating procedure (SOP) may be referenced instead of providing detailed text. When SOPs are utilized, they must be referenced in the text section and the Contractor SOPs must be provided in an Appendix to the SAP. It is not necessary to include a WVDEP SOPs from the Agency QAPrP if it is referenced as being used for the project.

An electronic version of the template is available and can be used to prepare the SAP. All instructions and examples, shown in shaded *italic* type, should be deleted from the final SAP.

Suggested text, which may be included as written in the SAP, is presented in normal type. This text can be used, modified, or deleted depending on the nature of the project. For example, if the project only involves groundwater sampling, the discussion of sampling other matrices should be deleted. If there is more than one option, choose the appropriate one and delete the others.

An underlined blank area (___________) in the template indicates that text should be added. Examples or choices may be in [brackets] and *italic* type following the blank space. If appropriate, select one and delete the others. If an appropriate choice is not provided, then provide one and delete all other choices listed. Use as much space as necessary to completely address each section. Remove the underlining from the added text.

If a given section does not apply, it is recommended that it be kept in the SAP with the statement "Not applicable" or "Does not apply" under the section heading. This avoids the writer having to renumber sections. If sections that are not relevant to the project are removed altogether, the remaining sections will need to be renumbered.

Example forms are provided in Attachment 1. These forms should be deleted from the final SAP.

Please contact the TCAU Project Manager for the area that the site is located in for assistance in completing the SAP. TCAU contacts can be found at https://dep.wv.gov/WWE/ee/tanks/lustmain/Pages/default.aspx.

Sampling and Analysis Plan for

[Title of Project]

[Name and Address of Contractor/Organization Here]

____

Date

TABLE OF CONTENTS

ATTACHMENT 1 - EXAMPLE FORMS

1.0 INTRODUCTION

*This section should include a **brief** description of the project, the problem to be investigated, and the scope of sampling effort. These topics will be covered in depth later so do not include a detailed discussion here.*

1.1 Site Name or Sampling Area

Provide the most commonly used name of the site or sampling area. Also include the name or abbreviation (e.g., "the Site"), if any, that will be used throughout the plan.

1.2 Site or Sampling Area Location

Provide a general description of the region, state or tribal area in which the site or sampling area is located. Include the street address, city, state, and postal code, if appropriate. Detailed sampling location information should be provided later in Section 2.

1.3 Responsible Agency

Provide a description of the company/organization conducting the sampling.

1.4 Project Organization

Fill in the information requested in Table 1-1, modifying it to the specific project and deleting what is not relevant. Provide the name, phone number, and email address of the person(s) and/or contractor(s) working on the sampling project as listed in the table. A brief description of the roles and responsibilities for each key position should be included, either in the table (as shown) or within the text of this section.

It should be noted that it is the responsibility of the Quality Assurance (QA) Officer to oversee the implementation of the Sampling and Analysis Plan (or QA Project Plan if one has been prepared), including whether specified quality control (QC) procedures are being followed as described. Ideally, this individual should discuss QA issues with the Project Manager but should not be involved in the data collection/analysis/interpretation/reporting process except in a review or oversight capacity. If the project is small, another technical person may fulfill this role.

Table 1-1 – Key Project Personnel Contact Information and Responsibilities

Title	Name	Phone Number Email Address	Responsibilities
Contractor Project Manager			
Contractor Quality Assurance Officer			
Laboratory Quality Assurance Officer			
WVDEP TCAU Project Manager			
WVDEP TCAU QAM			

2.0 BACKGROUND

This section provides an overview of the location, previous investigations, and the apparent problem(s) associated with the site or sampling area.

2.1 Site or Sampling Area Description

At a minimum, two maps of the area should be provided. First, a map showing the area within its geographic region should be provided. Second, a map showing proposed sampling locations on the site. Additional maps or figures may be provided, as necessary, for clarity. Maps should include a North arrow, a surface and/or ground water directional flow arrow (if appropriate), buildings or former buildings, spill areas, and other items described in Section XIV of the TCAU Site Investigation Report Template, as may be applicable. etc

Fill in the blanks.

The site or sampling area occupies __________ [*e.g., acres or square feet*] in a ________________ [*e.g., urban, rural, commercial, industrial, residential, agricultural, or undeveloped*] area. The site or sampling area is bordered on the north by ___________, on the west by ______________, on the south by ________________, and on the east by ________________. The specific location of the site or sampling area is shown in Figure ____.

Additional information should be provided that describes or shows the historic and current on-site structures and other important site features.

2.2 Operational History

As applicable, describe in as much detail as needed the past and present activities at the site or sampling area. The discussion might include the following information:

- *a description of the owner(s) and/or operator(s) of the site or areas near the site or the sampling area (in chronological order);*
- *a description of past and current operations or activities that may have contributed to suspected contamination;*
- *a description of the processes involved in the operation(s) and the environmentally detrimental substances, if any, used in the processes;*
- *a description of any past and present waste management practices.*

2.3 Previous Investigations/Regulatory Involvement

Provide a brief summary of previous sampling efforts at the site that may have bearing upon this current investigation. The summary should describe the following, at a minimum:

- *sampling date(s);*
- *name of the party(ies) that conducted the sampling;*
- *local, tribal, state or federal government agency for which the sampling was conducted;*
- *a rationale for the sampling;*
- *the type of media sampled (e.g., soil, sediment, water);*
- *laboratory methods that were used;*
- *a discussion of what is known about data quality and usability.*

2.4 Geological Information

For surface and/or ground water sampling: Provide a description of the hydrogeology of the area. Indicate the direction of flow for surface and/or ground water and include a directional flow arrow on the appropriate figure.

For soil sampling: Provide a description of the geology of the area.

2.5 Environmental and/or Human Impact

Discuss what is known about the potential and actual impacts of the possible environmental problem at the site on human health or the environment.

3.0 PROJECT DATA QUALITY OBJECTIVES

The Data Quality Objective (DQO) process determines the level of data quality needed for specific collection activities during sampling and analysis. The process begins with defining the problem, moves into decision making, and develops a decision rule in order to optimize a design plan.

3.1 Project Objectives and Problem Definition

Describe the purpose of the environmental investigation and how the data will be used. Discuss how the site's history relates to the problem to be investigated, the scope of the sampling effort, and the types of analyses required.

3.2 Data Quality Objectives (DQOs)

Data quality objectives (DQOs) are quantitative and qualitative criteria upon which project decisions are based. DQOs should cover the following items:

- *Describe the problem to be investigated.*
- *Identify what questions the study will attempt to answer, what actions (decisions) may result, and who the primary decision maker is.*
- *Identify the information that needs to be obtained and the measurements that need to be taken to resolve the decision statement(s).*
- *Define study boundaries, and when and where data should be collected.*

The use of "...if...then" statements is recommended. Some examples: "If contaminants of concern are not detected above the action level, then no further action is required." or "If contaminants of concern are found above the action level, then recommendations for further action, such as additional sampling, will be evaluated."

This section should describe decisions to be made based on the data and provide criteria on which these decisions will be made. Inclusion of this information in one or more tables is acceptable (See Table 3-1 for reference) or you may reference appropriate action level tables from the TCAU Corrective Action Guidance Document (CAGD) It should be noted that detection limits should be below action level criteria and when it is not, an exceedance of the action level will be assumed.

3.3 Data Quality Indicators (DQIs) and Measurement Quality Objectives (MQOs)

Data Quality Indicators (DQIs) provide a means to evaluate the quality of data and are normally defined in terms of PARCCS (precision, accuracy, representativeness, completeness, comparability, and sensitivity (method detection limits). You may reference the QAPrP for these terms; however, you will need to provide a minimum acceptable percentage for completeness, precision and accuracy in this document.

Data Quality Indicators provide a means to evaluate the quality of data and are defined in terms of precision, accuracy, representativeness, completeness, comparability and sensitivity (PARCCS). These terms are defined in the WVDEP QAPrP for the UST/LUST Program and are incorporated here by reference.

While a completeness goal of 100 % is desirable, achieving an overall completeness goal of *[specify the percentage (i.e. 95%, 90%, 85%, 80%]*, will be considered acceptable for this project. The minimum goal for precision and accuracy for this project is *[specify the percentage (i.e. 95%, 90%, 85%, 80%]* and *[specify the percentage (i.e. 95%, 90%, 85%, 80%]*, respectively.

3.4 Data Review and Validation

Discuss data review and data validation, including what organizations or individuals will be responsible for what aspects of data review and what the review will include. This section should also discuss how data that do not meet data quality objectives will be designated, flagged, or handled. Possible corrective actions associated with the rejection of data, such as reanalysis or resampling, should be addressed. Where possible and applicable, reference should be made to appropriate sections of the UST/LUST QAPrP. Data validation should be performed in accordance with EPA's Guidance for Labeling Externally Validated Laboratory Data for Superfund Use (January 2009).

Data review and validation is the process of examining field and laboratory analytical procedures and the resulting data to determine how well they conform to the requirements stated in this SAP.

Validation of samples for this project will be performed in accordance with the *[specify the level (i.e. Stage 1, Stage 2A, Stage 2B, Stage 3, Stage 4]* of EPA's Guidance for Labeling Externally

Validated Laboratory Analytical Data for Superfund Use (January 2009). At a minimum, *[specify the percentage]* of data will undergo data validation to the level specified above.

3.5 Data Management

Provide a list of the steps that will be taken to ensure that data are transferred accurately from collection to analysis to reporting. Discuss the measures that will be taken to review the data collection processes, including field notes or field data sheets; to obtain and review complete laboratory reports; and to review the data entry system, including its use in reports. A checklist is acceptable.   Attach any SOPs being utilized as an appendix or provide text indicating which SOPs from WVDEP's QAPrP are being used for the project.

All data collected during the sampling activities, including field and laboratory activities, will be recorded, reduced, reviewed, and reported. The Contractor's [*specify who is responsible (i.e. Project Manager, Quality Assurance Officer*] is responsible for these functions for field sample data, as appropriate. SOPs will be utilized in project data collection to ensure environmental sample collection efforts are comparable.

Include this sentence, if appropriate; otherwise delete.

Refer to Appendix [*specify appendix*] for SOPs being utilized on this project.

