MEMORANDUM

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SUBJECT: **Guidance Document LPR-SRR-2016-03**
Storage Tank Program Compliance Manual Volume 3: Underground Storage Tank Inspections

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Summary:

This volume of the Storage Tank Program Compliance Manual provides guidance to DEQ staff on the policies and procedures for underground storage tank (UST) inspections. This guidance provides inspection procedures, technical information regarding UST system components, regulatory and statutory framework and interpretations, instructions for the mobile inspection application, and supporting documentation. The guidance supersedes the following guidance:

1) Guidance No. 01-2025 - Volume III of the Storage Tank Program Compliance Manual – Underground Storage Tank Pollution Prevention that was effective October 12, 2001,

2) Guidance No. 02-2013 - Evaluation of Vapor Monitoring Data for Petroleum Storage Tank Release Detection that was effective July 17, 2002,

3) Guidance No. 05-2011 - Guidelines for Underground Storage Tank Secondary Containment Guidance that was effective May 13, 2001, and

4) Guidance No. LPR-SRR-2011-11 - Underground Storage Tank (UST) Operator Training Guidance that was effective December 20, 2011.

Electronic Copy:

An electronic copy of this guidance in PDF format is available for staff internally on DEQNET, and for the public on DEQ's website at:
http://www.deq.virginia.gov/Programs/LandProtectionRevitalization/Laws,Regulations,Guidance.aspx

STORAGE TANK PROGRAM COMPLIANCE MANUAL

VOLUME III – UNDERGROUND STORAGE TANK INSPECTIONS

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Appendices

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1 Introduction - Underground Storage Tank (UST) Inspections

This volume of the Petroleum Storage Tank Compliance Manual provides guidance to Department of Environmental Quality (DEQ) staff regarding aspects of UST inspections including inspection goals, inspection planning, pre-inspection procedures, inspection procedures, post inspection procedures and technical guidance regarding UST operation and maintenance.

1.1 Inspection Planning

Each Regional Office (RO) should plan inspections for its UST facilities during each federal fiscal year (FFY). Inspection planning should include consideration of DEQ's inspection goals, the Risk Based Inspection Strategy (RBIS) (Appendix A) Virginia Department of Transportation (VDOT) 3rd party contractor inspections, inspections conducted by the Environmental Protection Agency (EPA) and/or their contractors, other third party inspections, and resource sharing.

- **Inspection Types.** There are four UST inspection types-- formal, local official, site visits and closure-- that DEQ uses to implement the regulatory requirements of the UST program. Detailed descriptions of how each type of inspection is conducted are located in the following sections.

- **Facilities Requiring Inspection.** Formal inspections are required for all active UST facilities. Active facilities are those that contain USTs that are currently in use or properly temporarily out of use (Section 3.3).

- **Inspection Frequency.** Active UST facilities should be formally inspected every three years or within three FFY's (October 1- September 30).

- **New Facilities.** Local officials conduct initial inspections at new facilities. DEQ staff will conduct subsequent inspections no later than three FFY's from the initial inspection. For example, if the USTs at a facility were formally inspected on January 1, 2015, the next formal inspection must occur by September 30, 2018 (end of FFY).

- **Existing Facilities.** The Discoverer query, "Official DEQ UST Inspection Query" (Inspection Query)[1], should be used to determine the latest date that a formal inspection should be conducted for an existing facility.

[1] The Inspection Query is maintained by the Office of Spill Response and Remediation (OSRR) and shared with the Groundwater Managers and Team Leaders/Technical Reviewers.

- **Inspection Strategy.** As DEQ inspection staff plans the inspections for each FFY**,** they should follow the "Risk Based Inspection Strategy" (RBIS) found in Appendix A. At the beginning of each FFY, each RO will determine "high" and "low" risk sites in accordance with the RBIS. Generally, high risk sites should be formally inspected first and low risk sites last, in the event that DEQ cannot inspect all facilities within three years.

- **3rd Party Inspections.** DEQ's Office of Spill Response and Remediation (OSRR) will notify each RO of any VDOT, EPA, or other third-party inspections that will take place in their region during each FFY.

- **Resource Sharing.** Petroleum Program Managers (PPMs) and OSRR staff will periodically identify resource needs that may be addressed with resource sharing amongst ROs. DEQ's Resource Sharing Policy should be followed when resource sharing occurs.

1.2 Inspector Training

Before new inspectors are permitted to conduct unaccompanied inspections, the RO will provide training that includes the following topics:

- **Laws and Regulations.** Appendix B (Law, Regulations and Educational Literature) identifies the law, regulations and literature governing USTs.

- **DEQ Program Guidance.** Applicable sections of this manual (Volumes I, II, III, and IV) and any applicable staff guidance.

- **UST Operator Training Course.** It may be beneficial for a new inspector to complete an online Class B operator training course such as Tennessee Tank Helper . A Virginia Supplement to Tennessee Tank Helper describes the few differences in Virginia's and Tennessee's UST regulations.

- **OSHA and safety-related training.** Safety training topics will include those listed in Appendix C (Facility Inspection Safety).

- **Field Training.** Field training by a senior staff member will demonstrate proper inspection procedures for each type of inspection. Training will include spill and overfill equipment identification and operation, release detection systems, corrosion protection systems, secondary containment systems, and testing procedures.

- **Records Training**. This includes a demonstration of registration, closure, and compliance records review procedures.

- **Mobile Application Training.** This includes training on the operation of and procedures for using the UST Inspection Mobile Application. Additional guidance is described in the Underground Storage Tank Inspection Application User's Manual (Appendix E).

- **CEDS Facility Tank Module (CEDS) Training.** This training should be conducted in accordance with the CEDS database operations discussed in Volume II of this manual. .

2 Formal Inspection Procedures

2.1 DEQ Compliance Measures

Background

DEQ inspection staff conducts approximately 2,000 Formal UST inspections per year to achieve the three year cycle goal.

The EPA's Office of Underground Storage Tanks (OUST), in cooperation with the Association of State and Territorial Solid Waste Management Officials (ASTSWMO), developed "Significant Operational Compliance (SOC) Determinations for Updated UST Performance Measures" in September 2003. Subsequently, DEQ's UST compliance program ensured that each formal UST inspection contained, at a minimum, an evaluation of EPA's SOC performance measures.

After the federal Energy Policy Act of 2005 (EPACT) was enacted, DEQ's UST compliance program had to meet the requirements of EPA SOC and EPACT. To ensure that the three year inspection cycle could be met efficiently, DEQ developed an electronic inspection application (Inspection App) and the "Virginia DEQ Compliance Measures for UST Inspections" (DEQ Compliance Measures) (Appendix G) for the evaluation of regulated USTs.

UST Compliance Evaluation using DEQ Compliance Measures

DEQ inspection staff will use the DEQ Compliance Measures (Appendix G) to evaluate all regulated UST systems. The DEQ Compliance Measures will replace the use of EPA's SOC document since DEQ's measures incorporate EPA's SOC performance measures.

DEQ Compliance Measures[2] contain the *most significant* aspects of UST operational compliance. Application of each compliance measure is discussed in detail in Chapter 3 - Formal Inspection Compliance Evaluation.

[2] The fact that other aspects of the UST program (i.e., other statutory and regulatory requirements) are not included in the DEQ Compliance Measures is not intended, nor should it be interpreted, to mean that those other aspects of the UST program are not important. The regulatory requirements not listed on the DEQ Compliance Measures are still enforceable regulatory requirements; owners and operators of USTs must comply with **all** UST regulations. DEQ Compliance Measures were developed to provide additional consistency and efficiency to DEQ's UST compliance inspections.

Typically, the compliance inspector will not consider regulatory criteria outside the scope of the DEQ Compliance Measures to determine the compliance status of UST systems[3]. However, when a suspected or confirmed release is identified, compliance inspectors may evaluate UST system compliance using any regulatory criteria indicated in Virginia's UST Technical Regulation (§9VAC25-580 et seq.).

2.2 UST Inspection Application

Formal inspections should be completed in the Inspection App located on the inspector's assigned mobile device (Apple iPad®) following the instructions contained in the UST Inspection Application User Manual (Appendix E).

In the event that the inspector is unable to conduct the inspection on the mobile device due to inclement weather, device failure, or other technical difficulties, the inspector may use a log book or the inspection form located in (Appendix F) to record the information upon return to the office. The CEDS-generated "Underground Storage Tank Facility Inspection Report" (Ex. in Appendix E) will serve as the official UST inspection report file of record.

2.3 Formal Inspection Preparation

In order to maximize efficiency and be prepared in the field, inspectors should perform these tasks in the office prior to the field inspection:

a. **Determine Inspection Schedule.**
When devising their inspection schedule, inspectors should make a conscientious effort to use state resources and time efficiently. The inspector should draft an inspection schedule by possible facilities, dates, and times. The inspector should plan the relative time for each inspection and the driving time between inspections. A typical UST inspection takes about an hour to an hour and a half to complete. Large or very complex facilities will take longer to inspect. The tablet mobile inspection application contains a mapping tool to map the route between each facility and also includes written directions and time estimates (Appendix E). If an inspector suspects that a Verizon cellular signal is unavailable in some travel locations and they are unfamiliar with the area, it is recommended that the inspector print directions.

b. **Verify tank owner information.**
The inspector should attempt to determine if the CEDS tank owner address, owner contact name, owner phone number, owner/contact email and mailing address are correct by contacting the tank owner and/or contact using the current CEDS telephone numbers. During this information verification process, the inspector should specify the

[3] In rare instances when the case scenario may warrant the use of regulatory criteria outside of DEQ Compliance Measures, regional staff should consult with DEQ Central Office staff.

date and time of planned inspection. A voice mail message or e-mail may be left if the owner or contact is unavailable.

If the current CEDS owner or contact data is incorrect and the inspector is unable to contact the appropriate party, the inspector should attempt to determine the correct owner information prior to the inspection by using other sources. Electronic Content Management (ECM) records, on-line local government tax and property records, state corporation records, and internet searches are good resources to obtain contact information.

c. **Provide advance written notice of the formal inspection**.
The inspector must confirm the inspection date and time in writing regardless of telephone conversations or messages. The inspector should e-mail the tank owner and/or operator (if unable to locate the owner) using the letter found in Appendix H 15-30 days prior to the inspection. Formal inspection notices may be mailed when an e-mail address is unavailable.

The inspector may schedule the inspection in less than fifteen days from the date of the notice if a shorter timeframe is mutually agreeable. The purpose of the written notification is to ensure that the owner/operator has adequate time to (i) make copies of requested records and (ii) ensure personnel with knowledge of the equipment and operations are present for the inspection.

d. **Review facility records.**
Each inspector should conduct a thorough records review prior to each inspection to gain an understanding of the facility and its history. The following records may be obtained from CEDS and ECM and should be reviewed (if available) prior to the inspection:

- Notification Form.
- Inspection.
- Testing records.
- Closure records.
- LUST/Pollution Complaint files.

e. **Determine if any active remediation or enforcement cases exist.** The inspector should review the CEDS facility information. If any remediation case is noted or other violations identified in Warning Letters or Notices of Violations, note these for follow-up. This information will automatically be populated in the Inspection App. If an outstanding remediation or enforcement case exists, the inspector should coordinate the inspection with the case manager or enforcement specialist.

f. **Load pending inspections onto mobile device.** The inspector should load their pending inspections onto the mobile device (iPad) prior to the inspection by following the "Facility Check-Out" instructions located in the UST Inspection Application User's Manual (Appendix E).

g. **Ensure vehicle is equipped with necessary materials and equipment.**
The document "Mandatory Equipment and Materials for ALL UST Inspections" (Appendix D) contains a list of the equipment and materials needed to conduct UST Inspections.

2.4 Inspection Activities

To conduct formal inspections, DEQ inspectors will:

- **Examine equipment and demonstrate performance.** Require the owner/operator to remove all heavy manhole, tank, or dispenser covers, and demonstrate all equipment (ATGs, etc.) performs as needed to verify compliance.

- **Perform visual equipment verification.** If possible, for the tank owner's benefit, equipment should be visually examined under each manhole cover and in each dispenser to identify missing or improperly installed equipment, potential system problems, and to detect any current equipment leaks.

- **Discuss with the owner and/or operator possible compliance options** (if possible).

- **Document any "Reasons for Noncompliance" in the Inspection App**.

- **Notify the owner/operator of the potential for enforcement action**. (See Volume IV of this manual).

- **Practice acceptable inspection techniques and safety as discussed in Section 2.4.1 Acceptable Inspection Technique and Safety**.

- **Create an optional facility site sketch.** The inspector should draw a sketch of the site, if necessary. The sketch may show:

  - all product lines (as best as can be determined);
  - all dispensers;
  - fill ports;
  - ALLDs;
  - observation or monitoring wells;
  - ATG units/panels;
  - interstitial monitoring points;

- vapor recovery units;
- cathodic protection testing sites;
- impressed current panels (rectifiers); and
- obvious site features such as streets and buildings.

If a site sketch is created, it must be scanned into a .pdf format and scanned into ECM as an inspection record.

2.4.1 Safety and Acceptable Inspection Technique

Safety Considerations

UST facilities can contain many hazards like high traffic, inattentive drivers, petroleum vapors, and poisonous insects among others. Inspectors should ensure that they are always attentive to their surroundings and use safety equipment to help prevent unwanted accidents. Appendix C- Facility Inspection Safety contains a list of inspector safety considerations.

During equipment verification, inspectors must wear safety vests and use safety cones to blockade the inspection area to prevent vehicular accidents. Since petroleum vapors, snakes, and spiders (Figure 2-1) are often found in sumps and under dispensers, inspectors should assess these areas prior to inspection. Gloves should be worn when touching any equipment for protection from insect bites and skin irritation from petroleum.

Inspectors must also follow any facility required safety rules/policies such as wearing personal protection equipment (safety goggles, ear protection, and steel toed boots). Many manufacturing facilities may also require long hair to be tied up and secured to avoid injury.

Access to equipment and demonstrations

Inspectors must ensure that the actions they undertake at a facility do not create a hazardous situation or result in damage to the facility. Therefore, the inspection verification methods are limited to interview and visual examination techniques. A basic principle of acceptable inspection technique is that any verification requiring demonstrations (e.g., use of the equipment, probing to show equipment is intact, accessing equipment located under heavy manhole covers) must be performed by the tank owner or owner's representative.

Access to Private Property

DEQ's policy[4] is for staff to obtain consent from the property owner or an authorized representative of the property owner by phone, email, or formal notification letter prior to or at the time of conducting an inspection or investigation on private property[5], absent urgent circumstances.

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[4] Enforcement Guidance Memorandum No. 1-2011 "Access to Private Property for Inspections and investigations, Denial of Access, and Obtaining Administrative Inspection Warrants when Conducting Inspections"

[5] Private property, means property that is not owned by a governmental entity but rather a private citizen or legal entity such as a company. Convenience stores and other commercial facilities are considered private property in that context since they are not government owned.

Once the inspection begins, the tank owner/operator should not:

- limit the scope of the inspection,
- require DEQ staff to sign waivers limiting liability or confidentiality agreements,
- deny photography of items that reasonably relate to the inspection or are evidence of non-compliance,
- refuse or limit the staff's ability to view documents necessary to conduct the inspection, or
- take other actions as discussed in Guidance Memorandum No. 1-2011.

If the tank owner or operator objects to or impedes the inspection in any way, the inspector should immediately leave and notify their manager.

3 Formal Inspection Compliance Evaluation

3.1 Facility Information

The inspector should verify that the facility information contained in the Inspection App is correct. When differences exist, the inspector should record the correct information in the Inspection App. CEDS will automatically update with the correct information and highlight any differences in the inspection and registration information in red in the CEDS database.

3.2 Tank Information

Number and type of USTs

It is important for the inspector to determine the actual number of USTs at a facility by interviewing facility personnel and verifying the information provided.

The inspector should note the number of vent pipes, fill ports, dispensers, and tank fields to verify the number of USTs. These verification measures have limitations. For example, there is not always a one-to-one relationship between the number of vent pipes, fill ports, and dispensers and the number of USTs. For example, a facility may contain: one vent pipe, two fill ports, and three dispensers per tank. The inspector should keep in mind that unregulated USTs may also have vent pipes, fill ports, and dispensers. The facility personnel's explanations of the relationship between the number of vent pipes, fill ports, dispensers, and tank fields should be consistent with the number of tanks the facility personnel report.

The inspector should verify that all regulated USTs are correctly reflected on the Tank Owner Information screen in the Inspection App. The total should include partially deferred USTs (USTs which store fuel for use by emergency power generators installed prior to September 15, 2010). Non-regulated tanks (exempt, excluded, and deferred) USTs should not appear on the Tank Owner Information screen.

The inspector should amend the tank data in the Inspection App by creating or editing tank data from the Tank Owner Summary screen.

3.2.1 Discrepancies between CEDS Information and Inspection Observations

The inspector should request the facility contact to explain any discrepancies between the CEDS data and either the interview data or field observations. If the inspector conducts the CEDS review after the inspection, the inspector must obtain an explanation of any discrepancy as part of the inspection follow up.

If comparison of registration data on file with the agency (whether or not CEDS entry has been completed) with the information discovered during the inspection suggests that the Notification for Underground Storage Tanks Form 7530 is inaccurate, the inspector should note the need for a notification amendment in the Registration section of the Inspection App.

3.2.2 Inspection Application Data Entry Requirements

It is essential for data quality and tracking that the UST facility inspection data is entered into the Inspection App and CEDS consistently and in a manner conducive to querying and data reporting. An inspection may be entered into CEDS either manually or electronically via syncing with the mobile device and uploading the inspection information. The following table provides the definitions of pertinent fields from the CEDS inspection tab and the Inspection App and when each field should be used. Facility inspections uploaded to CEDS via the mobile device will automatically complete the CEDS inspection data fields. All inspections uploaded from the mobile device will be UST Formal Inspections.

Field Name	Field Options	Field Definition	When to Use	Comments
INSPECTION DATE		Date of Inspection conducted by DEQ Staff, EPA Inspector, VDOT Inspector, or Local Official.	After a UST Inspection.	The date inspected by DEQ staff should be used for all inspections conducted in the Inspection App. For Local Official Inspections of "new facilities", use the date tanks were installed (brought into use). The tank installation date should be obtained from a Notification for Underground Storage Tanks Form 7530 Form. The installation date may be obtained via a conversation with a tank owner or a building permit if a Notification for Underground Storage Tanks Form 7530 Form has not been received.
INSPECTION TYPE	UST Site Visit	Site visits are conducted to verify return to compliance items subsequent to a formal inspection, Delivery Prohibition, or to conduct outreach to members of the regulated community. Site visits may be conducted by DEQ staff or EPA.	Use for facility visits that do not meet the UST Formal or UST Closure inspection criteria.	Includes site visits after imposition of Delivery Prohibition and those conducted at the request of enforcement or remediation staff.

	UST Formal Inspection	UST Formal Inspection conducted in accordance with the Petroleum Storage Tank Compliance Manual by DEQ staff, VDOT, EPA, or local officials.	Use for all UST Inspections that at a minimum contain an evaluation of DEQ Compliance Measures.	UST inspections conducted at facilities containing only "temporarily out of use" USTs are considered UST Formal Inspections, not UST Closure Inspections. All inspections uploaded from the mobile device are UST Formal Inspections.
	Local Official Inspection	Installation inspection conducted by designated local official.	Use when a VA Notification for Underground Storage Tanks Form 7530 Form or other indication of a new UST facility is received. DEQ will assume that the local official conducted an inspection at the new tank installation as indicated in the Virginia Uniform Statewide Building Code.	Use the date of tank installation for the "Inspection date" and "Local Official Insp" for inspector. This inspection type should not be used if existing active USTs are located at the facility. Facility inspection details will not populate for this inspection type.
	UST Closure	Inspection conducted by DEQ staff, VDOT, EPA, or local officials at facilities pertaining to tanks that are presently or have previously been closed (excluding temporarily out of use tanks).	Use for inspections that pertain to tank closure only. Closure inspections are conducted during a tank(s) closure or to verify that tanks have been properly closed.	UST inspections conducted at facilities containing only "temporarily out of use" USTs are considered UST Formal Inspections, not UST Closure Inspections.

OWNER		Registered or Unregistered UST Owner identified as result of inspection.	Use for each owner per tank, located at a facility per UST Formal Inspection.	Multiple inspection records may need to be created for inspections conducted at facilities with multiple tank owners.
INSPECTOR	DEQ Staff Name	The person's first and last name that conducted the referenced UST inspection.	Use for each UST inspection conducted by DEQ staff.	
	Local Official Insp	Denotes a local official (building or fire official) conducted the referenced local official inspection.	Use only for UST inspections conducted at the time of a new tank installation at a new facility.	
	EPA Insp	Denotes an EPA official conducted the referenced UST inspection.	Use for UST inspections conducted by an EPA official even if a DEQ staff member was present.	Inspection details should be left blank for inspections conducted by EPA officials.
	VDOT Inspector	Denotes that VDOT's 3rd party inspector conducted the referenced inspection.	Use for UST inspections conducted by VDOT's 3rd party inspector at VDOT facilities only.	

3.2.3 CEDS Tank Statuses

The "Tank Status" field is one of the most important fields used to track "active" facilities for each three year inspection cycle. Below is a table which defines the use of CEDS Tanks Status Fields.

TANK STATUS	WHEN TO USE	COMMENTS
CURR IN USE	1. USTs are registered "currently in use" via a Notification for Underground Storage Tanks Form 7530, OR 2. An inspection has indicated the USTs are "currently in use", OR 3. Other documentation has been provided that demonstrates the USTs are "currently in use", OR 4. USTs have not been properly temporarily closed in accordance with Part VII of the UST Technical Regulation, OR 5. USTs have not been removed from ground, or closed in ground in accordance with Part VII of the UST Technical Regulation **and** do not meet any of the below permanently out of use scenarios.	
TEMP OUT OF USE	Use this tank status for USTs that are in temporary closure in accordance with Part VII of the UST Technical Regulation. DEQ should have received the following documentation: 1. A Notification for Underground Storage Tanks Form 7530 form registering the USTs "temporarily out of use", 2. A building permit for temporary UST closure or a "Building Permit Certification Form" (Appendix J) and 3. A statement, photograph, receipt or inspection record documenting that the equipment is secured. Documentation demonstrating that the tank is in compliance with the remaining temporary closure requirements is not necessary to change the CEDS tank status to temporarily out of use.	If a Notification for Underground Storage Tanks Form 7530 form is received registering the tank temporarily out of use, but a building permit and documentation that the equipment is secured has not been received, then the tank status must remain "currently in use".
REM FROM	Form Notification for Underground Storage	Use this status only for tanks that were

GRD	Tanks Form 7530, inspection, or other valid written evidence (e.g. closure report) indicates the UST was "removed from the ground" in accordance with Part VII of the UST Technical Regulation.	closed in accordance with Part VII of the UST Technical Regulation. See "Perm Out of Use" below for improperly closed/documented tanks.
CLS IN GRD	Form Notification for Underground Storage Tanks Form 7530, inspection, or other valid written evidence (e.g. closure report) indicates a UST was "closed in the ground" in accordance with Part VII of the UST Technical Regulation.	Use this status only for tanks that were closed in accordance with Part VII of the UST Technical Regulation. See "Perm Out of Use" below for improperly closed/documented tanks.
PERM OUT OF USE	1. USTs have not been properly permanently closed (removed from ground or closed in ground) in accordance with Part VII of the UST Technical Regulation and staff attempts to locate the UST owner or landowner are unsuccessful, OR 2. Staff attempts to locate facility are unsuccessful due to 911 address changes, improper registration information, or redevelopment of area, OR 3. The original Form Notification for Underground Storage Tanks Form 7530 received prior to December 22, 1988 lists "permanently out of use" (closed) USTs. There was not a requirement to provide information about whether the UST was removed or closed in the ground during this time, OR 4. The USTs are not regulated (i.e., heating oil tanks).	Caution should be used when using the "Perm Out of Use" tank status since these facilities will not show on most facility queries and can easily be forgotten. Use "Permanently Out of Use" only if removal does not meet regulatory requirements (e.g., no closure documents or missing lab results). The "Permanently Out of Use" tank status should remain for old or abandoned UST facilities commonly referred to as "deadwood" facilities. List **improper closure, deficiency, or deadwood** and any other site aspects in tank comment field along with the comment date and commenter's name or initials. "Permanently Out of Use" USTs are usually empty and most likely will not be brought back into use. DO NOT USE "Temporarily Out of Use" for these facilities since "Temporarily Out of Use" implies that the regulatory requirements have been met and the facility must be inspected every three years.

4 Temporary Closure

4.1 Description

Temporary closure requires the owner/operator to perform the following activities:

- **Obtain a building permit.** The owner/operator must obtain a permit from the local building or fire officials or submit the "Building Permit Certification Form" (Appendix J).

- **Complete and submit a UST Notification Form Notification for Underground Storage Tanks Form 7530.**
    - The owner/operator must submit a Notification Form within 30 days following cessation of use of the UST system.
    - The owner/operator may provide notice for several tanks at the same facility using one notification form, but if they have temporarily closed tanks at more than one facility, they must file a separate notification for each facility.

- **Empty the tank or conduct release detection and maintain operator training.**
    - Owners and operators must continue release detection, and comply with operator training requirements during the temporary closure period unless the UST is empty.
    - Operator training and release detection are not required as long as the UST remains empty.
    - The UST system is empty when no more than 1 inch of residue, or 0.3% by weight of the total capacity of the UST system, remains in the tank.
    - If the tank is brought back into use, designated operators must complete an approved UST Operator Training program within 60 days.

- **Maintain corrosion protection.**
    - Cathodic protection tests must continue to be conducted every three years for cathodically protected tanks and/or piping.
    - Impressed current systems must remain "on" and the rectifier read every 60 days and records kept.
    - Internal lining inspections must continue to be conducted 10 years after liner installation and every five years thereafter.

- **Within three months, cap and secure equipment.** Once a UST system has been temporarily closed for three months, the product lines, pumps, man ways, and ancillary equipment must be capped and secured; the vent lines must remain open and functioning.

4.2 Time Limit for Temporary Closure

Owners/operators of new or upgraded USTs may go into temporary closure indefinitely as long as all requirements are being met. After the December 22, 1998 regulatory deadline for spill, overfill, and corrosion protection, substandard UST systems could temporarily close for 12 months. After 12 months, temporarily closed UST systems had to be permanently closed or upgraded to current standards for new UST systems. Local officials, based upon site specific conditions, could grant 12-month extensions to the temporary closure period of substandard tanks. DEQ no longer allows a 12-month temporary closure period for substandard UST systems since substandard UST systems have likely not met the regulatory requirements for corrosion protection since December 22, 1998.

4.3 Other Requirements:

- **Spill and overfill**: These requirements do not need to be met for temporary closure.

- **Financial Responsibility:** Financial Responsibility (FR) is not required for empty USTs that meet the regulatory requirements for temporary closure.
    - DEQ made this decision because FR violations for empty tanks generally present a low environmental risk.
    - The inspector should notify the Office of Financial Responsibility and Data Management (OFRDM) whenever a facility has empty USTs that meet the regulatory requirements for temporary closure.
    - Once notified, the OFRDM will suspend the owner/operator's FR demonstration requirement and release the owner/operator's FR mechanism.
    - However, OFRDM will require the owner or operator to demonstrate FR again if the USTs are either brought back into service or no longer meet the regulatory requirements for temporary closure. The regional office should notify OFRDM if either of these events occurs.

4.4 Compliance Evaluation

In order to evaluate compliance with temporary closure requirements the inspector must ensure that the items discussed below are verified at the time of inspection. Items that cannot be verified should be identified as non-compliant in the Inspection App.

1) **Registration.** DEQ has received a properly completed Notification of Underground Storage Tanks Form (Notification for Underground Storage Tanks Form 7530) registering the tank(s) as temporarily out of use. Any non-compliance should be noted in the Registration section of the Inspection App.

2) **Building permit was obtained.** A building permit or "Building Permit Certification Form" (Appendix J) for temporary UST closure has been submitted.

   - **No building permit.**

     Locality Does Not Issue Permits: Some localities do not issue building permits for temporary tank closure. In cases where the tank owner did not obtain a building permit because the locality does not issue such permits or the tank owner failed to obtain one at time of closure, the tank owner may submit the "Building Permit Certification Form" (Appendix J).

     State Agencies: The Virginia Department of General Services (DGS) acts as the permitting authority for state agencies. There is one exception, however. DGS, through a Memorandum of Understanding, has delegated to the Virginia Department of Transportation (VDOT) the authority to issue building permits for tank installations at VDOT or State Police owned facilities. DGS and the other governing bodies of state agencies do not typically issue building permits.

     Other: There may be other entities that act as the permitting authority. In cases where the tank owner indicates that they aren't required to obtain a permit from the local officials, the inspector should contact OSRR.

3) **Necessary equipment was secured.** The fill caps, man ways, and ancillary equipment have been secured if the UST system was last used at least three months ago. The fill caps and dispenser nozzles (if applicable) should be locked or secured to avoid unauthorized access and/or vandalism to the tank. Padlocks, nuts and bolts, or pipe caps that require specific pipe wrenches may be used to secure equipment.

4) **Vent lines were open and functioning.** The inspector can visually verify that caps or other devices have not been placed on vent lines.

5) **Corrosion protection system is being maintained properly.** Corrosion protection non-compliance for temporarily closed tanks should be noted under the temporary closure section and not the tank or piping corrosion protection sections of the Inspection App.

6) **Release detection not conducted for tanks containing greater than one inch of product.** The inspector needs to verify if the tank(s) contains product by requesting the tank owner/operator to stick the tank while on-site. The inspector may also accept work order invoices or other documentation that demonstrates whether the tank contains fuel. This verification must be performed in order for the inspector to determine which regulatory requirements are applicable to the temporarily out of use tanks.

4.5 Incomplete Temporary Closure

In many cases, tank owners will stop using their tanks without performing all or some of the temporary closure requirements. Generally, USTs are considered "currently in use" until proper temporary closure has been achieved in accordance with 9VAC25-580-310 or the tanks are permanently closed with a closure assessment.

A Temporary Closure fact sheet for public distribution may be found in Appendix I.

5 Spill Prevention

5.1 Description

All regulated USTs that accept more than twenty-five gallons of regulated substance at transfer are required to have a spill containment device (including remote fills). USTs that always receive transfers of no more than twenty-five gallons, such as many used oil tanks, are not required to have spill prevention. Spill containment devices are usually buckets (Figure 3-1) or basins that are sealed around the fill port. Common names for spill containment devices include "spill buckets" or "catchment basins."

Figure 3-1 Spill Bucket

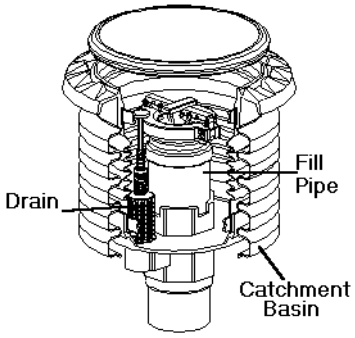

Figure 3-2 Spill Bucket Schematic

Spill containment devices are designed to catch small amounts (three to five gallons) of product after delivery and temporarily contain product that leaks out of the delivery hose until it can be disposed of properly. Coated concrete containment and other unconventional devices are acceptable as long as they do not allow product to be released into the environment.

5.2 Compliance Evaluation

In order to evaluate compliance with spill prevention requirements the inspector must verify the items discussed below at the time of inspection. Items that cannot be verified should be identified as non-compliant in the Inspection App.

1) **Spill Prevention device is present (for tanks receiving greater than 25 gallons of product at a time).** Spill prevention devices must have intact walls and bottoms. Spill

prevention devices must be able to contain product. The inspector should verify or have the tank owner demonstrate that the spill containment structure contains a bottom by visual means or other documentation to the satisfaction of the inspector. Very old tank systems may contain aluminum rings or concrete forms around the fill ports to separate the surrounding soil or backfill. These aluminum rings may easily be mistaken for an aluminum spill bucket, but do not meet the spill prevention requirements since they are bottomless. Verification may include an installation invoice, photograph, or other documentation at the discretion of the inspector.

2) **Spill prevention device is free of holes and cracks.** The tank owner/operator or site contact should properly remove any substances so that the inspector can visually verify the integrity of the spill prevention device. Spill prevention devices may become cracked or damaged by heavy traffic or heavy equipment (snow plows), settling, or product incompatibility. In order to meet the regulatory requirements, the bucket must retain product and must be free of holes or cracks that may cause product to be released into the environment.

Housekeeping Only Issues: The inspector should notify the owner/operator of these issues but they do not constitute non-compliance.

- **Water, product, or debris contained in bucket.**
  Substances in the spill bucket may not make it non-compliant. Spill prevention devices should be kept clean and empty to meet the manufacturer's design capacity and to maximize the containment area during delivery.

- **Water entering tank from spill bucket.**
  Some spill containment devices may have a drain valve (Figure 3-2) that transfers the contents of the bucket back into the tank. If a drain valve is used, any debris, water, and product mixture that is present in the spill bucket will be drained into the tank. It is especially important to avoid water entering a tank that contains any ethanol since the water will mix with the ethanol in the fuel and could be transferred to vehicular fuel tanks. Due to many problems with spill bucket drain valves, many tank owners have replaced the problematic equipment with liquid-tight plugs. Spill containment devices that lack a pump or plug must be manually emptied.

6 Overfill Prevention

All regulated USTs that accept more than twenty-five gallons of regulated substance at transfer are required to have an overfill prevention device (including remote fills). The purpose of overfill prevention devices are to prevent USTs from being overfilled during a product delivery. There are three basic types of overfill prevention devices: (i) shutoff valves, (ii) ball floats, and (iii) alarms.

Overfill prevention must:

1) Automatically shut off flow into the tank when the tank is no more than 95% full;
2) Alert the transfer operator when the tank is no more than 90% full by restricting the flow into the tank or triggering a high level alarm; or,
3) Restrict flow 30 minutes prior to overfilling, alert the operator with a high level alarm one minute before overfilling, or automatically shut off flow into the tank so that none of the fittings located on top of the tank are exposed to product due to overfilling.

6.1 Shutoff Valves

6.1.1 Shutoff Valve Description

An automatic shutoff device (shutoff valve) installed in a UST's fill pipe (Figure 3-3) can slow down the delivery when product has reached a certain level in the tank. Shutoff valves typically meet the regulatory requirements by either a) automatically shutting off flow into the tank when the tank is no more than 95% full, or b) automatically shutting off flow into the tank so that none of the fittings located on top of the tank are exposed to product due to overfilling.