Include this sentence, if appropriate; otherwise delete.

SOPs from WVDEP's QAPrP are being utilized for this project. WVDEP SOPs being utilized are: [*specify SOPs being utilized*]

As required, a WVDEP certified laboratory [*specify lab*] is being utilized for this project. The lab has a current WVDEP lab certification for analysis to be performed for this project. The laboratory receiving field samples is responsible for the recording, reduction, reviewing, and reporting of the corresponding analytical results. WVDEP's Division of Water and Waste Management (DWWM) Laboratory Quality Assurance Program is responsible for certifying environmental laboratories in order to ensure that all divisions of WVDEP receive accurate and reliable analytical data. Laboratories are certified when they follow approved methods, employ well-trained capable staff, and use equipment and instrumentation suited to the work they perform.

3.6 Assessment Oversight

Describe the procedures which will be used to implement the QA Program. This includes oversight by the Quality Assurance Manager, or the person assigned QA responsibilities. Indicate how often a QA review of the different aspects of the project, including audits of field and laboratory procedures, use of performance samples, review of laboratory and field data, etc., will take place. Describe what authority the QA Manager or designated QA person must ensure that identified field and analytical problems will be corrected and the mechanism by which this will be accomplished and documented.

Include the following paragraph, as appropriate; otherwise delete. Modify if necessary.

The Contractor Quality Assurance Officer will work with the Contractor Project Manager to assure that the above data management and data validation process is implemented correctly. This will be accomplished by conducting a data review and data validation as described in Section 3.4, as well as performing the additional tasks outlined below.

The QA Officer will review the laboratory analytical data for the following:

1. Potential identification of significant and noticeable data quality issues/deficiencies, and
2. Review of the data for detected constituents of concern. This evaluation will not involve an in-depth review of all raw data. Constituents of concern in excess of the action levels as enumerated in [*specify Table*] will be evaluated for use in delineating the extent of impact of the constituents. The goal of this evaluation would be to assess how remediation will be accomplished or if further assessment will be necessary.
   Particular attention will be paid to any constituents of concern detected in the [specify *water or soil samples]* above the regulatory standards presented in [*specify Table*].

4.0 SAMPLING RATIONALE

For each sampling event, the SAP must describe the sampling locations, the media to be sampled, and the analytes of concern at each location. A rationale should be provided to support these choices. The information may be presented in a table. See Tables 4-1 and 4-2 for examples.

The following subsections, as applicable, must be included for plan approval and should be consistent with the project DQOs. They *are subdivided on a media specific basis (soil, sediment, and water). Other media should be added as needed. Appropriate figures should be included showing proposed sampling locations.*

Information regarding the collection of field duplicates may be included in these sections or in Section 10.1.2. Provide a rationale for the selection of these locations.

Do not include sampling procedures, preservation, etc., as these topics are covered in later sections.

4.1 Soil Sampling

Provide a general overview of the soil sampling event. Present a rationale for choosing each sampling location at the site or sampling area and the depths at which the samples are to be taken, if relevant. If decisions will be made in the field, provide details concerning the criteria to be used to make these decisions. List the analytes of concern at each location and provide a rationale as to why the specific chemical or group of chemicals was chosen. Include a figure showing sampling locations.

4.2 Sediment Sampling

Provide a general overview of the sediment sampling event. Present a rationale for choosing each sampling location at the site or sampling area and the depths or area of the river, stream or lake at which the samples are to be taken, if relevant. If decisions will be made in the field, provide details concerning the criteria to be used to make these decisions. List the analytes of concern at each location and provide a rationale as to why the specific chemical or group of chemicals was chosen. Include a figure showing sampling locations.

4.3 Water Sampling

Provide a general overview of the water sampling event. For groundwater, describe the wells to be sampled or how the samples will be collected (e.g., hydro punch), including the depths at which the samples are to be taken. For surface water, describe the depth and nature of the samples to be collected (fast or slow moving water, stream traverse, etc.). Present a rationale for choosing each sampling location or sampling area. If decisions will be made in the field, provide details concerning the criteria to be used to make these decisions. List the analytes of concern at each location and provide a rationale as to why the specific chemical or group of chemicals was chosen. Include a figure showing sampling locations.

4.4 Other Sampling

Describe other media, if any, that may be sampled. Present a rationale for choosing each sampling location at the site or sampling areas, and the depths at which the samples will be taken, if relevant. If decisions will be made in the field, provide details concerning the criteria to be used to make these decisions. List the analytes of concern at each location and provide a rationale as to why the specific chemical or group of chemicals was chosen. Include a figure showing sampling locations.

Table 4-1: Sampling Design and Rationale
Matrix = Soil

Sampling Location/ID Number	Depth (ft)	Analytical Parameter	Rationale *

* Include rationale for location, depth and analysis.

Table 4-2: Sampling Design and Rationale
Matrix = Groundwater

Sampling Location/ID Number	Analytical Parameter	Rationale *

* Include rationale for location and analysis.

5.0 REQUEST FOR ANALYSES

The following sections should discuss the analytical support for the project: the analyses requested; analytes of concern; turnaround time; available resources; available laboratories; etc. The use of tables is recommended. If samples will be sent to more than one laboratory, it should be clear where each sample is to be sent.

5.1 Analyses Narrative

Complete this subsection concerning the analyses for each matrix. The use of an analytical services table is recommended for each matrix to be sampled. See Tables 5-1 and 5-2 for examples. Each table must include the analytical parameters for each type of sample. Quality Control (QC) samples, such as blanks, duplicates, splits, and laboratory QC, should be included in the column titled "Special Designation." The selected analyses must be consistent with the DQOs and analytes of concern.

Information on container types, sample volumes, preservatives, special handling and analytical holding times for each parameter may be included here or on separate tables. See Tables 5-3 and 5-4 for examples.

Include any special requests, such as fast turn-around time (2 weeks or less), specific QC requirements, or modified sample preparation techniques in this section.

Note: Rationale for the selection of duplicate and laboratory QC sample locations, when utilized, is to be provided in Section 10.0.

5.2 Analytical Laboratory

Field analyses for pH, conductivity, turbidity, or other field tests should be discussed in the sampling section. Field measurements in a mobile laboratory should be discussed here and listed separately from samples to be sent to a fixed laboratory. Field screening tests (for example, immunoassay tests) should be discussed in the sampling section, but the confirmation tests should be discussed here, and the totals included in the tables.

Include the following paragraph. Modify if necessary.

Samples associated with this project will be submitted to [*specify lab*] located in [*specify lab's location*]. The laboratory is certified by the WVDEP to perform the requested analyses. The laboratory's WVDEP certification number is [*specify lab certification number*].

Table 5-1: Analytical Services
Matrix = Soil

Sample Number	Sample Location	Depth (ft)	Special Designation	Analytical Methods			
Total number of Soil Samples, excluding QC:							
Total number of Soil Samples, including QC:							

Table 5-2: Analytical Services
Matrix = Groundwater

Sample Number	Sample Location	Special Designation	Analytical Methods			
Total number of samples, excluding QC						
Total number of samples, including QC						

Table 5-3: Analytical Method, Containers, Preservation, and Holding Times Requirements
Matrix = Soil

Analytical Parameter and/or Field Measurements	Analytical Method Number	Containers (number, type, size/volume)	Preservation Requirements (chemical, temperature, light protection)	Maximum Holding Times

Table 5-4: Analytical Method, Containers, Preservation, and Holding Times Requirements
Matrix = Groundwater

Analytical Parameter and/or Field Measurements	Analytical Method Number	Containers (number, type, size/volume)	Preservation Requirements (chemical, temperature, light protection)	Maximum Holding Times

6.0 FIELD METHODS AND PROCEDURES

The sampling discussion should track the samples identified in Section 4.0 and the Analytical Services table(s). Provide a description of sampling procedures. Example procedures are provided below. Alternatively, contractor SOPs may be referenced below and included in the SAP as an appendix. WVDEP SOPs found in the Agency QAPrP may be referenced below, but do not have to be included in the appendix. The location of referenced SOP must be provided in the text.

Depending on the nature of the project, some of the following sections may not be applicable. If this is the case, enter "Not Applicable" or other text to indicate that the section does not apply.

6.1 Field Equipment

6.1.1 List of Equipment Needed

List all the equipment to be used in the field to collect samples, including decontamination equipment, if required. Discuss the availability of back-up equipment and spare parts. This information can be presented in a table. See Table 6-1 for an example.

6.1.2 Calibration of Field Equipment

Describe the procedures by which field equipment is prepared for sampling, including calibration standards used, frequency of calibration and maintenance routines. Indicate where the equipment maintenance and calibration record(s) for the project will be kept. See Table 6-2 for an example.

6.2 Field Screening

In some projects, a combination of field screening using a less accurate or less sensitive method and confirmation samples to be analyzed in a fixed laboratory will be used. This section should describe the field methods or reference attached SOPs. Analyses such as XRF or immunoassay kits are two examples.

Describe how samples will be collected, prepared, and analyzed in the field. Include in an appendix any Contractor SOPs relating to these methods. If utilizing a SOP from the WVDEP QAPrP, the SOP needs referenced below but not included as an appendix. Confirmation of *screening results should also be described. The role of the field screening in decision making for the site should be discussed here if it has not been covered previously.*

6.3 Soil

6.3.1 Surface Soil Sampling

Use this subsection to describe the surface soil samples that are to be collected within 6-12 inches of the ground surface. Specify the method (e.g., hand trowels) that will be used to collect and transfer the samples to the appropriate containers or reference the appropriate sections of a Soil Sampling SOP. Include in an appendix any Contractor SOPs relating to these methods. If utilizing a SOP from the WVDEP QAPrP, the SOP needs referenced below but not included as an appendix.

If exact soil sampling locations will be determined in the field, this should be stated. The criteria used to determine sampling locations should be provided.

Include this paragraph first if exact sampling locations are to be determined in the field; otherwise delete.

Exact soil sampling locations will be determined in the field based on accessibility, visible signs of potential contamination (e.g., stained soils), and topographical features which may indicate the location of hazardous substance disposal (e.g., depressions that may indicate a historic excavation). Soil sample locations will be recorded in the field logbook as sampling is completed. A sketch of the sample location will made including physical reference points. If possible, distances to the reference points will be given.

If surface soil samples are to be analyzed for <u>volatile organic compounds</u> (VOCs), include this paragraph (modify as necessary); otherwise delete.

Samples to be analyzed for volatile organic compounds will be collected first. Surface soil samples for VOC analyses will be collected as grab samples (independent, discrete samples) from a depth of 0 to ___ inches below ground surface (bgs). Surface soil samples will be collected using *[specify the type of sampling device]*. See Section 7.1 for preservation and shipping procedures.

If surface soil samples are to be analyzed for <u>compounds other than volatiles</u>, include this paragraph (modify as necessary); otherwise delete.

Surface soil samples will be collected as grab samples (independent, discrete samples) from a depth of 0 to ___inches below ground surface (bgs). Surface soil samples will be collected using a stainless-steel hand trowel. Samples to be analyzed for __________ *[list all analytical methods for soil samples except volatile organic compounds]* will be placed in a sample-dedicated disposable container and homogenized. Homogenized material will be transferred to the appropriate sample containers. Sample containers will be filled to the top, taking care to prevent soil from remaining in the lid threads prior to being closed. See Section 7.1 for preservation and shipping procedures.

6.3.2 Subsurface Soil Sampling

Use this subsection for subsurface soil samples that are to be collected 12 inches or more below the surface. Specify the method (e.g., hand augers) that will be used to reach the appropriate depth, state the depth at which samples will be collected and describe the method used to collect and transfer samples to the appropriate containers or reference the appropriate sections of a Soil Sampling SOP. Include in an appendix any Contractor SOPs relating to these methods. If utilizing a SOP from the WVDEP QAPrP, the SOP needs referenced below but not included as an appendix.

If exact soil sampling locations will be determined in the field, this should be stated. The criteria used to determine sampling locations should be provided. There should also be a discussion concerning possible problems, such as subsurface refusal.

Include this paragraph first if exact sampling locations are to be determined in the field; otherwise delete.

Exact soil sampling locations will be determined in the field based on accessibility, visible signs of potential contamination (e.g., stained soils), and topographical features which may indicate the location of hazardous substance disposal (e.g., depressions that may indicate a historic excavation). Soil sample locations will be recorded in the field logbook as sampling is completed. A sketch of the sample location will made including physical reference points. If possible, distances to the reference points will be given.

If subsurface soil samples are to be analyzed for <u>volatile organic compounds</u>, include this paragraph (modify as necessary); otherwise delete.

Samples to be analyzed for volatile organic compounds (VOCs) will be collected first. Subsurface samples will be collected by boring to the desired sample depth using [*specify sampling equipment*]. Once the desired sample depth is reached, soil samples for VOC analyses will be collected as independent, discrete samples. Samples will be collected using *[specify the type of sampling device].*, See Section 7.1 for preservation and shipping procedures.

If subsurface soil samples are being collected for <u>compounds other than volatiles</u>, include this paragraph (modify as necessary); otherwise delete.

Subsurface samples will be collected by boring to the desired sample depth using [*specify device].* Samples will be transferred from the *[specify sampling device]* to a sample-dedicated container. Material in the container will be transferred to the appropriate sample containers. Sample containers will be filled to the top taking care to prevent soil from remaining in the lid threads prior to being closed. See Section 7.1 for preservation and shipping procedures.

6.4 Sediment Sampling

Use this subsection if sediment samples are to be collected. Specify the method (e.g., dredges) that will be used to collect the samples and at what depth samples will be collected. Describe how samples will be homogenized and transferred to the appropriate containers. If an SOP will be followed, it should be referenced and included in the appendix.

If exact sediment sampling locations will be determined in the field, this should be stated. Describe where sediment samples will be collected

Exact sediment sampling locations will be determined in the field, based on *[Describe the criteria to be used to determine sampling locations.]*. Care will be taken to obtain as representative a sample as possible. The sample will be taken from areas likely to collect sediment deposits, such as slow-moving portions of streams or from the bottom of the lake at a minimum depth of ___ feet.

The final paragraph describes sample homogenization, which is particularly important if the sample is to be separated into solid and liquid phases, and how the container is to be filled. Include this paragraph for all sediment sampling. It is assumed that sediment samples will not *be analyzed for volatile compounds. However, if sediment is to be analyzed for volatile organic compounds, the samples to be analyzed for volatile compounds should not be homogenized, but rather transferred directly from the sampler into the sample container. Modify as necessary.*

Material in the sampler will be transferred to a sample-dedicated container and homogenized. Material from the container will be transferred with a clean trowel from the container to the appropriate sample containers. Sample containers will be filled to the top, taking care to prevent soil from remaining in the lid groves prior to being sealed. See Section 7.2 for preservation and shipping procedures.

6.5 Water Sampling

6.5.1 Surface Water Sampling

Use this subsection if samples are to be collected in rivers, streams, lakes and reservoirs, or from standing water in runoff collection ponds, gullies, drainage ditches, etc. Describe the sampling procedure, including the type of sample (grab or composite - see definitions below), sample bottle preparation, and project-specific directions for taking the sample. State whether samples will be collected for chemical and/or microbiological analyses. Alternatively, reference the appropriate sections of attached SOPs.

> *Grab: Samples will be collected at one time from one location. The sample should be taken from flowing, not stagnant water, and the sampler should be facing upstream in the middle of the stream. Samples will be collected by hand or with a sample bottle holder. For samples taken at a single depth, the bottle should be uncapped, and the cap protected from contamination. The bottle should be plunged into the water, mouth down, and filled 6 to 12 inches below the surface of the water. If it is important to take samples at depths, special samplers (e.g., Niskin or Kemmerer Depth Samplers) may be required.*

> *Time Composite: Samples are collected over a period, usually 24 hours. If a composite sample is required, a flow- and time-proportional automatic sampler should be positioned to take samples at the appropriate location in a manner such that the sample can be held at 4^oC for the duration of the sampling.*

> *Spatial Composite: Samples are collected from different representative positions in the water body and combined in equal amounts. A Churn Splitter or equivalent device will be used to ensure that the sample is homogeneously mixed before the sample bottles are*

filled. Volatile organic compound samples will be collected as discrete samples and not composited.

If exact surface water sample locations will be determined in the field, this should be stated. Describe the criteria used to determine where surface water samples will be collected.

Include this paragraph first if exact sampling locations are to be determined in the field (modify as necessary); otherwise delete.

Exact surface water sampling locations will be determined in the field based on *[describe the criteria to be used to determine sampling locations]*. Sample locations will be recorded in the field logbook as sampling is completed. A sketch of the sample location will made including physical reference points. If possible, distances to the reference points will be given.

Use this paragraph if samples are to be collected in rivers, streams, lakes and reservoirs, or from standing water in runoff collection ponds, gullies, drainage ditches, etc. Modify as necessary; otherwise delete.

Samples will be collected from *[describe the sampling location]. [Describe the sampling procedure (e.g., grab, time composite, spatial composite), sample bottle preparation, and project-specific directions for taking the sample, or reference the appropriate sections of a Water Sampling SOP. If SOPs are referenced, they should be included in an appendix.]* See Section 7.3 for preservation and shipping procedures.

6.5.2 Groundwater Sampling

This subsection contains procedures for water level measurements, well purging, and well sampling. Relevant procedures should be described under this heading with any necessary site-specific modifications or reference appropriate SOP(s). Include in an appendix any Contractor SOPs relating to these methods. If utilizing a SOP from the WVDEP QAPrP, the SOP needs referenced below but not included as an appendix.

6.5.2.1 Water-Level Measurements

The following language may be used as is or modified as needed to meet project needs.

All field meters will be calibrated according to manufacturer's guidelines and specifications before and after every day of field use. Field meter probes will be decontaminated before and after use at each well.

If well heads are accessible, all wells will be sounded for depth to water from top of casing and total well depth prior to purging. An electronic sounder, accurate to the nearest +/- 0.01 feet, will be used to measure depth to water in each well. When using an electronic sounder, the probe is lowered down the casing to the top of the water column. The graduated markings on the probe wire or tape are used to measure the depth to water from the surveyed point on the rim of the well casing. Typically, the measuring device emits a constant tone when the probe is submerged in standing water and most electronic water level sounders have a visual indicator consisting of a small light bulb or diode that turns on when the probe encounters water. Total well depth will be sounded from the surveyed top of casing by lowering the weighted probe to the bottom of the well. The weighted probe will sink into silt, if present, at the bottom of the well screen. Total well depths will be measured by lowering the weighted probe to the bottom of the well and recording the depth to the nearest 0.1 feet.

Water-level sounding equipment will be decontaminated before and after use in each well. Water levels will be measured in wells which have the least amount of known contamination first. Wells with known or suspected contamination will be measured last.

6.5.2.2 Purging

Describe the method that will be used for well purging (e.g., dedicated well pump, bailer, hand pump), or reference the appropriate sections in a Ground Water SOP. If Contractor SOPs are referenced, they should be included in an appendix. If utilizing a SOP from the WVDEP QAPrP, the SOP needs referenced below but not included as an appendix. Note: A combination of purging methods may be used.

Include this paragraph if <u>dedicated well pumps</u> will be used (modify as necessary); otherwise delete.

All wells will be purged prior to sampling. If the well casing volume is known, a minimum of three casing volumes of water will be purged using the dedicated well pump.

Include this paragraph if <u>hand pumps, submersible pumps, bailers, or other sampling methods</u> will be used (modify as necessary); otherwise delete.

All wells will be purged prior to sampling. If the well casing volume is known, a minimum of three casing volumes of water will be purged using [*specify sampling method*]. When a submersible pump is used for purging, clean flexible Teflon tubes will be used for groundwater extraction. All tubes will be decontaminated before use in each well. Pumps will be placed 2 to 3 feet from the bottom of the well to permit reasonable draw down while preventing cascading conditions.

The following paragraphs should be included in all sample plans (modify as necessary).