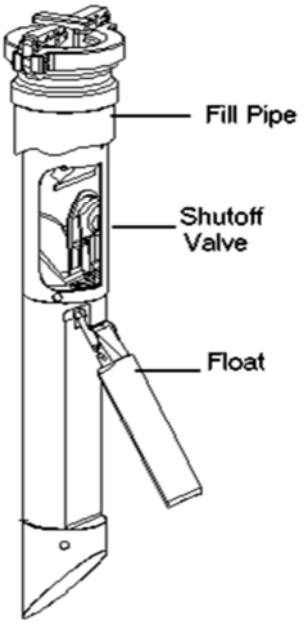

Figure 6-1 Shutoff Valve Schematic

Shutoff valves may be an integrated part of drop tubes or retrofitted in existing drop tubes. Shutoff devices typically have one or two valves that are operated by a float mechanism (Figure 6-1). As product levels rise in a tank, the float mechanism rises causing the shutoff valve to close with the flow of the product. A shutoff valve most often appears as a half moon shaped metal plate (deflector plate) inside the drop tube (Figure 6-2). The actual valves cannot be seen unless the deflector plate is damaged.

Figure 6-2 Shutoff Valve Deflector Plate

Most automatic shutoff devices work in two stages. The first stage drastically reduces the flow of product by allowing product to slowly enter the tank through a bypass valve. The delivery driver can then cease filling and still have room in the tank for the product left in the delivery hose.

It is important that shutoff devices are installed properly so that they may alert the transfer operator when the tank is 95% full. Proper installation requires the installer to perform mathematical calculations to determine where the float mechanism should be placed. The shutoff valve should not appear to be installed above the top of the tank.

6.1.2 Compliance Evaluation of Shutoff Valve

In order to evaluate compliance with overfill prevention requirements, the inspector must verify the items discussed below at the time of inspection. Items that cannot be verified should be identified as non-compliant in the Inspection App.

1) **Overfill device is present for tank receiving deliveries greater than 25 gallons.**
   If a shutoff device is the method of overfill prevention for a tank and it cannot be verified at the time of inspection due to inaccessibility, the inspector should indicate such by marking the corresponding reason for non-compliance in the Inspection App. Verification may include an installation invoice, photograph, or other documentation at the discretion of the inspector.

   The inspector may use their professional judgment and current site conditions to determine if further verification of the device is necessary. If the inspector believes that further documentation is necessary, he or she may subsequently request verification on an RCA as noted in Volume IV-Compliance Follow-up or perform a follow-up site visit.

2) **Overfill prevention device shuts off or restricts flow at required volume.** DEQ staff will not remove these devices to determine if they have been properly installed. However, if it appears that the valve is not properly installed from visual verification within the fill

riser, then the inspector may request the owner/operator to verify that the valve is properly installed by hiring a contractor to investigate and properly install, if necessary.

3) **Automatic shutoff is operational.**
The inspector should determine that the device has not been tampered with, blocked, or disabled by a stick or other device. Sometimes transfer operators use the product measuring stick to keep the shutoff valve open so they can transfer product faster or drop more product than ordered to empty the trailer compartment. Deflector plates or valve mechanisms may be damaged or rendered inoperable when jimmied open by a stick. If a stick is present in the fill pipe rendering the valve inoperable, the inspector should request the tank owner/operator to have the stick removed and have the shutoff equipment evaluated for proper functionality.

Sticking of a tank may also damage deflector plates and shutoff valves. If the deflector plate is damaged, it is very likely that the shut off valve is also damaged. The inspector should request the tank owner/operator to have a contractor evaluate the functionality of the shutoff device if any component of the shut off mechanism appears to be damaged.

6.2 Ball Float

6.2.1 Ball Float Description

Ball float valves are placed at the bottom of the vent line, vapor recovery valve, or other tank riser, several inches below the top of the UST. The ball floats on the product and rises with the product during delivery until it restricts vapor flowing out of the vent line (Figure 6-3). If all tank fittings and risers are tight, the ball float valve can create enough backpressure to restrict product flow into the tank, which will notify the delivery driver to close the truck's shutoff valve when the tank is at least 90% full..

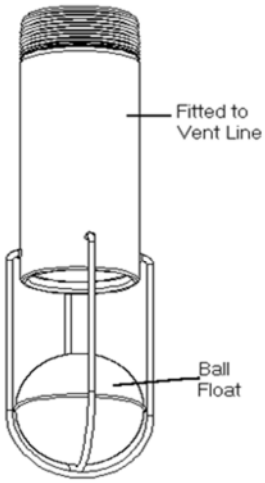

Figure 6-3 Ball Float Schematic

Figure 6-4 Seated Ball Float Valve in Vapor Recovery Riser

6.2.2 Compliance Evaluation of Ball Float Valve

The inspector should verify the items discussed below during the inspection. Items that cannot be verified should be identified as non-compliant in the Inspection App.

1) **Ball float device is present for tank receiving deliveries greater than 25 gallons.**
   Verification may include an installation invoice, photograph, or other documentation at the discretion of the inspector.

   The inspector may use their professional judgment and current site conditions to determine if further verification of the device is necessary. If the inspector believes that further documentation is necessary, they may subsequently request verification on a RCA as noted in Volume IV-Compliance Process or perform a follow-up site visit.

2) **Overfill prevention device shuts off or restricts flow at required volume.**
   DEQ staff will not remove these devices to determine if they have been properly installed. However, if it appears that the valve is not properly installed from visual verification, then the inspector may request the owner/operator to verify that the valve is properly installed by hiring a contractor to investigate and properly install, if necessary.

3) **Ball float does not appear to be damaged or broken.**
   If the ball float appears to be damaged or broken (i.e., missing or improperly seated ball), the inspector should indicate such as a reason for noncompliance in the Inspection App.

- **Ball is missing.** The metal cages surrounding the balls often corrode and release the balls. If the ball is not present, the device will not shutoff fuel during a delivery nor alert the transfer operator that a tank overfill has occurred.

- **Ball is stuck in seated position (Figure 6-4).** Sometimes the balls become stuck in the seated position when they are not sitting on product. This can cause pressure to build up in the tank during a delivery and cause the tank to rupture. Additionally, the petroleum vapors may vent from a tank riser, such as the ATG riser, resulting in a release of product.

Ball float valves may be problematic when used in conjunction with suction piping, pressurized delivery, or coaxial Stage I vapor recovery[6].

- When ball floats are used in conjunction with suction product piping, product may be released from the air eliminator valve at the dispenser when an overfill occurs due to increased pressure building in the tank.

- Ball float-vent devices must not be used with pressurized deliveries. Should the float-vent valve close during the delivery, the tank may over pressurize and rupture.

- Ball float devices are not compatible with coaxial Stage I vapor recovery as the float vent valve does not block the vapor return path around the drop tube. If an overfill occurs, the delivery driver ends up with both the delivery hose and the vapor return hose full of product with no place for it to go.

At this time, when the owner reports or the inspector notices the use of a ball float valve in conjunction with suction piping, pressurized delivery, or coaxial Stage I vapor recovery, the inspector should note the information in the overfill prevention comments section and notify the owner of the potential problems in the comment section of the RCA. The inspector should not address the ball float system compatibility non-compliance through an RCA unless a product release or overfill has occurred due to the incompatible equipment.

6.3 Overfill Alarms

6.3.1 Overfill Alarm Description

Overfill alarms (Figure 6-5) often use float sensors or probes installed in the tank to activate an alarm when the tank is either 90% full or within one minute of being overfilled. In either case,

[6] Since ball float valves are problematic and may result in tanks being over pressurized, the EPA's revised regulation eliminates the use of ball float valves for overfill prevention.

the alarm should provide enough time for the delivery driver to close the truck's shutoff valve before overfilling occurs.

Figure 6-5 Overfill Alarm Modules

6.3.2 Compliance Evaluation of Overfill Alarms

The inspector should verify the items discussed below during the inspection. Items that cannot be verified should be identified as non-compliant in the Inspection App.

1) **Overfill alarm is present for tank receiving deliveries greater than 25 gallons.**
   To verify the presence of an overfill alarm, the inspector should request that the site contact show them the overfill alarm, provide a printout that indicates the ATG is programmed appropriately, or provide other demonstrative records. The inspector must be able to verify that an overfill alarm exists if the tank owner/operator indicates that an alarm is the method of overfill prevention for their tank(s), otherwise the tank is out of compliance with overfill prevention requirements.

2) **Overfill alarm alerts delivery driver when the tank is no more than 90% full or within one minute of overfilling.**
   The inspector should verify that the ATG or other console is programmed properly to alert the delivery driver at the required tank volume.

   - **Improperly programmed automatic tank gauges (ATGs) (Overfill vs. High level Alarm).** Overfill alarms are often part of ATG systems. The ATG system must be programmed properly for the overfill alarm to function properly. The overfill alarm must be set to alarm when the tank is no more than 90% full or one minute prior to overfilling.

     Many alarms have two alarm settings: 1) an overfill alarm setting and 2) a high level alarm. Overfill alarms are intended to meet the overfill prevention regulatory requirements whereas high level alarms may be programmed at any alert level (such as 95% full). Typically, the ATG is programmed to trigger an overfill alarm when the tank is 90% full since that is easier than calculating what the level of fuel in the tank

should be one minute prior to overfilling. High level alarms are usually set at 95% full as an additional release preventative measure. If the high level alarm is set at the same level or below the overfill alarm, it is likely that the overfill alarm will not engage.

The inspector should check with the manufacturer if they encounter a high level alarm set below or at the same level as the overfill alarm and require reprogramming of the ATG, if necessary.

3) **Alarm appears operational.**
The inspector may request the site contact to demonstrate that the equipment is operable by pushing the “test” button on the audible alarm. The test button only tests that the electrical circuit is continuous, thus there may be other inoperability issues. An inoperable audible/visual alarm constitutes non-compliance.

- **Disabled overfill alarms.** ATG system set up printouts may indicate that the overfill alarm is "disabled" which is considered non-compliance in cases where the ATG overfill alarm is the only method of overfill prevention.

4) **Alarm is audible or visible to delivery driver.**
Typically, the alarm should be outside and near the tank pad. If the alarm is far from the tank pad or located inside, the inspector should use their professional judgment to determine if the delivery driver may see or hear the alarm from both the tank fill ports and any remote fills.

7 Tank Release Detection

6.4 Description

Release detection is required for most regulated tanks[7].

- **Exceptions:** 1) Tanks used to fuel emergency generators[8] installed prior to September 15, 2010 and, 2)empty tanks in proper temporary closure status as described in Section 4.0 Temporary Closure .

- **Tanks installed prior to September 15, 2010:** Eight types of methods may be used: 1) Inventory Control and Tank Tightness Testing[9]; 2) Manual Tank Gauging (MTG)[10] ; 3) ATG monthly monitoring; 4) Vapor Monitoring; 5) Groundwater Monitoring; 6) Interstitial Monitoring; 7) SIR; and 8) other approved methods.

- **Tanks installed on or after September 15, 2010: I**nterstitial monitoring must be used.

If the tank owner is using multiple tank release detection methods, the inspector must ensure that at least one method is in full compliance. If all methods are out of compliance, the inspector should choose the most economically feasible method for detailed inspection and note the other method or methods in the tank release detection comments.

6.4.1 Leak Detection Evaluations

95/5 Probability

All tank release detection methods must be capable of detecting specific leak rates with a 95% probability of detection and a 5% probability of false alarms described in 9VAC25-580-130.A.3. The majority of release detection methods and equipment have been evaluated and certified by a third party as meeting the probability requirements.

National Workgroup on Leak Detection Evaluation

Leak detection evaluations (3rd party certifications) may be obtained from equipment manufacturers or the National Workgroup on Leak Detection Evaluation (NWGLDE). NWGLDE consists of state and EPA regulators that review and compile third party leak detection system evaluations on their website: www.NWGLDE.org.

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[7] Release detection is not required for tanks that are specifically excluded, deferred, or partially deferred by 9VAC25-580-20 and discussed in Section 22, Regulatory Interpretations of this manual.

[8] Emergency generator tanks that do not store a motor fuel may not be regulated by 9VAC25-58-10 *et. seq.* Refer to Section 22, Regulatory Interpretations of this manual for additional information.

[9] Tanks must be less than 10 years old or upgraded within the past 10 years to use Inventory Control and Tank Tightness Testing.

[10] MTG is permitted only for tanks with a capacity of 2,000 gallons or less. MTG may only be used for 10 years after the install/upgrade date if the tank is 1,001-2,000 gallons.

Unusual/New Equipment

When DEQ staff encounter unusual or new equipment, they may consult NWGLDE's website to ensure the leak detection system meets the probability requirements. If the inspector is unable to locate the leak detection evaluation, they may request the tank owner/operator to demonstrate that the release detection system meets the 95% probability of detection and 5% probability of false alarm requirements.

DEQ may accept documentation other than 3rd party certifications as long as the documentation sufficiently demonstrates compliance. RO staff should consult with OSRR staff when reviewing demonstration documentation.

6.4.2 Compliance Assistance

The EPA has published various handouts describing how particular release detection methods should be conducted. The EPA handouts may be accessed from DEQ's UST Compliance Assistance website located at: http://www.deq.virginia.gov/Programs/LandProtectionRevitalization/PetroleumProgram/StorageTanks/UndergroundStorageTanks/USTComplianceAssistance.aspx.

6.4.3 Inspection Application Data Entry

Release Detection Method

The inspector should ask the facility contact if release detection has been conducted and what method or methods are being used. If the owner indicates that they did not conduct any tank release detection, the inspector should make a note of the response in the release detection comments section of the mobile application.

The inspector should note which method the owner uses for each tank on the "Edit Tank Details" screen in the Inspection App. If no release detection is used and the tanks are regulated, then the inspector should leave all release detection options unchecked on the Tank Details screen.

Equipment Access

Where the site contact is unable to provide access to areas of the facility that need to be inspected in order to perform visual verification, the inspector should note this in the release detection comments. If visual verification was not possible because access was denied, the inspector should notify their supervisor immediately. Property Access issues are discussed in Section 2.4.1 Acceptable Inspection Technique.

The inspector may use their professional judgment, current site conditions, and previous inspection documentation to determine if further verification, such as an installation invoice, photograph, or other documentation, is necessary. When further verification is necessary, the inspector should mark "Other" as a release detection deficiency to ensure that the compliance issue will be available on the CEDS generated non-compliance letters.

6.5 Inventory Control + Tank Tightness Testing (IC + TTT)

6.5.1 Description

IC + TTT is rarely used because it can only be used for ten years after either the date of the tank installation or the tank cathodic protection upgrade. Additionally, IC + TTT may not be used as a sole release detection method for tanks installed on or after September 15, 2010 because interstitial monitoring is required for those tanks[11].

There are three components to IC + TTT:

1) **Inventory Calculations** - IC + TTT requires the tank owner to compare actual tank volumes to the actual gallons sold and delivered every operating day[12]. At the end of each month, the daily overages and shortages are totaled to determine a monthly overage or shortage. The tank receives a "fail" result if the monthly overage or shortage is greater than 1% of the tank's flow through (product sold) + 130 gallons.

2) **Tank Water Monitoring -** The measurement of the water level at the bottom of the tank to the nearest 1/8 inch is required on a monthly basis and should be noted in the owner's monthly inventory control records.

3) **Tank Tightness Test** - A tank tightness test must be conducted at the time of installation and every 5 years thereafter.

Further information regarding IC + TTT may be found in the EPA guidance entitled, "Doing Inventory Control Right For Underground Storage Tanks" and American Petroleum Institute Publication 1621, "Recommended Practice for Bulk Liquid Stock Control at Retail Outlets."

6.5.2 Compliance Evaluation of Inventory Control + TTT

In order to evaluate compliance with release detection requirements, the inspector must verify the items discussed below during the inspection. Items that cannot be verified should be identified as non-compliant in the Inspection App.

1) **Tanks must be less than 10 years old or upgraded within the past 10 years to use method.** In the case of IC + TTT, the date upgraded is the date the tank was protected against corrosion. When noncompliance relates to the corrosion protection upgrade, the inspector should record the date the tank was upgraded with corrosion protection in the release detection comments section.

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[11] Local fire officials under Chapter 57, Section 5704.2.11.5.1 of the 2012 Virginia Statewide Fire Prevention Code may require some form of inventory control be performed on all USTs.

[12] Generally, operating days are days that the business is open. For seasonal businesses, the tank owner must collect enough data to be statistically accurate.

2) **Tanks must have been installed prior to September 15, 2010.** Interstitial Monitoring (IM) must be conducted for tanks installed on or after September 15, 2010.

3) **Records are provided for the most recent 8 months.**

4) **Method is conducted at least monthly with intervals no longer than 45 days.** For example, IC records exist for June 3rd, July 8th, August 14th, September 19th, etc. Noncompliance will not be addressed since the method was conducted at least monthly with intervals no longer than 45 days.

5) **Records must reflect regular sticking of the tank and proper reconciliation (1% + 130 gallons)**. The inspector should verify that tank product measurements, the gallons pumped from each tank, and any product deliveries have been recorded every operating day.

6) **Equipment is capable of 1/8 inch measurements (gauge stick or other instrument).** Tank owners usually use a dipstick or ATG to measure the level of fuel in the tank. The inspector must determine if the measuring device is in good condition and capable of 1/8 inch measurements. Dipsticks that are not marked in 1/8 inch increments or are broken, taped, cracked or have worn ends are considered non-compliant.

7) **Water is monitored at least monthly.** The inspector should ensure that water is monitored monthly because excessive water in a tank may be indicative of water intrusion. A legible, handwritten log is acceptable demonstration documentation.

8) **Tank tightness test conducted within past 5 years.** A third party testing company normally performs tank tightness tests[13]. The inspector must confirm that the TTT meets the following regulatory requirements:

    a. TTT must be capable of detecting a 0.1 gph leak rate from any portion of the tank that routinely contains product while accounting for the effects of thermal expansion or contraction of the product, vapor pockets, tank deformation, evaporation or condensation, and the location of the water table.
    b. Additionally, the TTT must have a 95% probability of detecting a release, with no more than a 5% probability of a false alarm.
    c. Tank tightness test equipment descriptions and performance measures can usually be found at www.NWGLDE.org .

[13] Some owners, such as jobbers, may have the equipment to perform their own tank tightness tests.

TTT as sole RD method: A TTT may be used as a sole method of release detection for any tank installed prior to September 15, 2010, as long as it is performed monthly[14].

Tank tests performed monthly by an ATG at a 0.1 gph leak rate do not typically qualify as tank tightness tests since ATGs only test the portion of the tank where product is present and ATGs do not consider tank deformation or the water table. A precision tank tightness test typically tests the entire tank including the ullage space (space where product is absent), consider tank deformation, and the water table.

6.5.3 Suspected Release Reporting

The owner may be required to report a suspected release to DEQ (See Section 2: The Storage Tank Program Technical Manual) if one or more of the following Inventory Control + TTT results are obtained:

1) If the leak check number, an absolute value[15], has been exceeded for two consecutive months,

2) If one or more USTs fails a tank tightness test, or

3) Greater than 2 inches of water is found in the tank.

If a suspected release should have been reported and was not, the inspector should note this in the comments section of the Inspection App and coordinate with regional remediation staff.

6.6 Manual Tank Gauging (MTG)

6.6.1 Description

MTG is commonly used for small USTs such as used oil tanks. MTG is a rare release detection method since it is permitted only for tanks with a capacity of 2,000 gallons or less. MTG may only be used for 10 years after the install/upgrade date if the tank is 1,001-2,000 gallons. Additionally, MTG may not be used for tanks installed on or after September 15, 2010 since interstitial monitoring is required for those tanks.

Every week, the owner must keep the tank dormant (fuel neither added nor removed) for a specified period of time depending upon the tank's capacity (Table 7-1). The tank owner must determine the product volume at the beginning of the dormant period, determine the product

[14] Monthly third-party contracted TTT is rarely used since it is often the least economical and practical method of release detection. TTT used as a sole method of release detection is considered to meet the requirements of "other methods" in the Regulation.

[15] The absolute value is the numerical value of a quantity without regard to its sign. For example, the absolute value of -54 is 54.

volume at the end of the dormant period, and determine if any difference in the measured volumes exceeds acceptable standards for such differences (Table 7-1). At the end of every month, the tank owner compares the weekly test average result to the results in Table 7-1.

6.6.2 Tank Tightness Testing

A tank tightness test is required in conjunction with MTG when:

1) A tank's capacity is between 550 and 1,000 gallons and the tank diameter is not 48 or 64 inches[16] (Table 7-1), or

2) A tank's capacity is between 1,000 and 2,000 gallons.

Table 7-1 Manual Tank Gauging Testing Requirements

Tank Size	Minimum Duration of Test	Weekly Standard (1 test)	Monthly Standard (4-test average)
Up to 550 gallons	**36 hours**	**10 gallons**	**5 gallons**
551-1,000 gallons (when tank diameter is 64")*	**44 hours**	**9 gallons**	**4 gallons**
551-1,000 gallons (when tank diameter is 48")*	**58 hours**	**12 gallons**	**6 gallons**
551-1,000 gallons (also requires tank tightness test every 5 years)	**36 hours**	**13 gallons**	**7 gallons**
1,001-2,000 gallons (also requires periodic tank tightness testing)	**36 hours**	**26 gallons**	**13 gallons**

* - In addition to the regulatory language contained in 9VAC25-580-160.2.e, MTG, by EPA guidance (Appendix K), may be used as sole method of release detection (no TTT requirement) for tanks up to 1,000 gallons when the tank diameter is 64 or 48 inches.

More detailed guidance on performing manual tank gauging measurements and calculations is located in the EPA guidance entitled, "Manual Tank Gauging for Small Underground Storage Tanks" .

6.6.3 Compliance Evaluation

In order to evaluate compliance with release detection requirements, the inspector must verify the items discussed below during the inspection. Items that cannot be verified should be identified as non-compliant in the Inspection App.

1) **Method has not expired for use.** The inspector must determine the tank's installation date, upgrade date (if applicable) and tank capacity to determine if MTG may be used as

[16] Tank diameters may be determined by having the site contact stick the tank and recording the measurement from the bottom of the tank to the top of the fill riser. Then, the length the fill riser should be measured and subtracted from the total tank and fill riser measurement. The result is the approximate tank diameter.

a release detection method. In the case of MTG, the date upgraded is the date the tank was protected against corrosion. When noncompliance relates to the corrosion protection upgrade, the inspector should record the date the tank was upgraded with corrosion protection in the release detection comments section.

2) **Tank size is appropriate for using MTG.** The inspector should ensure the tank capacity is not greater than 2,000 gallons.

3) **Tanks must have been installed prior to September 15, 2010.** Tanks installed on or after September 15, 2010 are required to conduct interstitial monitoring for release detection.

4) **Records provided for the most recent 8 months.**

5) **Method is conducted at least monthly with intervals no longer than 45 days.** For example, MTG records exist for June 3rd, July 8th, August 14th, September 19th, etc. Noncompliance will not be addressed since the method was conducted at least monthly with intervals no longer than 45 days.

6) **Records must reflect weekly sticking of the tank and proper reconciliation.** The inspector should ensure that every week the tank is taken out of service for the required period of time and that the tank contents are properly measured by reviewing the manual tank gauging log. Proper measurement requires that the tank be stuck to the nearest 1/8 inch, twice at the beginning of the time period and twice at the end of the time period. The two stick readings are averaged to increase efficacy, and then compared to the other averaged reading to determine a weekly overage and shortage. The inspector should also determine if the weekly readings are being averaged to calculate a monthly difference.

7) **Equipment is capable of 1/8 inch measurement.** Tank owners usually use a dipstick or ATG to measure the level of fuel in the tank. The inspector must determine if the measuring device is in good condition and capable of 1/8 inch measurements. Dipsticks that are not marked in 1/8 inch increments or are broken, taped, cracked or have worn ends are considered non-compliant.

8) **Tank tightness test conducted within past 5 years.** A third party testing company normally performs tank tightness tests[17]. The inspector must confirm that the TTT meets the specified requirements.
   a. To comply with regulatory requirements, TTT must be capable of detecting a 0.1 gph leak rate from any portion of the tank that routinely contains product while accounting for the effects of thermal expansion or contraction of the product,

[17] Some owners, such as jobbers, may have the equipment to perform their own tank tightness tests.

vapor pockets, tank deformation, evaporation or condensation, and the location of the water table.

b. Additionally, the TTT must have a 95% probability of detecting a release, with no more than a 5% probability of a false alarm.

c. Tank tightness test equipment descriptions and performance measures can usually be found at www.NWGLDE.org.

TTT as sole RD method: A TTT may be used as a sole method of release detection for any tank installed prior to September 15, 2010, as long as it is performed monthly[18].

Tank tests performed monthly by an ATG at a 0.1 gph leak rate do not typically qualify as tank tightness tests since ATGs only test the portion of the tank where product is present and an ATG does not consider tank deformation and the water table. A precision tank tightness test typically tests the entire tank including the ullage space (space where product is absent), considers tank deformation, and the water table.

6.6.4 Suspected Release Reporting

The owner may be required to report a suspected release to DEQ (See Section 2: The Storage Tank Program Technical Manual) if one or more of the following Manual Tank Gauging results are obtained:

1) If either the weekly or monthly test standard has been exceeded,

2) If one or more USTs fails a tank tightness test, or

3) Greater than 2 inches of water is found in the tank.

If a suspected release should have been reported and was not, the inspector should note this in the comments section of the Inspection App and coordinate with regional remediation staff.

[18] Monthly third-party contracted TTT is rarely used since it is often the least economical and practical method of release detection.

6.7 Automatic Tank Gauging (ATG)

6.7.1 Description

ATG involves the use of equipment that conducts monthly monitoring via the use of probes that measure the product level, water level, and product temperature. ATGs behave as computers and use the collected data to statistically calculate the probability that a release of product has occurred. ATGs may also function as overfill alarms and interstitial space monitors.

Although ATG is the most commonly used form of release detection, it may not be used as a sole release detection method for tanks installed on or after September 15, 2010 because interstitial monitoring is required for those secondarily contained tanks. However, the same console may be used to interpolate and record interstitial sensor data.

There are a number of ATG brands in use such as Veeder-Root, Incon (Franklin Fueling Systems), OPW, EECO, and Auto-Stik.

ATG as "Other method"

Although ATGs are identified in the UST Technical Regulation as a release detection method under 9VAC25-580-160.4 and this provision requires that Inventory control be conducted, most ATGs meet the regulatory requirements for "Other Methods" (9VAC25-580-160.8) and under that provision, Inventory Control is not necessary. **Thus, the ATG section of the UST Technical Regulation (9VAC25-580-160.4) is no longer used as the regulatory criteria when evaluating release detection compliance.**

6.7.2 Types of Test (Static versus Continuous)

Most ATGs may perform static in-tank tests during a period where fuel is neither added nor removed from the tank. An added capability of many ATGs is continuous monitoring where the ATG continuously gathers snapshots of data during short periods of downtime.

CSLD or SCALD

Continuous monitoring requires additional software that may be called CSLD (Continuous Statistical Leak Detection) or SCALD (Statistical Continuous Automatic Leak Detection). Continuous monitoring is typically used by 24-hour stations that do not wish to shut their tanks down for testing or for manifolded tanks. ATGs equipped with CSLD or SCALD software can usually evaluate with lower product levels than those with standard software. Consult NGWLDE for product level limitations.

6.7.3 Testing Limitations

Certain models of ATGs may not detect a release within the accuracy requirements due to tank size, product type, or maximum throughput. In order to determine if the ATG equipment meets the regulatory requirements for each particular tank, consult the NWGLDE website (www.nwglde.org) as indicated in Section 7.1.1 Leak Detection Evaluations of this manual. The ATG system may need to be upgraded with new software or probes to meet the regulatory requirements. ATGs only test the portion of the tank that contains product at the time the test is conducted. Thus, ATGs may not be able to detect a leak at the top of a tank unless the tank is filled to the top.

Low Product Levels

Many ATGs cannot properly conduct in-tank tests due to low product levels. The level of product required in a tank to conduct an in-tank test varies depending upon the machine brand, software, and probe type. If the ATG is not conducting a valid in-tank test at least once a month due to low product levels, the tank is non-compliant.

To comply with release detection requirements, the tank owner/operator can keep more fuel in the tank, install continuous monitoring software, or change release detection methods (e.g. Statistical Inventory Reconciliation (SIR)).

Manifolded Tanks

Most ATGs require siphon break valves or continuous monitoring software to properly conduct in-tank tests on manifolded tanks. The inspector should verify that CSLD/SCALD software or a siphon break valve exists for manifolded tanks. If the inspector or the tank owner contact is unsure if a siphon break valve exists, then the tank owner should hire a contractor to verify presence of the valve.

Large Tanks > 15,000 gallons
Older ATG software and/or equipment may not accurately test tanks over 15,000 gallons. Special software may be required for ATGs to work on tanks larger than 15,000 gallons. The inspector should verify that the ATG will perform properly if the tank is greater than 15,000 gallons. Verification is possible through the NWGLDE website (www.NWGLDE.org) or the manufacturer.

Product Limitations
Most ATGs are not equipped with the appropriate probe to accurately conduct in-tank tests in viscous products such as used oil. When viscous fuels are encountered, the inspector may record the ATG make and model number in the release detection comment field of the Inspection App and later verify through the 3rd party equipment leak detection evaluation or the manufacturer that the ATG can accurately conduct a leak test.

Throughput Limitations
Many older ATGs may not function properly with high throughputs. Inspectors should check NWGLDE's website or with the manufacturer to determine the throughput limitation when an ATG is used for high throughput facilities.

Leak Detection Evaluations
The inspector should always verify leak rate probabilities (Section 7.1.2) for manifolded tanks, high throughput tanks, or very large tanks, especially if the facility is having trouble with the ATG functioning properly. If the inspector discovers the tank size, monthly throughput, and/or operating conditions are inconsistent with either the Third Party Certification information or manufacturer claims, the use of the ATG is non-compliant and the inspector should mark the appropriate reason for non-compliance box in the Inspection App.

6.7.4 Compliance Evaluation
In order to evaluate compliance with release detection requirements, the inspector must verify the items discussed below during the inspection. Items that cannot be verified should be identified as non-compliant in the Inspection App.

1) **Tanks must have been installed prior to September 15, 2010.** Tanks installed on or after September 15, 2010 must use interstitial monitoring for release detection.

2) **Records are provided for the most recent 8 months.** The records may be printed from the ATG, manually recorded by the site contact, or through remote monitoring software in cases where the unit does not contain a functioning printer.

3) **Method is conducted at least monthly with interval no longer than 45 days.** For example, ATG records exist for June 3rd, July 8th, August 14th, September 19th, etc. Noncompliance will not be assessed since the method was conducted at least monthly with intervals no longer than 45 days.

4) **ATG is set up properly.** The inspector may verify the proper setup of the ATG by requesting the tank owner/operator to print out the machine's setup. The setup programming should match the UST system (capacity, type of tank, thermal coefficient, etc.) Additionally, the inspector should determine whether or not the ATG software, probe type, and product are compatible. For instructions on ATG setup and other programming, consult the technical manuals on the ATG vendor's website.

5) **ATG conducts a valid test (provides a Pass or Fail result).**
The in-tank tests should indicate a "periodic test" or "0.2 gph" test. Annual (0.1 gph) tests meet the regulatory requirements if they are conducted monthly. Gross tests (3.0gph leak tests) are not valid monthly tests since the test is conducted at a greater than 0.2 gph leak rate. If the reports show that the tank(s) did not meet the 0.2 gph detection rate, then the inspector should mark the corresponding reason for non-compliance box in the Inspection App.

Inconclusive or Invalid Results
Inconclusive or Invalid results are not considered valid tests and usually indicate a system problem that needs correction. For instance, an invalid test result may result from the following conditions:

- The product level in the tank is too low.
- The temperature change within the tank may be too great.
- The tank's capacity is greater than 15,000 gallons and the ATG does not contain software for these large tanks.
- The tank contains a viscous product.

Failed Tests
A "failed" test may still be considered a valid test for release detection, even if the failure was directly related to a release of product. A failed test may also be considered a suspected release (Section 7.4.5).

Conversely, if the test "failed" for reasons not related to a release of product, then a non-compliance issue may exist. For instance:

- A test that failed because someone was fueling during the test equates to an invalid test (i.e., test not conducted).
- A test that failed because the ATG was programmed improperly results in non-compliance due to an incorrect setup.
- A test that fails because the fuel is incompatible with the ATG system results in non-compliance due to incompatibility.
- A test that failed or is invalid due to siphoning of a manifolded tank during testing in non-compliance.

Additional Information
EPA's Automatic Tank Gauging Systems For Release Detection: Reference Manual For Underground Storage Tank Inspectors describes how various ATG equipment works, specifications and limitations, operation and maintenance requirements, and how to print and read reports.

6.7.5 Suspected Release Reporting

If the ATG in-tank tests indicate that the UST "failed" a test and a valid explanation is not provided, a suspected release should be reported and investigated. The DEQ Storage Tank Technical Manual discusses what constitutes a suspected release, as well as reporting and investigation requirements.

6.8 Vapor Monitoring

6.8.1 Description

Vapor monitoring is rarely used and may not be used as a sole release detection method for tanks installed on or after September 15, 2010 since interstitial monitoring of mandated secondary containment is required for those tanks. This form of release detection involves vapor wells surrounding the tank pit and requires monthly vapor measurements using monitoring devices such as vapor testing tubes, flame ionization detectors (FIDs), or photo ionization detectors (PIDs). Vapor monitoring via "sniff" testing (using a person's nose) is not an acceptable technique.

To verify the presence of this kind of release detection equipment, the inspector may view the vapor monitoring well ports (often marked with white background and black equilateral triangle) and monitoring equipment.

The "Evaluation of Vapor Monitoring Data for Release Detection" (Appendix L) provides guidelines and a procedure that staff and tank owners/operators may use to evaluate vapor monitoring data to determine if a release should be suspected.

6.8.2 Compliance Evaluation

In order to evaluate compliance with release detection requirements, the inspector must verify the items discussed below during the inspection. Items that cannot be verified should be identified as non-compliant in the Inspection App.

1) **Tanks must have been installed prior to September 15, 2010.** Tanks installed on or after September 15, 2010 must use interstitial monitoring for release detection.

2) **Records are provided for the most recent 8 months.**

3) **Method is conducted at least monthly with interval no longer than 45 days.** For example, Vapor Monitoring records exist for June 3rd, July 8th, August 14th, September 19th, etc. Noncompliance will not be addressed since the method was conducted at least monthly with intervals no longer than 45 days.