Water will be collected into a measured bucket to record the purge volume. Casing volumes will be calculated based on total well depth, standing water level, and casing diameter. One casing volume will be calculated as:

$$\mathbf{V = \pi d^2\ h / 77.01}$$

where: **V** is the volume of one well casing of water ($1ft^3 = 7.48$ gallons);
d is the inner diameter of the well casing (in inches);
h is the total depth of water in the well (in feet).

It is most important to obtain a representative sample from the well. Stable water quality parameter (temperature, pH and specific conductance) measurements indicate representative sampling is obtainable. Water quality is considered stable if for three consecutive readings:

- temperature range is no more than ± 1°C;
- pH varies by no more than 0.2 pH units;
- specific conductance readings are within 10% of the average.

The water in which measurements were taken will not be used to fill sample bottles.

If the well casing volume is known, measurements will be taken before the start of purging, in the middle of purging, and at the end of purging each casing volume. If the well casing volume is NOT known, measurements will be taken every 2.5 minutes after flow starts. If water quality parameters are not stable after 5 casing volumes or 30 minutes, purging will cease, which will be noted in the logbook, and ground water samples will be taken. The depth to water, water quality measurements and purge volumes will be entered in the logbook.

If a well dewaters during purging and three casing volumes are not purged, that well will be allowed to recharge up to 80% of the static water column and dewatered once more. After water levels have recharged to 80% of the static water column, groundwater samples will be collected.

6.5.2.3 Well Sampling

Describe the method that will be used to collect samples from wells. (This will probably be the same method as was used to purge the wells.) Specify the sequence for sample collection (e.g., bottles for volatile analysis will be filled first, followed by semi-volatiles, etc.). State whether samples for metals analysis will be filtered or unfiltered. Include the specific conditions, such as turbidity, that will require samples to be filtered. Include in an appendix any Contractor SOPs relating to these methods. If utilizing a SOP from the WVDEP QAPrP, the SOP needs referenced below but not included as an appendix.

The following paragraph should be included in all sample plans (modify as necessary). Modify sample numbers and analyses as necessary to suit the subject project.

At each sampling location, all bottles designated for a particular analysis (e.g., volatile organic compounds) will be filled sequentially before bottles designated for the next analysis are filled (e.g., semi-volatile organic compounds). If a duplicate sample is to be collected at this location, all bottles designated for a particular analysis for both sample designations will be filled sequentially before bottles for another analysis are filled. In the filling sequence for duplicate samples, bottles with the two different sample designations will alternate (e.g., volatile organic compounds designation GW-2, volatile organic compounds designation GW-4 (duplicate of GW-2), metals designation GW-2, and metals designation GW-4 (duplicate of GW-2). Groundwater samples will be transferred directly into the appropriate sample containers with preservative, if required, chilled if appropriate, and processed for shipment to the laboratory.

If samples are to be collected for volatiles analysis, include the following paragraph (modify as necessary); otherwise delete.

Samples for volatile organic compound analyses will be collected using a low flow sampling device. A [*specify type*] pump will be used at a flow rate of [*specify rate including units*]. Vials for volatile organic compound analysis will be filled first to minimize the effect of aeration on the water sample. See Section 7.3 for preservation and shipping procedures.

If some samples for *metals (or other) analysis* *are to be filtered, depending upon sample turbidity, include the following paragraph (modify as necessary); otherwise delete.*

After well purging and prior to collecting groundwater samples for metals analyses, the turbidity of the groundwater extracted from each well will be measured using a portable turbidity meter. A small quantity of groundwater will be collected from the well, transferred to a disposable vial and a turbidity measurement will be taken. The results of the turbidity measurement will be recorded in the field logbook. The water used to measure turbidity will be discarded after use. If the turbidity of the groundwater from a well is above 5 Nephelometric Turbidity Units (NTUs), both a filtered and unfiltered sample will be collected. A 5-micron filter will be used to remove larger particles that have been entrained in the water sample. A clean, unused filter will be used for each filtered sample collected. Groundwater samples will be transferred from the filter directly into the appropriate sample containers with a preservative and processed for shipment to the laboratory. When transferring samples, care will be taken not to touch the filter to the sample container. After the filtered sample has been collected, the Teflon tube and filter will be removed, and an unfiltered sample will be collected. A sample number appended with an "Fl" will represent a sample filtered with a 5-micron filter. See Section 7.3 for preservation and shipping procedures.

If samples are to be *filtered* *for metals (or other) analysis* *regardless of sample turbidity**, include the following paragraph (modify as necessary); otherwise delete.*

Samples designated for metals analysis will be filtered. A 5-micron filter will be used to remove larger particles that have been entrained in the water sample. A clean, unused filter will be used for each filtered sample collected. Groundwater samples will be transferred from the filter directly into the appropriate sample containers to which preservative has been added and processed for shipment to the laboratory. When transferring samples, care will be taken not to touch the filter to the sample container. After the filtered sample has been collected, the Teflon tube and filter will be removed, and an unfiltered sample will be collected. A sample number appended with an "Fl" will represent a sample filtered with a 5-micron filter. See Section 7.3 for preservation and shipping procedures.

6.6 Other

Describe the collection of other media, if any.

6.7 Decontamination Procedures

In this section, specify the decontamination procedures that will be followed if non-dedicated sampling equipment is used. Alternatively, a contractor may provide their Decontamination SOP as an appendix in the SAP or they may reference below their intent to follow the WVDEP SOP on Decontamination found in the WVDEP QAPrP. Modify as necessary.

The decontamination procedures that will be followed are in accordance with approved procedures. Decontamination of sampling equipment must be conducted consistently as to assure the quality of samples collected. All equipment that comes into contact with potentially contaminated soil or water will be decontaminated. Disposable equipment intended for one-time use will not be decontaminated but will be packaged for appropriate disposal. Decontamination will occur prior to and after each use of a piece of equipment.

The following, to be carried out in sequence, is a recommended procedure for the decontamination of sampling equipment

Use the following decontamination procedures; edit as necessary.

- Non-phosphate detergent and tap water wash, using a brush if necessary
- Tap-water rinse
- 0.1 N nitric acid rinse [*For inorganic analyses, include an acid rinse; otherwise, delete.*]
- Deionized/distilled water rinse
- Pesticide-grade solvent (reagent grade hexane) rinse in a decontamination bucket [*For organic analyses, include a solvent rinse; otherwise, delete.*]
- Deionized/distilled water rinse (twice)

Equipment will be decontaminated in a predesignated area on pallets or plastic sheeting, and clean bulky equipment will be stored on plastic sheeting in uncontaminated areas. Cleaned small equipment will be stored in plastic bags. Materials to be stored more than a few hours will also be covered.

Table 6-1: Field and Sampling Equipment

Description of Equipment	Material (if applicable)	Dedicated (Yes/No)

Table 6-2: Field Equipment/Instrument Calibration, Maintenance, Testing, and Inspection

Analytical Parameter	Field Equipment/ Instrument	Calibration Activity	Maintenance & Testing/ Inspection Activity	Frequency	Acceptance Criteria	Corrective Action

7.0 SAMPLE CONTAINERS, PRESERVATION, PACKAGING AND SHIPPING

This section describes the types of containers to be used and the procedures for preserving, packaging and shipping samples. Information concerning the number /type of sample containers, volumes, and preservatives may have been presented in tabular form previously. The organization responsible for adding preservatives should be named.

The number and type of sample containers, volumes, and preservatives are listed in [*specify table(s)*]. The containers are pre-cleaned and will not be rinsed prior to sample collection. Where required, the preservatives were added to the containers by the laboratory, [*specify lab*], which provided the containers.

If preservatives must be added in the field, then complete the following; otherwise delete it.

Preservatives, if required, will be added by _______ [*name of agency/organization doing the sampling*] to the containers prior to shipment of the samples to the laboratory.

7.1 Soil Samples

Include the following paragraphs, as appropriate; otherwise delete. Modify if necessary.

VOLATILE ORGANIC COMPOUNDS: Soil samples to be analyzed for volatile organic compounds will be stored in their sealed [*specify sample container*] for no more than two days prior to analysis. Samples will be chilled to 6°C immediately upon collection.

Include the following sentences if samples will be frozen or preserved; otherwise delete.

Frozen Encore-sampler samples will be stored for no more than 4 days prior to analysis. If samples are preserved by ejecting into either methanol or sodium bisulfate solution the holding time is two weeks.

OTHER ORGANIC COMPOUNDS: Soil samples for ______________ *[include all requested analysis(ses)]* will be homogenized and transferred from the sample-dedicated homogenization container into 8-ounze wide-mouth glass jars using a trowel. A separate container will be collected for each laboratory. [*Alternatively, samples will be retained in the brass sleeve in* *which collected until sample preparation begins.*] The samples will be chilled to 6°C immediately upon collection.

METALS: Surface soil samples to be analyzed for metals will be homogenized and transferred from the sample-dedicated homogenization container into 8-oz, wide-mouth glass jars. A separate container will be collected for each laboratory. Samples will not be chilled. Subsurface samples will be retained in their original brass sleeves or other container unless transferred to bottles.

7.2 Sediment Samples

Include the following paragraphs, as appropriate; otherwise delete. Modify if necessary.

VOLATILE ORGANIC COMPOUNDS: Sediment samples to be analyzed for volatile organic compounds will be stored in their sealed [*specify sample container*] for no more than two days prior to analysis. Samples will be chilled to 6°C immediately upon collection.

Include the following sentences if samples will be frozen or preserved; otherwise delete.

Frozen Encore-sampler samples will be stored for no more than 4 days prior to analysis. If samples are preserved by ejecting into either methanol or sodium bisulfate solution the holding time is two weeks.

OTHER ORGANIC COMPOUNDS: Soil samples for ______________ *[include all requested analysis(ses)]* will be homogenized and transferred from the sample-dedicated homogenization pail into 8-ounze wide-mouth glass jars using a trowel. A separate container will be collected for each laboratory. The samples will be chilled to 6°C immediately upon collection.

METALS: Sediment samples, with rocks and debris removed, which are to be analyzed for metals will be homogenized and transferred from the sample-dedicated homogenization pail into 8-oz, wide-mouth glass jars. A separate container will be collected for each laboratory. Samples will not be chilled.

7.3 Water Samples

Include the following paragraphs, as appropriate; otherwise delete. Modify if necessary.

VOLATILE ORGANIC COMPOUNDS: Low concentration water samples to be analyzed for volatile organic compounds will be collected in 40-ml glass vials. 1:1 hydrochloric acid (HCl) will be added to the vial prior to sample collection. During purging, a test vial will be filled with sample at each sample location and the pH will be measured using a pH meter or pH paper to ensure that sufficient acid is present to result in a pH of less than 2. If the pH is greater than 2, additional HCl will be added to the sample vials. Another vial will be pH tested to ensure the pH is less than 2. The tested vial(s) will be discarded. The sample vials will be filled so that there is no headspace. The vials will be inverted and checked for air bubbles to ensure zero headspace. If a bubble appears, the vial will be discarded, and a new sample will be collected. The samples will be chilled to 6°C immediately upon collection. Three vials of each water sample are required for each laboratory.

METALS: Water samples collected for metals analysis will be collected in 1-liter polyethylene bottles. The samples will be preserved by adding nitric acid (HNO_3) to the sample bottle. The bottle will be capped and lightly shaken to mix in the acid. A small quantity of sample will be poured into the bottle cap where the pH will be measured using pH paper. The pH must be ≤ 2. The sample in the cap will be discarded, and the pH of the sample will be adjusted further if necessary. The samples will be chilled to 6°C immediately upon collection. One bottle of each water sample is required for each laboratory.

GENERAL CHEMISTRY (WATER QUALITY) PARAMETERS: Water samples collected for *[specify the parameters requiring preservation]* will be collected in *[specify size of container]* polyethylene bottles. The *[specify analysis]* samples will be preserved by adding *[describe preservative appropriate to each sample type]* to the sample bottle. The bottle will be capped and lightly shaken to mix in the preservative. A small quantity of sample will be poured into the bottle cap where the pH will be measured using pH paper. The pH must be within the appropriate range. The sample in the cap will be discarded, and the pH of the sample will be adjusted further if necessary. Samples will be chilled to 6°C immediately upon collection. Samples from each location that require the same preservative will be placed in the same bottle, if being analyzed by the same laboratory.

_______________ *[Include all requested analysis(es), e.g., Anions, Pesticides, Semi-volatile Organic Compounds. A separate paragraph should be included for each bottle type.]* Low concentration water samples to be analyzed for *[specify analysis(ses)]* will be collected in *[specify bottle type]*. No preservative is required for these samples. The samples will be chilled to 6°C immediately upon collection. Two bottles of each water sample are required for each laboratory.

7.4 Other Samples

If samples of other media (e.g., soil gas) are to be collected, specify the analyses that will be performed and the containers and preservatives required, if any.

7.5 Packaging and Shipping

The following provides a generic explanation and description of how to pack and ship samples. It may be incorporated as is, if appropriate, or modified to meet any project-specific conditions.

All sample containers will be placed in a strong-outside shipping container (a steel-belted cooler). The following outlines the packaging procedures that will be followed for low concentration samples.

1. When ice is used, pack it in zip-locked, double plastic bags. Seal the drain plug of the cooler with fiberglass tape to prevent melting ice from leaking out of the cooler.

2. The bottom of the cooler should be lined with bubble wrap to prevent breakage during shipment.

3. Check screw caps for tightness and, if not full, mark the sample volume level of liquid samples on the outside of the sample bottles with indelible ink.

4. Secure bottle/container tops with clear tape and custody seal all container tops.

5. Affix sample labels onto the containers with clear tape.

6. Wrap all glass sample containers in bubble wrap to prevent breakage.

7. Seal all sample containers in heavy duty plastic zip-lock bags. Write the sample numbers on the outside of the plastic bags with indelible ink.

8. Place samples in a sturdy cooler(s) lined with a large plastic trash bag. Enclose the appropriate COC(s) in a zip-lock plastic bag affixed to the underside of the cooler lid.

9. Fill empty space in the cooler with bubble wrap or Styrofoam peanuts to prevent movement and breakage during shipment. Vermiculite should also be placed in the cooler to absorb spills if they occur.

10. Ice used to cool samples will be double sealed in two zip lock plastic bags and placed on top and around the samples to chill them to the correct temperature.

11. Each ice chest will be securely taped shut with fiberglass strapping tape, and custody seals will be affixed to the front, right and back of each cooler.

8.0 DISPOSAL OF RESIDUAL MATERIALS

This section should describe the type(s) of investigation-derived wastes (IDW) that may be generated during this sampling event. IDW may not be generated in all sampling events, in which case this section would not apply. Use the language below, edited as necessary or reference the appropriate sections of a SOP dealing with the disposal of residual material. If referencing a SOP, state in which appendix the SOP may be found. Depending upon site-specific conditions and applicable federal, state, and local regulations, other provisions for IDW disposal may be required. If any analyses of IDW are required, these should be discussed. If IDW are to be placed in drums, labeling for the drums should be discussed in this section. Modify as necessary.

In the process of collecting environmental samples, the sampling team will generate different types of potentially contaminated IDW that include the following:

- Used personal protective equipment (PPE)
- Disposable sampling equipment
- Decontamination fluids
- Soil cuttings from soil borings [Include this bullet when sampling soils; otherwise delete.]
- Purged groundwater and excess groundwater collected for sample container filling [Include this bullet when sampling groundwater; otherwise delete.]

Listed below are the procedures that should be followed for handling the IDW. The procedures have enough flexibility to allow the sampling team to use its professional judgment as to the proper method for the disposal of each type of IDW generated at each sampling location.

The following bullet is generally appropriate for site or sampling areas with low levels of contamination or for routine monitoring. If higher levels of contamination exist at the site or sampling area, other disposal methods (such as the drumming of wastes) should be used to dispose of used PPE and disposable sampling equipment. Modify as necessary.

- Used PPE and disposable equipment will be double bagged and placed in a municipal refuse dumpster. These wastes are not considered hazardous and can be sent to a municipal landfill. Any PPE and disposable equipment that is to be disposed of which can still be reused will be rendered inoperable before disposal in the refuse dumpster.

Include this bullet if sampling for <u>both metals and organics (modify as necessary)</u>; otherwise delete.

- Decontamination fluids that will be generated in the sampling event will consist of dilute nitric acid, pesticide-grade solvent, deionized water, residual contaminants, and water with non-phosphate detergent. The volume and concentration of the decontamination fluid will be sufficiently low to allow disposal at the site or sampling area. The water (and water with detergent) will be poured onto the ground or into a storm drain. Pesticide-grade solvents will be allowed to evaporate from the decontamination bucket. The nitric acid will be diluted and/or neutralized with sodium hydroxide and tested with pH paper before pouring onto the ground or into a storm drain.

Include this bullet if sampling for <u>metals</u> but not organics (modify as necessary); otherwise delete.

- Decontamination fluids that will be generated in the sampling event will consist of nitric acid, deionized water, residual contaminants, and water with non-phosphate detergent. The volume and concentration of the decontamination fluid will be sufficiently low to allow disposal at the site or sampling area. The water (and water with detergent) will be poured onto the ground or into a storm drain. The nitric acid will be diluted and/or neutralized with sodium hydroxide and tested with pH paper before pouring onto the ground or into a storm drain.

Include this bullet if sampling for <u>organics</u> but not metals (modify as necessary); otherwise delete.

- Decontamination fluids that will be generated in the sampling event will consist of pesticide-grade solvent, deionized water, residual contaminants, and water with non-phosphate detergent. The volume and concentration of the decontamination fluid will be sufficiently low to allow disposal at the site or sampling area. The water (and water with detergent) will be poured onto the ground or into a storm drain. Pesticide-grade solvents will be allowed to evaporate from the decontamination bucket.

Include this bullet if sampling <u>soils (modify as necessary)</u>; otherwise delete.

- Soil cuttings generated during the subsurface sampling will be disposed of in an appropriate manner.

Include this bullet if sampling groundwater (modify as necessary); otherwise delete.

- Purged groundwater will be [*specify disposal method*]

Depending upon the degree of groundwater contamination, site-specific conditions, and applicable federal, state, and local regulations, disposal methods will vary. Disposal methods can also vary for purge water from different wells sampled during the same sampling event.

9.0 SAMPLE DOCUMENTATION AND SHIPMENT

This section discusses various record keeping requirements related to work performed in the field. Documentation of field activities should occur daily.

9.1 Field Notes

This section should discuss record keeping in the field. This may be through a combination of logbooks, preprinted forms, photographs, or other documentation. Information to be maintained is provided below.

9.1.1 Field Logbooks

Use field logbooks to document where, when, how, and from whom any vital project information was obtained. Logbook entries should be complete and accurate enough to permit reconstruction of field activities. Maintain a separate logbook for each sampling event or project. Logbooks should have consecutively numbered pages. All entries should be legible, written in black ink, and signed by the individual making the entries. Use factual, objective language.

At a minimum, the following information will be recorded during the collection of each sample:

Edit this list as relevant.

- Sample location and description
- Site or sampling area sketch showing sample location and measured distances
- Sampler's name(s)
- Date and time of sample collection
- Designation of sample as composite or grab
- Type of sample (soil, sediment or water)
- Type of sampling equipment used
- Field instrument readings and calibration
- Field observations and details related to analysis or integrity of samples (e.g., weather conditions, noticeable odors, colors, etc.)
- Preliminary sample descriptions (e.g., for soils: clay loam, very wet; for water: clear water with strong ammonia-like odor)
- Sample preservation

- Lot numbers of the sample containers, sample identification numbers and any explanatory codes, and chain-of-custody form numbers
- Shipping arrangements (overnight air bill number)
- Name(s) of recipient laboratory(ies)

In addition to the sampling information, the following specific information will also be recorded in the field logbook for each day of sampling:

Edit this list as relevant.

- Team members and their responsibilities
- Time of arrival/entry on site and time of site departure
- Other personnel on site
- Summary of any meetings or discussions with tribal, contractor, or federal agency personnel
- Deviations from sampling plans, site safety plans, and QAPP procedures
- Changes in personnel and responsibilities with reasons for the changes
- Levels of safety protection
- Calibration readings for any equipment used and equipment model and serial number

9.1.2 Photographs

If photographs will be taken, the following language may be used as is or modified as appropriate.