4) **Site assessment has been done for vapor monitoring.** Upon installation of the vapor monitoring method, the site must be assessed to ensure the regulatory requirements can be met and to establish the number and position of the wells. The site assessment should include the following information:

   a. **Backfill material.** The site assessment should indicate if the soil/backfill material surrounding the tanks is sufficiently porous to allow vapors to be easily detected. The most commonly used backfill materials, pea gravel or sand, are porous enough for vapors to move to the monitoring wells. Tanks installed over 20 years ago may have been installed in native soils such as clay that are not sufficiently permeable/porous for vapors to move to the wells and be detected within 30 days. If the site assessment does not indicate the backfill material, the tank inspector may be able to discern this information by the age of the tank, the apparent fill material contained inside the manhole covers and under dispenser, or by interviewing the tank owner or installer. If the backfill material is unknown, the inspector should request the tank owner to determine its suitability.

   b. **Product Volatility.** The stored substance must be sufficiently volatile to result in a detectable vapor level if a release occurs. Thus, vapor monitoring is an acceptable method for a volatile substance such as gasoline, but not for heavy, less volatile petroleum products such as crude oil or residual fuel oils. For less volatile products, a tracer compound may be combined with the stored product to satisfy the volatility requirement.

      Since vapor detection of middle distillates like diesel and kerosene is questionable, the site assessment must include demonstration that the monitoring device can detect the stored product. Acceptable demonstrative documentation includes manufacturer's claims or leak detection equipment evaluations (see Section 7.1.1).

   c. **Moisture Interferences.** Groundwater, rainfall, soil moisture, or other interferences must not render the vapor monitoring inoperative. If backfill is saturated with water, because of a perched water table, fluctuating water table, or rainfall, vapor monitoring devices cannot be used. Saturated backfill conditions will inhibit vapor movement. Additionally, vapor sensors may not properly function if immersed in water.

d. **Background Contamination.** The level of background contamination in the excavation zone must not interfere with the detection of new releases. The "Evaluation of Vapor Monitoring Data for Release Detection" (Appendix L) contains instructions for determining background contamination levels and evaluating vapor monitoring data.

5) **Wells are properly designed and positioned.** The inspector should use the information from the site assessment along with their expertise[19] to determine if the wells are properly designed and positioned. Typically, monitoring wells are installed in all four corners of the tank field and provide sufficient evaluation of the tank. Further investigation may be necessary by an environmental consultant for atypical installations.

6) **Wells are clearly marked and secured.** Monitoring wells must be clearly marked and secured. Proper markings may be the official American Petroleum Institute (API) triangle symbol or a label indicating the well is a monitoring well and should not be filled (Figure 7-6). Lids that are bolted down or locked are considered secured. Locked or zip-tied compression caps are also an acceptable means of securing a monitoring well. Any of the following are acceptable markings.

Figure 7-6 Properly labeled monitoring wells

6.8.3 Suspected Release Reporting

If any of the vapor monitoring readings have exceeded the established leak threshold, then a suspected release should have been reported and investigated. The DEQ Storage Tank Technical Manual discusses what constitutes a suspected release, as well as reporting and investigation requirements.

[19] Inspectors may also consult with remediation staff to determine proper monitoring well placement.

6.9 Groundwater Monitoring

6.9.1 Description

Groundwater monitoring involves the monthly evaluation of groundwater monitoring wells to ascertain the presence of regulated substance in the groundwater. The tank owner or operator usually uses a bailer or electronic sensor to detect the presence of product on the groundwater.

Groundwater monitoring may not be used if the groundwater depth ever reaches more than 20 feet from the ground surface or as a sole release detection method for tanks installed on or after September 15, 2010 since interstitial monitoring is required for those tanks.

6.9.2 Compliance Evaluation

In order to evaluate compliance with release detection requirements, the inspector must verify the items discussed below during the inspection. Items that cannot be verified should be identified as non-compliant in the Inspection App.

1) **Tanks must have been installed prior to September 15, 2010.** Tanks installed on or after September 15, 2010 must use interstitial monitoring for release detection.

2) **Records are provided for the most recent 8 months.**

3) **Method is conducted at least monthly with interval no longer than 45 days.** For example, Groundwater Monitoring records exist for June 3rd, July 8th, August 14th, September 19th, etc. Noncompliance will not be addressed since the method was conducted at least monthly with intervals no longer than 45 days.

4) **Site assessment should have been completed.** A site assessment should be completed that verifies items 5 through 7. For most sites, the site assessment may be as simple as the tank owner documenting the facts for items 5 through 7.

5) **Groundwater is never greater than 20 feet from surface.** The depth to groundwater may be verified via the monitoring well. A measuring stick may be used to determine monitoring well depth. If the well casing is 20 feet from surface and groundwater is present at bottom of the well, then the groundwater is clearly at least 20 feet from surface. If the well collects surface water, then it may not be functioning properly and could produce false positive monitoring. If the depth to groundwater is unknown and questionable, the tank owner may need to hire an environmental consultant to determine depth to groundwater.

6) **Wells are properly designed and positioned.**

The inspector should use the information from the inspection and site assessment along with their expertise[20] to determine if the wells are properly designed and positioned.

The following requirements apply for groundwater monitoring well installation:

a. The slotted portion of the well casing must be designed to prevent migration of natural soils or filter pack into the well and to allow entry of the regulated substance on the water table into the well under both high and low groundwater conditions. The slots should appear small, uniform, and at the same depth of the fluctuating water table. The depth to water table should be indicated in the site assessment.

b. The well must be sealed from the ground surface to the top of the filter pack.

c. The well must intercept the excavation zone (tank pit) or be as close to it as technically feasible. Typically monitoring wells are installed in all four corners of the tank field and provide sufficient evaluation of the tank. Further investigation may be necessary by an environmental consultant for atypical installations.

7) **Wells are clearly marked and secured.**
Monitoring wells must be clearly marked and secured. Proper markings may be the official American Petroleum Institute (API) triangle symbol or a label indicating the well is a monitoring well and should not be filled (Figure 77). Lids that are bolted down or are locked are considered secured.

8) **Substance stored is not readily miscible in water and has a specific gravity less than one.** The inspector should verify that the product stored in the tank is not miscible in water with a specific gravity < 1 (meaning that the product is light enough to float on water). Such petroleum products include but are not limited to gasoline, diesel, kerosene, gasohol, heating oil, and used oil. Products with a specific gravity > 1 may include crude oil, bunker C and certain hazardous substances. The inspector may verify the product in the tank by checking the marking on the fill port, checking the labels on the dispensers, asking the site contact, and/or reviewing delivery records.

9) **Device detects 1/8 inch of free product.**
The most commonly used devices for groundwater sampling include bailers, dipsticks with water/oil sensitive paste, and dedicated monitoring devices. The inspector may assume that devices that allow for manual measurement of 1/8 inch of free product (such as bailers or dipsticks with water/oil sensitive paste) meet the requirement. For electronic equipment, the inspector should ask the site contact for a demonstration that the device is functioning. If the device does not appear to be functioning, the inspector should indicate such in the Inspection App.

[20] Inspectors may also consult with remediation staff to determine proper monitoring well placement.

Figure 7-7 Properly labeled monitoring wells

6.9.3 Suspected Release Reporting

If any dissolved or free product is found in the groundwater, then a suspected release should have been reported and investigated unless the contamination is due to a previously reported release. The DEQ Storage Tank Technical Manual discusses what constitutes a suspected release, as well as reporting and investigation requirements.

6.10 Interstitial Monitoring (IM)

6.10.1Description

Interstitial monitoring may be used for any double-walled or secondarily contained tank, but must be used for tanks installed on or after September 15, 2010 and tanks containing CERCLA listed hazardous substances. Interstitial monitoring requires secondary containment as discussed in Chapter 13 - Secondary Containment Requirements. When a release occurs in the tank, the product will leak into the interstitial (annular) space (interstice) between the inner and outer tank walls where it may be detected. Product detection can be conducted through either continuous or manual monitoring.

- **Continuous Monitoring.** The secondary containment system must allow for interstitial monitoring and is typically designed with a monitoring device in the annular space between an inner and outer tank wall. These sensors are usually connected to an ATG console or interstitial monitoring unit.

- **Manual Monitoring.** A measuring stick with product/water finding paste may also be acceptable for interstitial monitoring, as long as the secondary containment system is designed so that any liquid that enters the interstitial space is channeled for detection by the stick and product/water finding paste. A record must be kept detailing the visual observations. The record must include the date of the monitoring, the observation(s)

for each tank, and the person who conducted the monitoring. Records must be kept for at least 12 months.

6.10.1.1 **Types of Sensors**

Liquid Level Sensors

Liquid level sensors measure liquid that is present in the interstitial space. Some tank interstices are filled with a brine (salt) solution. In these types of systems, liquid level sensors measure the level of brine solution that is present in the interstice. When the level of the brine solution changes, an alarm should occur on the ATG or monitoring console. An increase in brine solution indicates that either product has entered the interstice from a breech in the inner tank wall or groundwater has intruded into the interstice from a breech in the outer wall.

Some tank interstitial monitoring systems do not use a brine solution, but use float sensors that will send an alarm to an ATG or monitoring console. The sensors may detect vapors or liquid in the interstice. There are two types of liquid sensors used in dry interstices: discriminating and non-discriminating. Discriminating sensors can distinguish between fuel and water. Non-discriminating sensors only indicate that liquid is present and do not distinguish between fuel and water.

1) Float Switches (non-discriminating)

The most common sensor is a basic float switch that consists of two magnets, one of which is attached in a permanently fixed location inside the sensor. A second magnet is attached to an object which will float on fuel or water. When a liquid is introduced to a predetermined level, the magnets contact and complete an electronic circuit. The active circuit is then translated as an alarm by the monitoring device.

2) Float Switches (discriminating)
A discriminating sensor can differentiate between fuel and water by the use of multiple magnetic circuits in a single sensor. Since water and fuel have different liquid densities, each magnetic circuit will trigger a separate alarm. Discriminating sensors look similar to non-discriminating sensors. Water entering the interstice indicates a breach in the outer wall, whereas fuel entering the interstice indicates a breach in the inner tank wall.

Optical Sensors (discriminating and non-discriminating)
Optical sensors use a light beam directed at a reflective surface inside the sensor. When liquid is introduced, the light beam is refracted and converted to an electrical signal. The console is then notified of the presence of liquid.

Electrical Conductivity Sensors
These devices take advantage of the electrical conductivity of fluids. When a liquid is in contact with the sensor, an electrical bridge is completed between two contact points and sends a signal to the monitoring device.

6.10.1.2 **Other Monitoring Devices**

Pressure Monitoring Device
Pressure monitoring devices use pressurized nitrogen gas to continuously maintain constant pressure within the interstitial space of double-walled tanks. The system is designed to activate a visual and acoustic alarm before stored product can escape to the environment. The system is capable of detecting breaches in both the inner and outer walls of double-walled tanks.

Vacuum Monitoring Device
Vacuum monitoring devices use vacuum generated by the turbine pump or separate external vacuum pump to continuously maintain a partial vacuum within the interstitial space of double-walled tanks. These systems are designed to activate a visual and acoustic alarm, and optional turbine pump shutdown before stored product can escape to the environment. These systems are capable of detecting breaches in both the inner and outer walls of double-walled tanks and double-walled piping.

6.10.2 Compliance Evaluation

In order to evaluate compliance with release detection requirements, the inspector must verify the items discussed below during the inspection. Items that cannot be verified should be identified as non-compliant in the Inspection App.

1) **IM is the primary method of release detection for tank(s) installed on or after September 15, 2010.**

2) **Records are provided for the most recent 8 months.**

3) **Method is conducted at least monthly with interval no longer than 45 days.** For example, IM records exist for June 3rd, July 8th, August 14th, September 19th, etc. Noncompliance will not be assessed since the method was conducted at least monthly with intervals no longer than 45 days.

4) **Sensors are positioned/installed according to manufacturer's requirements (if verifiable).**

5) **Device is set up/programmed properly.** The inspector should print the system setup on an electronic interstitial monitor or ATG to ensure that the sensor and associated alarms have been enabled and the sensor is correctly setup in the monitoring device.

6.10.3 Suspected Release Reporting

The inspector should determine if any of the obtained results (fail or inconclusive) constitutes a suspected release by consulting the suspected release section of The DEQ Storage Tank Program Technical Manual . Any suspected release should have been reported and investigated. The DEQ Storage Tank Technical Manual discusses what constitutes a suspected release, as well as reporting and investigation requirements.

6.11 Statistical Inventory Reconciliation (SIR)

6.11.1 Description

SIR requirements are not easily found in Virginia's UST Technical Regulation because SIR is considered an "other method"[21] in the regulation. SIR may not be used as a sole release detection method for tanks installed on or after September 15, 2010 because interstitial monitoring is required for those tanks.

SIR requires sticking the tank on a daily basis and performing a monthly statistical review of the results. This review is typically performed by a third-party SIR vendor. In rare cases, the tank owner may purchase approved SIR software to perform the statistical analysis. SIR must be able to detect a 0.2 gallon per hour leak rate or a release of 150 gallons within a month with a 95% probability of detection and no more than a 5% probability of false alarm. In order to determine if the particular SIR method meets the regulatory requirements, consult the NWGLDE website (www.nwglde.org) as indicated in Section 7.1.2 Leak Detection Evaluations of

[21] Section 9VAC25-580-160.8 of the UST Technical Regulation allows DEQ, on behalf of the State Water Control Board (board), to approve other methods of release detection if the owner and operator can demonstrate that the method can detect a release as effectively as any other release detection method and it can detect a 0.2 gallon per hour leak rate or a release of 150 gallons within a month with a probability of detection of 0.95 and a probability of false alarm of 0.05.

this manual. SIR must be conducted every 30 days. After each 30 day period, the tank owner must have the analyzed data on-file within 30 days of the last day data was collected.

Limitations to SIR
Large tanks greater than 18,000 gallons, tanks with large throughput, and tanks with water or small pinholes, can distort the SIR data. Refer to the "List of Leak Detection Evaluations" at www.nwglde.org for additional SIR information by vendor.

Data Interpretation
SIR reports will show one of three results: (i) pass; (ii) fail; or (iii) inconclusive. Inconclusive and fail results may occur due to regulatory noncompliance such as incorrect sticking technique, poor record keeping, unrecorded deliveries, not accounting for water in the tank, or an inadequate number of data points. However, inconclusive or failed results may indicate a suspected release (see Section 7.8.3 Suspected Release Reporting).

Failed or Inconclusive Results
Failed or Inconclusive SIR results do not necessarily constitute regulatory non-compliance; rather failed or inconclusive results may indicate an underlying issue that needs to be addressed. For example, Tank 1 had sporadic inconclusive results (May, July, September) within an 8 month period. Upon further investigation, the inspector realizes that the measuring stick is missing 2 inches from its bottom. In this example, the noncompliance issue is the measuring device is unable to measure product levels to 1/8 inch accuracy, not the inconclusive result.

6.11.2 Compliance Evaluation

In order to evaluate compliance with release detection requirements, the inspector must verify the items discussed below during the inspection. Items that cannot be verified should be identified as non-compliant in the Inspection App.

1) **Tanks must have been installed prior to September 15, 2010.** Tanks installed on or after September 15, 2010 must use interstitial monitoring for release detection.

2) **Records are provided for the most recent 8 months.**

3) **Method is conducted at least monthly.** After each 30 day period, the tank owner must submit data for analysis and have the analyzed data record on-file within 30 days of the last day data was collected. For example, if a tank owner/operator collects monthly SIR data from May 15th to June 15th, the data must be analyzed and returned to the owner/operator (if applicable) by July 15th. As another example, the tank owner provides SIR data for June through February, but December, January, and February's data was analyzed on March 15th. SIR was not conducted monthly because December's and January's data were not analyzed within 30 days of the last day data was collected.

4) **Monitoring device can measure product levels to 1/8 inch accuracy.** When used, the measuring stick should be in good condition and should contain the button at the end of the stick. Dipsticks that can't be read to 1/8 inch, are broken, taped, cracked or that have ends that are worn (end button missing) are not serviceable devices.

   Sometimes a tank owner may use an ATG system to measure product levels rather than a measuring stick. If an ATG is used to measure the product levels, the inspector should ensure that the ATG is set up properly [see Automatic Tank Gauging (ATG)].

6.11.3 Suspected Release Reporting

Inconclusive Results

If the SIR report shows inconclusive results, the owner must immediately investigate to identify the cause of the inconclusive result and immediately correct the situation. The site contact should be able to demonstrate or explain to the inspector the corrective measures taken in response to an inconclusive result. If no action was taken, the inspector should determine if any of the results constitute a suspected release by consulting the suspected release section of The DEQ Storage Tank Program Technical Manual.

Failed Results

A suspected release should be reported when SIR results for two consecutive months are inconclusive or there are three inconclusive SIR results during any six month period. If applicable, the inspector should determine if a suspected release was reported. If either the owner failed to take corrective measures or failed to report a suspected release for two consecutive months of inconclusive results or for three in six months, the inspector should note this in the comments for follow-up by remediation staff.

6.12 Other Approved Tank Methods

For any alternative method, the inspector must confirm that such method is acceptable by contacting OSRR. If the method is acceptable, the inspector should note this in the Tank Release Detection Comments section of the Inspection App. If the method is not acceptable, the inspector should provide an explanation in the comments section.

6.12.1 Compliance Evaluation

In order to evaluate compliance with release detection requirements, the inspector must verify the items discussed below during the inspection. Items that cannot be verified should be identified as non-compliant in the Inspection App.

1) **Tanks must have been installed prior to September 15, 2010.** Tanks installed on or after September 15, 2010 must use interstitial monitoring for release detection.

2) **Records are provided for the most recent 8 months.**

3) **Method is conducted at least monthly.** For example, records exist for June 3rd, July 8th, August 14th, September 19th, etc. Noncompliance will not be assessed since the method was conducted at least monthly with intervals no longer than 45 days.

4) **Other.** Any other compliance issue should be noted and described in the mobile app by checking the "Other" box and describing in the comment field the compliance issue. An example of an "other" compliance issue would be if the method could not conduct a release at a 0.2gph leak rate with a 95% probability of detection and a 5% chance of a false alarm.

6.12.2 Suspected Release Reporting

A suspected release should be reported if any unusual operating condition exists such as failed results. The DEQ Storage Tank Technical Manual discusses what constitutes a suspected release and reporting requirements.

7 Piping Release Detection

Introduction

Piping[22] release detection is required for most regulated piping[23] except piping associated with tanks that fuel emergency generators[24] installed prior to September 15, 2010 and empty tanks in proper temporary closure status as described in Chapter 4 Temporary Closure. There are two different types of piping: pressurized and suction.

General Requirements

- **Pressurized Piping**

  Installed prior to September 15, 2010: Generally needs both an automatic line leak detector (ALLD) and either an annual line tightness test or monthly monitoring.

[22] "Pipe" or "piping" means a hollow cylinder or the tubular conduit that is constructed of non-earthen materials that routinely contains and conveys regulated substances from the underground tank(s) to the dispenser(s) or other end-use equipment. Such piping includes any elbows, couplings, unions, valves, or other in-line fixtures that contain and convey regulated substances from the underground tank(s) to the dispenser(s). Pipe or piping does not include vent, vapor recovery, or fill lines. 9VAC25-580-10.

[23] Release detection is not required for piping associated with tanks that are specifically excluded, deferred, or partially deferred by 9VAC25-580-20 and discussed in Section 9: Regulatory Interpretations of this manual.

[24] Emergency generator USTs that store "heating oil" may be excluded from 9VAC25-580-20. Refer to Section 9 of this manual for further information.

Installed on or after September 15, 2010: ALLD and interstitial monitoring must be used as the primary method of release detection for pressurized piping installed on or after September 15, 2010. Secondary/additional methods may be used but secondary methods will not be evaluated for regulatory compliance.

- **Suction Piping**

  US Suction Piping
  Installed prior to September 15, 2010 and doesn't meet the criteria for exempt suction pipe: Must either be tightness tested every three years or use SIR, interstitial monitoring, vapor monitoring, or groundwater monitoring.

  Installed on or after September 15, 2010 and doesn't meet the criteria for exempt suction pipe: Must use interstitial monitoring for release detection. Secondary/additional methods may be used but secondary methods will not be evaluated for regulatory compliance.

  Safe or European Style Suction Piping
  This piping is exempt from release detection if it meets the criteria described in 10.1.1 Safe Suction Piping.

- If multiple monthly monitoring methods are used, at least one method must comply fully with the requirements set out below.

8 Pressurized and Gravity Fed Piping

Description

Pressurized piping is the most commonly used UST piping. In pressure pipe systems, the submersible turbine pump (STP) is located in the tank (Figure 9-8), not at the dispenser, as in suction systems. The STP distributes fuel from the tank, through the piping, to the dispenser.

- **Pressurized piping must meet two standards for proper release detection.**

  1) **ALLD** (Figures 9-8 and 9-9). The ALLD should be capable of detecting a catastrophic leak of three gallons per hour at 10 pounds per square inch in one hour of pump operation, and

  2) **Periodic release detection:**

     For Piping Installed prior to September 15, 2010: A second release detection method, such as annual line tightness testing or a monthly monitoring method, such as SIR, ATG, vapor monitoring, groundwater monitoring, or interstitial monitoring.

For Piping Installed on or after September 15, 2010: Interstitial monitoring must be used for release detection in addition to the ALLD.

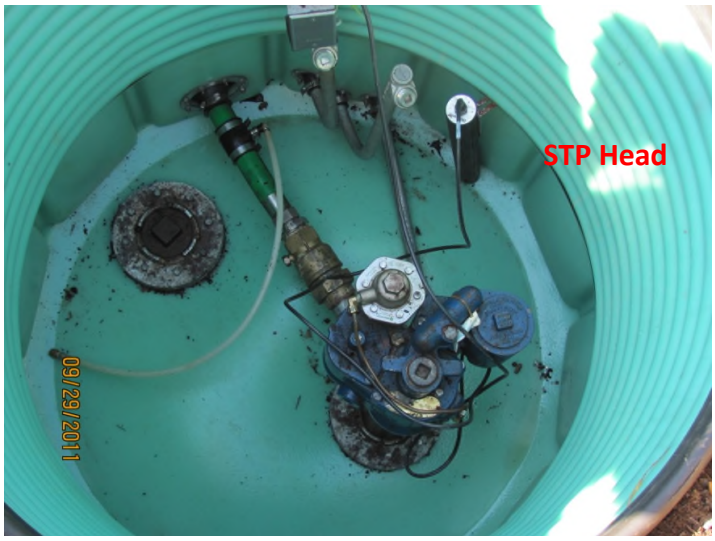


Figure 9-8 Submersible Turbine Pump (STP) Head

- Gravity fed piping is rare and is considered to be pressurized piping since the product is under head pressure. Any piping that runs downhill, even if a suction pump exists, is under head pressure and is considered pressurized piping as far as the regulatory requirements are concerned.

- Piping release detection is not typically required for used oil systems since the only product piping is considered fill piping that does not routinely contain product.

8.1 Automatic Line Leak Detectors (ALLDs)

The purpose of the ALLD is (i) to restrict or cut off flow from the pump when the required pressure cannot be maintained in the line or when an alarm is triggered or (ii) to trigger an audible or visual alarm when sensors monitoring the pipe are activated.

- There are two types of ALLDs: mechanical devices (Figure 9-9) and electronic devices (Figure 9-10).

- Mechanical ALLDs typically meet the regulatory requirements by restricting the flow of product when there is a pressure change within the pipe.

- Electronic ALLDs test piping pressure decay and may shut down the STP and trigger visual alarms via an ATG or dedicated console.

- Sump sensors may also be used to meet the ALLD regulatory requirement. Sump sensors either trigger a visual alarm or shut down the STP via an ATG as described in Section 9.3.5 Piping Interstitial Monitoring.

Figure 9-9 Mechanical Automatic Line Leak Detectors (ALLDs)

Figure 9-10 Electronic Automatic Line Leak Detectors (ALLDs) and standalone console

ALLDs are usually housed in sumps under large manhole covers which may be circular or rectangular and are found at the top of a submersible pump in the tank (Figure 9-11). The sumps are generally opposite the fill ports and may be bottomless or totally enclosed units.

Figure 9-11 STP Sump Manhole covers

8.1.1 ALLD Installation

ALLDs must be installed in accordance with the manufacturer's instructions in order to function properly. The most common installation errors are placement of ALLDs and product incompatibility.

ALLD Placement

The placement of the ALLD is crucial for leak detection for the entire product line. ALLD manufacturers require the ALLD to be installed either in a 2" port on the STP (Figure 9-12) or in a special tee (Big-Flo or High Capacity units) installed at the outlet of the STP (Figure 9-13). An ALLD cannot detect a leak in piping or equipment upstream of itself such as the STP head.

Sump sensors used as ALLDs must also be placed in the STP sump properly. Most manufacturers require that the sensor be placed at the lowest point in the sump almost touching the bottom of the sump. Sump sensors requirements are discussed in more detail in Section 9.3.5 Piping Interstitial Monitoring.

Figure 9-12 ALLD on STP

Figure 9-13 ALLD on High Capacity STP

Solenoid Valve Placement

Solenoid valves are used in piping systems that contain master and satellite dispensers to regulate the flow of product to the appropriate dispenser (Figure 9-14). These solenoid valves must be installed so that they do not impede the detection of a release by the ALLDs. Since ALLDS do not test beyond a closed valve, the solenoid valve cannot be placed anywhere in the product line unless it is electronically controlled to normally be in the open position. Solenoid valves in the dispenser should be installed by the dispensing hose outlet and away from the product piping path as seen in Figures 9-14 and 9-15.

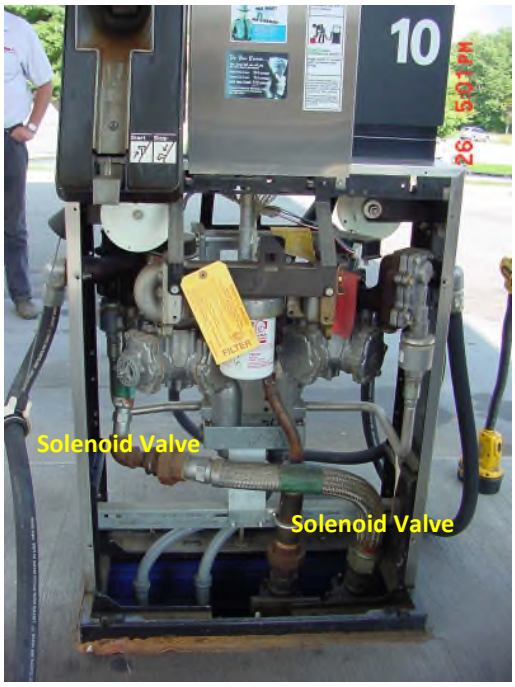
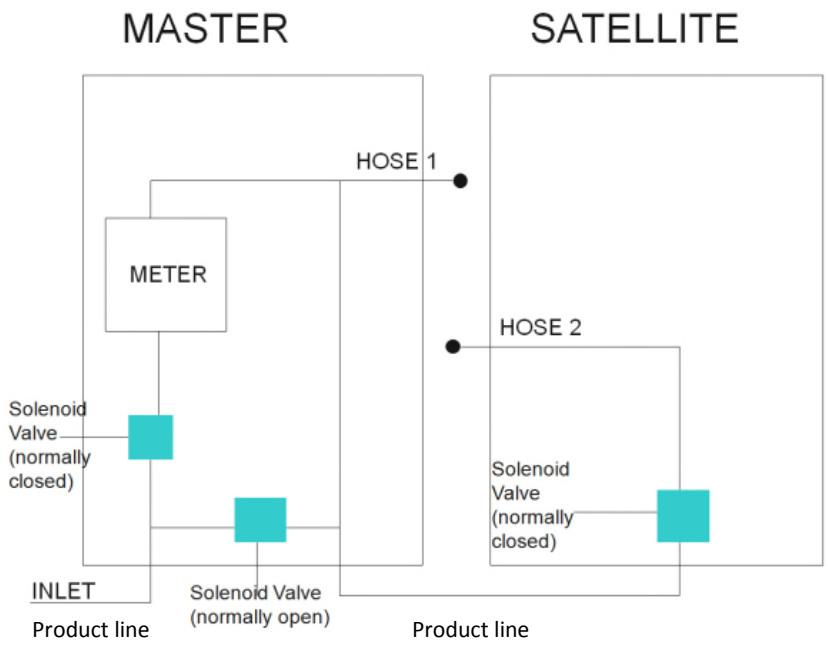


Figure 9-14 Solenoid Valves



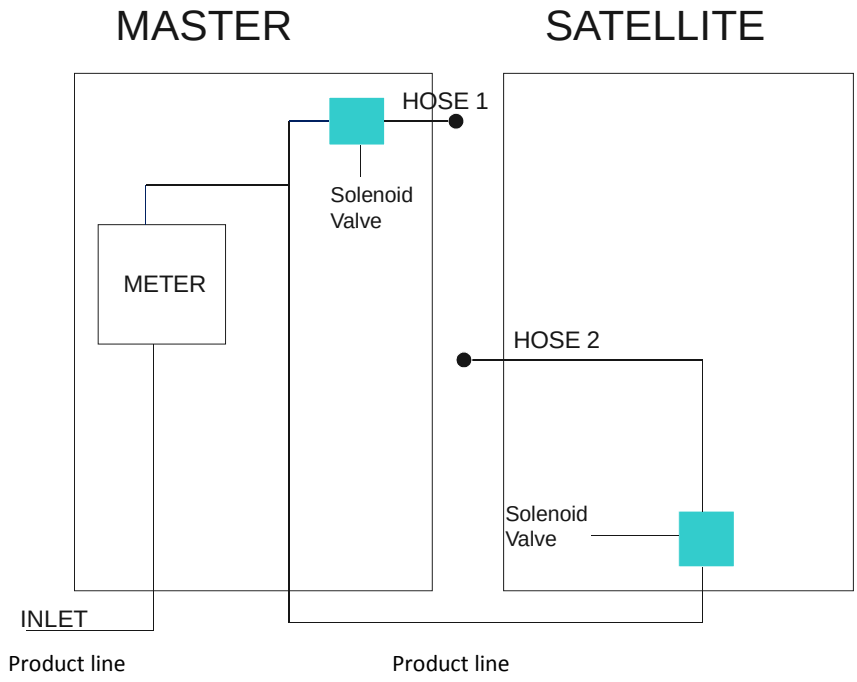


Figure 9-15 Proper Solenoid Valve Placement Diagrams

8.1.2 Compliance Evaluation for ALLDs

In order to evaluate compliance with ALLD requirements, the inspector must verify the items discussed below during the inspection. Items that cannot be verified should be identified as non-compliant in the Inspection App.

1) **An ALLD device is present on <u>each</u> STP (or a sump sensor exists).** Most manufacturers require one ALLD per product line[25].

   Mechanical ALLDs were tested annually in accordance with manufacturer's requirements. Mechanical ALLDs must be tested for functionality annually in accordance with the manufacturer's requirements. Determining manufacturer testing requirements for mechanical line leak detectors is relatively easy since the testing protocol is typically shipped with the mechanical ALLD and contained on the manufacturer's website.

2) **Electronic line leak detectors and sump sensors were tested annually.** Due to the dynamic manufacturer testing requirements for <u>electronic</u> ALLDs and sump sensors, DEQ will continue to accept electronic ALLD self-tests to meet the annual ALLD testing requirements until a Virginia regulatory change[26].

3) **Test record was provided for a valid test that was conducted within past 12 months.** Acceptable documentation differs depending on the ALLD type. The inspector should ensure that the test was properly conducted within the past year.

   a) **Mechanical ALLDs**. The tank owner should provide a test report with results and testing protocols from the tester.

   b) **Electronic ALLDs and sump sensors**. The tank owner should provide a testing report from a qualified tester, an ATG self-test print out, or a sensor report for sump sensors. Some stand alone (not part of an ATG system) electronic LLD modules do not contain printers. In these cases, the tank owner/operator may record the line leak detection results in a notebook with the date and result of each monthly test.

[25] The inspector should consult with the manufacturer's installation instructions and product guides for specific requirements.

[26] Virginia's regulations will change in the near future. The regulatory change will most likely require ALLDs and sump sensor to be tested in accordance with the manufacturer's instructions, or a code of practice developed by a nationally recognized association or independent testing laboratory. Most current manufacturer's instructions for testing of electronic ALLDS due not include self-tests.

Owners are required to maintain the most recent annual test results for one year. Additionally, the owner is required to maintain the manufacturer's written performance claims related to the equipment.

4) **The appropriate ALLD was installed for the product stored.**

ALLDs specific to diesel product may not function properly for gasoline or other product piping due to the difference in product viscosity. If the inspector identifies a diesel ALLD being used for gasoline product, he or she should note the ALLD model number in the piping release detection comments. Red jacket diesel ALLDs are usually marked with a green label or green paint (Figure 9-16) on the very top of the unit whereas FE Petro diesel and kerosene ALLDs are tan in color. If necessary, the inspector should consult the manufacturer or the NWGLDE website: www.NWGLDE.org, to determine if the ALLD will function properly for the product stored. The inspector should indicate if field verification was not possible by marking the appropriate deficiency under piping release detection in the Inspection App.

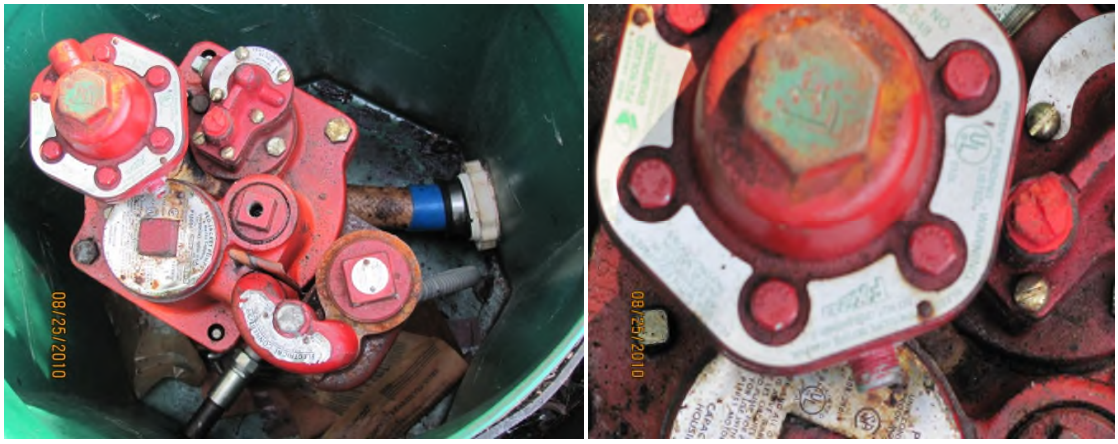


Figure 9-16 Red Jacket Diesel Automatic Line Leak Detector (ALLD)
Note the green octagonal top and green print on label.