Photographs will be taken at the sampling locations and at other areas of interest on the site or sampling area. They will serve to verify information entered in the field logbook. For each photograph taken, the following information will be written in the logbook or recorded in a separate field photography log:

- Time, date, location, and weather conditions
- Description of the subject photographed
- Name of person taking the photograph

9.2 Labeling

The following paragraph provides a generic explanation and description of the use of labels. It may be incorporated as is, if appropriate, or modified to meet any project-specific conditions.

All samples collected will be labeled in a clear and precise way for proper identification in the field and for tracking in the laboratory. A copy of the sample label is included in Appendix __. The samples will have pre-assigned, identifiable, and unique numbers. At a minimum, the sample labels will contain the following information: station location, date of collection, analytical parameter(s), and method of preservation. Every sample, including samples collected from a single location but going to separate laboratories, will be assigned a unique sample number.

9.3 Sample Chain-Of-Custody Forms and Custody Seals

The following paragraphs provide a generic explanation and description of the use of chain-of-custody forms and custody seals. They may be incorporated as is, if they are appropriate, or modified to meet any project-specific conditions.

All sample shipments for analyses will be accompanied by a chain-of-custody record. A copy of the form is found in [*specify Appendix*]. Form(s) will be completed and sent with the samples for each laboratory and each shipment (i.e., each day). If multiple coolers are sent to a single laboratory on a single day, form(s) will be completed and sent with the samples for each cooler.

The chain-of-custody form will identify the contents of each shipment and maintain the custodial integrity of the samples. Generally, a sample is in someone's custody if it is either in someone's physical possession, in someone's view, locked up, or kept in a secured area that is restricted to authorized personnel. Until the samples are shipped, the custody of the samples will be the responsibility of ____________ [name of agency/ organization/contractor conducting sampling]. The sampling team leader or designee will sign the chain-of-custody form in the "relinquished by" box and note date, time, and air bill number.

A self-adhesive custody seal will be placed across the lid of each sample. A copy of the seal is found in [*specify Appendix*]. For VOC samples, the seal will be wrapped around the cap. The shipping containers in which samples are stored (usually a sturdy picnic cooler or ice chest) will be sealed with self-adhesive custody seals any time they are not in someone's possession or view before shipping. All custody seals will be signed and dated.

10.0 QUALITY CONTROL

The following sections should discuss the quality control samples that are being collected to support the sampling activity. This includes field QC samples, confirmation samples, background samples, laboratory QC samples, and split samples. Wherever possible, the locations at which the samples will be collected should be identified and a rationale provided for the choice of location. Frequency of collection should be discussed. Modify as necessary

10.1 Field Quality Control Samples

Field quality control samples are intended to help evaluate conditions resulting from field activities and are intended to accomplish two primary goals; assessment of field contamination and assessment of sampling variability. The assessment of field contaminants looks for substances introduced in the field due to environmental factors or sampling equipment and is done by using blanks of different types. The assessment of sampling variability includes variability due to sampling technique and instrument performance as well as variability possibly caused by the heterogeneity of the matrix being sampled. The following sections cover field QC.

10.1.1 Assessment of Field Contamination (Blanks)

Field contamination is usually assessed through the collection of different types of blanks. Equipment blanks are obtained by passing distilled or deionized water, as appropriate, over or through the decontaminated equipment used for sampling. They provide the best overall means of assessing contamination arising from the equipment, ambient conditions, sample containers, transit, and the laboratory. Field blanks are sample containers filled in the field. They help assess contamination from ambient conditions, sample containers, transit, and the laboratory. Trip blanks are prepared by the laboratory and shipped to and from the field. They help assess contamination from shipping and the laboratory and are for volatile organic compounds only. TCAU recommends that equipment blanks be collected, where appropriate (e.g., where neither disposable nor dedicated equipment is used). Trip blanks must be utilized when volatiles are being sampled. Only one type of blank must be collected per event, not all three.

10.1.1.1 Equipment Blanks

In general, equipment (rinsate) blanks should be collected when reusable, non-disposable sampling equipment (e.g., trowels, hand augers, and non-dedicated groundwater sampling *pumps) are being used for the sampling event. Equipment blanks can be collected for soil, sediment, surface water and ground water samples. A minimum of one equipment blank is prepared each day for each matrix when equipment is decontaminated in the field. These blanks are submitted "blind" to the laboratory, packaged like other samples and assigned its own unique identification number. Note that for samples which may contain VOCs, water for blanks should be purged prior to use to ensure that it is organic free. High Performance Liquid Chromatography (HPLC) water, which is often used for equipment and field blanks, can contain VOCs if it is not purged.*

Include this paragraph if blanks will be analyzed for <u>both metals and organic compounds (modify as necessary)</u>; otherwise delete.

Equipment rinsate blanks will be collected to evaluate field sampling and decontamination procedures by pouring High Performance Liquid Chromatography (HPLC) organic-free (for organics) or deionized water (for inorganics) over the decontaminated sampling equipment. One equipment rinsate blank will be collected per matrix each day that sampling equipment is decontaminated in the field. Equipment rinsate blanks will be obtained by passing water through or over the decontaminated sampling devices used that day. The rinsate blanks that are collected will be analyzed for *[Include names of target analytes, e.g., metals, total petroleum hydrocarbons, volatile organic compounds, etc.].*

Include this paragraph if blanks will be analyzed <u>only for organic compounds (modify as necessary)</u>; otherwise delete.

Equipment rinsate blanks will be collected to evaluate field sampling and decontamination procedures by pouring High Performance Liquid Chromatography (HPLC) organic-free water over the decontaminated sampling equipment. One equipment rinsate blank will be collected per matrix each day that sampling equipment is decontaminated in the field. Equipment rinsate blanks will be obtained by passing water through or over the decontaminated sampling devices used that day. The rinsate blanks that are collected will be analyzed for *[Include names of target analytes, e.g., volatile organic compounds, total petroleum hydrocarbons, etc.].*

Include this paragraph if blanks will be analyzed <u>only for metals (modify as necessary)</u>; otherwise delete.

Equipment rinsate blanks will be collected to evaluate field sampling and decontamination procedures by pouring deionized water over the decontaminated sampling equipment. One equipment rinsate blank will be collected per matrix each day that sampling equipment is decontaminated in the field. Equipment rinsate blanks will be obtained by passing deionized water through or over the decontaminated sampling devices used that day. The rinsate blanks that are collected will be analyzed for metals.

Always include this paragraph if an equipment rinsate blank is being collected (modify as necessary); otherwise delete.

The equipment rinsate blanks will be preserved, packaged, and sealed in the manner described for the environmental samples. A separate sample number and station number will be assigned to each sample, and it will be submitted blind to the laboratory.

10.1.1.2 Field Blanks

Field blanks are collected when dedicated equipment is used and decontamination is not necessary. A minimum of one field blank is prepared each day sampling occurs in the field, but equipment is not decontaminated. These blanks are submitted "blind" to the laboratory, packaged like other samples and each with its own unique identification number. Note that for samples which may contain VOCs, water for blanks should be purged prior to use to ensure that it is organic free. HPLC water, which is often used for equipment and field blanks, can contain VOCs if it is not purged.

Include this paragraph if blanks will be analyzed for <u>both metals and organic compounds</u> (modify as necessary); otherwise delete.

Field blanks will be collected to evaluate whether contaminants have been introduced into the samples during the sampling due to ambient conditions or from sample containers. Field blank samples will be obtained by pouring High Performance Liquid Chromatography (HPLC) organic-free water (for organics) and/or deionized water (for inorganics) into a sampling container at the sampling point. The field blanks that are collected will be analyzed for *[Include names of target analytes, e.g., metals, volatile organic compounds, etc.].*

Include this paragraph if blanks will be analyzed <u>only for organic compounds</u> (modify as necessary); otherwise delete.

Field blanks will be collected to evaluate whether contaminants have been introduced into the samples during the sampling due to ambient conditions or from sample containers. Field blank samples will be obtained by pouring High Performance Liquid Chromatography (HPLC) organic-free water into a sampling container at the sampling point. The field blanks that are collected will be analyzed for *[Include names of target analytes, e.g., volatile organic compounds, total petroleum hydrocarbons, etc.]*.

Include this paragraph if blanks will be analyzed ***only for metals*** *(modify as necessary); otherwise delete.*

Field blanks will be collected to evaluate whether contaminants have been introduced into the samples during the sampling due to contamination from sample containers. Field blank samples will be obtained by pouring deionized water into a sampling container at the sampling point. The field blanks that are collected will be analyzed for metals.

Always include this paragraph if a field blank is being collected (modify as necessary); otherwise delete.

The field blanks will be preserved, packaged, and sealed in the manner described for the environmental samples. A separate sample number and station number will be assigned to each sample, and it will be submitted blind to the laboratory.

10.1.1.3 Trip Blanks

Trip blanks are required only if no other type of blank will be collected. Trip blanks are only relevant to volatile organic compound (VOC) sampling efforts. If trip blanks are required, one is submitted to the laboratory for analysis with every shipment of samples for VOC analysis. These blanks are submitted "blind" to the laboratory, packaged like other samples and each is assigned its own unique identification number. Note that for samples which may contain VOCs, water for blanks should be purged prior to use to ensure that it is organic free. HPLC water, which is often used for trip blanks, can contain VOCs if it is not purged.

Trip blanks will be prepared to evaluate if the shipping and handling procedures are introducing contaminants into the samples, and if cross contamination in the form of VOC migration has occurred between the collected samples. A minimum of one trip blank will be submitted to the laboratory for analysis with every shipment of samples for VOC analysis. Trip blanks are 40-mL vials that have been filled with HPLC-grade water that has been purged so it is VOC free and shipped with the empty sampling containers to the site or sampling area prior to sampling. The sealed trip blanks are not opened in the field and are shipped to the laboratory in the same cooler with the samples collected for volatile analyses. The trip blanks will be preserved, packaged, and sealed in the manner described for the environmental samples.

10.1.1.4 Temperature Blanks

Include this paragraph with all plans.

For each cooler that is shipped or transported to an analytical laboratory a 40-mL VOA vial will be included that is marked "temperature blank." This blank will be used by the sample custodian to check the temperature of samples upon receipt.

10.1.2 Assessment of Field Variability (Field Duplicate or Co-located Samples

Duplicate samples are collected simultaneously with a standard sample from the same source under identical conditions but are placed into separate sample containers. Field duplicates will consist of a homogenized sample divided in two or else a co-located sample. Each duplicate portion should be assigned its own sample number so that it will be blind to the laboratory. A duplicate sample is treated independently of its counterpart to enable assessment of laboratory performance through comparison of the results. Not all projects require the collection of field duplicates. These samples need to be collected at a site if the site may be closed under risk-based standards, if the site has suspected or known matrix issues, or when the WVDEP TCAU Project Manager requests collection of the samples for a given project. When required, at least 10% of samples collected per event should be field duplicates and at least one duplicate should be collected for each sample matrix, but collection can be stretched out over more than one day (e.g., if it takes more than one day to reach 10 samples). Duplicate samples should be collected from areas of known or suspected contamination. Since the objective is to assess variability due to sampling technique and possible sample heterogeneity, source variability is a good reason to collect co-located samples, not to avoid their collection. Modify as necessary.

Duplicate soils samples will be collected at sample locations *[Identify soil sample locations from which duplicate or collocated samples will be collected.]*. Duplicate samples will be collected from these locations because *[Include a rationale for collecting duplicate samples from these locations; e.g., "samples from these locations are suspected to exhibit moderate concentrations of contaminants" or "previous sampling events have detected moderate levels of contamination at the site or sampling area at these locations."]*.

Include this paragraph if collecting <u>soil</u> samples and analyzing for compounds <u>other than volatiles</u> (modify as necessary); otherwise delete.

Soil samples to be analyzed for *[list all analytical methods for this sampling event except for volatiles]* will be homogenized in a sample-dedicated container. Homogenized material will then be transferred to the appropriate wide-mouth glass jars for both the regular and duplicate samples. All jars designated for a particular analysis (e.g., semi-volatile organic compounds) will be filled sequentially before jars designated for another analysis are filled (e.g., metals).

Include this paragraph if collecting soil samples and analyzing for volatiles (modify as necessary); otherwise delete.

Soil samples for volatile organic compound analyses will not be homogenized. Equivalent samples from a co-located location will be collected identically to the original samples, assigned unique sample numbers and sent blind to the laboratory.

Include these paragraphs if collecting sediment samples. If volatile organic compound analysis will be performed on sediment samples, modify the above paragraph for soil sample volatile analyses by changing "soil" to "sediment." Modify as necessary.

Duplicate sediment samples will be collected at sample locations *[Identify sediment sample locations from which duplicate or co-located samples for duplicate analysis will be obtained.]*. Duplicate samples will be collected from these locations because *[Include a rationale for collecting duplicate samples from these locations.]*.

Sediment samples will be homogenized in a sample-dedicated container. Homogenized material will then be transferred to the appropriate wide-mouth glass jars for both the regular and duplicate samples. All jars designated for a particular analysis (e.g., semi-volatile organic compounds) will be filled sequentially before jars designated for another analysis are filled (e.g., metals).

Include this paragraph if collecting water samples (modify as necessary); otherwise delete.

Duplicate water samples will be collected for water sample numbers *[water sample numbers which will be split for duplicate analysis]*. Duplicate samples will be collected from these locations because *[Include a rationale for collecting duplicate samples from these locations.]*.

When collecting duplicate water samples, bottles with the two different sample identification numbers will alternate in the filling sequence (e.g., a typical filling sequence might be, VOCs designation GW-2, VOCs designation GW-4 (duplicate of GW-2); metals, designation GW-2, metals, designation GW-4, (duplicate of GW-2) etc.). Note that bottles for one type of analysis will be filled before bottles for the next analysis are filled. Volatiles will always be filled first.

Always include this paragraph.

Duplicate samples will be preserved, packaged, and sealed in the same manner as other samples of the same matrix. A separate sample number will be assigned to each duplicate, and it will be submitted blind to the laboratory.

10.2 Background Samples

Background samples are seldom collected for LUST sites but may be collected in situations where the possibility exists that there are native or ambient levels of one or more target analytes present or where one aim of the sampling event is to differentiate between on-site and off-site contributions to contamination. One or more locations are chosen which should be free of contamination from the site or sampling location itself, but have similar geology, hydrogeology, or other characteristics to the proposed sampling locations that may have been impacted by site activities. For example, an area adjacent to but removed from the site, upstream from the sampling points, or up gradient or cross gradient from the groundwater under the site.

If background sampling is being performed for the project, specify the sample locations that have been designated as background. Include a rationale for collecting background samples from these locations and describe or reference the sampling and analytical procedures which will be followed to collect these samples.

10.3 Field Screening, Confirmation and Split Samples

For projects where field screening methods are used (typically defined as testing using field test kits, immunoassay kits, or soil gas measurements or equivalent, but not usually defined as the use of a mobile laboratory which generates data equivalent to a fixed laboratory), two aspects of the tests should be described. First, the QC which will be run in conjunction with the field screening method itself, and, second, any fixed laboratory confirmation tests which will be conducted. QC acceptance criteria for these tests should be defined in these sections rather than in the DQO section. As applicable, discuss these topics in Section 10.3.1 through 10.3.3.

10.3.1 Field Screening Samples

For projects where field screening methods are used, describe the QC samples which will be run in the field to ensure that the screening method is working properly. This usually consists of a combination of field duplicates and background samples. If field screening is being performed, provide discussion concerning acceptance criteria and corrective action to be taken if results are not within defined limits. Discuss confirmation tests below, as applicable.

10.3.2 Confirmation Samples

If the planned sampling event includes a combination of field screening and fixed laboratory confirmation, this section should describe the frequency with which the confirmation samples will be collected and the criteria which will be used to select confirmation locations. These will both be dependent on the use of the data in decision making. It is recommended that the selection process be at a minimum of 10% and that selection criteria include checks for both false positives (i.e., the field detections are invalid or the concentrations are not accurate) and false negatives (i.e., the analyte was not detected in the field). Because many field screening techniques are less sensitive than laboratory methods, false negative screening is especially important unless the field method is below the action level for any decision making. It is recommended that some "hits" be chosen and that other locations be chosen randomly.

If being performed, describe confirmation sampling. Discuss the frequency with which samples will be confirmed and how location will be chosen. Define acceptance criteria for the confirmation results and corrective actions to be taken if samples are not confirmed.

10.3.3 Split Samples

Split Samples are ones that are divided among two or more laboratories for the purpose of providing an inter-laboratory or inter-organization comparison. Usually one organization (for example, a responsible party) collects the samples and provides sufficient material to the other organization (for example, WVDEP) to enable it to perform independent analyses. Not all projects require the collection of split samples. These samples need to be collected at a site if the site may be closed under risk-based standards, if the site has suspected or known matrix issues, or when the WVDEP TCAU Project Manager requests collection of the samples for a given project.

If performing split sampling, describe the purpose of the split sampling in this section. Include references to the approved sampling plan prepared by the party collecting the samples. Provide *a rationale for the sample locations at which split samples will be obtained and how these locations are representative of the sampling event as a whole. Describe how results are to be compared and define criteria by which agreement will be measured. Discuss corrective action to be taken if results are not in agreement.*

10.4 Laboratory Quality Control Samples

Laboratory quality control (QC) samples are analyzed as part of standard laboratory practice. The laboratory monitors the precision and accuracy of the results of its analytical procedures through analysis of QC samples. Typically, laboratory QC samples consist of matrix spike/matrix spike duplicate (MS/MSD) samples for organic analyses, and matrix spike and duplicate samples (MS/DS) for inorganic analyses. The term "matrix" refers to use of the actual media collected in the field (e.g., routine soil and water samples). Not all projects require the collection of field samples for MS/MSD. Laboratory quality control samples may need to be collected at a site if the site may be closed under risk-based standards, if the site has suspected or known matrix issues, or when the WVDEP TCAU Project Manager requests collection of the samples for a given project.

Laboratory QC samples are collected in the field but prepared by the laboratory. They are not a separate sample, but an aliquot (subset) of an existing field sample. Do not include laboratory QC checks, such as calibration standards or surrogates. These were discussed in previous sections and should be included in MQO tables or the laboratory QA Manual/SOPs.

For this sampling event, samples collected at the following locations will be the designated laboratory QC samples:

If a matrix is not being sampled, delete the reference to that matrix.

- For soil, samples *[List soil sample locations and numbers designated for QA/QC.]*
- For sediment, samples *[List sediment sample locations and numbers designated for QA/QC.]*
- For water, samples *[List water sample locations and numbers designated for QA/QC.]*

Add a paragraph explaining why these sample locations were chosen for QA/QC samples. QA/QC samples should be samples expected to contain moderate levels of contamination. A rationale should justify the selection of QA/QC samples based on previously detected contamination at the site or sampling area, historic site or sampling area operations, expected contaminant deposition/migration, etc.

11.0 FIELD VARIANCES

It is not uncommon to find that, on the actual sampling date, conditions are different from expectations such that changes must be made to the SAP once the samplers are in the field. The following paragraph provides a means for documenting those deviations, or variances. Adopt the paragraph as is or modify it to project-specific conditions.

As conditions in the field may vary, it may become necessary to implement minor modifications to sampling as presented in this plan. When appropriate, the WVDEP Project Manager will be notified and a verbal approval will be obtained before implementing the changes. Modifications to the approved plan will be documented in the sampling project report.

12.0 FIELD HEALTH AND SAFETY PROCEDURES

Describe any project-specific health and safety procedures that must be followed in the field, including safety equipment and clothing that may be required, explanation of potential hazards that may be encountered, and location and route to the nearest hospital or medical treatment facility.