8.1.3 Suspected Release Reporting

A suspected release should be reported if any unusual operating condition exists such as an alarm or piping shutdown or flow restriction issued by an ALLD. The DEQ Storage Tank Technical Manual discusses what constitutes a suspected release and reporting requirements.

8.2 Periodic Pressurized Piping Release Detection Methods

Description

- **Piping installed prior to September 15, 2010:** Seven types of periodic monitoring methods may be used in conjunction with ALLDs for pressure piping systems: 1) annual line tightness testing (ALTT); 2) ATG monthly monitoring; 3) vapor monitoring; 4)

groundwater monitoring; 5) interstitial monitoring; 6) SIR; and 7) other approved methods.

- **Piping installed on or after September 15, 2010:**I Interstitial monitoring must be used in conjunction with ALLDs.

If the tank owner is using multiple periodic monitoring methods, the inspector must ensure that at least one method is in full compliance. If both methods are out of compliance, the inspector should choose the most economically feasible method for detailed inspection and note the other method in the piping release detection comments.

Most of the piping periodic monitoring methods must meet the applicable requirements discussed in Section 7 Tank Release Detection. Any additional requirements specific to piping are discussed in this section. The inspector should evaluate the items in accordance with DEQ's Compliance Measures (Appendix G).

The inspector should ask the facility contact if piping release detection has been conducted and what method or methods are being used. If the owner indicates that they did not conduct any piping release detection, the inspector should make a note of the response in the release detection comments section of the mobile application.

8.3 Compliance Evaluation

8.3.1 Line Tightness Test

Annual line tightness testing (LTT) may be used as a release detection method for piping installed prior to September 15, 2010. In order to evaluate compliance with line tightness testing requirements, the inspector must verify the items discussed below during the inspection. Items that cannot be verified should be identified as non-compliant in the Inspection App.

1) **Tanks must have been installed prior to September 15, 2010.** Tanks installed on or after September 15, 2010 must use interstitial monitoring for release detection.

2) **Annual line tightness testing must be conducted in accordance with the UST Technical Regulation by either:**
   a) Precision line tightness test, or
   b) A 0.1 gph annual leak test conducted from an electronic ALLD.
   A third party testing company normally performs precision line tightness tests[27]. A 0.1 gph pipe test may be conducted annually by electronic ALLDs connected to an ATG or

[27] Some owners, such as jobbers, may have the equipment to perform their own line tightness tests.

stand alone console. Precision line tightness testing and electronic line testing must be conducted with a 95% accuracy rate and a probability of false alarm of less than 5%. In order to determine if the testing equipment meets the regulatory requirements, the inspector may consult the NWGLDE website (www.nwglde.org).

3) **Record must be provided for a precision LTT conducted within the past year.** The inspector should record the date of the test and the results (pass or fail) in the Inspection App. If the tightness test was conducted by an electronic unit, then the inspector may wish to note the manufacturer and model number in the piping release detection comment field for reference.

8.3.2 Suspected Release Reporting

A suspected release should be reported if any unusual operating condition exists such as failed results. The DEQ Storage Tank Technical Manual discusses what constitutes a suspected release and reporting requirements.

8.3.3 ATG

Electronic line leak detection via an automatic tank gauge (ATG) or a standalone console may be used as a monthly monitoring method for piping installed prior to September 15, 2010. For ATG systems, periodic monitoring can be conducted monthly at a 0.2 gph leak rate. In order to evaluate compliance with ATG requirements, the inspector must verify the items discussed below during the inspection. Items that cannot be verified should be identified as non-compliant in the Inspection App.

1) **Piping must have been installed prior to September 15, 2010.** Piping installed on or after September 15, 2010 must use interstitial monitoring for release detection.

2) **Records are provided for the most recent 8 months.** The records may be printed from the ATG, retrieved from a computer, or manually recorded by the site contact in cases where the unit does not contain a functioning printer.

3) **Method is conducted at least monthly with interval no longer than 45 days.** For example, ATG records exist for June 3rd, July 8th, August 14th, September 19th, etc. Noncompliance will not be assessed since the method was conducted at least monthly with intervals no longer than 45 days.

4) **ATG is set up properly.** The inspector may verify the proper setup of the ATG by requesting the tank owner/operator to print out the machine's setup. The setup programming should match the UST piping system. The inspector should verify that the length of piping programmed in the ATG is generally correct. A release could go undetected if the piping length is incorrectly programmed in the ATG. For instructions on ATG setup and other programming, consult the technical manuals on the ATG vendor's website.

5) **ATG conducts a valid test (provides a Pass or Fail result).**
The electronic ALLD tests should indicate a ”pass” or “fail” result. Typically the ATG or console will indicate if a 0.2pgh or 0.1gph test was conducted. If the reports show that the tank(s) did not meet at least the 0.2 gph detection rate, then the inspector should mark the corresponding reason for non-compliance box in the Inspection App.

Inconclusive or Invalid Results
Inconclusive or Invalid results are not considered valid tests and usually indicate a system problem that needs correction. For instance:

- A test result may be inconclusive or invalid because of low product levels.
- A test result may be inconclusive or invalid if the tanks are greater than 15,000 gallons and the ATG does not contain software for these large tanks.
- A test result may be inconclusive or invalid if the tanks contain viscous products.

Failed Tests
A “failed” test may still be considered a valid test for release detection, even if the failure was directly related to a release of product. However, a failed test may also be considered a suspected release (Section 7.4.5).

Conversely, if the test “failed” for reasons not related to a release of product, then a non-compliance issue may exist. For instance:

- A test may fail because the tank is empty and the pump is unable to pressurize the lines.
- A test may fail because the ATG was programmed improperly which results in non-compliance due to an incorrect setup. For example, the line length was programmed improperly.
- A test may fail because of faulty mechanical equipment (bad transducer, improper wiring, etc.).

Section 7.4 Automatic Tank Gauging (ATG) and EPA’s Automatic Tank Gauging Systems for Release Detection: Reference Manual for UST Inspectors discuss ATG requirements.

8.3.4 Suspected Release Reporting

A suspected release should be reported if any unusual operating condition exists such as failed results. The DEQ Storage Tank Technical Manual discusses what constitutes a suspected release and reporting requirements.

8.3.5 Vapor Monitoring

Vapor monitoring may be used as a monthly monitoring method for piping installed prior to September 15, 2010. Normally, owners who use vapor monitoring for their piping release detection will also use vapor monitoring for their tank release detection. The inspector should

refer to Section 7.5 Vapor Monitoring for vapor monitoring requirements. In order to evaluate compliance with vapor monitoring requirements, the inspector must verify the items discussed below during the inspection. Items that cannot be verified should be identified as non-compliant in the Inspection App.

1) **Piping must have been installed prior to September 15, 2010.** Tanks installed on or after September 15, 2010 must use interstitial monitoring for release detection.

2) **Records are provided for the most recent 8 months.**

3) **Method is conducted at least monthly with interval no longer than 45 days.** For example, Vapor Monitoring records exist for June 3rd, July 8th, August 14th, September 19th, etc. Noncompliance will not be assessed since the method was conducted at least monthly with intervals no longer than 45 days.

4) **Site assessment has been done for vapor monitoring.** Upon installation of the vapor monitoring method, the site must be assessed to ensure the regulatory requirements can be met and to establish the number and position of the wells. Site assessment requirements are further discussed in Section 7.5 Vapor Monitoring.

5) **Wells are properly designed and positioned.** The inspector should use the information from the site assessment along with their expertise to determine if the wells are properly designed and positioned. Further investigation may be necessary by an environmental consultant for atypical installations.

6) **Wells are clearly marked and secured.** Monitoring wells must be clearly marked and secured. Proper markings may be the official American Petroleum Institute (API) triangle symbol or a label indicating the well is a monitoring well and should not be filled (Figure 9-17). Lids that are bolted down or are locked are considered secured. Locked or zip tied compression caps are also an acceptable means of securing a monitoring well. Any of the following are acceptable markings.

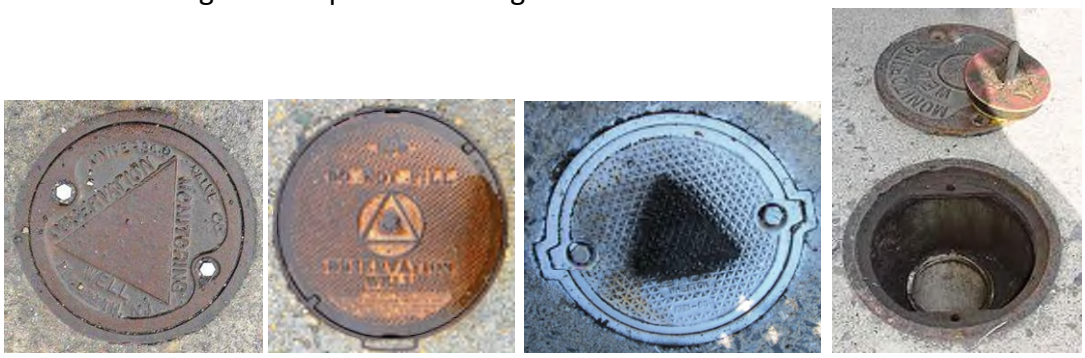


Figure 9-17 Properly labeled monitoring wells

8.3.6 Suspected Release Reporting

A suspected release should be reported if any unusual operating condition exists such as petroleum vapors in vapor monitoring wells. The DEQ Storage Tank Technical Manual discusses what constitutes a suspected release and reporting requirements.

8.3.7 Groundwater Monitoring

Groundwater monitoring may be used as a release detection method for piping installed prior to September 15, 2010. Normally, owners who use groundwater monitoring for their piping release detection will also use groundwater monitoring for their tank release detection. If the owner uses groundwater monitoring for piping, then the inspector should refer to the Section 7.6 Groundwater Monitoring for groundwater monitoring requirements. In order to evaluate compliance with groundwater monitoring requirements, the inspector must verify the items discussed below during the inspection. Items that cannot be verified should be identified as non-compliant in the Inspection App.

1) **Tanks must have been installed prior to September 15, 2010.** Tanks installed on or after September 15, 2010 must use interstitial monitoring for release detection.

2) **Records are provided for the most recent 8 months.**

3) **Method is conducted at least monthly with interval no longer than 45 days.** For example, Groundwater Monitoring records exist for June 3rd, July 8th, August 14th, September 19th, etc. Noncompliance will not be assessed since the method was conducted at least monthly with intervals no longer than 45 days.

4) **Site assessment should have been completed.** A site assessment should be completed that verifies items 5 through 8. For most sites, the site assessment may be as simple as the tank owner documenting the facts for items 5 through 8.

5) **Groundwater is never greater than 20 feet from surface.** The depth to groundwater may be verified via the monitoring well. A measuring stick may be used to determine monitoring well depth. If the well casing is 20 feet from the surface and groundwater is present at the bottom of the well, then groundwater is clearly at least 20 feet from surface. If the well collects surface water, then it may not be functioning properly. If the depth to groundwater is unknown or questionable, the tank owner may need to hire an environmental consultant to determine depth to groundwater.

6) **Wells are properly designed and positioned.**
   The inspector should use the information from the inspection and site assessment along with their expertise to determine if the wells are properly designed and positioned.

   The following requirements apply for groundwater monitoring well installation:

a. The slotted portion of the well casing must be designed to prevent migration of natural soils or filter pack into the well and to allow entry of regulated substance on the water table into the well under both high and low groundwater conditions. The slots should appear small, uniform, and at the same depth of the fluctuating water table. The depth to water table should be indicated in the site assessment.

b. The well must be sealed from the ground surface to the top of the filter pack.

c. The well must intercept the excavation zone or be as close to it as technically feasible. Further investigation may be necessary by an environmental consultant for atypical installations.

7) **Wells are clearly marked and secured.**
Monitoring wells must be clearly marked and secured. Proper markings may be the official American Petroleum Institute (API) triangle symbol or a label indicating the well is a monitoring well and should not be filled (Figure 9-18). Lids that are bolted down or are locked are considered secured. Locked or zip tied compression caps are also an acceptable means of securing a monitoring well. Any of the following are acceptable markings.

Figure 9-18 Properly labeled monitoring wells

8) **Substance stored is not readily miscible in water and has a specific gravity less than one.** The inspector should verify that the product stored in the tank is not miscible in water with a specific gravity < 1 (meaning that the product is light enough to float on water). Such petroleum products include but are not limited to gasoline, diesel, kerosene, gasohol, heating oil, and used oil. Products with a specific gravity > 1 may include crude oil, bunker C and certain hazardous substances. The inspector may verify the product in the tank by checking the marking on the fill port, checking the labels on the dispensers, asking the site contact, consulting registration documents, and/or reviewing delivery records.

9) **Device detects 1/8 inch of free product.**

The most commonly used devices for groundwater sampling include bailers, dipsticks with water/oil sensitive paste, and dedicated monitoring devices. The inspector may assume that devices that allow for manual measurement of 1/8 inch of free product (such as bailers or dipsticks with water/oil sensitive paste) meet the requirement. For electronic equipment, the inspector should ask the site contact for a demonstration that the device is functioning. If the device does not appear to be functioning, the inspector should indicate such in the Inspection App.

8.3.8 Suspected Release Reporting

A suspected release should be reported if any unusual operating condition exists such as product detected on the groundwater. The DEQ Storage Tank Technical Manual discusses what constitutes a suspected release and reporting requirements.

8.3.9 Piping Interstitial Monitoring

Description

Interstitial monitoring may be used for any double-walled or secondarily contained piping system, but must be used for pressurized piping installed on or after September 15, 2010 and hazardous substance piping. Piping interstitial monitoring requires secondary containment as discussed in Chapter 13 - Secondary Containment Requirements. Secondarily contained piping is usually double-walled and sloped back to a sump. When a release in the primary pipe occurs, the product will be channeled by the secondary pipe wall to the sump for detection. Product detection can be conducted through either continuous or manual monitoring.

- **Continuous Monitoring.** The secondary containment system must allow for interstitial monitoring and typically is designed to drain back to an STP sump where sump sensors[28] are present for product detection. Sump sensors are usually connected to an ATG console or interstitial monitoring unit.

- **Manual Monitoring.** Visual monitoring of the STP sump may also be acceptable for interstitial monitoring, as long as a record is kept detailing the visual observations. The record must include the date of the visual containment sump inspection, the observation(s) for each containment sump, and the person who conducted the visual inspection.

NOTE: If the piping was installed on or after September 15, 2010, the under dispenser containment (UDC) needs to be interstitially monitored when visual monitoring cannot be conducted. If visual access is not provided, then a sump sensor should be placed in the

[28] Most sump sensors have dual functions; they can function as ALLDs and also meet the requirement for an "other" method of monthly release detection under 9VAC25-580.160.8 as discussed previously in Section 9.2, Automatic Line Leak Detectors.

dispenser pan and monitored monthly. Monthly monitoring records should be kept for at least one year.

8.3.9.1 **Types of Sensors**

1) Float Switches (non-discriminating).
The most common sump sensor (Figure 9-19) is a basic float switch that consists of two magnets, one of which is attached in a permanently fixed location inside the sensor. A second magnet is attached to an object which will float on fuel or water. When a liquid is introduced to a predetermined level, the magnets contact and complete an electronic circuit. The active circuit is then translated as an alarm by the monitoring device.

Figure 9-19 Float switch sump sensors

2) Float Switches (discriminating)

A discriminating sensor can differentiate between fuel and water by the use of multiple magnetic circuits in a single sensor. Since water and fuel have different liquid densities, each magnetic circuit will trigger a separate alarm. Discriminating sensors look similar to non-discriminating sensors.

3) Optical Sensors (discriminating and non-discriminating)
Optical sensors use a light beam directed at a reflective surface inside the sensor. When liquid is introduced, the light beam is refracted and converted to an electrical signal. The console is then notified of the presence of liquid.

4) Electrical Conductivity
These devices take advantage of the electrical conductivity of fluids. When a liquid is in contact with the sensor, an electrical bridge is completed between two contact points and sends a signal to the monitoring device.

5) Pressure Monitoring Device
Pressure monitoring devices use pressurized nitrogen gas to continuously maintain constant pressure within the interstitial space of double-walled piping. The system is designed to activate a visual and acoustic alarm before stored product can escape to the environment. The system is capable of detecting breaches in both the inner and outer walls of double-walled piping.

6) Vacuum Monitoring Device
Vacuum monitoring devices use vacuum generated by the turbine pump or separate external vacuum pump to continuously maintain a partial vacuum within the interstitial space of double-walled tanks and double-walled piping. These systems are designed to activate a visual and acoustic alarm, and optional turbine pump shutdown before stored product can escape to the environment. These systems are capable of detecting breaches in both the inner and outer walls of double-walled tanks and double-walled piping.

8.3.9.2 ***Interstitial Monitoring Compliance Evaluation***

In order to evaluate compliance with interstitial monitoring requirements, the inspector must verify the items discussed below during the inspection. Items that cannot be verified should be identified as non-compliant in the Inspection App.

1) **IM is the primary method of release detection for tank(s) installed on or after September 15, 2010.**

2) **Records are provided for the most recent 8 months.**

3) **Method is conducted at least monthly with interval no longer than 45 days.** For example, IM records exist for June 3rd, July 8th, August 14th, September 19th, etc.

Noncompliance will not be assessed since the method was conducted at least monthly with intervals no longer than 45 days.

4) **Sensors are positioned/installed according to manufacturer's requirements.** Manufacturers typically require sump sensors to be installed at the lowest point within a sump, almost touching the sump bottom. Float switch sump sensors must remain in an upright position in order to function properly. Float switch sump sensors that are lying on their side (Figure 9-20) will not alarm if product is present because the float will be unable to float on the product and make contact with the other magnet to sound an alarm.

Figure 9-20 Improperly installed sump sensor

5) **Device is set up/programmed properly.** The inspector should request the tank owner/operator to print the system setup on an electronic interstitial monitor or ATG to ensure that the sensor and associated alarms have been enabled.

6) **Equipment should be compatible with substance stored.**

7) **Monitoring equipment is working properly.** If product or water is present in the sump, a non-discriminating sensor should be in alarm mode. If the sensor is discriminating, but the water level is above the water float sensor, then the water must be removed from the system.

8) **System must be designed, constructed, and installed to detect a leak from any portion of the piping that routinely contains product.** The inspector should ensure that product can drain into containment sump for detection. Oftentimes the piping interstice (interstitial space of double-walled piping or piping secondarily contained by chaseways) is tightness tested at the time of installation. Test boots are used to close

the interstitial space at the beginning and end of the piping run for testing. The inspector should also ensure that test boots are not impeding the flow of product into the containment sump.

9) **Secondary containment systems must be designed, constructed, and installed to contain regulated substances released from the tank system until they are detected or removed and prevent the release of regulated substances to the environment at any time during the operational life of the UST system.**

   The inspector must also ensure that any containment areas are able to contain any released product until it can be detected. If the sump or containment area contains any breaches within 4 inches above the piping penetrations, then it will need to be repaired or replaced if interstitial monitoring is used as the primary method of release detection.

If an inspector identifies noncompliance related to items 7 and 8 above, then they should mark "Other" as the noncompliance issue in the mobile app and briefly describe the issue in the associated comment box.

8.3.1 Suspected Release Reporting

A suspected release should be reported if any unusual operating condition exists such as unexplained product in the interstitial space. The DEQ Storage Tank Technical Manual discusses what constitutes a suspected release and reporting requirements.

8.3.2 SIR

- SIR may be used as a monthly monitoring method for piping installed prior to September 15, 2010.
- SIR that meets the release detection performance standard qualifies as an "other approved method".
- SIR is conducted the same for tanks and/or piping. SIR is recognized as a UST system monthly monitoring method and relies on tank inventory and throughput data.
- Detailed SIR requirements are discussed in Section 7.8 SIR.

8.3.2.1 *SIR Compliance Evaluation*

In order to evaluate compliance with SIR requirements, the inspector must verify the items discussed below during the inspection. Items that cannot be verified should be identified as non-compliant in the Inspection App.

1) **Piping must have been installed prior to September 15, 2010.** Piping installed on or after September 15, 2010 must use interstitial monitoring for release detection.

2) **Records are provided for the most recent 8 months.**

3) **Method is conducted at least monthly.** After each 30 day period, the tank owner must have the analyzed data on-file within 30 days of the last day data was collected. For example, if a tank owner/operator collects monthly SIR data from May 15th to June 15th, the data must be analyzed and returned to the owner/operator (if applicable) by July 15th. Another example, the tank owner provides SIR data for June through February, but December, January, and February's data was analyzed on March 15th. SIR was not conducted monthly because December's and January's data were not analyzed within 30 days of the last day data was collected.

4) **Monitoring device can measure product levels to 1/8 inch accuracy.** SIR for piping relies on the tank product inventory to identify a release. When used, the measuring stick should be in good condition and should contain the button at the end of the stick. Dipsticks that can't measure to 1/8 inch, are broken, taped, cracked or that have ends that are worn (end button missing) are not serviceable devices.

   Sometimes a tank owner may use an ATG system to measure product levels rather than a measuring stick. If an ATG is used to measure the product levels, the inspector should ensure that the ATG is set up properly [see Section 7.4 Automatic Tank Gauging (ATG)].

8.3.3 Suspected Release Reporting

A suspected release should be reported if any unusual operating condition exists such as failed results. The DEQ Storage Tank Technical Manual discusses what constitutes a suspected release and reporting requirements.

8.3.4 Other Methods

For other methods of piping release detection, the inspector should verify with the OSRR UST Program Coordinator that the alternate method is acceptable. If so, the inspector should verify that the system or method has been operated or conducted properly and acceptable records have been maintained by following the guidelines mentioned previously in Section 7.9 Other Approved Tank Methods. Otherwise, the inspector should indicate any reasons for noncompliance in the Inspection App.

8.3.5 Suspected Release Reporting

A suspected release should be reported if any unusual operating condition exists such as failed results. The DEQ Storage Tank Technical Manual discusses what constitutes a suspected release and reporting requirements.

9 Suction Piping

Suction piping contains an aboveground pump instead of a submersible pump. Suction pumps are contained inside dispenser housing and may be identified by the pump and belt in the dispenser (Figure 9-21). Suction piping is less common than pressurized because it takes longer to dispense fuel. Additionally, suction piping is not used for long piping runs due to potential vapor lock. There are two types of suction piping: 1) Unregulated Safe (European) suction, and 2) Regulated Unsafe (US) suction.

Figure 9-21 Suction pumps

9.1.1 Safe Suction Piping

- Safe or European suction piping is the most common type of suction piping.

- This suction piping is sloped back to the tank and contains a check valve ONLY at the dispenser and not at the tank. The inspector should be aware that the check valve is often included as part of the suction pump. Visual verification may be possible by asking the site contact to remove the pump cover and indicate where the check valve is located. If visual verification is impossible, the inspector must rely on information provided by the tank owner, contractor, installation records or the VA Notification for Underground Storage Tanks Form 7530 Notification of Underground Storage Tanks Form to determine if a check valve exists at the tank. Typically, DEQ will accept a VA Notification for Underground Storage Tanks Form 7530 as verification that the piping is safe suction.

- Safe suction piping is exempt from UST release detection requirements.

- Manifold piping that connects two tanks for product transfer and equalization, is usually considered safe suction piping unless a pump controls the product transfer.

- Safe suction is identified in the Inspection App, CEDSTanks, and the Notification for Underground Storage Tanks Form 7530 as "No Valve: Suction".

9.1.2 Unsafe Suction Piping

- Owners are required to conduct release detection for US suction piping (unsafe suction) where a check valve is only located at the tank.

- Suction piping installed prior to September 15, 2010, may satisfy release detection requirements in one of two ways: (i) conduct a line tightness test on the underground piping every three years and retain the records for three years; or (ii) perform a monthly monitoring method and retain the records for one year.

- **Unsafe suction piping installed on or after September 15, 2010 must be secondarily contained and interstitial monitoring must be the primary method of release detection.**

- Any of the periodic pressurized piping release detection methods discussed in Section 9.2 Periodic Pressurized Piping Monitoring Methods may be used for suction piping release detection.

- There are only two differences between periodic pressurized and suction piping release detection methods:

  1) When used to monitor suction piping for releases, a precision line tightness test or 0.1gph ATG piping test may be conducted every 3 years instead of every year, and

  2) Electronic line tightness testing methods for suction systems do not currently exist.

- Unsafe suction is indicated in the Inspection App, CEDSTanks, and the Notification for Underground Storage Tanks Form 7530 Form as "Valve: Suction".

9.1.3 Compliance Evaluation

In order to evaluate compliance with unsafe suction piping release detection requirements, the inspector must verify the items discussed below during the inspection. Items that cannot be verified should be identified as non-compliant in the Inspection App.

1) **Interstitial monitoring must be used as the primary method of release detection for piping installed on or after September 15, 2010.**

2) **Line tightness test (LTT) must have been conducted within the past 3 years (if applicable).**

3) **Line tightness test record is provided (if applicable).**

4) **Records are provided for the most recent 8 months (if applicable).**

5) **Method is conducted at least monthly (if applicable).** Records exist for June 3rd, July 8th, August 14th, September 19th, etc. Noncompliance will not be assessed since the method was conducted at least monthly with intervals no longer than 45 days.

   For SIR: After <u>each</u> 30 day period, the tank owner must have the <u>analyzed</u> data record on-file within 30 days of the last day data was collected. For example, if a tank owner/operator collects monthly SIR data from May 15th to June 15th, the data must be analyzed and returned to the owner/operator (if applicable) by July 15th. Another example, the tank owner provides SIR data for June through February, but December, January, and February's data was analyzed on March 15th. SIR was not conducted monthly because December's and January's data were not analyzed within 30 days of the last day data was collected.

6) **Release detection must be conducted.** If records are not provided, the inspector should ask the tank owner or site contact if release detection was conducted and record the answer in the Inspection App.

6) **Device is set up/programmed properly.** The inspector should request the tank owner/operator to print the system setup on an electronic interstitial monitor or ATG to ensure that the sensor and associated alarms have been enabled. The setup programming should match the UST piping system. The inspector should verify that the length of piping programmed in the ATG is correct by estimating the actual piping length from the tank to the dispenser and comparing it to the piping length indicated on the ATG setup report. A release could go undetected if the piping length is incorrectly programmed in the ATG. For instructions on ATG setup and other programming, consult the technical manuals on the ATG vendor's website.

   Vapor monitoring devices may need to be set up or programmed for specific fuel types and sensitivities. The inspector may need to refer to the owner's manual or manufacturer's requirements to determine proper device set up.

10) **Sensors are positioned/installed according to manufacturer's requirements.** Manufacturers typically require sump sensors to be installed at the lowest point within a

sump, almost touching the sump bottom. Float switch sump sensors must remain in an upright position in order to function properly. Float switch sump sensors that are lying on their side will not alarm if product is present because the float will be unable to float on the product and make contact with the other magnet to sound an alarm.

11) **Equipment should be compatible with substance stored.**

12) **Site assessment should have been completed (if applicable).** A site assessment should be completed in accordance with the requirements discussed in Section 7.5 Vapor Monitoring or Section 7.6 Groundwater Monitoring, respectively.

13) **Groundwater is never greater than 20 feet from surface (if applicable).** The depth to groundwater may be verified via the monitoring well. A measuring stick may be used to determine monitoring well depth. If the well casing is 20 feet from surface and groundwater is present at bottom of the well, then groundwater is clearly at least 20 feet from surface. If the well collects surface water, then it may not be functioning properly. If the depth to groundwater is unknown and questionable, the tank owner may need to hire an environmental consultant to determine depth to groundwater.

14) **Wells are properly designed and positioned (if applicable).**
The inspector should use the information from the inspection and site assessment along with their expertise to determine if the wells are properly designed and positioned as discussed in Section 7.5 Vapor Monitoring or Section 7.6 Groundwater Monitoring, respectively.

7) **Wells are clearly marked and secured.**
Monitoring wells must be clearly marked and secured. Proper markings may be the official American Petroleum Institute (API) triangle symbol or a label indicating the well is a monitoring well and should not be filled (Figure 9-18). Lids that are bolted down or are locked are considered secured. Any of the following are acceptable markings.

Figure 9-22 Properly labeled monitoring wells

9.2 Suspected Release Reporting

A suspected release should be reported if any unusual operating condition exists such as failed results. The DEQ Storage Tank Technical Manual discusses what constitutes a suspected release and reporting requirements.

10 Tank Corrosion Protection

All regulated UST systems are required to have corrosion protection. There are five types of tank materials that meet the corrosion protection requirements: 1)Fiberglass; 2)Composite (unless retrofitted with anodes post installation); 3) Jacketed steel; 4)Cathodically protected steel; or 5)Steel tanks retrofitted with internal tank liners.

10.1 Tank Material of Construction

10.1.1 Fiberglass

Because fiberglass is generally corrosion-resistant, tanks constructed of fiberglass inherently meet corrosion protection requirements. Fiberglass tanks are usually corrugated or ribbed for additional structural integrity and are usually red, off-white, or gray in color when found in Virginia. Examples of fiberglass UST manufacturers include Owens-Corning, Xerxes Corporation and Containment Solutions, Inc. Fiberglass tanks manufactured after October 19, 1983 should be equipped with strike plates installed at fill openings. Industry standards have required strike plates beneath fiberglass tank openings since approximately 1985. Tank owners and operators of tanks installed prior to 1986 should be reminded to ensure striker plates exist under the tank fill openings. Problems associated with the omission of strike plates is discussed in the Storage Tank Program Technical Manual.

10.1.2 Composite or Clad (Steel/Fiberglass)

Some steel tanks are clad with an outer coating of fiberglass laminate or urethane and are commonly referred to as composite tanks. Clad fiberglass coatings are typically 100 mils thick and urethane coatings are 70 mils. Because the thick cladding alone typically provides adequate protection, composite tanks meet the UST Technical Regulation corrosion protection requirements. Buffhide®, High-glass®, FibreThane®, ACT-100®, and ACT 100-U® are all examples of composite tanks.

Although not required, some composite tanks may be galvanically cathodically protected by factory or field installed anodes[29] to provide supplemental corrosion protection beyond that which is required by the regulation. Existing composite tanks may be retrofitted with a cathodic protection system to provide supplemental protection or to prevent corrosion of the

[29] Composite tanks containing factory installed anodes must be specially ordered from the manufacturer since composite tanks are not usually manufactured with anodes.

composite tank by bonding it to nearby tank systems and structures protected by an impressed current system.

10.1.3 Jacketed Steel

Jacketed steel tanks are typically double-walled tanks with inner steel walls and outer polymer (polyurethane or polyethylene) or fiberglass walls (jackets). There is an interstitial space between the inner and outer walls that allows for interstitial monitoring. Jacketed steel tanks meet the requirements for secondary containment. Titan® tanks (polyurethane jacket) and Permatanks® (fiberglass jacket) are examples of jacketed steel tanks.

10.2 Verifying Tank Material of Construction

Inspectors may verify the tank material of construction by records review, non-invasive investigative techniques, or in rare cases, visual inspections. Since most tanks are completely covered by backfill and soil, the inspectors must rely on the information reported in CEDS, a VA Notification for Underground Storage Tanks Form 7530, installation invoices, or DEQ file records.

Verification Techniques

In cases where the tank material of construction cannot be determined by DEQ using the techniques identified above or owner records, the tank owner is responsible for identifying the tank material. An owner may use various investigation techniques to determine the tank material.

- **Magnets** - may be used to determine if the tank is steel, but may not provide a definitive answer if the magnet comes in contact with striker plates or ribs in a fiberglass tank.

- **Cathodic protection testing** - may identify if a steel tank is coated or fiberglass. CP testing can reveal information from voltage changes as well as hints that a tank is sti-P3 by showing that fill, STP or ATG risers are isolated from the tank steel.

Visual Investigation - Some tank tops are used as the containment sump bottoms and can be viewed from the containment sump. Additionally, a technician may be able to remove risers to determine if di-electric bushings have been used. The presence of di-electric or isolation bushings usually indicates that the tank is a sti-P3 tank since those bushings were sized specifically for the sti-P3 tank bungs.In rare cases where information regarding the tank material is unavailable, the tank owner may have to expose the top of the tank to determine the tank material. If the tank material is unknown at the time of the inspection, the inspector should indicate “failure to demonstrate corrosion protection” as a reason for noncompliance in

the Inspection App and require the owner or operator to investigate and determine the tank material of construction.

10.3 Corrosion Protection Methods

10.3.1 Cathodic Protection Systems

The two general types of cathodic protection that are installed on UST systems to meet corrosion protection requirements are galvanic and impressed current systems. Stated in the simplest terms, both of these types of cathodic protection systems attempt to reverse the flow of electric current away from the metal that is intended to be protected from corrosion. Both types of cathodic protection systems replace the flow of electrons (current) from the protected structure with a DC current. Galvanic systems produce small amounts of current to protect small structures or well coated large structures. Impressed current systems use larger currents to protect several structures or uncoated, large structures such as bare steel tanks. Cathodic protection systems are discussed in detail in Virginia DEQ's "Guidelines for Underground Storage Tank Cathodic Protection Evaluation" .

10.3.1.1 **Guidelines for Underground Storage Tank Cathodic Protection Evaluation**

DEQ's "Guidelines for Underground Storage Tank Cathodic Protection Evaluation" (CP Guidelines) contain DEQ's regulatory interpretations related to cathodic protection systems. The UST Technical Regulation requires that cathodic protection systems be evaluated prior to application, periodically evaluated, and properly repaired by qualified individuals and in accordance with national standards. The CP Guidelines describe acceptable means of evaluation and provide qualification guidelines for testers and corrosion experts. The CP Guidelines also describe acceptable alternatives to closure for upgrading violations for the more complicated scenarios. The evaluation methods discussed in the CP Guidelines reflect applicable industry standards such as the National Association of Corrosion Engineers (NACE) and the Steel Tank Institute (STI) recommended practices.

10.3.1.2 **Tank Integrity Assessments**

Tank integrity assessments were required prior to installing cathodic protection systems on bare steel tanks or unverified[30] sti-P3® tanks to assess the possibility that the tank was already corroded. Applying cathodic protection systems to corroded tanks could exacerbate the corrosion cells and further damage the tank. Because the regulation required that all tanks be protected against corrosion by December 22, 1998, DEQ staff should have already determined if an integrity assessment was conducted.