Approval of Sampling and Analysis Plan for:

[Title of Project]____

[Name and Address of Responsible Party Here]_______________________

____
Date

WVDEP Project Manager ________________________

WVDEP TCAU QA Manager ________________________

For WVDEP use:

Approved by WVDEP TCAU Project Manager: _________________________ Date: _________________________

30-day/Expedited Review? ☐ Yes ☐ No

Date Received by TCAU QA: _________________________

Reviewed by: _________________________ Date: _________________________

Approved: _________________________ Date: _________________________

WVDEP TCAU Quality Assurance Manager

ATTACHMENT 1

EXAMPLE FORMS

EXAMPLE

Table 1-1 – Key Project Personnel Contact Information and Responsibilities

Title	Name	Phone Number Email Address	Responsibilities
Contractor Project Manager	John Doe ABC Company	304-111-1111 John.doe@ yahoo.com	Performs direct daily oversight of the field activities ensuring that work is performed in accordance with the issued this SAP and all WVDEP requirements.
Contractor Quality Assurance Officer	Jane Doe ABC Company	304-111-1111 Jane.doe@ yahoo.com	Has responsibility to make sure field work is conducted in accordance with the Quality Assurance/Quality Control (QA/QC) requirements of this SAP.
Laboratory Quality Assurance Officer	Janet Doe My Labs Company	304-222-2222 Janet.doe@mylab.com	The laboratory QA Officer is responsible for ensuring that the laboratory adheres to it's QA/QC procedures including ensuring all activities are performed in accordance with the requirements of the WVDEP Laboratory Quality Assurance Program.
WVDEP TCAU Project Manager (PM)	DEP PM WVDEP	304-333-3333 PM@wv.gov	The WVDEP Project Manager is responsible for oversight of projects assigned to them. The PM reviews and approves data and documents generated at the sites they manage.
WVDEP TCAU QAM	DEP QAM WVDEP	304-444-4444 QAM@wv.gov	The QAM may perform audits of selected project and has direct responsibility in the Tanks program for assessing the QA/QC performance and determining if QA/QC objectives are met.

EXAMPLE

Table 3-1: Contaminants of Concern, Laboratory and Action Levels
Matrix = Soil

Analytical Parameter (Contaminants of Concern)	Laboratory Reporting or Quantitation Limits	Action Levels		
		CAGD Tier 1	CAGD Tier 2	CAGD Tier 3
Volatile Organic Compounds by Method 8260 (mg/Kg)				
Benzene	10	0.130	0.75	5.0
Toluene	10	44	44	44
Ethylbenzene	10	2.0	6.2	46
Xylenes	10	5.2	260	260

CAGD – Leaking Aboveground and Underground Storage Tank Corrective Action Guidance Document, 2018
mg/Kg = milligrams per kilogram

EXAMPLE

Table 4-1: Sampling Design and Rationale
Matrix = Soil

Sampling Location/ID Number	Depth (ft)	Analytical Parameter	Rationale *
SB1	0-1.5 2-4, 6-8	, metals VOA & metals	Assess environmental conditions at the former UST and former fuel pump island locations. Volatiles will not be collected from the shallow soil due to probable weathering effects.
SB2	0-1.5 2-4, 6-8	metals VOA & metals	Assess the potential presence of contaminants in undocumented fill materials at the Site. Volatiles will not be collected from the shallow soil due to probable weathering effects.

* Include rationale for location, depth and analysis.

VOA = volatile organic analyses

EXAMPLE

Table 4-2: Sampling Design and Rationale
Matrix = Groundwater

Sampling Location/ID Number	Analytical Parameter	Rationale *
SB1	VOA, metals	Assess the potential migration of contaminants to the groundwater at the former UST and former fuel pump island locations.
SB2	VOA, metals	Assess the potential migration of contaminants to the groundwater from the fill materials located on the Site.

* Include rationale for location and analysis.
VOA = volatile organic analyses

EXAMPLE

Table 5-1: Analytical Services
Matrix = Soil

Sample Number	Sample Location	Depth (ft)	Special Designation	Analytical Methods			
						SW846 Method 8260B (volatiles)	SW846 Method 6010/7470 (metals)
SB-01-05	SB1	0-1.5					X
SB-01-24	SB1	2-4	MS/MSD			X	X
SB-01-68	SB1	6-8				X	X
SB-02-05	SB2	0-1.5					X
SB-02-24	SB2	2-4				X	X
SB-02-68	SB2	6-8				X	X
SB-01-10	SB2	6-8	Duplicate of SB-02-68			X	X
Total number of Soil Samples, excluding QC:						4	6
Total number of Soil Samples, including QC:						5	7

MS/MSD = matrix spike/ matrix spike duplicate

EXAMPLE

Table 5-2: Analytical Services
Matrix = Groundwater

Sample Number	Sample Location	Special Designation	Analytical Methods			
					SW846 Method 8260B (volatiles)	SW846 Method 6010/7470 (metals)
SB-01	SB1	MS/MSD			X	X
SB-02	SB2				X	X
SB-03	SB2	Duplicate of SB-02-68			X	X
Total number of Soil Samples, excluding QC:					2	2
Total number of Soil Samples, including QC:					3	3

MS/MSD = matrix spike/ matrix spike duplicate

EXAMPLE

Table 5-3: Analytical Method, Containers, Preservation, and Holding Times Requirements Matrix = Soil

Analytical Parameter and/or Field Measurements	Analytical Method Number	Containers (number, type, size/volume)	Preservation Requirements (chemical, temperature, light protection)	Maximum Holding Times
Volatiles	SW-846 Method 8260B	Two EnCore® Samplers	Chill with ice to 6ºC	48 hours
Metals	SW-846 Method 6010/7470	4 oz glass jar	Chill with ice to 6ºC	<180 days/<28 days for Hg

Table 5-4: Analytical Method, Containers, Preservation, and Holding Times Requirements Matrix = Groundwater

Analytical Parameter and/or Field Measurements	Analytical Method Number	Containers (number, type, size/volume)	Preservation Requirements (chemical, temperature, light protection)	Maximum Holding Times
Volatiles	SW-846 Method 8260B	3 x 40-ml VOA	Chill with ice to 4ºC pH<2 with HCl	14 days
Metals	SW-846 Method 6010/7470	1 L HDPE	Chill with ice to 4ºC pH<2 with HNO_3	6 months

VOA = volatile organic analysis
HDPE = high density polyethylene
Hg = mercury
HCl = hydrochloric acid
HNO_3 = nitric acid

EXAMPLE

Table 6-1: Field and Sampling Equipment

Description of Equipment	Material (if applicable)	Dedicated (Yes/No)
Sampling sleeves	Acetate or equivalent	Yes
Hand auger	Hardened steel	No
EnCore® samplers	Plastic	Yes
Sampling trowel	Plastic or stainless steel	Yes
Bailer	Plastic or stainless steel	Yes
Conductivity meter	NA	No
Peristaltic pump with dedicated tubing	Tygon or HDPE tubing	No

NA = not applicable
HDPE = high density polyethylene

EXAMPLE

Table 6-2: Field Equipment/Instrument Calibration, Maintenance, Testing, and Inspection

Analytical Parameter	Field Equipment/ Instrument	Calibration Activity	Maintenance & Testing/ Inspection Activity	Frequency	Acceptance Criteria	Corrective Action
Temperature (sensor)	Multimeter Manufacturer X, Model Y	Annual check of endpoints of desired temperature range (0ºC to 40ºC) versus NIST thermometer	See manufacturer's manual	Annually	±0.2ºC of true value at both endpoints (i.e., manufacturer's listed accuracy for the sensor)	Remove from use if doesn't pass calibration criteria
pH (electrode)	Multimeter Manufacturer X, Model Y	Initial: two-point calibration bracketing expected range (using 7.0 and either 4.0 or 10.0 pH buffer, depending on field conditions); followed by one-point check with 7.0 pH buffer Post: single-point check with 7.0 pH buffer	See manufacturer's manual	Initial: beginning of each day Post: end of each day	Initial: two-point calibration done electronically; one-point check (using 7.0 pH buffer) ±0.1 pH unit of true value Post:) ±0.5 pH unit of true value with both 7.0 pH and other "bracketing" buffer (and either 4.0 or 10.0 pH)	Recalibrate Qualify data

Records Retention And Disposal Schedule

Agency: Department of Environmental Protection	
Division: Water and Waste Management	8-5-2021
Final Action Code: 1 Destroy 2 Shred 3 Retain Permanently 4 DEP Archives	**Page:** 1 of 1 **Effective Date:**

Series/ Auth Number	Name/Description of Record Series	Retain at Agency (Electronic Only)	Comments	Final Action Code
RCRA Subtitle C	Records related to generators, transporters, and TSD (treatment, storage and disposal) facilities as required by Subtitle C of the Resource Conservation and Recovery Act (RCRA). Includes notification forms, permit applications and modifications, background and supporting documentation, public notices, drafts and final permits, comments and records of public meetings, fact sheets, exception reports, appeals, import and export notifications, closure and post-closure documents, inspection reports, court orders, enforcement actions, manifests, delistings, correspondence, financial assurance documents, records relating to interim status, and other related records.	**Permanent** (plan to destroy paper files once electronic record copy is successfully developed and verified, which should be no longer than 10 years after a site becomes inactive)	The Resource Conservation and Recovery Act (RCRA) provides authority to track hazardous waste from "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. Therefore, the State is to maintain permanent files of all sites (plots of land) that have had hazardous waste activities conducted on them.	3
RCRA Subtitle I	Contains records that document the management of the underground storage tank (UST) and leaking underground storage tank (LUST) program. Includes notification forms, release reports, site characterization reports, financial assurance, evaluations, information requests, inspection and sampling reports, initial abatement measures and site check, incident reports, confirmed release notice to comply, free product removal reports, investigation for soil and groundwater cleanup, corrective action plans, public notices, and enforcement actions.	**Permanent** (plan to destroy paper files once electronic record copy is successfully developed and verified, which should be no longer than 10 years after an approved tank closure/removal).		3
Aboveground Storage Tank	Contains records that document the management of the aboveground storage tank program. Includes electronic: Registrations, registration modifications, transfers, closures, certified inspections, spill prevention response plans, inspection and enforcement, release reports, financial assurance, initial abatement measures and site check, incident reports, confirmed release notice to comply, investigation for soil and groundwater cleanup, corrective action plans, public notices that will be scanned to electronic format.	**Permanent** (plan to destroy any paper activity once electronic record is successfully developed and verified. This is a new program, so there are no historic files to scan)		3