[30] Sti-P3® tanks may be verified by installation invoices, tank warranty information, previous VA Notification for Underground Storage Tanks Form 7530 Notification for USTs form, or sworn affidavits.

Four categories of integrity assessments were allowed:

- Manned internal tank inspections and assessment;
- Monthly monitoring (for tanks less than ten years old at the time of the upgrade only);
- Tank tightness testing for tanks less than ten years old at the time of the upgrade; or
- Other approved methods.

Other approved methods included non-invasive integrity assessment methodologies such as ASTM G-158, Tank Environmental Profile (TEP®), Mean Time to Corrosion Failure (MTCF®), and Petroscope®. The non-invasive assessments considered various parameters such as the age of tank, tank material of construction (bare steel, coated, lined, sti-P3®) backfill soil type, native soil types, and soil resistivity. Based upon known parameters, calculations were performed to assess the potential for tank corrosion over time to assess possible tank life expectancy in years.

At this point in time, because all facilities containing tanks upgraded with cathodic protection have been inspected and the upgrading of bare steel tanks is no longer a regulatory option, it is generally unnecessary for inspector's to request or review integrity assessments for USTs. However, if an owner wishes to add cathodic protection to an existing tank, then an integrity assessment may be required (e.g. internally lined tank).

Upon inspection, DEQ inspectors found that some cathodically protected tanks were upgraded without prior integrity assessments. Because most of the commonly used integrity assessments relied on information that needed to be collected prior to cathodic protection upgrade, tank owners were faced with problems returning to compliance. As a result, DEQ developed "Alternatives to Closure for Upgrading Violations-Decision Matrix" which may be found in Appendix M of the "Guidelines for Underground Storage Tank Cathodic Protection Evaluation".

In cases where the impressed current system rectifier has been turned off for more than 90 days, the system is considered depolarized which results in an unprotected steel tank in a corrosive environment. In these cases, a tank owner must prove to DEQ that the tank (or tanks) is in sound condition and a suitable candidate for cathodic protection, i.e., perform an integrity assessment. Again, because most integrity assessments rely on information that should have been collected before the cathodic protection system was installed, the inspector should refer to the "Alternatives to Closure for Upgrading Violations-Decision Matrix" for the methods an owner may use to prove the tank is in sound condition without a formal integrity assessment.

10.3.1.3 **Testing Requirements**

The UST Technical Regulation requires cathodic protection systems be tested within the first six months after installation and every three years thereafter with one exception. When factory or field installed anodes are included with a new ACT-100® or ACT-100-U® installation, the cathodic protection does not need to be periodically tested. However, the cathodic protection must be periodically tested on ACT-100® or ACT-100-U® tank(s) that were retrofitted with

cathodic protection after installation because the status of the cladding cannot be determined. (See Appendix M – EPA Guidance Regarding Cathodic Protection Monitoring of ACT-100® and ACT-100-U® Underground Storage Tanks with Cathodic Protection).

Additional information regarding cathodic protection systems and testing requirements may be found in Section 11.3.1 Cathodically Protected Tanks.

Evaluation of cathodic protection systems to ensure they are functioning as intended has proven to be one of the more problematic areas of the UST Technical Regulation and has led to a great deal of confusion and various practices among individuals engaged in the field of cathodic protection. The applicable UST regulations contain no specific criteria and instead defer to industry standards. Also, a large degree of latitude has historically been provided for interpretation of what constitutes an acceptable evaluation.

Because there are many factors that can affect cathodic protection, there is understandably no standard test method or simple approach that will work at every site. Therefore, DEQ has established "Guidelines for Underground Storage Tank Cathodic Protection Evaluation" that describes what a generally acceptable testing technique is and what documentation is sufficient in order to evaluate the results generated by a qualified cathodic protection tester/expert. To this end, a form for evaluating cathodic protection is included in Appendix K of the "Guidelines for Underground Storage Tank Cathodic Protection Evaluation".

Double-Walled Cathodically Protected Steel Tanks

Testing requirements for double-walled cathodically protected steel tanks where both walls of the tank are steel may differ from the standard testing requirements. For cathodically protected double-walled steel tanks that use interstitial monitoring capable of detecting a wall breach or ingress of product and water[31], the cathodic protection testing time frame is within six months of installation and following any activity that could affect the cathodic protection system but not necessarily every three years thereafter. The cathodic protection system testing requirements for double-walled steel tanks are discussed in the EPA Memorandum: Clarification and Guidance Regarding Cathodic Protection/Monitoring of Double-walled Steel USTs (http://www.epa.gov/ust/ust-technical-compendium-newupgraded-ust-systems - Question 13).

Note: The 60-day inspection requirement for impressed current CP systems is still required for double-walled cathodically protected steel tanks that are not using interstitial monitoring as release detection.

[31] An example of interstitial monitoring equipment that does not detect ingress of product and water is a vapor sensor that cannot detect water.

10.3.1.4 **Testing Qualifications**

In order to test UST cathodic protection systems in Virginia, an individual must meet certain minimum qualifications. It is the intent of the DEQ that only those individuals who meet the minimum qualifications may perform testing in a manner that is consistent with the policies established in the "Guidelines for Underground Storage Tank Cathodic Protection Evaluation". Cathodic protection tests and evaluations conducted by unqualified individuals will not be acceptable to demonstrate compliance with the cathodic protection testing requirements.

10.3.1.5 **Cathodic Protection System Repairs**

Cathodic protection system repairs should be conducted in accordance with industry and national standards as well as the "Guidelines for Underground Storage Tank Cathodic Protection Evaluation". Where a cathodic protection system requires repair, the inspector should request repair records, corrosion expert certification (when required), and a post-repair cathodic protection test to demonstrate that the system was properly repaired and appears to be working properly.

10.3.1.6 **Compliance Evaluation**

The inspector should evaluate cathodic protection systems in accordance with DEQ's Compliance Measures (Appendix G) and the "Guidelines for Underground Storage Tank Cathodic Protection Evaluation" (www.deq.virginia.gov/Portals/0/DEQ/Land/Tanks/06-2006.pdf). The following criteria have been drawn from these documents and the regulation to assist the inspector in his or her evaluation:

Galvanic Systems

1. Metallic portions of UST system that are in contact with soil are cathodically protected.
2. Most recent CP system test occurred within the past three years.
3. CP system test record has been provided.
4. CP system was tested within six months of repair.
5. CP system has been tested in accordance with the current DEQ Guidelines for Underground Storage Tank Cathodic Protection Evaluation.
6. CP system is performing adequately based on results of testing.
7. CP system repairs have been performed in accordance with DEQ Guidelines for Underground Storage Tank Cathodic Protection Evaluation and nationally recognized industry standards. In cases where supplemental anodes are installed, a means for interrupting the current must exist such as a shut off or disconnect switch.
8. CP system was installed in accordance with DEQ Guidelines for Underground Storage Tank Cathodic Protection Evaluation and nationally recognized industry standards.

Impressed Current

1. Metallic portions of UST system that are in contact with soil are cathodically protected.
2. Most recent CP system test occurred within the past three years.
3. Most recent CP system test records have been provided.
4. CP systems were tested within six months of repair of any cathodically protected UST system.
5. CP system has been tested in accordance with DEQ Guidelines for Underground Storage Tank Cathodic Protection Evaluation and nationally recognized industry standards.
6. CP system is performing adequately based on results of testing;
7. CP system repairs must be conducted in accordance with DEQ Guidelines for Underground Storage Tank Cathodic Protection Evaluations and nationally recognized industry standards
8. CP system was installed in accordance with the current DEQ Guidelines for Underground Storage Tank Cathodic Protection Evaluation and nationally recognized industry standards.
9. Rectifier is "on" at time of inspection. Most rectifiers have an on/off switch or a green or red light to indicate whether or not the rectifier is "on", and
10. Rectifier is inspected every 60 days (rectifier logs) and most recent log is provided.

If a tank is cathodically protected and also contains an internal liner, the tank owner must maintain the cathodic protection system. Requirements for lined cathodically protected steel tanks are discussed in Section 11.3.2 Internal Lining.

10.3.2 Internal Lining

Lining the interior of existing tanks was another upgrade method acceptable to meet tank corrosion protection requirements. Lining entails emptying the tank, internally inspecting the tank for holes, sandblasting the tank, then spraying fiberglass epoxy resin to the prescribed thickness on the inside of the tank. Internal tank liners must be installed according to industry standards such as American Petroleum Institute Publication 1631, "Recommended Practice for the Interior Lining of Existing Steel Underground Storage Tanks", and National Leak Prevention Association (NLPA) Standard 631, "Entry, Cleaning, Interior Inspection, Repair, and Lining of Underground Storage Tanks". Prior to lining a tank, an internal inspection should have been performed to ensure the tank was suitable for lining.

Note: Internal Lining is not a corrosion option for newly installed tanks since tanks installed after September 15, 2010 must be double-walled or secondarily contained. Internal liners do not typically meet secondary containment requirements since the liner is bonded to the steel

shell[32] and an interstitial space does not exist. However, internal liners may be installed in tanks for added protection, but the tank owner must still maintain any secondary containment or cathodic protection systems.

11.3.2.1 Verification

Because an inspector cannot visually verify that a tank is lined without using methods that are not recommended or practical for DEQ inspectors (e.g., use of a remote video camera), the inspectors must rely on VA Notification for Underground Storage Tanks Form 7530, installation invoices, and liner inspections for lining documentation.

11.3.2.2 Internal lining inspections

Where lining is the only method of complying with corrosion protection, the installed lining must be inspected after 10 years and every five years thereafter. Internal tank liners are typically inspected by manned entry after the emptying and cleaning of the tank. However, video cameras are also an option for liner inspections as long as the camera and inspection meet nationally recognized standards such as Ken Wilcox's "Recommended Practice for Inspecting Buried Lined Steel Tanks Using a Video Camera" www.kwaleak.com/protocols/video_inspection_practice_sept99.pdf.

11.3.2.3 Cathodically Protected Lined Tanks

If a tank is cathodically protected and lined, the cathodic protection system must be maintained as described in the UST Technical Regulation and in the DEQ Guidelines for Underground Storage Tank Cathodic Protection Evaluation. Although recommended, periodic internal lining inspections are not required for cathodically protected tanks.

10.3.3 Compliance Evaluation

During compliance inspections, inspectors should verify the following:

- The liner was inspected, as required. If the inspection was absent, tardy, or reflects failure, the inspector should note such in the Inspection App.

- If the tank is cathodically protected and lined, the tank inspector should ensure that the cathodic protection is tested, as required.

10.3.4 Other Approved Method

Other methods that meet the performance standards of the UST Technical Regulation are acceptable to meet the corrosion protection requirements. Where the owner reports use of an alternate method, the inspector should record the name and type of method used in the Inspection App. If visual verification is possible, the inspector should confirm the corrosion

[32] Unique lining systems that create a double-walled tank system with an interstitial space may meet secondary containment requirements when the outer tank shell is protected against corrosion. Staff should consult with OSRR staff if a lining system creates a tank wall and is not bonded to the steel shell.

protection method reported by the owner. If visual verification is not possible, the inspector may rely on the information in CEDS and DEQ's files.

Where the owner does not use one of the previously listed types of corrosion protection (i.e., cathodically protected metal, fiberglass, composite, secondary containment/double walled, or lined interior), then the inspector should confirm the acceptability of the alternate method with the UST Compliance Coordinator in OSRR.

11 Piping Corrosion Protection

All underground piping that routinely contains product must be protected against corrosion.[33] Vent lines, tank risers, and fill pipes[34] do not "routinely contain product" and are not considered UST piping; therefore, no corrosion protection or release detection is required. However, flex connectors are considered part of the product line and must be protected against corrosion. Product lines typically begin at the tank connections and end at the shear valve located under the dispenser (Figure 3-13).

Tank Manifold Piping

Corrosion protection is required for tank manifold piping because the piping routinely contains product. Some systems have a copper pipe/line connecting the pump on the master tank to the high point of the siphon bar at the drone tank. The copper manifold line between the master tank and siphon bar is also considered a European suction line and must be protected from corrosion if in contact with the ground.

Figure 3-13 View of piping inside dispenser

[33] Aboveground product piping and underground piping associated with an aboveground storage tank (AST) are not part of the regulatory scope.

[34] Drain lines or remote fill lines are considered to be the same as fill pipes. See 9VAC25-580.10 definition for pipe.

Protecting Piping from Corrosion

There are many ways to protect piping from corrosion. Corrosion protection may be accomplished by either:

a) Using non-metallic piping that is made of a corrosion-resistant material such as fiberglass or other plastic polymers,
b) Isolating the metallic component in question from the ground, or
c) Adding cathodic protection.[35] Buried steel piping must be cathodically protected.

11.1 Verifying Piping Material of Construction

Usually inspectors will verify the piping type visually from either the STP sump or from under the dispenser during the inspection. If the inspector is unable to verify the piping material of construction visually, then the inspector must rely on the information reported in CEDS, a VA Notification for Underground Storage Tanks Form 7530, installation invoices, or previous DEQ staff's inspection records. In cases where the piping material of construction is unknown, the tank owner may use various investigation techniques to determine the piping material such as cathodic protection testing or by exposing a portion of the piping to determine the material.

Piping cathodic protection may be verified in the field by evidence of anode wire leads connected to the pipe (if visible), wire or anode indications in the pavement, or a rectifier (impressed current only). If field verification is not possible, the inspector may accept a cathodic protection test conducted in accordance with DEQ's testing requirements as outlined in the "Guidelines for Underground Storage Tank Cathodic Protection Evaluation" (www.deq.virginia.gov/Portals/0/DEQ/Land/Tanks/06-2006.pdf).

If the piping material is unknown, the inspector should indicate the failure to demonstrate corrosion protection as a reason for noncompliance and require the owner to provide the demonstrative information in a "Request for Corrective Action" as described in Volume IV – Compliance Process of this manual.

11.2 Piping Types

11.2.1 Non-metallic Piping

Non-metallic piping typically is made of fiberglass or plastic polymers and does not require corrosion protection.

Note: Although non-metallic piping does not require corrosion protection, it must be compatible with the product stored and must meet Underwriter Laboratories (UL) 971

[35] New metallic piping installed after December 22, 1988 and in contact with the ground must be factory coated with a suitable dielectric material and cathodically protected.

standards. Until July 1, 2005, the UL standard did not require the outer wall or jacket of secondarily contained piping to be compatible with the piping stored. As a result, many piping issues occurred such as elongation, over bending, outer-jacket splitting, swelling, softening, and delamination. Due to the outer-jacket incompatibility, the UL 971 standard was amended on July 1, 2005, to require the outer wall of any secondarily contained piping to be (1) compatible with the product stored, (2) resistant to external conditions, and (3) resistant to "scuffs" and other damage as a result of handling and installation practices. Virginia allowed any existing (pre-2005) piping to be installed until existing supplies were exhausted. All regulated non-metallic product piping installed today must meet the current UL 971 standard.

11.2.2 Metallic Piping

Any metallic piping (e.g., product piping, copper piping associated with emergency generators, short segments of galvanized steel suction, and piping connectors) must be protected from corrosion if it is in contact with the ground. Any buried metallic component of the product piping system, such as metallic piping connectors, nipples, ells, tees, couplings, unions, and ball valves, must also be protected. There are two main methods of protecting piping and piping components from corrosion:

- **Isolate pipe from soil**. Ensure the pipe and connectors are isolated from contact with the ground by installing secondary containment sumps, dispenser pans, piping chaseways, or jacketing (flex connectors). Tape (duct tape, electrical tape, green tape, etc.) is not an acceptable material for piping isolation (Figure 3-14). Field installed pipe wraps (zipper boots) may be used to isolate piping connectors from the soil. Unless it is factory installed or bonded[36] to the pipe, tape wraps are unacceptable. Inspectors should consult with the UST Compliance Coordinator if factory installed or bonded tape wraps are encountered prior to making a compliance determination.

- Components used to isolate the metallic piping component should be compatible with the substance stored in the tank and should be liquid tight. Sumps that cannot be maintained in a liquid tight manner should be repaired or replaced. If metallic components of a piping system are installed in a containment sump, the sump should remain dry. Metallic components are protected from corrosion by the removal of water on a regular basis. Water in sumps can be highly corrosive due to winter road salt applications. In situations where it is difficult to maintain a dry sump, cathodic protection may be necessary.

[36] Tape wraps that are bonded to the structure are very rare for UST installations. Bonded tape wraps are usually encountered on interstate pipelines that are also supplemented by impressed current systems.

Figure 3-14 Unacceptable Tape Wrap on Flexible Pipe Connector.

Cathodically protect – Piping may be cathodically protected galvanically[37] with block or spike anodes or electrically bonded into an impressed current system when designed by a corrosion expert. After December 22, 1988, cathodically protected piping and connectors should have been coated with a dielectric material. Components installed on or before December 22, 1988 and in contact with the ground do not have to comply with the coating requirement, but do have to have cathodic protection or be isolated/booted. Existing DEQ approved CP upgrades (spike anode) to flex connectors in contact with soil may be allowed on a case-by-case basis, but CP systems installed after June 2006 must have a disconnect-switch or some other means to interrupt the current during testing.[38]

Cathodic protection types, installation, repair, and testing requirements are briefly discussed in Section 11.3.1 Cathodically Protected Tanks and furthermore in the "Guidelines for Underground Storage Tank Cathodic Protection Evaluation" (www.deq.virginia.gov/Portals/0/DEQ/Land/Tanks/06-2006.pdf).

11.2.3 Other Metallic Components

Although metallic piping and piping components require corrosion protection, there are other metal components of the tank system that do not. Metallic components of the UST system that

[37] Galvanic cathodic protection is also known as a sacrificial anode system because the anode corrodes instead of the metal that it is protecting. Galvanic cathodic protection is described in more detail in the "Guidelines for Underground Storage Tank Cathodic Protection Evaluation"

[38] This is due to the need to use the -850 mV instant off test method to compensate for IR drop when CP testing.

do not require corrosion protection include: tank vent lines; any type of tank riser pipe; tank hold down straps/turnbuckles (unless manufacture r/local code requires it); remote tank fill lines; and, submersible turbine pump (STP) heads. Although the pump head "routinely contains product", it is not required to meet the corrosion protection requirements and may be in contact with the ground or submerged in water without the need for cathodic protection as long as the manufacturer indicates those conditions are acceptable. However, the pump head should remain visible (not buried) so that any obvious corrosion problems or leaks that may be present can be observed and appropriate action taken to prevent or repair any leaks. Even though it is not required, it is recommended that, in damp applications, the pump head be protected from water due to a noted and likely-related increase in functional element[39] failures. DEQ recognizes the benefit of protecting these components from corrosion, despite the fact that there is no regulatory requirement, and recommends that the owner consider including these items in their corrosion protection system and survey.

11.3 Testing Requirements, Tester Qualifications, and Criteria

Piping cathodic protection testing requirements, tester qualifications, and testing criteria mirror the tank requirements discussed in Section 11.3.1.3 Testing Requirements and subsequent sections.

"Mixed" Piping

In those instances where fiberglass reinforced plastic or flexible piping is connected to an existing metallic pipe (e.g. to extend a fueling island), a cathodic protection test station or access to the soil where the two dissimilar materials are joined must be provided. This is necessary to effectively test the adequacy of cathodic protection operating on the metallic piping.

12.4 Cathodically Protected Piping Compliance Evaluation

Piping cathodic protection evaluation mirrors the tank cathodic protection evaluation discussed in Section 11.3.1.6 Compliance Evaluation and usually occurs simultaneously except in situations where only the piping is cathodically protected. The inspector should evaluate cathodic protection systems in accordance with DEQ's Compliance Measures (Appendix G) and the "Guidelines for Underground Storage Tank Cathodic Protection Evaluation" (www.deq.virginia.gov/Portals/0/DEQ/Land/Tanks/06-2006.pdf) and complete the "Piping Corrosion Protection" section of the Inspection App for piping compliance evaluation.

[39] Functional elements are a component of submersible turbine pumps.

Cathodic Protection Test

For both galvanic and impressed current systems, the inspector should verify compliance with the following:

1) The cathodic protection system was tested within the past three years or within six months for newly installed systems,
2) The most recent cathodic protection test was conducted by a qualified cathodic protection tester, and
3) The most recent test was conducted properly, continuity was appropriate, and the system passed the test.

60-day Rectifier Checks

For impressed current cathodic protection systems the inspector should verify compliance with the following:

1) The rectifier is "on" at time of inspection. Most rectifiers have an on/off switch or a green or red light to indicate whether or not the rectifier is "on". Green/red light indicators can be burned out or purposefully mis-wired to indicate operation. A meter usually exists within the rectifier and should be checked.

2) Rectifier has been inspected by the tank owner every 60 days and the most recent log is provided.

3) Rectifier appears to be operating properly. For instance, if the rectifier is on, but the amps or voltage are reading "zero", the system may not be properly protected against corrosion. Output amps should be within 15% of last CP expert approved setting or owner should contact a CP expert for system evaluation.

If the cathodic protection test and/or the rectifier check record are omitted or it did not appear that an adequate inspection occurred, the inspector should indicate non-compliance. If the documents suggest the impressed current cathodic protection system is not operating properly (low amps, power out, high voltage, etc.), the inspector should indicate such by checking the appropriate non-compliance reason in the Inspection App and elaborating in the comments section.

12 Secondary Containment Requirements

On September 15, 2010[40] new Virginia UST Technical Regulations went into effect requiring:

- All tanks and/or piping installed on or after September 15, 2010 to be secondarily contained if installed within 1,000 feet of a public water supply or potable well.
- Under-dispenser containment (UDC) to be installed under any dispenser installed or replaced on or after September 10, 2010.
- Interstitial monitoring to be used as a method of tank and/or piping release detection for tank and/or piping systems installed on or after September 10, 2010.

Secondary Containment Fact Sheets for public distribution may be found at Appendix N .

12.1 Tank and Piping Secondary Containment Requirements

12.1.1 Scope

Virtually all new or replaced USTs (including newly installed emergency generator tanks) must have secondary containment because the majority of UST locations/stations will have a water distribution line or well onsite. Underground water supply piping is considered part of the community water system. If a water distribution line or onsite well is planned as part of a new UST facility installation, it is enough to trigger the new secondary containment requirements.

In order to install a single-walled tank after September 10, 2010, the tank owner must submit a detailed map showing the distance from the proposed UST to the closest existing community water system or existing potable drinking water well. If the distance to the water supply is greater than 1,000 feet but less than 2,000 feet, the map must be prepared and signed by a licensed professional surveyor.

If more than 50% of the UST product piping is being replaced, the entire pipe run must be replaced with secondarily contained (double-walled) piping. If 50% or less of product piping is removed and replaced, secondary containment is not required. It is the tank owner's responsibility to demonstrate that less than 50% of the piping was replaced.

Only the specific tank or piping run being installed or replaced must be double-walled or secondarily contained. In other words, if only one tank out of four is removed and replaced, secondary containment is not required on the three tanks that are not being replaced. Likewise, if only one piping run is being replaced and not the connected tank, only the replaced

[40] Secondary containment has been required for USTs containing hazardous substances since December 22, 1998.

piping needs to be double-walled or secondarily contained. Also, if new piping is connected to existing single-walled piping to reconfigure a piping run, the new piping must be secondarily contained, but the existing piping may remain single-walled. A transition sump may be used around the piping connections for interstitial monitoring of the new piping. The new piping must also be interstitially monitored for releases.

Secondary containment is not required when single-walled, temporarily closed UST systems are brought back into use since temporarily closed tanks have always been considered active tanks.

The requirement for UST secondary containment does <u>not</u> apply to:

- **Petroleum USTs that are not new or not replaced in a manifolded UST system when new tanks are added**. For example when you replace one of the manifolded tanks, the existing tank can remain single-walled.

- **Piping runs that are not new or not replaced on petroleum USTs with multiple piping runs.**

- **Safe or European suction piping** as described in Section 10.1.1 Safe Suction Piping.

- **Piping that manifolds two or more petroleum USTs together.**

- **Repairs meant to restore a petroleum UST, pipe, or dispenser to operating condition.** For this purpose, a repair is any activity that does not meet the definition of "replace" – see definition of “replace” in 9VAC25-580-10.

- **Other instances approved by the board where equivalent protection is provided.** Staff should consult with OSRR when “other instances” may exist.

12.1.2 Interstitial Monitoring

Interstitial monitoring (IM) is required for hazardous substance tanks/piping and all tanks/piping installed on or after September 15, 2010. Interstitial monitoring requirements are discussed in Section 7.7 Interstitial Monitoring and Section 9.3.5 Piping Interstitial Monitoring.

12.1.3 Design Standards

Secondary containment petroleum piping systems should be designed to meet a national standard such as UL971. Secondary containment designs that do not meet national standards are acceptable if a professional engineer certifies the design. Petroleum Equipment Institute’s Recommended Practice (PEI RP) 1200 (2012) contains additional information for sumps, sump testing, and other national standards requirements.

12.1.4 Under-Dispenser Containment (UDC)

12.1.4.1 **Scope**

- **<u>UDCs</u> are required anytime the piping (including connectors) under the motor fuel dispenser system is:**
  1. New (due to a dispenser upgrade, total piping replacement, or a completely new UST), <u>and</u>
  2. Required to have **secondary containment** (pressurized or valve-suction).

- **<u>UDCs</u> are not required when the motor fuel dispenser system is upgraded but the piping below it is not changed.**
  1. When the new system is **not required** to have secondary containment (safe-suction).

- **A "motor fuel dispenser system" means the motor fuel dispenser <u>and</u> the equipment necessary to connect the dispenser to the underground storage tank system.** The equipment necessary to connect the motor fuel dispenser to the underground storage tank system may include check valves, shear valves, unburied risers, flexible connectors, or other transitional components that are beneath the dispenser and connect the dispenser to the underground piping.

- **A motor fuel dispenser system is considered new when** (1) it is installed at a location where there previously was none or (2) an existing dispenser is removed and replaced with another dispenser and the pipe component equipment used to connect the dispenser to the UST system is replaced.

- **Replacing the piping connector as part of a dispenser replacement will usually trigger the requirement for under-dispenser containment at the UST system.** A dispenser replacement alone (without pipe or pipe connector change-out) does not trigger the requirement for under-dispenser containment.

12.1.4.2 **Design Standards**

Motor fuel under-dispenser containment must meet the following requirements:

- Liquid-tight on its sides, bottom, and at any penetrations;
- Compatible with the substance conveyed by the piping; and,
- Allow for visual inspection and access to the components in the containment system or be electronically monitored (i.e., sensors).

Dispenser "pans" are a common term for under-dispenser containment but any methods that achieve the same protections meet the regulatory requirement. When new dispenser pans are installed in conjunction with required secondarily contained piping, the interstitial monitoring requirements for piping must be considered in the design of the system. When new dispenser

pans are installed, they should be designed to allow the owner/operator to visually inspect or monitor by a sump sensor or other approved device.

12.1.5 Compliance Evaluation

During compliance inspections, inspectors should verify the following:

1) Correct secondary containment and under-dispenser containment were installed for installations/replacements conducted on or after September 15, 2010.

2) The facility is conducting interstitial monitoring for tanks and/or piping installed/replaced on or after September 15, 2010.

3) Secondary Containment equipment does not contain any cracks, holes, or other conduits for product to be released from at least four inches above any piping penetrations or sidewall seam. If the highest penetration or sidewall seam is less than four inches from the top of the sump, then there should be no cracks, holes, or other damage within one inch of the top (See PEI-RP1200). Any defects in the penetration boots, sump seams, cracks, or holes where product could be released must be repaired in accordance with industry standards.

12.1.5.1 **Inspection Examples**

Example 1 - Installation of a **completely new pressure or unsafe (U.S.) valve-suction piping run and dispenser.** Requires secondary containment for the piping, interstitial monitoring for the piping, a UDC, and UDC monitoring (if the UDC doesn't allow for visual inspection and access to the UDC components or the UDC must be monitored to provide interstitial monitoring for some of the piping). Piping is required to be interstitially monitored at least once every 30 days. If the piping is properly sloped to the STP sump, this would most likely be done at the STP sump via a sump sensor. The UDC is required to be monitored which can be done visually or electronically; however, if the pipe interstice or chase is open in the UDC and the piping slopes back to the STP sump, monitoring the STP sump would fulfill any monitoring requirement for the UDC. Compliance or noncompliance with this requirement should be noted in the Inspection APP.

Example 2 - **A dispenser change with new piping (piping connectors) under the dispenser but piping run not replaced.**
The new regulation requires a UDC be installed and be able to be visually inspected or be monitored (ex. sensors). Compliance or noncompliance with this requirement should be noted in the Inspection APP. If the piping is double-walled, the pipe interstice or chase is open in the UDC, and the piping slopes back to the STP sump, monitoring the STP sump fulfills the monitoring requirement for the UDC.

Example 3 - **A dispenser change with no new piping under the dispenser (below shear valve) and the piping run is not replaced**. – No UDC requirements and no UDC monitoring requirements.

13 Operator Training

Section 9VAC25-580-125 of the UST Technical Regulation effective September 15, 2010, requires UST owners and operators to identify and train certain classes of UST operators in critical tank operational compliance activities. Owners and operators must designate UST operators for each facility and ensure that each designated individual has the appropriate training. Each existing UST operator should have completed the required training **by August 8, 2012** and must complete retraining when found out of compliance with the UST Technical Regulation.

When a Class A or Class B Operator is replaced, the new operator must complete and document the initial training within **60 days** of assuming Class A and/or Class B Operator duties unless the new operator already holds a valid operator training certificate. In addition, owners and operators are required to maintain records documenting each operator's training certification.

DEQ will rely on qualified industry professionals to develop and provide training to designated UST operators and will review and approve training programs for use by designated UST operators. DEQ will accept training programs approved in another state as long as the program meets EPA's minimum grant guidelines for operator training. The tank owner and/or operator is responsible to pay any costs associated with their chosen UST Operator Training program.

Generally, tank owners/operators should:

- Designate Class A, Class B, and Class C Operators for each facility,
- Obtain UST Operator Training for all classes of operators,
- Keep on file the designation and Certificates of Training for each trained operator for DEQ staff review upon inspection,
- Conduct annual refresher training for all Class C operators, and
- Ensure the emergency notification procedures are stored in a known location at the facility or posted if the facility is unmanned.

Operator Training Fact Sheets for public distribution may be found at Appendix O.

13.1 Who Must Comply

Owners and operators of all "in use", regulated USTs are subject to the operator training requirements. The universe of regulated USTs includes tanks used for emergency generator purposes but does not include USTs otherwise excluded or deferred by the UST Technical Regulation. Owners and operators that do not possess **any** "in use" USTs, but possess USTs that are properly "temporarily closed" [41] **and** contain less than one inch of product, are not subject to the UST Operator Training requirements unless or until they bring the "temporarily closed" USTs back into use. Proper temporary closure requirements are discussed in Section 4 Temporary Closure.

Designated operators must complete an UST Operator Training program within **60 days** of bringing "temporarily closed" USTs back into use.

13.2 Classification and Designation of Operators

Each UST owner/operator must designate Class A, Class B, and Class C Operator(s) for each of their UST facilities. The following describe ways that operators should be designated:

- Class A, Class B, and Class C Operators should be individuals.
- The same individual may be designated as both the Class A and Class B Operator for a facility[42].
- Multiple or single individuals may be designated for each operator class.
- Third party contractors may be designated as operators for Class A, Class B, and/or Class C (for unmanned facilities). However, the entity designated should be an individual.
- The same individual or different individuals may be designated as Class A, Class B, and Class C Operators. It will be common to have the same individual designated as a Class A and Class B Operator.
- The same individual may be designated as a Class A, Class B, and/or Class C Operator for multiple facilities.

A "Designation of Class A, B, and C Operators Fact Sheet" may be found in Appendix O. The list of designated operators should contain the operator's class, operator's name, employer (if corporation), address, phone number, and e-mail address.

13.2.1 Class A Operators

Section 9VAC-25-580-125.A.1 of the UST Technical Regulation defines a Class A Operator as the following:

[41] The requirements for temporary closure can be found at Part VII (9 VAC 25-580-310 et seq.) of the Regulation.
[42] Class A Operators are usually tank owners and Class B Operators are usually tank operators. DEQ recognizes that in some situations the tank owner and operator may be the same individual or corporate representative.

…"Class A operator" means an operator who has primary responsibility to operate and maintain the underground storage tank system and facility. The Class A operator's responsibilities include managing resources and personnel, such as establishing work assignments, to achieve and maintain compliance with regulatory requirements. In general, Class A operators focus on the broader aspects of the underground storage tank statutory and regulatory requirements and standards necessary to properly operate and maintain the underground storage tank system and facility.

Class A Operators are usually tank owners or environmental managers and usually function at the highest level of regulatory compliance responsibility. Class A Operators should be the individuals that have ultimate responsibility for UST system compliance and respond to suspected and confirmed releases.

Typically, the registered UST owner or appropriate owner's representative should be designated as a Class A Operator. In the case of corporations and other similar entities, the owner's representative should have supervisory authority over the personnel managing the UST system(s) and some authority to designate finances for compliance with UST regulatory requirements.

Class A Operators typically ensure:

- Appropriate individuals are designated as Class A, Class B, and Class C Operators.
- Class B Operators are trained to properly operate and maintain the UST system(s).
- Class B Operators maintain appropriate UST system(s) compliance records.
- Class B and Class C Operators properly respond to emergencies such as spills or releases.
- Funding is available to meet the regulatory requirements for the UST system(s).
- Financial Responsibility requirements are met.

13.2.2 Class B Operators

Section 9VAC-25-580-125.A.2 of the UST Technical Regulation defines a Class B Operator as the following:

> *…"Class B operator" means an operator who implements applicable underground storage tank regulatory requirements and standards in the field or at the underground storage tank facility. A Class B operator oversees and implements the day-to-day aspects of operations, maintenance, and recordkeeping for the underground storage tanks at one or more facilities.*

Class B Operators are individuals who are usually UST operators, UST managers, environmental managers, facility managers, facility superintendents, lessees, or operation's managers. In general, a Class B Operator is responsible for the "nuts and bolts" of regulatory compliance. A Class B Operator is also responsible for the day-to-day operation of the USTs and maintaining the facility compliance records.

Class B Operators will typically be considered the facility "operators" as defined in 9VAC25-580-10. "Operator" is defined as "any person in control of, or having responsibility for, the daily operation of the UST system." When the individual(s) that are listed as Class B Operator(s) represent a corporation, DEQ will consider the corporation to be the UST "operator" for purposes of compliance and enforcement. UST owners and operators are jointly and severally liable for UST compliance with the regulation.

Class B Operators typically:

- Schedule the applicable required testing of the UST system(s).
- Schedule routine maintenance of the UST system(s).
- Periodically check the system(s) components to verify proper operation.
- Meet and correspond with DEQ staff regarding UST facility compliance inspections.

13.2.3 Class A and/or Class B Operator Responsibilities

The following may be performed by a Class A and/or Class B Operator:

- Class A and/or Class B Operators must maintain a list of designated Class A, Class B, and Class C Operators.
- At least one designated Class A or Class B Operator must be readily available and able to be onsite at the facility within a reasonable time to respond to suspected/confirmed releases, other unusual operating conditions, and equipment shut-offs or failures.
- Class A or Class B Operators must be available for immediate telephone consultation when a UST facility is in operation.
- Certified Class A and/or Class B Operators may train their Class C Operators.
- Class A and/or Class B Operators must maintain all operator training verifications for Class A, Class B, and Class C Operators.
- Class A and/or Class B Operators must maintain emergency response and notification procedures for Class C Operators.
- Class A and/or Class B Operators should ensure that their Class C Operators' training is refreshed annually.

13.2.4 Class C Operators

Section 9VAC-25-580-125.A.3 of the UST Technical Regulation defines a Class C Operator as the following:

> *…"Class C operator" means the person responsible for responding to alarms or other indications of emergencies caused by spills or releases from underground storage tank systems and equipment failures. A Class C operator generally is the first line of response to events indicating emergency conditions.*

Class C Operators are generally clerks or employees that control the dispensing or sale of fuel and are tasked with responding appropriately to tank-related emergencies. A certified and trained Class C Operator must be present when the facility is manned[43]and available within a reasonable amount of time when the facility is unmanned.

Manned and Unmanned facilities

A manned facility is a facility that usually has a person present who is able to observe and respond to emergency situations. Generally, unmanned facilities do not have any employees present on a regular basis and are usually considered "remote" sites. When allowed by local officials, some facilities may be unmanned during the night, but manned during the day. Sites

[43] Please note that it is possible for a facility to be "manned" at times and "unmanned" at other times. Examples include a convenience store that is not open 24 hours a day but sells fuel 24 hours, public works facilities, and VDOT fueling stations.

that are manned and unmanned must follow the requirements for both manned and unmanned facilities.

Examples of unmanned facilities include telecommunication and radio transmitter sites, sewage or water treatment pump stations, electric transformer sites, and remote fueling stations. Many facilities, such as hospitals, apartment complexes, and nursing homes that contain emergency generator tanks may be considered unmanned if the physical tank location does not typically contain employees.

Designating Operators for Multiple Facilities and Multi-State Facility Owners
Properly designating and training operators can be complex for tank owners with multiple facilities; however, tank owners have multiple options. Owners may choose to designate the same person as a Class A and Class B Operator at a facility or designate the same person as Class A and Class B Operator for multiple facilities. For example, an owner of three facilities could designate the same employee to act as Class A and B Operator for all three facilities. Conversely, an owner may designate more than one Class A, Class B, and/or Class C Operator per facility. In these cases, **all** designated operators must receive initial training.

13.3 UST Operator Training Requirements

Any person designated as a Class A, Class B, or Class C Operator must successfully complete the required training for the operator class which he/she is designated. If a person is designated as more than one class of operator, the individual must successfully complete training in each class for which the individual is designated.[44] The following discussion enumerates the generally required course content for each operator class.

13.3.1 Class A Operator Initial Training Requirements and Deadlines

Class A Operator training must include a general knowledge of UST system(s) requirements and compliance. At a minimum the Class A Operator Training program must contain information regarding the following:

a. Spill and overfill prevention;
b. Release detection and related reporting requirements;
c. Corrosion protection;
d. Emergency response;
e. Product and equipment compatibility;
f. Financial responsibility;

[44] Many training programs have combined Class A and Class B UST operator training into one program because Class A and Class B Operators will commonly be the same individual. Class C Operators will most likely be trained by certified Class A and Class B Operators as provided in the Regulation.

g. Notification and storage tank registration requirements;
h. Temporary and permanent closure requirements; and
i. Class B and Class C Operator training requirements.

All Class A Operators must complete an approved or approvable[45] training course. When a Class A Operator is replaced, the new operator must complete and document the initial training within **60 days** of assuming Class A Operator duties unless the new operator already holds an acceptable operator training certificate.

13.3.2 Class B Operator Initial Training Requirements and Deadlines

Class B Operator training must include an in depth understanding of the operational and maintenance aspects of UST systems and related regulatory requirements. At a minimum the training program must contain information regarding the following:

a. Spill and overfill prevention;
b. Release detection and related reporting requirements;
c. Corrosion protection and related testing;
d. Emergency response;
e. Product and equipment compatibility;
f. Reporting and recordkeeping requirements; and
g. Class C Operator training requirements.

All Class B Operators must complete an approved or approvable training course. When a Class B Operator is replaced, the new operator must complete and document the initial training within **60 days** of assuming Class B Operator duties unless the new operator already holds a valid operator training certificate.

Class A and Class B training may be combined into one course since Class A and Class B UST Operator Training requirements overlap. Also, Class A and Class B UST Operator Training may be focused on facility specific equipment. For example, a training program for a facility that contains only fiberglass USTs and poly-flexible product piping may not need to include cathodic protection and associated testing requirements.

13.3.3 Class C Operator Initial Training Requirements and Deadlines

At a minimum, the Class C Operator training must contain the following information:

a. Written instructions or procedures for responding to emergencies caused by spills, releases, and alarms;
b. Notification telephone list that includes names and telephone numbers of the appropriate authorities to contact in the event of UST system(s) emergency; and
c. Names and telephone numbers of the Class A and Class B Operators for the facility.

[45] An approvable program is one that meets the basic criteria of an acceptable training program but has not yet been approved by DEQ.

Class C Operators may be trained by a variety of sources and the training may be as simple as a review of the above items with the trainer. Most Class C Operators will be trained by certified Class A or Class B Operators[46]. A Class C Operator must complete training before assuming any duties. **Class C Operators must be briefed on the facility's emergency notification procedures every 12 months.**

13.3.4 Class A and Class B Operator Retraining Requirements

Beyond the initial training requirement, Class A and B Operators must successfully complete an approvable or approved training course again upon notification by DEQ. Initially, retraining will not be included in Requests for Compliance Action (RCA), Warning Letters (WLs), Notices of Violations (NOVs), Tank Compliance Agreements (TCAs), or Letters of Agreement (LOAs). Retraining will generally be required at the point that DEQ's enforcement division pursues a formal enforcement action for resolution of noncompliance[47]. Retraining should be included as a corrective action measure in an enforceable order (Consent Special Order or Unilateral Special Order). UST inspection staff should coordinate with the Enforcement Division to include the retraining requirement in an enforceable order. Operators for the facility must, at a minimum, complete retraining in the areas of noncompliance. UST Operator retraining will not be required if the UST noncompliance issues are resolved prior to issuance of an enforceable order. Once notified, Class A and Class B Operators must complete an approved Operator Training program within **90 days**.

Retraining should also be required if a tank owner or operator has been found in violation of applicable sections of the UST Technical Regulation through a delivery prohibition proceeding. In this case, staff should send a separate retraining request (Appendix P) to the tank owner/operator subsequent to the proceeding.

DEQ will verify compliance with the retraining requirement during the next scheduled inspection, regardless of the purpose of the inspection. If a designated operator fails to obtain Operator Retraining as required, then DEQ staff may issue an NOV and proceed with enforcement as usual. If a training provider has received Virginia approval for their initial training program, then they are not required to seek approval of the retraining program. Retraining programs that are approved in other states as meeting the minimum federal EPA UST Operator Training Grant Guidelines will be accepted via reciprocity.

[46] A Class A or Class B Operator Training Certificate will be accepted as Class C training verification in cases where the Class A or Class B Operator is also a designated Class C Operator.

[47] Retraining will not be required for operators when the only remaining noncompliance issues are: financial responsibility, release investigation, release response, or corrective action.

13.4 Documentation Requirements

Tank owners/operators must maintain a written record of (1) class designation and (2) successful completion of training for each individual operator. The required designation and training documentation should include the following information:

1. Legal name of each operator,
2. Class of operation (Class A, Class B, and/or Class C),
3. Date of successful completion of training (initial and refresher, if applicable),
4. Telephone numbers for the Class A and/or Class B Operators that are not permanently onsite or assigned to more than one facility, and,
5. Certificate of Training for each trained operator. The name of the trainer, operator class, and the date of training should be provided in the documentation for Class C Operators.

An "Underground Storage Tank (UST) Operator Class Designation Form – Single Facilities" (Appendix O) may be used to document the designation of operators. Other forms of documentation are acceptable and may be necessary for facilities with multiple Class A, Class B, and Class C Operators.

The required documentation for each operator should be kept onsite and immediately available to demonstrate compliance for manned UST facilities and readily available for unmanned facilities. The operator designation and training certification documentation must be kept on file as long as each operator serves in that capacity at the facility or three years, whichever is longer. When a different or new operator is designated, the operator designation record should be amended as soon as possible but no later than **30 days** after designation.

In addition to operator designation and training certification records, certain emergency notification information must be maintained at manned UST facilities and posted in a conspicuous location at unmanned facilities. In many cases, the emergency notification procedures may simply be a telephone call list and general procedures to safely secure a spill area and shut off pumps, if necessary. The posted notification procedures should contain the Class C Operator(s) and owner contact information, including names and telephone numbers, and any emergency information. It is also acceptable to simply post the owner's name or title, emergency procedures, and a telephone number for a central location such as a call center or particular 24 hour hotline. In this case, the answering location must have the Class C Operator(s) and owner contact information, including names and telephone numbers, and any additional emergency information.

13.5 UST Operator Training Programs

13.5.1 UST Operator Training Program Approval

DEQ has ultimate approval authority over any UST Operator Training program offered in Virginia. The agency accepts many forms of UST Operator Training such as web-based,

classroom, hands-on, and in-house training programs. Class A and Class B UST Operator Training programs, that are not another state's program, must obtain approval from DEQ for their Virginia-specific training programs, either in advance or retroactively. Class A and Class B training providers that have received UST Operator Training program approval from another state must submit the information discussed in the "UST Operator Training Program Approval Procedures" (Appendix O) to DEQ for review and approval. A Class C Operator Training program does not need to be submitted to DEQ for approval[48].

Prior approval of a UST Operator Training program is not required to implement training, but is recommended. Designated operators must demonstrate to DEQ that they have completed a UST Operator Training course that meets Virginia's regulatory requirements. Therefore, designated operators who attend a training program that has not been approved by DEQ run the risk of having their training certification rejected if DEQ declines to approve the training program. If a designated operator submits certification for completion of a training course that has not been formally approved by DEQ, DEQ will contact the training provider to request the training provider to submit documentation for approval. The deadline for the training provider to submit the necessary documentation is **30 days**. Failure to submit UST Operator Training program approval documentation within 30 days of DEQ's request may invalidate any training certificates issued by that training provider.

Class A and Class B training program review, approval, and verification is the responsibility of the DEQ UST Compliance Coordinator.[49] Each training provider that seeks program approval must submit complete, accurate and up-to-date course material for review. [50] The UST Compliance Coordinator may perform only a general review of the course and testing material, and may request to attend and evaluate any training course at any time for approval and/or approval retention.

DEQ's UST Compliance Coordinator issues approval notification to the training provider contact via electronic mail. Training program approval will remain valid unless a revocation is issued by DEQ upon discovery that the training program does not meet regulatory requirements. Training providers are not required to submit spelling and/or format changes to an Operator Training program to DEQ for approval. However, if information is modified, added, or removed from the training program, the training program should be re-submitted to the DEQ UST

[48] Class C training may be provided by a certified Class A and/or Class B Operator, thus, no DEQ approval is required for Class C courses.

[49] If DEQ staff have concerns related to particular training programs, they should contact the UST Operator Training Coordinator for resolution and compliance verification.

[50] UST Class A and Class B Operator Training program approval is further discussed in Chapter 1Appendix O - Operator Training Fact Sheets.

Compliance Coordinator for review and possibly re-approval. DEQ maintains a list of approved Class A and Class B UST Operator Training programs for the general public on DEQ's petroleum programs website located at http://www.deq.virginia.gov/Portals/0/DEQ/Land/Tanks/atproviders.pdf. DEQ's UST Compliance Coordinator maintains the "UST Operator Training Provider" database and ensures that the website is regularly updated.

13.5.2 Successful Completion of UST Operator Training Course

Class A and Class B Operators must demonstrate to DEQ that they have successfully completed an approved Operator Training course through (1) a passing score on an examination or (2) practical hands-on application of material presented in the training course. Class A and Class B Operators must score 80% or better on the examination to pass the test. For hands-on training, Class A and B Operators must demonstrate to the trainer's satisfaction a hands-on knowledge of operation and maintenance checks of UST equipment, including performance of release detection at the UST facility. Successful completion of an Operator Training course must be documented through a training certificate. Class A and Class B Certificates of UST Operator Training should include the following information:

1. Legal First and Last Name of the designated operator,
2. Class of operation (Class A and/or Class B),
3. Date of training completion , and
4. Training provider's name, company, address, and telephone number.

13.6 DEQ Verification of Operator Training Compliance

DEQ verifies compliance with operator training requirements during routine UST facility compliance inspections. At the time of the inspection, the tank owner/operator must provide the DEQ inspector with documentation of the operator class designation and training certifications for each inspected facility.

Verification of UST Operator Designation

DEQ inspection staff verifies that at least one person for each operator class (A, B, and C) exists and that the documentation is current with respect to personnel.[51] The DEQ inspector should indicate in the Inspection App if the facility owner has not designated their Class A, Class B, and Class C Operators. The inspector should record the designated Class B operator's contact information in the facility contact field on the "Tank Owner Summary" page of the Inspection App. If more than one person is designated as the Class B operator, then the inspector should record the additional persons in the comments field of the Inspection App.

Verification of UST Operator Training

[51] Generally, DEQ will rely on the tank owner's class designations. However, if it is clear that the operators are designated improperly or the inspector has a concern with the designation, DEQ staff should consult the UST Operator Training Coordinator.

DEQ inspection staff verifies successful completion of an approved UST Operator Training course by reviewing the training certificates for each designated Class A and Class B Operator. DEQ staff should indicate in the Inspection App if training certificates for each designated Class A and Class B Operator do not exist, and, optionally, the name, address, and telephone number of the training provider. Usually, a Class C Operator will not have a training certificate; therefore, a written record of the Class C Operators name, date trained, trainer's name, and trainer's operator class designation will be sufficient documentation. This documentation may be part of another training record such as new employee orientation, OSHA training, safety training, etc. DEQ staff should indicate on the Inspection Report that documentation of Class C Operator training exists.

Upon return to the office, the inspector should verify that the training provider or the in-house training program is listed in the "UST Operator Training Provider Database "[52] as an approved operator trainer for Class A and/or Class B training. If the training provider is not listed in the UST Operator Training Provider Database, then the inspector should notify the UST Compliance Coordinator via e-mail within **15 days** of the date of the inspection so that the coordinator may obtain the information for program approval from the provider. The inspector should provide the UST Compliance Coordinator with the name, address, and telephone number of the training provider. Upon notification from the DEQ inspection staff, the UST Compliance Coordinator will request the training provider to submit the necessary information to obtain training program approval and impose a submission deadline of **30 days**. The DEQ inspector will be copied on the correspondence. The UST Compliance Coordinator will promptly update the UST Operator Training Provider Database upon approval of the training program in question and send an e-mail to the inspector informing them of program approval.

If the training provider does not submit the necessary information to DEQ's UST Compliance Coordinator within 30 days, the Training Coordinator will notify the tank owner/operator in writing and request the owner/operator to obtain UST Operator Training from an approved program within 60 days of the date of the letter. The DEQ inspector will verify that the designated operator(s) completed an approved course during the next routine inspection. If the tank owner has not obtained training by an approved provider by the next routine inspection, then the inspector should address the failure to obtain approved UST Operator Training.

Verification of Class C Emergency Notification Procedures

DEQ inspection staff also verifies that the written emergency notification procedures are available at the site for manned facilities or posted in a conspicuous location at the facility for unmanned facilities. For manned UST facilities, the DEQ inspector verifies that at least one Class C Operator is present at the facility. For unmanned facilities, DEQ staff verifies that the emergency response procedures are posted in an obvious and visually accessible location, such as the dispenser island.

[52] The "UST Operator Training Provider Database" must be used instead of the DEQ website list of approved trainers because the website list will not include in-house training programs.

14 Registration

The inspector must conduct a review of the registration records of the facility to determine if the current registration data is correct. The inspector should refer to Volume II of this manual for registration/notification requirements for USTs. UST Registration information is stored in CEDS and available for review in the Inspection App. The inspector should review the registration information with the site contact during the inspection to ensure correctness.

If any registration information is incorrect, the inspector should attempt to obtain a signed and revised Notification for Underground Storage Tanks Form 7530 during the facility inspection by the owner or the owner's authorized representative. If the inspector is unable to obtain a new Notification for Underground Storage Tanks Form 7530 Form during the inspection, they should indicate in the Inspection App that noncompliance issues exist for "Registration" and identify any reasons for noncompliance. The inspector should also amend the incorrect information in the Inspection App following the instructions in the UST Inspection Application User's Manual (Appendix E).

15 Financial Responsibility (FR)

The Office of Financial Responsibility and Data Management (OFRDM) is primarily responsible for compliance and enforcement of the requirements of 9 VAC 25-590, known as the Virginia Petroleum Underground Storage Tank Financial Responsibility Requirements Regulation. Inspectors no longer need to request information from owners and/or operators regarding FR. In addition, inspectors and regional offices no longer track FR for compliance or initiate enforcement proceedings for FR violations. All FR compliance, tracking, and enforcement are conducted by OFRDM.

An explanation of issues regarding FR and temporary closure may be found in Section 4.

16 Suspected Releases

When a release occurs from an UST, the owner and/or operator of the tank is required to report the release to one or more governmental agencies. Release reporting requirements and identification of suspected releases are dependent upon the nature of the release. Section 2.0, Release Reporting Requirements of The Storage Tank Program Technical Manual provides staff with regulatory requirements and programmatic procedures for dealing with release reports.

Additionally, Section 2 of The Storage Tank Program Technical Manual, describes how to identify suspected releases during compliance inspections. If the inspector identifies a suspected release from the UST system, they should note such in the applicable comment fields on the Inspection App and inform the appropriate remediation staff. Failure to report a suspected release when required may be treated as non-compliance.

17 Site Visits

17.1 Purpose

The purpose of a site visit is to assess a facility's compliance status outside of a formal inspection or conduct outreach to members of the regulated community. For example, site visits may be conducted before or after imposition of Delivery Prohibition proceedings or any time at the request of enforcement staff. Because the activities normally performed during site visits may be completed quickly, site visits provide a method for visually verifying certain compliance items; encouraging and assisting with regulatory compliance; and educating a large segment of the regulated community within a short time. Site visits may be used to:

a. Verify return to compliance items subsequent to a formal inspection;
b. Conduct an on-site informal enforcement meeting;
c. Introduce DEQ to a new facility owner/operator;
d. Perform a summary review of the facility to determine whether the facility is registered correctly, verify the tank information listed on the Form Notification for Underground Storage Tanks Form 7530, and/or assist with facility registration;
e. Provide educational literature to and discuss program requirements with a new facility owner/operator;
f. Perform visual verification of the information the facility personnel provides (checking for spill, overfill, corrosion protection and release detection);
g. Discuss with the facility personnel and/or the owner/operator return to compliance options;
h. Conduct an inspection follow-up within 3 to 6 months after attaching delivery prohibition red tags on operating facilities as indicated in Volume IV of the PST Compliance Manual; and/or
i. Conduct an inspection follow-up within 6 to 12 months following the removal of delivery prohibition red tags as indicated in Volume IV of the PST Compliance Manual, or
j. Assess status of non-compliant issues prior to initiating adversarial enforcement action.

18 Local Official Inspections

18.1.1 Background

The UST Technical Regulation requires owners and operators to obtain a Certificate of Use issued in accordance with the Virginia Uniform Statewide Building Code (USBC) prior to using USTs[53]. The certificate of use is generally issued, prior to installation, as a "building permit" from the local building and/or fire officials.

[53] The Department of General Services (DGS) functions as the building official for state owned facilities. In some cases, such as with VDOT, DGS has further delegated the authority to the state agency.

The USBC section on flammable and combustible liquids (Va. Code §36-99.6) indicates that the UST Technical Regulation is adopted and incorporated by reference to be an enforceable part of the USBC.

18.1.2 Installation Inspections

Typically, the local building and/or fire officials will conduct inspections of the UST system at time of installation since the local officials issue Certificates of Use or building permits for UST installation. Local official inspections conducted at installation are considered "formal" inspections, but will be indicated in CEDS as "Local Official Inspection", as indicated in Section 3.2.2. Typically, DEQ staff will conduct a UST Formal Inspection within 3 years after the initial local official inspection. However, DEQ staff may conduct UST Formal Inspections at installation, or anytime thereafter, in addition to the "Local Official Inspection", if time permits.

If the DEQ inspector notes during a UST Formal Inspection that required equipment for a tank and/or piping is present but is incorrectly maintained, operated, or installed, the inspector should make a note to that effect in the applicable comments section of the Inspection App. Incorrect maintenance, operation, or installation will result in noncompliance for the equipment in question even if there is not a corresponding reason for noncompliance in the Inspection App.

18.1.3 Local Code Related Laws and Regulations

The USBC section on flammable and combustible liquids indicates that if there are conflicts between the building/fire code provisions and the incorporated State Water Control Board Regulations (SWCB) regulations (UST Technical Regulation) the SWCB provisions shall apply. Key differences in the two regulations are discussed in the Virginia Building and Fire Code Related Laws Package (March 2014).

In some cases, determining whether the building, fire, or UST Technical regulations apply can be complex.
RO staff should contact OSRR staff for assistance in cases where overlapping regulatory situations need assessment. DEQ staff may need to coordinate with the Department of Housing and Community Development (DHCD) staff to determine the appropriate regulatory requirements. DEQ staff should work with the local officials to ensure that any environmental, human health and safety concerns are addressed appropriately.

19 Closure Inspections

A closure inspection is an on-site review of the tank closure process or end result to verify compliance with permanent closure requirements[54]. An example of a closure inspection is attending a tank closure/removal to determine if there has been a product release. Closure

[54] UST closure inspections should not be conducted on temporarily out of use tanks since they are considered active tanks and may be brought back into use. Rather, formal inspections should be conducted on temporarily out of use tanks.

inspections may also occur when an inspector visits a facility with the intent of conducting a Formal Inspection, but finds that the tanks have been removed or closed in place. Because UST closure compliance may be verified via records demonstration, UST closure inspections are not required and may be conducted at the discretion of Regional Office Management.

19.1.1 Purpose

Inspectors may use closure inspections to accomplish a number of tasks:

1) Verify tank closure has occurred;
2) Evaluate if the tank may have leaked;
3) Resolve registration discrepancies;
4) Ensure new tanks have not been installed without DEQ notification; or
5) Assist in closure review process such as determining risks, structure locations, or soil sample locations.

19.1.2 Documentation

The Inspection App was not designed for UST Closure Inspections and should not be used for closed tanks. Instead, the inspector should create an inspection log, memo, or narrative, containing the following information, and place it into ECM as an inspection report:

1. **Tank owner name, address, and phone number.** This information may be determined from CEDS, ECM, or interviewing the site contact. If the tank owner is unknown, the inspector should attempt to determine the landowner information.

2. **Tank information including numbers (closed and active), capacity, contents, and material of construction.** If the closed tanks were registered, the information used in STORMS should also be used on the inspection report to avoid confusion concerning which tanks were closed.

3. **The date the tank(s) was closed or was taken out of service to the extent such information is known**.

4. **Any additional pertinent facility information.**

The inspector should ensure that the tank closure was performed in accordance with the closure requirements discussed in the Volume II of this manual..

20 Post-Inspection Procedures

20.1 Inspection Report Review & Addressing Non-Compliance

Upon returning to the office, the inspector should sync the mobile device to CEDS to transfer the inspection data using the instructions located in the UST Inspection Application – User's Manual (Appendix E).

After any type of inspection, the inspector should review the inspection report to determine if any follow up with the facility owner, operator, and/or landowner is necessary. Additionally, the inspector should ensure that the information from the Inspection App transferred to CEDS properly and amend any information, if necessary. Once the Inspection Report is finalized, the inspector or other designated regional office staff should insert the Inspection Report into ECM.

If the inspector identifies any **inspection deficiencies that could warrant expedited delivery prohibition,** based on the criteria in Appendix C of Volume IV , the inspector should immediately notify his/her supervisor.

The inspector should follow-up with the tank owner, operator and/or landowner where regulatory non-compliance exists. The inspector should follow the guidance set out in Volume IV of this manual to address identified compliance problems.

21 Regulatory Interpretations

21.1 Regulatory Decision Tree for USTs

In general, answering the questions below in the sequence they are presented will assist in establishing whether or not the DEQ UST Technical Regulation applies to a given tank, and the extent to which the tank is regulated. Additionally, the UST and AST Regulatory Information and Release Matrix (Appendix AD) of the Storage Tank Program Technical Manual may be consulted.

Important Note: To determine whether or not a UST is subject to the regulation, this section must be read in its entirety, starting at the beginning and continuing until reaching a STOP point. No question can be answered without completing all questions that precede it, in the order in which they are presented.

1. **Is the device a tank? Meaning is it a "stationary device designed to contain an accumulation of regulated substances and constructed of non-earthen materials (e.g., concrete, steel, plastic) that provide structural support?"**

   A pit, pond, lagoon, surface impoundment, topographic depression, excavation, or diked area made, or made primarily, of earthen materials would not be considered a

tank. An earthen structure lined with man-made material that provides no structural support also would not be considered a tank.

If the answer is "NO," then STOP HERE. The object is not considered a tank. There are no applicable regulatory requirements under the UST Technical Regulation.

2. Is the tank an underground tank? Specifically, is/was 10% or more of the volume of the tank (or the volume of all tanks in combination), including the volume of the connected underground piping, below the surface of the ground?

Tank systems (tank and associated piping) located on or above the floor in an "underground area" (basement, tunnel, drift, etc.) with enough space for physical inspection of the tank exterior are not considered to be underground tanks. (See Exemption #9 in the definition of a UST in Article 9 of the State Water Control Law (SWCL).)

Unless the owner/operator can produce reliable documentation which demonstrates contrary volumes/percentages, DEQ assumes that a tank system is a UST if it appears to the inspector that the underground portion of the tank equals or exceeds 10%.

When ASTs and USTs are connected, the "valve rule" applies to differentiate between the UST and AST systems. The “valve” separates the UST from the AST. The UST system components include the UST and any underground piping and ancillary equipment up to the first valve. Any system components occurring after the first valve in the system are considered to be part of the aboveground storage tank system.

If the answer is "NO," then STOP HERE. This is not an underground storage tank. There are no applicable regulatory requirements under the UST Technical Regulation. (Refer to AST regulatory requirements.)

3. Does the underground tank contain a "regulated substance?"

The term "regulated substance" is defined in Section 62.1-44.34:8 of Article 9 of the SWCL to mean any one or a combination of the following:

a) A substance listed in §101(14) of CERCLA (42 USC § 9601 et seq.)
This list is available on the Web at: EPA List of Hazardous Substances and Reportable Quantities .

b) Petroleum, including crude oil or any fraction thereof, that is liquid at standard conditions of temperature and pressure (60 degrees F and 14.7 pounds per square inch absolute), and

c) Petroleum-based substances comprised of a complex blend of hydrocarbons derived from crude oil through a process of separation, conversion, upgrading, and finishing, such as motor fuels, jet fuels, distillate fuel oils, residual fuel oils, lubricants, petroleum solvents, and used oils.

Note: Pure (100%) biodiesel is not usually a regulated substance when it is comprised of 100% vegetable oil. However, most USTs storing biodiesel are regulated because the biodiesel is cut with diesel fuel and therefore contains a petroleum product.

If the answer is "NO," then STOP HERE. There are no applicable regulatory requirements under the UST Technical Regulation.

4. Is the underground tank one of the types that was specifically not included in the SWCL definition of a UST and excluded from the regulations promulgated under Article 9 of the SWCL?

Types of tanks or structures, which are not included in the definition of a UST, are:

- A farm or residential tank of 1,100 gallons or less capacity used for storing motor fuel for noncommercial purposes.
- A tank used for storing heating oil for consumption on the premises where stored.
- A septic tank (as defined in the regulation).
- A regulated pipeline facility (including gathering lines) which is regulated under the Natural Gas Pipeline Safety Act of 1968 (49 USC App. 1671 et seq.) or the Hazardous Liquid Pipeline Safety Act of 1979 (49 USC App. 2001 et seq.) (for interstate pipelines) , or comparable state laws(for intrastate pipelines) .
- A surface impoundment, pit, pond, or lagoon.
- A stormwater collection system defined in the regulation as a system which transports the flow of surface water run-off resulting from precipitation to and from a retention area or any areas where treatment

is designated to occur. Stormwater treatment systems are not stormwater collection systems.

- A wastewater collection system, defined in the regulation as a system which transports domestic, commercial, or industrial wastewater to and from retention areas or any areas where treatment is designated to occur. Wastewater treatment systems are not wastewater collection systems and are addressed later, in question 6.

- A flow-through process tank (as defined in the regulation).

- A liquid trap or gathering line which is directly related to oil or gas production and gathering operations.

- A tank situated in an underground area such as a basement, cellar, mineworking, drift, shaft, or tunnel if ...situated on or above the floor.

The term “underground storage tank” or “UST” does not include any pipes connected to any tank described in this section.

If the answer is "YES," then STOP HERE. The tank is an "Exempt UST." There are no applicable regulatory requirements under the UST Technical Regulation.

5. **Is the tank one of the following types of UST systems that is specifically "excluded" from the UST Technical Regulation's requirements by 9VAC25-580-20?**

   - **An UST system being regulated by the DEQ's Hazardous Waste Program because it contains hazardous wastes (i.e., substances listed or identified under Subtitle C of the Solid Waste Disposal Act (33 USC §1251 et seq.)**

   UST systems containing hazardous wastes listed or identified under Subtitle C of the Solid Waste Disposal Act are excluded from the statutory requirements of Article 9 and the regulatory requirements of 9 VAC 25-580-10 et seq. (see 9VAC25-580-20.B.1). These tanks are, however, regulated under RCRA Subtitle C.

   Important Note: If in doubt, contact the DEQ Hazardous Waste Program. Even in cases where the stored substance is a mixture of a RCRA Subtitle I substance (i.e., petroleum or a CERCLA listed substance) combined with only trace amounts of a RCRA Subtitle C substance, the tank may be regulated as a RCRA Subtitle C hazardous waste tank.

- **A wastewater treatment tank system that is part of a wastewater treatment facility regulated under §402 or §307(b) (i.e., VPDES and pre-treatment permits) of the Clean Water Act.**

- **An [item of] equipment or machinery that contains regulated substances for operational purposes (e.g., hydraulic lift tanks, electrical equipment tanks, etc.)**

- **An UST system that has a capacity of 110 gallons or less.**

- **Any UST which contains a de minimis (as that term is used in the preamble of 40 CFR 280, (53 Fed. Reg. 37108-37109) amount of regulated substances. This explanation incorporates consideration of tank size, containment time, amount, product concentration, and quantity of "regulated substance(s)".**

- **Any emergency spill or overflow containment UST system that is expeditiously emptied after use.**

A discussion of each of the regulatory exclusions may be found in EPA's Preamble of 40 CFR 280.

If the answer is "YES," then STOP HERE. There are no applicable regulatory requirements under the UST Technical Regulation.

6. Is the tank one of the following types of "deferred" tanks?

- A wastewater treatment tank system [that is not regulated by the Clean Water Act §§402 or 307b]

- An UST system containing radioactive material that is regulated under the Atomic Energy Act of 1954 (42 USC 2011 et seq.)

- UST system that is part of an emergency generator system at a nuclear power generation facility regulated by the Nuclear Regulatory Commission under 10 CFR 50, Appendix A.

- An airport hydrant fuel distribution system[55]

- UST system with field-constructed tanks[56]

[55] Certain airport hydrant fuel distribution systems will no longer be partially deferred from the regulation when the current Virginia regulations are amended to be at least as stringent as the federal regulations that became effective October 13, 2015.

If the answer is "YES," then STOP HERE. This type of UST is a "Deferred UST" which is "partially regulated" by the VA UST Technical Regulation. It must comply with Part I (interim prohibition) and Part VI (Release Response and Corrective Action) of the 9 VAC 25-580 requirements --- Release Response and Corrective Action --- but is not required to comply with Parts II, III, IV, V, VII and IX.

7. Does the UST store fuel, which is only used by an emergency power generator(s)?

If the answer is "YES," then STOP HERE. The tank is an "emergency generator" tank. It must comply with all of the requirements in Parts II, III, V, VI, VII and IX of the VA UST Technical Regulation, but is deferred from the requirements of Part IV - Release Detection if it was installed before September 15, 2010. If the "emergency generator" tank was installed on or after September 15, 2010, then the tank is fully regulated and Part IV-Release Detection is applicable.

If you have answered all the preceding questions and arrived at this point (i.e., If the answer to question #8 was "NO"), then the tank must comply with all of the requirements in Parts I, II, III, IV, V, VI, and VII of the VA UST Technical Regulation.

21.2 "Regulated Substance" Interpretations by DEQ

Congress, EPA, the General Assembly, and DEQ all recognize that even the best statutory/regulatory language is subject to some interpretation. As the "Implementing Agency" for the UST Technical Regulation, DEQ must make interpretations related to USTs. To do so, DEQ relies primarily on the collective common sense and professional judgment of its Regional Office and Central Office Petroleum Program staffs, and also on EPA staff, the Preamble to the Federal UST Regulation, and previously published EPA interpretations.

[56] Field constructed tanks will no longer be partially deferred from the regulation when the current Virginia regulations are amended to be at least as stringent as the federal regulations that will become effective October 2015.

Products that have been determined by the DEQ Tank Program to be "petroleum based substances" (therefore regulated) include:

- Varsol (also called "mineral spirits" or "petroleum solvents")
- Paraffin
- Naphtha, and
- E85, E15, B100 with diesel added

There are many substances that are neither petroleum nor CERCLA listed, and thus are unregulated at this time such as Propylene Glycol (a product used for airliner deicing).

21.3 “Use” Interpretations

DEQ often must interpret the applicability of the UST regulations because of questions posed by the use of a particular tank. Tank use determinations made by DEQ are described in the following paragraphs.

21.3.1 Airport Hydrant Fueling Systems (AHFS)

AHFSs are used at many large metropolitan airports and some military bases. AHFSs are typically large piping systems that supply vast quantities of fuel to airport terminals. Where the storage of fuel is in USTs, the AHFSs are regulated as USTs that are deferred from UST technical requirements (Parts II, III, IV, V and VII of 9 VAC 25-580-10 et seq.). Such AHFSs are subject to UST release response and corrective action requirements (Part VI of 9 VAC 25-580-10 et seq.). Where the storage of fuel is in ASTs and the entire system is less than 10% underground, the AHFSs are regulated as ASTs under the Facility and Aboveground Storage Tank Regulation, 9 VAC 25-91-10 et seq.

The federal regulation was amended and was effective October 2015 to remove the deferral for AHFSs. The state regulation will be amended accordingly.

21.3.2 "Dual Use" or "Multiple Use" USTs

Many USTs contain fuel that is used for multiple purposes. In such cases, the use with the most restrictive (environmentally protective) regulatory standard is the use that governs. A tank used for both regulated and unregulated purposes is therefore considered a regulated UST, and a tank used for a partially regulated purpose and a fully regulated purpose would be considered fully regulated.

Exception to “Dual Use” Policy

The dual use policy is not applicable when one of the UST uses is to store a product defined as “heating oil” for consumptive use on the premises where stored. In these cases, DEQ will defer to the “Heating Oil” Policy described in Section 22.3.10 "Heating Oil" USTs.

21.3.3 “De minimis”

Any UST that contains a de minimis concentration of regulated substances is excluded from the requirements of the UST Technical Regulation, pursuant to 9VAC25-580-20(B)(5). In general, de minimis has been interpreted to mean “virtually none.”

Per the EPA, this exclusion addresses “[a]ny UST system that contains a *de minimis* concentration of regulated substances”. EPA has not provided a percentage threshold as a cut off. Examples given in the preamble to the EPA regulation include substances with very small concentrations, such as chlorine in drinking water and swimming pools (generally a few parts per million). The de minimis tank exclusion is not intended to cover tanks that contain diluted gasoline or contaminated water. Rather, it is specifically, and appropriately, intended to narrow the statutory definition of an UST, which is so broad that it otherwise would include in-ground swimming pools filled with chlorine-treated water.

Diesel Exhaust Fluid (DEF)

In general, DEQ does not regulate USTs containing DEF because EPA has determined that DEF is not a regulated substance and contains *de minimis* concentrations of ammonia. The international standard for DEF allows no more than 0.2 percent by weight of alkalinity, measured as ammonia (CERCLA-listed), to be present in solution. Manufacturers indicate that the actual amount of ammonia in solution should be much less than 0.2 percent, and ideally there should be no ammonia in solution.

Implementing agencies should use the examples given in the preamble as a guide to determine whether USTs storing other fuel blends qualify for the *de minimis* concentration exclusion.

21.3.4 USTs Containing E85

E85 is an ethanol/gasoline fuel mixture that contains approximately 85% ethanol and 15% gasoline. Questions have been raised to DEQ regarding the regulatory status of USTs containing E85. 100%, non-denatured ethanol is not a regulated substance. Gasoline is a petroleum product and, therefore, is a regulated substance. Consequently, an UST containing E85 is storing an accumulation of regulated substances and, therefore, is an UST subject to the requirements of the UST Technical Regulation. The petroleum part of E85 is much greater than the examples of de minimis concentrations discussed in the preamble to the Federal UST regulation and an UST containing E85 does not qualify for the de minimis exclusion.

21.3.5 "Spill Containment" USTs

Many facilities have USTs that are used to contain petroleum product spills, which occur during the loading and unloading of ASTs or vehicles. These "spill containment" tanks often are not emptied until they have nearly reached their oil storage capacity. If a spill containment tank is not emptied "expeditiously" (within 24 hours of each spill) then the tank is fully regulated.

21.3.6 "Farm Use Motor Fuel" Interpretations for USTs

A "farm use motor fuel" UST having a capacity of 1,100 gallons or less is exempt from the requirements of the UST Technical Regulation.

"Farm use motor fuel USTs" must be both:
1) Located on a farm, and
2) Contain motor fuel[57] solely for use by the farm (not resold to another entity).

Exception: USTs that are located on farms but owned by an oil jobber or other commercial entity are fully regulated since they are commercial tanks.

Use by the farm is assumed by DEQ for motor fuel used in: vehicles titled/licensed in the name of the farm, vehicles licensed by DMV as farm-use vehicles, motorized equipment used in crop or animal production.

In some instances, tanks may be located on sites having some agricultural or farming component, however, another land use is dominant at that site. Examples of this are state correctional facilities (state farms) and state university agricultural research facilities. The primary purpose of state correctional facilities is to incarcerate criminals, not produce agricultural products. Likewise, state university agricultural research facilities are primarily institutions of higher education and research, not farming operations.

When DEQ encounters a dual use where a tank owner uses the fuel tank for farming operations and for another type of commercial activity, the IRS business category of the facility is used to determine if the tank is subject to the requirements of the UST Technical Regulation. True farming operations utilize the IRS's Schedule F (farms) for reporting income. Business entities other than farms use Schedule C (sole proprietorships) or other schedules for reporting income. The IRS schedule used to report the use of the tank will be used by DEQ to evaluate whether the tank is exempt from the requirements of the UST Technical Regulation.

Any doubts about a location's qualification as a farm often can be resolved by asking for the tank owner's latest tax forms which were filed with the Internal Revenue Service (IRS). Farm income is reported on Schedule F. If the tank owner used a Schedule F to report income from the operation, then the operation is considered a farm by DEQ. In accordance with the preamble to the UST regulations (40 CFR 280), farms can be orchards, Christmas tree farms, greenhouses (nurseries with growing operations; not nurseries in retail stores), and fish farms.

The EPA Preamble states that a farm does not include laboratories where animals are raised, land used to grow timber, and pesticide aviation operations. Moreover, this definition does not include retail stores or garden centers where the product of nursery farms is marketed, but not

[57] "Motor fuel" means petroleum or a petroleum-based substance that is motor gasoline, aviation gasoline, No. 1 or No. 2 diesel fuel, or any grade of gasohol, and is typically used in the operation of a motor engine. This definition applies to blended petroleum motor fuels such as biodiesel and ethanol blends that contain more than a de minimis amount of petroleum or petroleum-based substance.

produced. A livestock exchange is not a farm since it is a place where livestock is solely marketed, but not raised. Golf courses and other recreational facilities are not farms.

21.3.7 "Residential Use Motor Fuel" Interpretations for USTs

Tanks with a capacity of 1,100 gallons or less which contain motor fuel for residential use are exempt from the requirements of the UST Technical Regulation. Typically, these are tanks containing fuel for use in private automobiles, lawn equipment, recreational vehicles, and equipment, etc.

"Residential use" applies only to tanks that are located at one and two family dwelling units. This interpretation is consistent with the Virginia Statewide Fire Prevention Code. Tanks located at apartments, condominiums, hotels, and retirement communities have been determined by EPA to be regulated. Furthermore, EPA guidance indicates that tanks located at prisons, hotels and camps are regulated.

Tanks located at military bases, colleges, and universities, however, have been determined by EPA to be regulated because the primary purpose of these facilities is not for use as a dwelling.

Even if the tank is located at a residence, the motor fuel cannot be used for commercial purposes. If the fuel is resold or is supplied to vehicles used in a business (such as a kennel, funeral home, or catering business), the tank is not an exempt UST.

21.3.8 "Field Constructed" USTs

Field constructed USTs are typically large USTs that are constructed in the ground from concrete or other materials. These USTs are deferred from Parts II, III, IV, V, VII, and IX of 9 VAC 25-580-10 et seq. as field constructed tanks regardless of how they are used.

The federal regulation was recently amended to remove the deferral for field constructed USTs. The state regulation will be amended accordingly.

21.3.9 “Hazardous Waste Tanks”

Any tank containing a substance or substances regulated under Subtitle C of the Solid Waste Disposal Act is excluded from the regulation per 9VAC25-580-20(B)(1). If the tank contains a mixture of hazardous substances regulated under both Subtitle C and substances regulated under Subtitle I, these tanks are also excluded from the UST Technical Regulation and they will be regulated in conformance with Subtitle C.

21.3.10 "Heating Oil" USTs

Background

The term "heating oil UST" is commonly used to describe a tank that is exempt from both the federal and state UST regulations because it stores heating oil solely for consumption on the premises where stored.

Virginia law (Article 9, effective July 1, 1987) regulated heating oil USTs greater than 5,000 gallons in size until July 1, 1996 when the requirement was rescinded. Now all heating oil USTs, regardless of size, are exempted from the UST Technical Regulation (if the product is consumed on the premises). All such tanks closed prior to July 1, 1996 must have followed the proper UST closure requirements.

Tanks **containing a product** that is one of those specifically included in the definition of heating oil (listed below) when that product is being **entirely consumed on the premises for any purpose, are exempt from the UST Technical Regulation** Consequently, even if heating oil is consumed on the premises for a non-heating purpose (e.g. providing fuel for an emergency generator), the tank is used for storing heating oil for consumption on the premises where stored and is eligible for the heating oil exemption.

Substitutes for Heating Oil

A tank containing a fuel other than heating oil can qualify for the exemption if the fuel is consumed entirely on the premises in equipment (e.g. heating equipment, boilers, furnaces, etc.) for which the “fuel of choice” would normally be heating oil. Consequently, an UST containing motor fuel that is used in an incinerator, boiler, furnace, or similar equipment which would normally burn heating oil rather than motor fuel, would qualify for the exemption.

Conversely, if the motor fuel is used to power a motor generator (e.g. emergency generator, etc.), then even if that motor generator produces power for heating equipment, the heating oil exemption would **not** apply. This is because the **motor fuel** is being used in equipment for which the fuel of choice is motor fuel, not heating oil.

21.3.10.1 Distinguishing between Heating Oil and Motor fuel

"Heating oil" means petroleum that is No. 1, No. 2, No. 4--light, No. 4--heavy, No. 5--light, No. 5--heavy, and No. 6 technical grades of fuel oil; other residual fuel oils (including Navy Special Fuel Oil and Bunker C); and other fuels when used as substitutes for one of these fuel oils. Heating oil is typically used in the operation of heating equipment, boilers, or furnaces.

"Motor fuel" means petroleum or a petroleum-based substance that is motor gasoline, aviation gasoline, No. 1 or No. 2 diesel fuel, or any grade of gasohol, and is typically used in the operation of a motor engine.

Distinguishing between heating oil and motor fuel is simple if the product in the tank is clearly stated as one of those listed in either definition. However, No. 2 fuel oil, often known as "heating oil," is very similar to No. 2 diesel fuel in that it is also sometimes called "heating oil." No. 2 diesel fuel is one of the specified types of motor fuel and is not a specified type of heating oil. Both products are dyed for tax purposes when they are being sold for off-road use. Practically speaking, dyed No. 2 diesel fuel is difficult to distinguish from dyed No. 2 fuel oil. Also, in the past distributors have freely substituted No. 2 diesel and heating oil without expressly stating which one they are using. To confuse matters more, some fuels may be used as "substitutes" to heating oil as previously discussed. In order to determine whether or not a UST is exempt from the regulation because it stores "heating oil" can become complex. The decision tree in Appendix Q should assist DEQ staff and the regulated community with determining if their tank is exempt from the UST Technical Regulation because it stores heating oil or if it is a regulated tank because it stores a motor fuel.

21.3.10.2 **Dual Use Tanks**

Many USTs contain fuel that is used for multiple purposes. In such cases, the inspector must first determine whether or not the tank contains "heating oil" as defined. In cases where the product is clearly defined as heating oil, then the tank is non-regulated.

The regulatory decision becomes more complex when the tank contains motor fuel that is used for multiple purposes, one of which is on-site heating. In these specific cases, the inspector must consider the use of the tank since motor fuel can sometimes be considered a substitute for heating oil. If the motor fuel is being used to fuel a motor engine, then it is not being used solely as a substitute for heating oil and the tank is regulated.

In other words, the use with the most restrictive (environmentally protective) regulatory standard is the use that governs when a tank contains motor oil that is used for heating and to fuel a motor engine. A tank used for both regulated and unregulated purposes is therefore considered a regulated UST, and a tank used for a partially regulated purpose and a fully regulated purpose would be considered fully regulated. For example, many hospitals and public facilities have oil storage tanks, the contents of which are used for two purposes: (1) to heat the premises (an unregulated use) and (2) to power an emergency generator (a partially or fully regulated use). Such tanks are treated as regulated emergency generator USTs.

Staff should keep these points in mind when determining the regulatory status of a tank that may be considered a heating oil tank:

- If the contents are not consumed on premises where stored and/or is for re-sale, the tank is regulated as a UST unless it meets another regulatory exclusion or exemption.

- If the tank contents has been previously registered as a "motor fuel" (gasoline, aviation fuel, av gas, No. 1. Or No. 2 diesel, biodiesel, ethanol, or gasohol) and is

typically used in the operation of a motor engine, then DEQ will need to determine if the stored product is functioning as a substitute to heating oil and consumed on premises where stored.

- If the fuel in an emergency generator UST is also used to fuel heat generating equipment (boiler or furnace), then DEQ staff first will need to determine if the tank stores heating oil as defined by the UST Technical Regulation. If so, the tank is exempt. If not, the tank is considered a dual use tank and the more restrictive use governs.

- Whether the fuel is dyed is irrelevant to the regulatory status because undyed and dyed fuel may both be used in heating equipment and motor engines. An example would be dyed off road diesel that may be used to fuel heating equipment (non-regulated use) and off-road heavy equipment (regulated use). Conversely, clear kerosene may be used as heating oil or placed in on-road diesel trucks to keep the fuel from congealing in during cold weather.

- If the UST is only used to fuel an emergency generator, staff should assume the tank is not a heating oil UST because emergency generators are designed to run on a motor fuel. However, if the tank owner can provide sufficient documentation that the tank contained one of the products listed in the heating oil definition, then the tank is an exempted tank. The contents may not be considered a substitute for heating oil since the product is used to solely fuel a motor generator. Additionally, the majority of emergency generator USTs are using ultra low sulfur diesel (ULSD) due to air requirements mandating that some emergency generators use ULSD.

- Emergency generator USTs no longer enjoy the heating oil exemption unless they store a defined heating oil.

- USTs installed before September 15, 2010 will be regulated as “deferred” from release detection pursuant to 9VAC25-580-20(D). Those installed after September 15, 2010 will be treated as fully regulated tanks with release detection. Over the years many emergency generator USTs that may actually use diesel fuel have been removed from the database as “unregulated.” Inspectors may discover such tanks during inspections where a facility has other regulated tanks or if the emergency generator UST has a release, in which case the owner/operator should submit a Notification for Underground Storage Tanks Form 7530 to notify DEQ of the emergency generator UST.

Examples

Example 22-1: Applicability of the UST Regulations as Determined by Fuel Type and Use
Example: An UST of an unknown size contains one of the specified types of heating oil and the fuel is consumed on site for any consumptive use. Is this tank exempt from the UST regulations? Answer: Yes, this tank is exempt from the UST regulations because the tank contains a specified type of heating oil that is being consumed on site.

Example 22-2: Applicability of the UST Regulations as Determined by Fuel Type and Use
Example: An UST of an unknown size contains motor fuel and is being consumed on site in a furnace. Is this tank exempt from the UST regulations? Answer: Yes, this tank is exempt from the UST regulations because the motor fuel is solely being used in a device for which one of the specified types of heating oil would normally be the fuel of choice.

Example 22-3: Applicability of the UST Regulations as Determined by Fuel Type and Use

Example: An UST greater than 110 gallons contains motor fuel that is being consumed on site in a boiler and to fuel vehicles for a commercial enterprise. Is this tank exempt from the UST regulations?

Answer: No, this is a fully regulated tank. A tank used for both regulated and unregulated purposes is considered a regulated UST. This is a dual use situation where the first use is in the boiler and the second use is to fuel vehicles as part of a commercial enterprise. One use (boiler) qualifies for the heating oil exemption and is an unregulated use because the motor fuel is being consumed in a device for which one of the specified types of heating oil would normally be the fuel of choice. The second use (fueling vehicles) is a fully regulated use because (1) the tank is greater than 110 gallons, (2) the fuel is not a specified type of heating oil or being used in a device for which one of the types of heating oil would normally be the fuel of choice, and (3) the tank does not qualify for the farm/residential exemption since it is being used for a commercial enterprise.

Example 22-4: Applicability of the UST Regulations as Determined by Fuel Type and Use

Example: An UST that contains dyed No. 2 fuel oil that is used only on the premises in a furnace, in an emergency power generator, and to fuel motor vehicles that operate on the premises. Is this tank exempt from the UST regulations?

Answer: Yes, this tank is exempt from the UST regulations because the tank contains a specified type of heating oil that is being entirely consumed on site and, therefore, the nature of its consumptive use is immaterial.

Summary

The inspector should rely on the owner/operators description of the fuel. If the owner/operator indicates the fuel is a type of heating oil (as defined), it will not be regulated. If the owner/operator indicates the fuel is diesel or another type of motor fuel (as defined), it will be regulated. If the owner/operator doesn't know, use the preceding guidance to distinguish between heating oil and diesel fuel.

Exception: If the fuel is being used solely to power an emergency power generator and the tank owner/operator doesn't know what type of fuel is being used, it will be presumed to be diesel fuel and regulated unless documentation to the contrary exists.

21.3.11 Hydraulic Lift Tanks & Electrical Equipment

Equipment or machinery that contains regulated substances for operational purposes are excluded from the UST Technical Regulation per 9VAC25-580-20(B)(3). This includes hydraulic

lift tanks and electrical equipment like elevators, transformers and circuit boxes. To be included in this category, the equipment or machinery must contain only small amounts of regulated substances solely for operational purposes; and a loss of any regulated substance from the equipment is accompanied by faulty operation such that a loss of fluid causes knowledge of the loss. EPA chose to exclude these tanks because they are self-monitoring, they pose a minimal risk to human health and the environment, there have been few leaks and the universe of such tanks is huge.

If a hydraulic oil tank is also connected to an oil storage tank that is periodically emptied, then the hydraulic oil tank is generally regulated since the oil storage tank is a fully regulated tank (refer to Section 22.3.2 "Dual Use" or "Multiple Use" USTs).

21.3.12 "Used Oil" vs. "Waste Oil"

The terms “used oil” and “waste oil” are sometimes used interchangeably, but the terms have different regulatory meanings. USTs registered as used oil tanks will be treated as regulated USTs during compliance inspections unless the tank owner/operator states or provides evidence that the used oil may be a hazardous waste. Distinguishing between used oil and waste oil is discussed in detail in DEQ’s Petroleum Storage Tank Technical Manual. If DEQ staff suspect the tank may qualify as a hazardous waste as defined by the Resource, Conservation, and Recovery Act (RCRA), the case should be referred to the DEQ hazardous waste staff in the Division of Land Protection and Revitalization since the UST regulations do not regulate USTs containing waste oil.

21.3.13 Wastewater Treatment Tank System

Wastewater Treatment Tank Systems that are part of a wastewater treatment facility that are regulated under the Clean Water Act are excluded per 9VAC25-580-20(B)(2). Facilities regulated under the Clean Water Act are subject to the requirements of a VPDES permit, a Virginia Pollution Abatement (VPA) permit, or a pretreatment permit. VPDES permits are required for point source discharges to surface water. VPA permits are required to manage pollutants when there is no discharge to surface waters. Wastewater treatment tank systems that discharge materials into a sanitary sewer are required to have a pretreatment permit from the Publicly Owned Treatment Works (POTW) that operates the sanitary sewer.

Wastewater and Stormwater Treatment Tank Systems that are not regulated under the Clean Water Act and do not require a permit are deferred per 9VAC25-580-20(C)(1).

Emergency Generator USTs at Wastewater Treatment Facilities

Emergency generator USTs that are part of the backup power system at permitted treatment facilities are regulated as USTs under the UST Technical Regulation but, are deferred from

release detection requirements of the regulation if they were installed prior to September 15, 2010. Emergency generator USTs at wastewater treatment facilities do not perform a treatment function (i.e. treatment does not take place within these tanks). These tanks are not considered integral to the treatment process nor do they directly contribute to treatment of wastewater, therefore, they are regulated as specified in the UST Technical Regulation.

Oil-Water Separators

One type of wastewater treatment tank that Storage Tank Program staff must periodically deal with is the oil-water separator UST. Oil-water separators commonly are tank units with compartments for separating the collected oil and water. The water is usually discharged to a POTW or receiving stream under a VPDES permit or pumped and hauled to a treatment facility under a Virginia Pollution Abatement (VPA) permit. Oil-water separator systems are inherently wastewater treatment tank systems and are typically regulated under the Clean Water Act and require a VPDES permit. These tanks are considered excluded UST systems pursuant to 9 VAC 25-580-20.B.2. If a water permit is not required for the system, then it is considered a deferred UST system pursuant to 9 VAC 25-580-20.C. If oil collected by an oil-water separator is pumped to a separate UST, this separate UST is subject to the requirements of the UST Technical Regulation if it is not specifically included in the water permit. Storage Tank Program staff encountering releases from oil-water separator tanks should coordinate activities with DEQ Water Permit staff.

21.4 EPA Interpretations

A resource that DEQ staff can use for assistance in making UST Technical Regulation applicability interpretations is the Compendium of Regulatory Interpretations that EPA has developed since the inception of the UST Program in 1984. The compendium contains EPA's interpretations and guidance regarding the UST regulations issued in 1988has been updated periodically and can be found on the Internet. The EPA web site address is:

EPA has categorized the interpretations in the Compendium under the following headings:

1. Applicability, Definitions, and Notification (ADN)
2. New/Upgraded UST Systems (NUS)
3. Release Detection (RD)
4. Release Investigation, Confirmation, and Corrective Action (RICC)
5. Closure (CL)
6. Financial Responsibility (FR)

Appendices

Appendix A

Risk Based Inspection Strategy (RBIS) for USTs - A Pilot Project with EPA Region 3 VA-DEQ Risk Based Inspection Strategy — UST Inspection Program

Purpose and Background

This strategy is intended to evaluate alternative targeting methods for establishing annual inspection schedules in support of improved efficiency and effectiveness. It is critical to prioritize our activities to address times of dwindling resources at the federal, state, and local levels of government; address expanding regulatory responsibility (operator training, secondary containment, and delivery prohibition) demands on scarce staff time; evaluate those facilities with the greatest potential impact to human health and the environment; and, best serve the citizens of the Commonwealth.

Note: The DEQ-Regional Office tank staffs are most familiar with the many UST sites in their regions. This knowledge of the case-specifics of each UST site is important to incorporate into the risk ranking review process.

Elements of the RBIS - General

In general, there are several risk based factors to be considered in the order of most important to less important: Compliance History (CH) of the UST facility encompasses review of recent DEQ compliance/enforcement actions for the site; Environmental Sensitivity (ES) involves all potential environmental impacts the UST facility poses; Agency Exposure/Sectors (AES) relates to varying different environmental / ownership / media (air, water, land) issues; and, Environmental Excellence (EE) considers the UST facility status attained under the DEQ Environmental Excellence Program (if applicable.)

Compliance History (CH)

Compliance history is the cornerstone of the RBIS. Compliance history is a straight-forward way to prioritize compliance resources toward facilities with greatest potential for environmental impact. Using a 3-year look back for compliance trends at UST facilities can assist a DEQ-RO in developing a general priority order for inspection. Also, an option is to use the last two or three inspections to denote compliance trends based on number of RCAs (Request for Compliance Action), WLs (Warning Letter), and NOVs (Notice of Violation). For example, a high risk ranking would occur when either an active NOV exists or when a past NOV was not promptly resolved. Unresolved warning letters outstanding beyond the due dates and cases with multiple extensions may also be ranked as high risk. A satisfactory compliance history is defined as less than 2 deficiency letters or warning letters in the past and no notices of violation during the previous 3 years.

Environmental Sensitivity (ES)

Environmental sensitivity can include a wide range of considerations which change over time. Some examples of ES for USTs are: shallow and deep drinking water wells nearby; risk receptors (basements); wellhead protection areas; karst, fractured rock, or West Toe aquifer area (VRO, SWRO, BRRO); air non-attainment areas for VOCs; environmental justice (EJ); population density; proximity to national/state parks; flood plains; proximity to surface waters; endangered/threatened species; etc.

Note: A facility with an excellent CH (lower priority) may be located in an ES area flagging it as a higher priority for UST inspection.

Agency Exposure/Sectors (AES)

The Agency Exposure/Sectors factor is intended to provide additional flexibility to the agency and ROs in the risk based decision making process. AES helps address unexpected or unique situations when compliance resources are mandated or warranted for a specific situation.

AES Sectors for the UST Program in 2013-2014:

Federal Facilities — EPA will be urged to inspect their own federal (-96) military and non-military UST facilities statewide;

State Facilities — VDOT is piloting an UST inspection program for (-73) of their (-258) UST facilities. Compliance History has been historically satisfactory at VDOT sites so these sites should be at a somewhat lower priority;

Newer UST facilities - Installations in the past 3 years typically yield better compliance and lower threat to the environment;

Major Multistate commercial facilities — These include large entity/branded fueling facilities with newer USTs; and,

General Small Business (1-3 UST facility locations) — These commonly will have higher inspection priority due to their limited resources and often aging life-cycle higher-maintenance equipment and often frequent owner/operator turnover.

Environmental Excellence (EE)

Another factor is for DEQ-ROs to recognize UST facilities that participate in the Virginia Environmental Excellence Program (VEEP). Those include facilities that: go beyond regulatory requirements; have good compliance records; and, have active environmental management system (EMS) programs. Those facilities receiving VEEP certification at the E3 or E4 levels are eligible for consideration for a reduced on-site inspection frequency. There are several UST facilities statewide that are in the VEEP program.

Evaluation of RBIS

The major goal of the pilot RBIS is to focus DEQ-RO efforts on areas that are of the highest risk to human health or the environment. In order to appraise the performance goals of the RBIS, various measures and documentation will be evaluated during the mid-year and end-of-year reviews of this strategy and will become the basis for a continuing/annual RBIS program going forward. Evaluation of the effectiveness of this program will begin once we have inspected deferred facilities. Low priority facilities will be deferred up to a 5 year inspection cycle, and high priority sites will remain on the 3 year cycle. All facilities will be inspected within 5 years.

These RBIS performance measures are:

- For RBIS facilities, the DEQ will track resolution of any noncompliance found. This will include documentation of corrective actions. A future use of this measure will be to project the compliance outlook of RBIS facilities.
- For RBIS facilities that received a reduced inspection frequency, the DEQ will review the compliance status of the facility to ensure compliance was maintained. This will be a measure to check that the RBIS facilities under a lesser inspection frequency are in compliance and can maintain a reduced inspection frequency without adverse impacts.
- During the first 3-year cycle of the RBIS, the DEQ shall review the program and determine what, if any, additional information shall be provided for application of the risk based metrics.

Documentation for each facility will be included in the facility files for file review and record of decision made each year for inclusion in the RBIS.

UST Strategy

To help limit future UST releases, the state plans to inspect the 6,098 UST facilities every 3 years. To accomplish this, UST staff must perform approximately 2,033 inspections per year or 1,017 every six months.

Most DEQ Regional Offices currently achieve this inspection frequency. For these Regional Offices, prioritizing their inspections based on risk can give greater flexibility to provide time for AST inspections or to assist other Regional Offices via resource sharing. For those Regional Offices that cannot achieve the 3-year frequency, prioritizing inspections based on risk will ensure that inspection resources are targeted at areas of highest risk.

The annual UST prioritization process will work as follows:

- Each July, DEQ-OSRR will generate the list of inspections due.
- By August, DEQ-ROs will identify facilities on the list that are either:

- already scheduled for inspection in the current FY (these will be deleted from the new FY list), or
- low risk based on the general RBIS parameters consistent with other RBIS standards (these will stay on the new FY list as low priority inspections). Those facilities in a self-inspection status (federal, VDOT) should be identified as low-risk (only subject to spot checking).

- Once the low-priority facilities have been identified, the inspection plan for the upcoming federal fiscal year (October 1 — September 30) will be finalized by OSRR, preferably by September 1st.
- The agency recognizes that this pilot project requires additional documentation to verify the benefits of utilizing a RBIS. With continued success of this RBIS pilot project, the VADEQ believes that the long term reduction in tracking requirements balances efficient and effective operation of compliance programs along with EPA reporting needs.

Appendix B

Petroleum Storage Tank Compliance Program
Laws, Regulation, and Educational Literature

AST and UST Statutes:

Article 9 (USTs):

http://lis.virginia.gov/cgi-bin/legp604.exe?000+cod+TOC620100000030000100000000 (select 44.34:8 and :9)

Article 10 (UST Financial Responsibility):

http://lis.virginia.gov/cgi-bin/legp604.exe?000+cod+TOC620100000030000100000000 (select 44.34:10-:13)

UST Regulations:

Underground Storage Tanks: Technical Standards and Corrective Action Requirements (Chapter 580)

http://lis.virginia.gov/000/reg/TOC09025.HTM (select Chapter 580)

Petroleum Underground Storage Tank Financial Responsibility Regulations (Chapter 590)

http://lis.virginia.gov/000/reg/TOC09025.HTM (select Chapter 590)

The above statutes and regulations may also be accessed through DEQ's petroleum program's website's Guidance and Regulations page**.**

Educational Literature

DEQ Literature

Fact Sheet: Regulated UST Closures

Fact Sheet: Temporary Closure

Notification for Underground Storage Tanks (Form Notification for Underground Storage Tanks Form 7530-2)

DEQ's "Guidelines for Underground Storage Tank Cathodic Protection Evaluation"

Underground Storage Tank Program Inspection Application – Users Manual

CEDS_STORMS User's Manual

EPA Handouts:
Musts for USTs

Straight Talk on Tanks: Leak Detection Methods

Doing Inventory Control Right

Manual Tank Gauging for Small Underground Storage Tanks

What Do You Have To Do?

Minimum Requirements for Leak Detection, Corrosion Protection, Spill and Overfill Protection

Automatic Tank Gauging Systems for Release Detection: Reference Manual for Underground Storage Tank Inspectors

Operating and Maintaining Underground Storage Tanks

Note: The above mentioned EPA Handouts do not consider the 2005 EPACT requirements since the federal regulation has not yet been amended to include those requirements. Thus, the EPA literature is only applicable to UST systems installed prior to September 10, 2015.

Appendix C - **Facility Inspection Safety**

UST Inspector Safety Considerations:

A. Vehicle Accidents
   a. Notify State Police for all accidents involving state vehicles
   b. Carry vehicle safety equipment (flares, first aid kit, spare tire, etc).
   c. Report all vehicle accidents in accordance with the inspector's regional reporting standard operating procedures

B. Pedestrian accidents on-site or with state vehicles
   a. Notify State Police for all accidents involving state vehicles
   b. Use safety vests and traffic cones to provide increased visibility
   c. Avoid being in the line of traffic
   d. Use state vehicle to block tank pad

C. Slip, Trip, and Fall
   a. Beware of slippery surfaces at fueling facilities
   b. Open sumps are trip and fall hazards

D. Injuries from improper lifting
   a. Inspector should avoid lifting heavy equipment or covers, when possible
   b. Inspector should use prying tools provided for small covers
   c. Inspector should use gloves provided for hand protection
   d. Opening all access points is not required if a site contact is unable to assist

E. Sun and heat exposure
   a. Use sunscreen provided by Regional Office
   b. Drink adequate amounts of water

F. Petroleum vapors and liquids
   a. Breathing vapors should be avoided
   b. Wear gloves and proper clothing to cover exposed skin

G. Confined Spaces
   a. <u>Do Not Enter</u> confined spaces such as submersible pump manways, open trenches and tank pits

H. Insect bites and stings
   a. Beware that certain insects may be attracted to aromatic chemicals such as gasoline and perfume
   b. Beware that some spiders are attracted to the damp cool sumps at stations
   c. Use first aid kit for bites and stings

I. Hostile Facility Personnel
   a. Avoid confrontational situations
   b. Do not enter a facility when owner or representative refuses to grant access
   c. Either use police as an escort or mail the RCA if a hostile situation arises

J. Personnel Protection (see also Appendix D)
   a. Steel toe footgear
   b. Flashlight
   c. Cell phone
   d. Work/disposable gloves
   e. Reflective safety vest
   f. Ear Plugs
   g. Safety Glasses

K. Report all personal accidents/incidents in accordance with DEQ accident/incident reporting procedure.

Appendix D - **Equipment and Materials for All UST Inspections**

A. Mandatory Equipment and Materials:

1. DEQ Identification Card;
2. Ipad®;
3. At least one pair of work gloves;
4. At least one box of disposable gloves;
5. Two to three pairs of ear plugs;
6. One pair of safety glasses;
7. One reflective safety vest;
8. Steel toe footwear;
9. Four large safety cones;
10. Vehicle safety equipment (flares, first aid kit, spare tire, etc.).

B. Recommended Equipment and Materials for All UST Inspections

1. DEQ shirt(s);
2. One package of disposable hand wipes;
3. Camera;
4. Cell Phone;
5. Flashlight;
6. Office supplies as needed;
7. Collapsible tank gauging stick;
8. Water finding paste (KolorKut paste);

9. Hard hat;

10. Two screw drivers;

11. Crowbars;

12. Copies of Notification for Underground Storage Tanks Form 7530, 7540, and other forms/fact sheets for distribution;

13. Paper Inspection Log, Appendix F.

Appendix E - **Underground Storage Tank Inspection Application User's Manual**

Underground Storage Tank Inspection Application User's Manual

User Manual

Version 1

Last updated: September 30, 2014

Alicia Meadows
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Commonwealth of Virginia
Department of Environmental Quality
Richmond, Virginia

1 Introduction

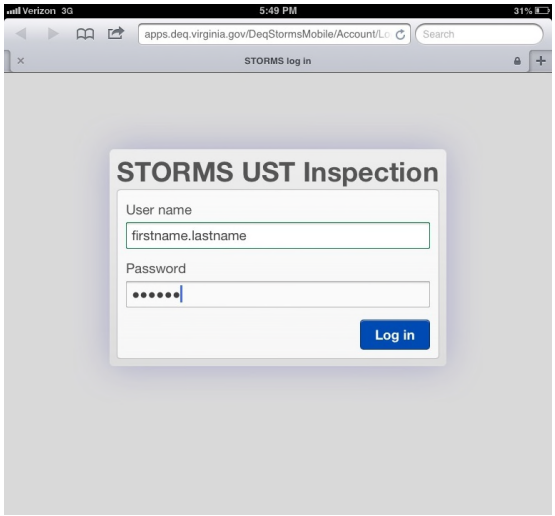
DEQ inspectors conduct approximately 2,000 Formal Underground Storage Tank (UST) inspections per year. In order to assist and increase efficiency with formal UST inspections, the Department of Environmental Quality (DEQ) developed a mobile inspection application (Inspection App). The Inspection App practically eliminates inspection report preparation and Comprehensive Environmental Data System (CEDS) data entry since it is easy to use and syncs with CEDS. Data contained in the inspection tables will also be used to automate the Request for Compliance Action (RCA), Warning Letters (WL), and Notices of Violations (NOVs).

The Inspection App was developed to cover the scope of a UST Formal Inspection as outlined in DEQ's UST Compliance Measures. The Inspection App contains 12 categories for compliance review: facility information, tank owner summary, temporary closure, spill prevention, overfill prevention, tank release detection, pipe release detection, tank corrosion protection, pipe corrosion protection, secondary containment, operator training, and registration. The Inspection App does not consider non-regulated tanks, closed tanks, tank and/or piping closures, financial assurance, suspected releases, or aboveground storage tanks (ASTs).

1.1 Accessing

The Inspection App is located on the web at http://apps.deq.virginia.gov/DeqStormsMobile//and may be accessed on the mobile device (IPad) via the web browser, Safari.

Log into the Inspection App by using the username format firstname.lastname and your current windows password. The inspector who will be conducting the inspection **must** be the person to log into the Inspection App and upload the facilities in order to identify the appropriate inspector.

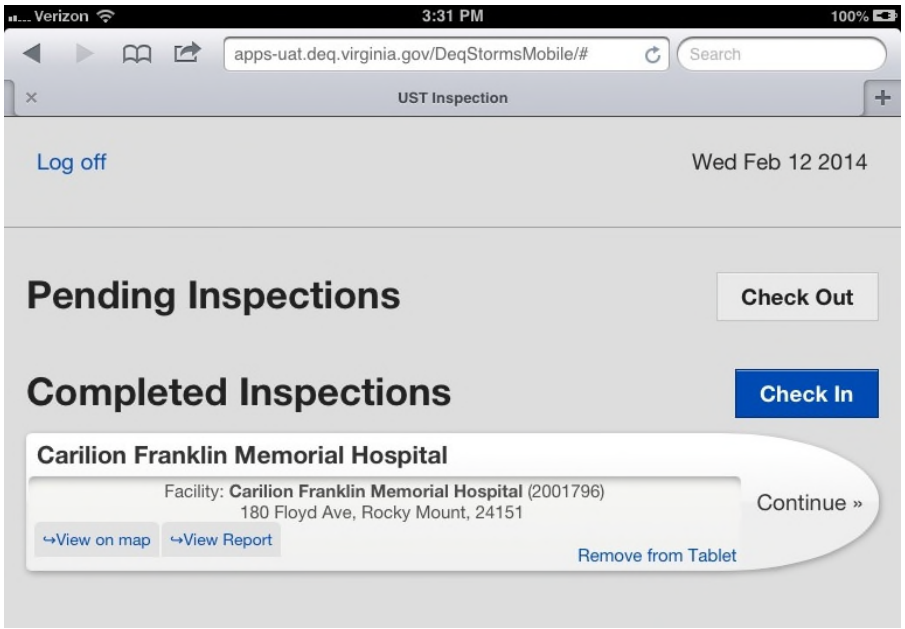


1.2 Facility Check-out

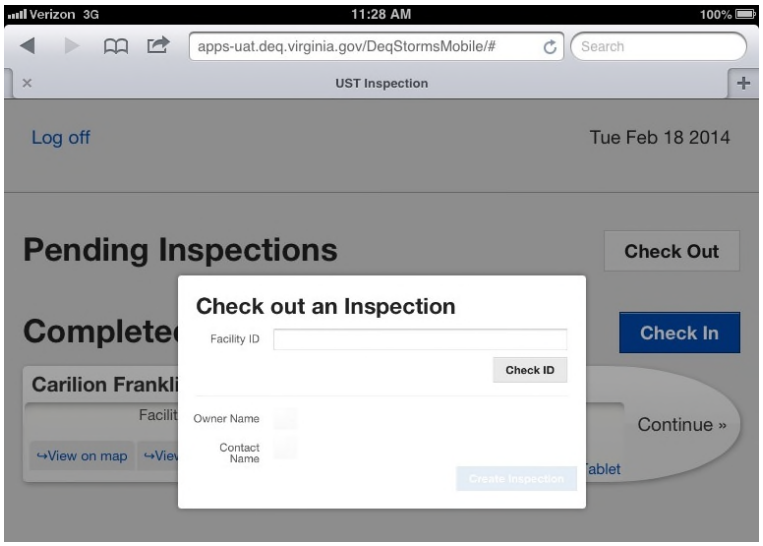
Facilities should be loaded onto the Inspection App prior to the inspection. Each inspection is tank owner specific. Therefore, if a facility contains multiple tank owners, then a separate formal inspection for each tank owner will need to be loaded onto the Inspection App.

Steps to "Check Out" a Facility

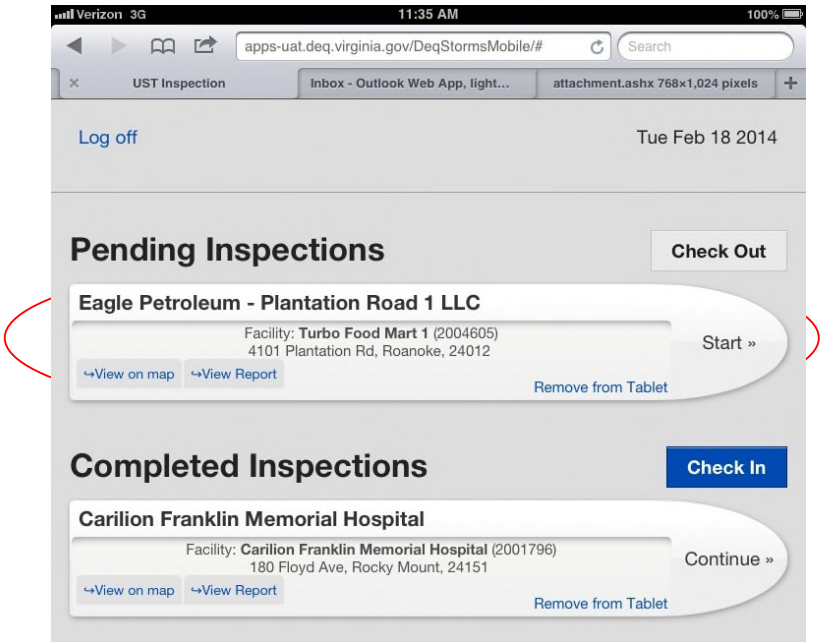
The facilities can be loaded onto the Inspection App by using the Check Out button as shown below:



After tapping the Check Out button, the following screen appears:



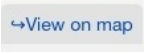
Enter the CEDS Facility ID number and tap the Check ID button. Then choose the appropriate active tank owner and contact name. Owner name is a mandatory field and must be identified to proceed. Although contact name is an optional field, it should be indicated if possible. Then tap "Create Inspection" to officially load the CEDS facility data information into the Inspection App. Multiple inspections may be loaded to the application. The facility(s) to be inspected will appear under "Pending Inspections" as shown below for the inspector:



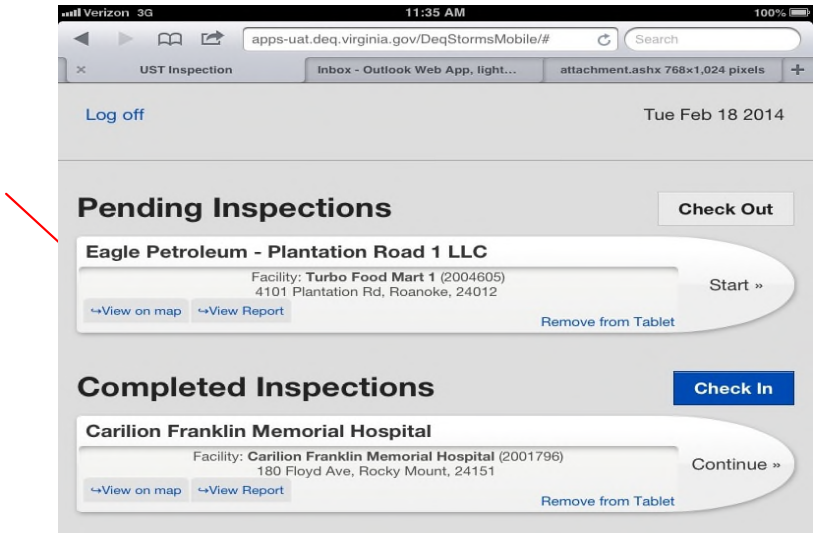
1.3 Map Tool

The Inspection App contains a map tool that can be used to locate the facility, determine the best routes to navigate/drive to the facility, and provide written step by step directions. The map tool is only available in areas where a Verizon cellular signal exists.

<u>Steps to access the map tool:</u>

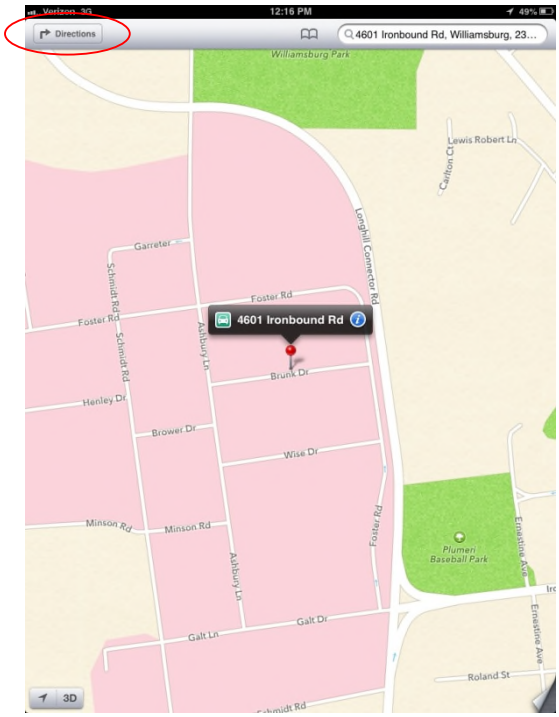
To access the map tool, tap the 

option that is available at the left side of the Facility bar as shown below.

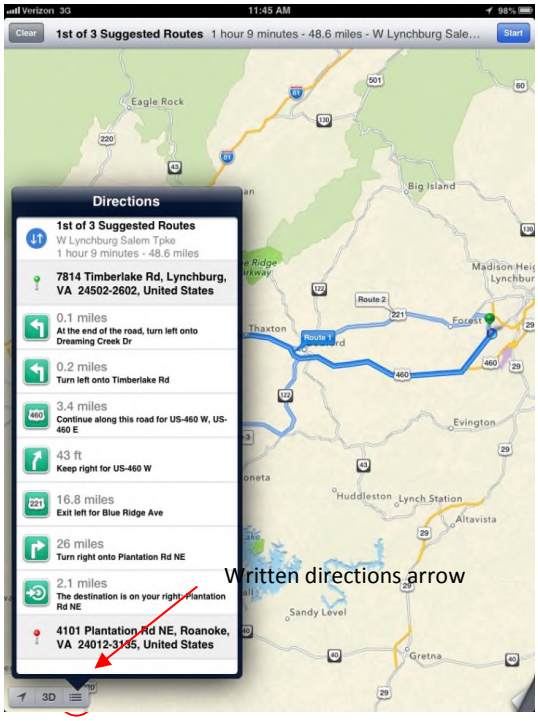


Once in the map view, the inspector can tap on

located at the top left hand of the screen, as shown below. Then tap “Route”, at the top right hand corner of the “Directions” window to view the route options. The inspector may choose the preferred route by tapping once on the corresponding highlighted blue route.



Finally, the written directions icon, , may be chosen to obtain written directions. Use a four finger swipe to return to the inspection.

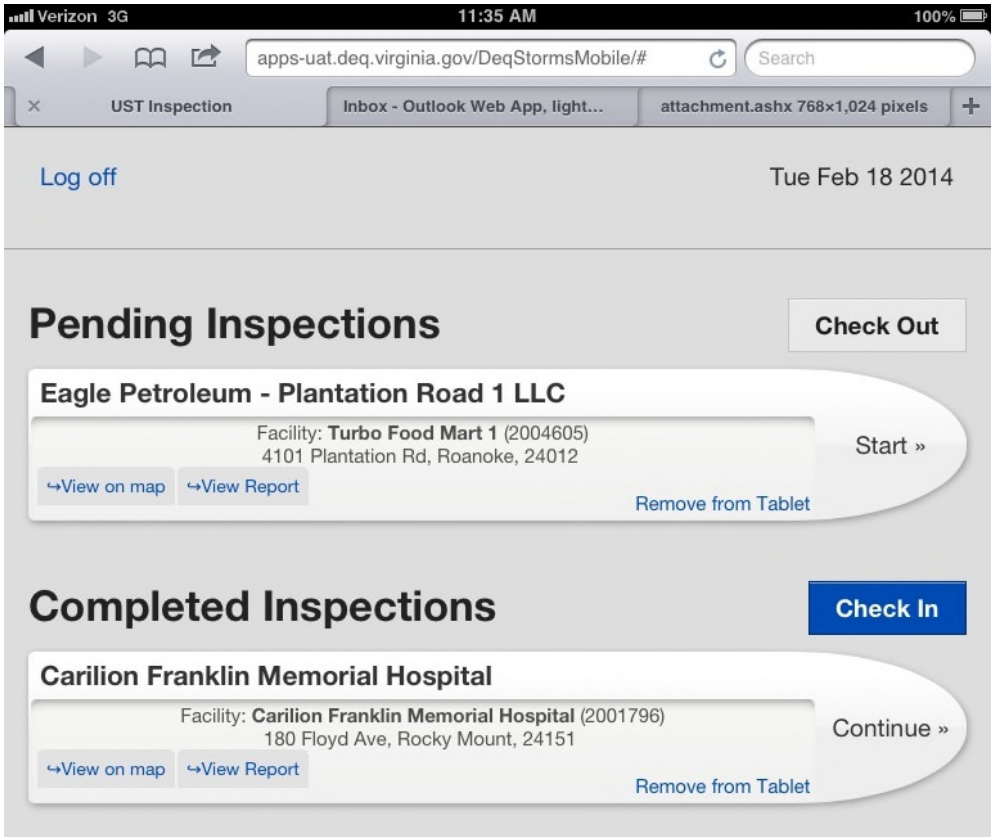


1.4 Remove from Tablet

The inspector may remove the inspection from the tablet at any time by tapping the Remove from Tablet option available at the right side of the Facility bar on the main screen**. This will permanently remove the current facility and all associated inspection information from the inspector's tablet**. The previous facility or inspection information may not be retrieved again, but the facility information can be re-loaded to the tablet as a new pending inspection.

2 Conducting a Formal UST Inspection

After the Facility has been checked out and appears on the "Pending Inspections" list in the Inspection App, an inspector may begin the inspection by tapping "Start" as shown below.



Once the inspection has been started, the following main inspection screen will appear (see below). The inspection categories (facility information, tank owner summary, spill prevention, overfill prevention, etc.) can be completed in any order but it is best to review the Tank Owner information before you step through the compliance sections. Check to make sure that owner, contact and tank details information is correct as extracted from CEDS. Make any modification to the tank details such as, tank and/or piping material and release detection, tank status, adding new tanks, or deleting tanks prior to beginning the compliance sections. If an unregistered tank is located at the facility, it should be added to the tank list from the "Tank Owner Summary" screen **prior** to evaluating compliance (Tank Owner Summary 2.2). If the

tank is added after the compliance evaluation has begun, the inspector will need to repeat the evaluation for the added tank.

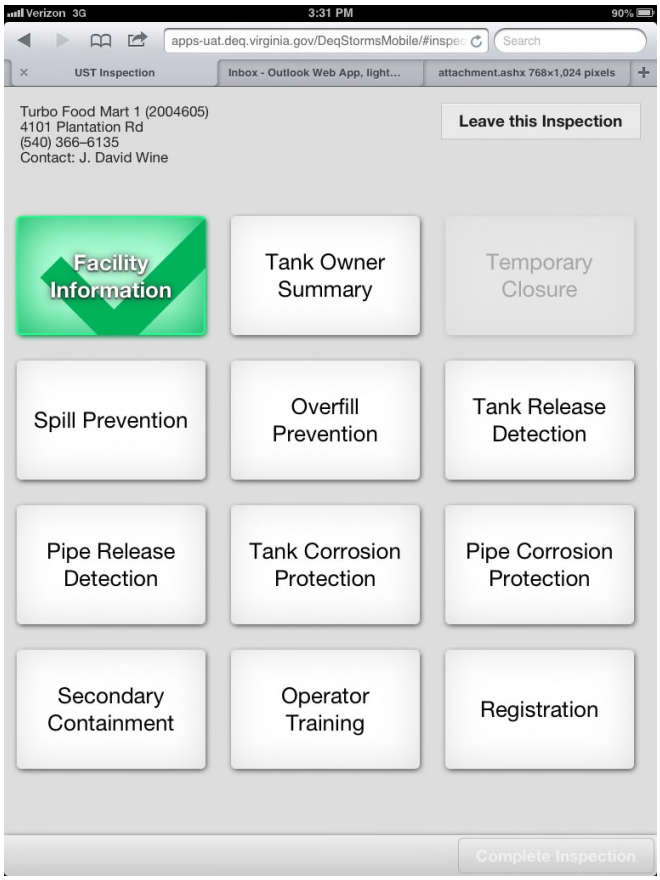
CAUTION: **Edited** facility, owner, or contact information that is changed in "Edit" mode in the Inspection App will change certain CEDS registration data (see Table 3.4-1). If owner information is edited, it will be reflected for ALL facilities associated with that owner.

However, if existing facility, owner, or contact information is replaced by using the search or create functions, current registration data will not be overwritten. Instead, a new "inspection" (INS) record will be created when the inspection is synced to CEDS. Similarly, if the inspector uses the plot point feature (Section 2.1) to determine the GIS coordinates, the current GIS database information will be overwritten by the data from the Inspection App. Edited tank and/or piping details (material, release detection, etc) will be reflected in the inspection record only—the registration data will not be overwritten. The table below describes how data changed in Edit Mode will appear in new CEDS and whether or not registration data will be overwritten.

Table 3.4-1 How Data Changed in Edit Mode Appears in CEDS

	Facility	Owner	Contact	Tank/Piping	Location Coordinates
Data Overwritten	STORMS Registration phone number only. CEDS Core data remains the same.	STORMS Registration name, address, and phone number. Change will affect any facility record associated with the edited owner.	All CEDS Contact fields.	None	DEQ GIS verified point data.
Additional Record Created	Edited facility name and address will appear in STORMS and the Inspection record.	None-new data replaces existing data.	None – new data replaces existing data.	Edited data will appear "Red" on Inspection Record	None-New point replaces existing GIS record.

Note: If a screen appears where all the compliance sections are grayed-out (like temporary closure is grayed-out below), then open the Tank Owner Summary section and review each tank listed to make sure that the "Federally Regulated" check box has been applied; otherwise the Inspection App assumes that the Tank Owner has no federally regulated tanks.



2.1 Facility Information

Typically, the first item to verify on the Inspection App Inspection Screen is "Facility Information". The facility information that appears in the Inspection App is the registration data from CEDS. The inspector should verify that the facility's name, 911 address[58], facility's phone number, and facility type are correct. If any of the facility information is incorrect, the inspector should change this data on the Inspection App by tapping in the corresponding field and editing the data.

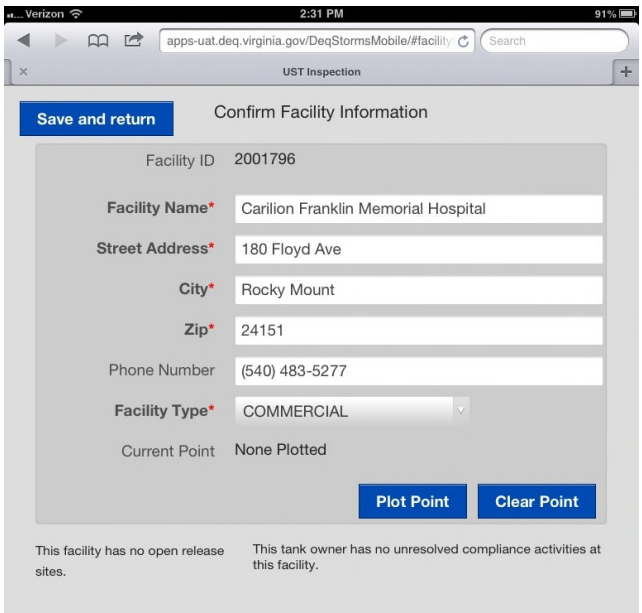
Note: Any field that has a red asterisk is a required field and needs to be entered before you can leave the Facility Information section.

If the "Current Point" field indicates "None Plotted", tap **Plot Point**, while you are at the facility, to identify the proper facility coordinates. If the "Current Point" field indicates improper

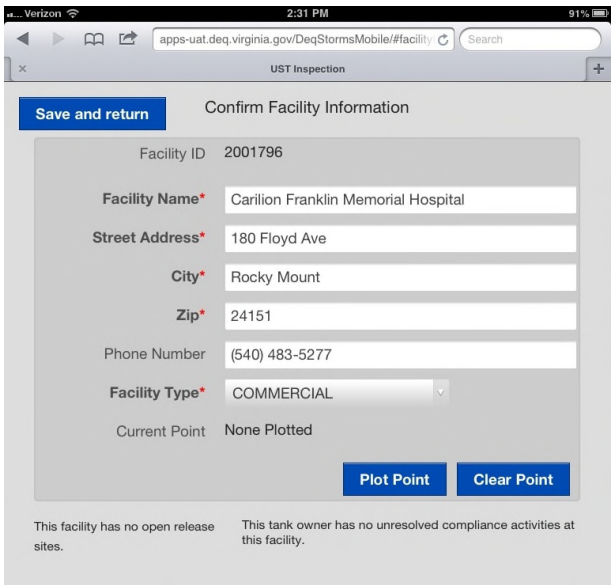
[58] A 911 address is a street address established to facilitate emergency service response. A 911 address is composed of a street number and street name, as opposed to a rural route and box number. The 911 address can often be obtained from the Web from sites such as http://www.whitepages.com using the facility phone number.

coordinates, then the inspector may tap **Clear Point** to clear the coordinate data and then subsequently re-plot the point.

Note: Any new coordinate data will replace the current verified point contained in DEQ's GIS database. The new coordinate data will be stored in DEQ's GIS database when the inspection is finalized and uploaded. The coordinate data will be used to denote the facility location in the DEQ VEGIS tool contained in the Data View and "What's in my Backyard" applications.



If the facility has any open release cases/sites or unresolved compliance activities, they will appear at the bottom of the "Confirm Facility Information" screen.



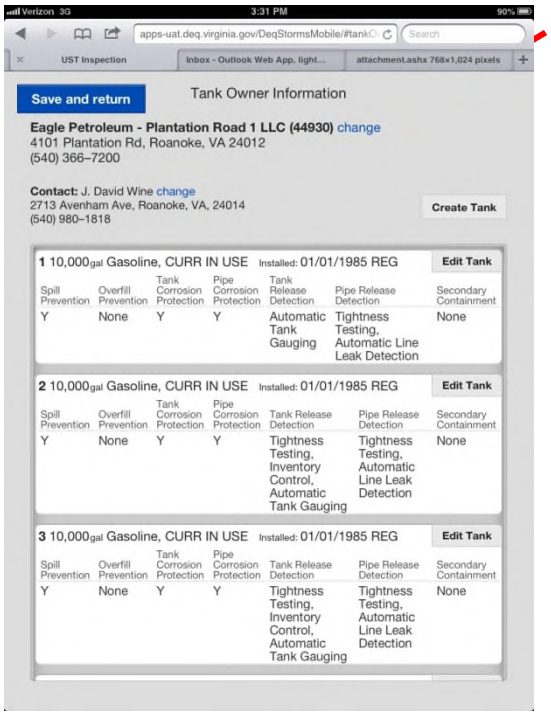
Once all facility information data has been verified and appropriately amended, tap the **Save and return** button located at the top left hand corner of the screen to return to the main inspection screen.

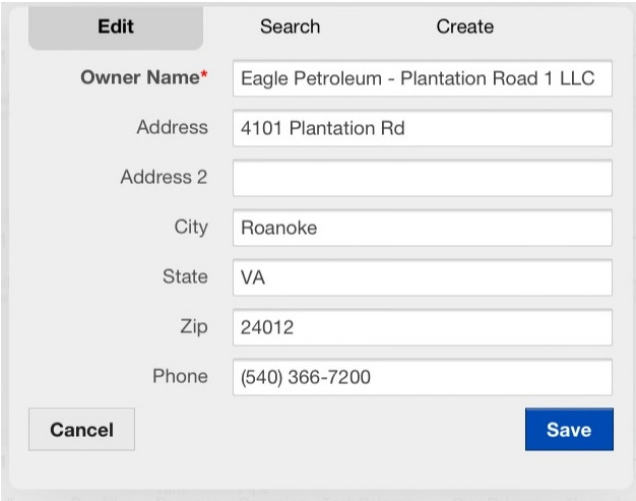
2.2 Tank Owner Summary

The tank and owner summary information may be accessed by pressing the **Tank Owner Summary** option from the main screen. The inspector must verify that the tank owner, owner mailing address, and owner phone number are correct. If any of the owner information is incorrect, the inspector should amend the data in the Inspection App and note the need for an amended Notification for Underground Storage Tanks Form 7530 under the Registration section of the Inspection App.

<u>Caution:</u> Changing tank owner information in "edit" mode will overwrite the CEDS registration data and change the data for ALL facilities.

If the current tank owner or contact information is different than what appears, tap "change" to access the edit screen. From the edit screen, the inspector may edit the owner data, search for another tank owner, or create a new tank owner.





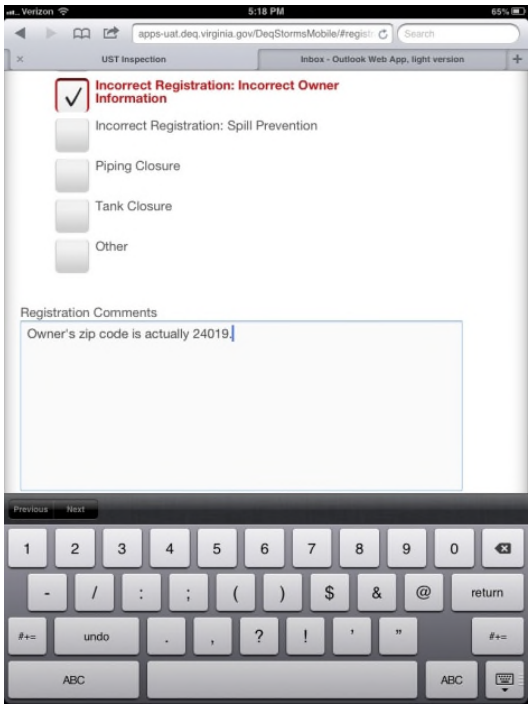
2.2.1 Edit Owner

The "edit owner" mode should only be used to change existing tank owner inspection information such as the owner address, city, state, zip, or phone number. The "edit owner" mode should not be used to change the owner. The Search or Create mode should be used to change an owner. The tank owner information that appears on the edit screen is directly linked to the registered tank owner data contained in CEDS.

Caution: Changing tank owner information in "edit" mode will overwrite the CEDS registration data and change the data for ALL facilities.

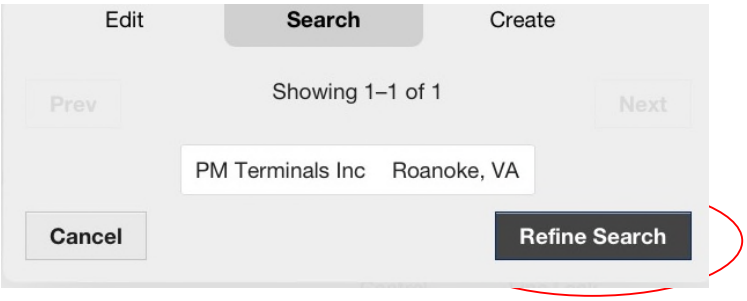
If the inspector is sure that a Notification Form has not been received for the correct owner information, then the inspector should note that in the Registration section of the inspection as a "Reason for non-compliance" and record the correct owner information in the "Registration Comments" field as indicated below.

Note: At this time, adding comments to the Registration comments box may cause other compliance section comments to get erased. Until this inspection app bug gets fixed, please add any registration comments to the general inspection comment section once you press the "Complete Inspection" button after all the compliance sections have been completed.



2.2.2 Search Owner

To search for an owner, tap "change" to the right of the owner name on the Tank Owner screen. Then, tap **Search** to search for an existing tank owner. A wildcard such as a percent (%) symbol does not need to be used to search for a new owner based on keywords. For instance, "Shee" may be used to search for "Sheetz". However, partial words or keywords will retrieve more results than more specific queries. In order to minimize the number of results, tap the "refine search" button as shown below and enter a new query parameter.



Changing the tank owner to an existing tank owner will **not** overwrite CEDS registration data—it will create a new owner for the tanks associated with the "INS" or inspection record in CEDS.

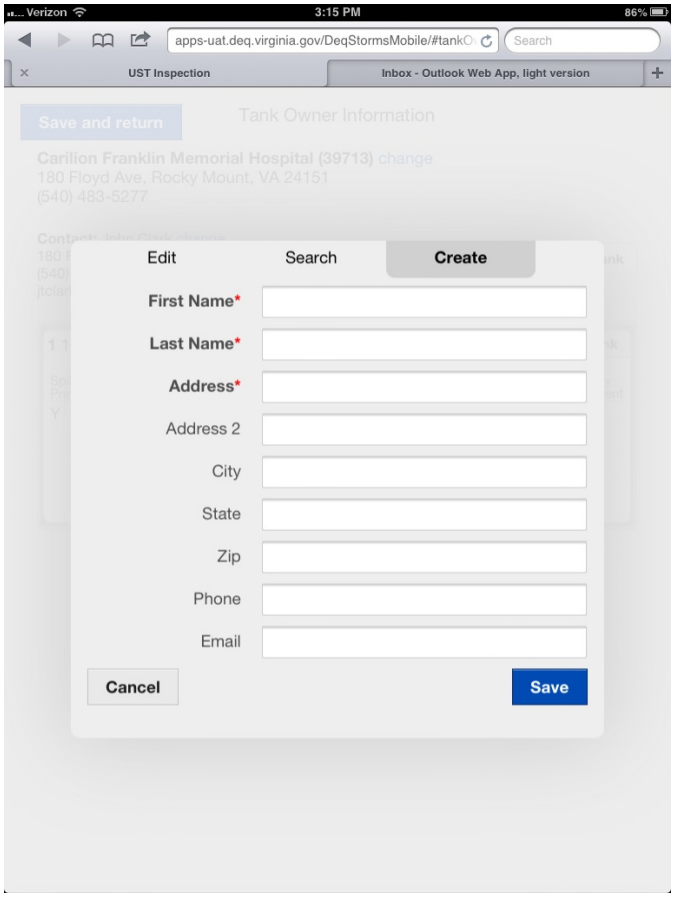
The "Cancel" or back arrow button may be used to return to the Tank Owner Information screen without saving the new owner information.

2.2.3 Create Owner

A new tank owner (owner without an existing CEDS record), may be created by tapping on "change" to the right of the owner name on the Tank Owner screen. Then tap "Create" at the top of the change owner screen. The new owner name, owner mailing address, and owner phone number should be placed in the corresponding fields. Tap Save to save the data and return to the Tank Owner Information screen. Use the Cancel or the back arrow button to return to the Tank Owner Information screen without changing any tank owner data.

Note: Required fields are marked with a red asterisk and must contain data to save the new tank owner.

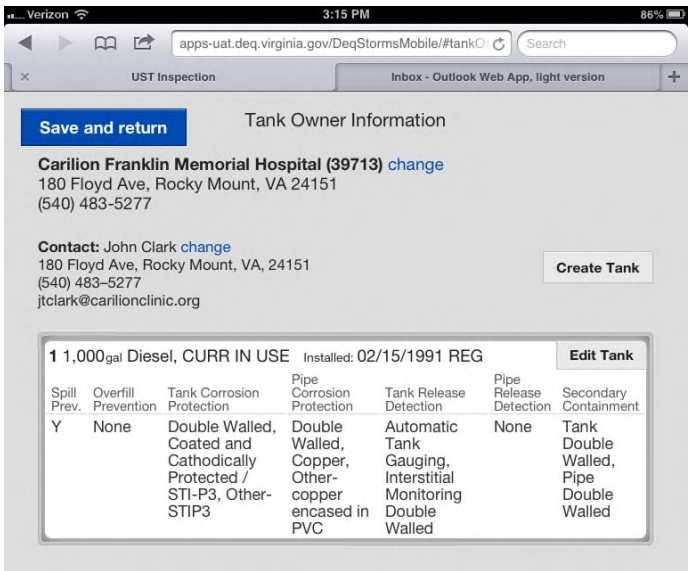
New tank owner information will be available as a new inspection record, but will not overwrite the existing registration record. The registration record may be changed after proper documentation (i.e. Notification for Underground Storage Tanks Form 7530 Form or Bill of Sale) is received.



2.3 Contact – Edit, Search, and Create

A contact may be edited, searched, or newly created in much the same way as a tank owner except the user should choose the "change" option beside the contact name (shown below). Additionally, the contact name may be edited without a VA Notification for Underground Storage Tanks Form 7530 to substantiate it. The same instructions in Section 2.2.1 Edit Owner, 2.2.2 Search Owner, and 2.2.3 Create Owner may be used to edit, search, and create a contact.

Note: All fields with a red asterisk are required fields and you will need to enter the information before the inspection app will let you save the new tank owner contact.



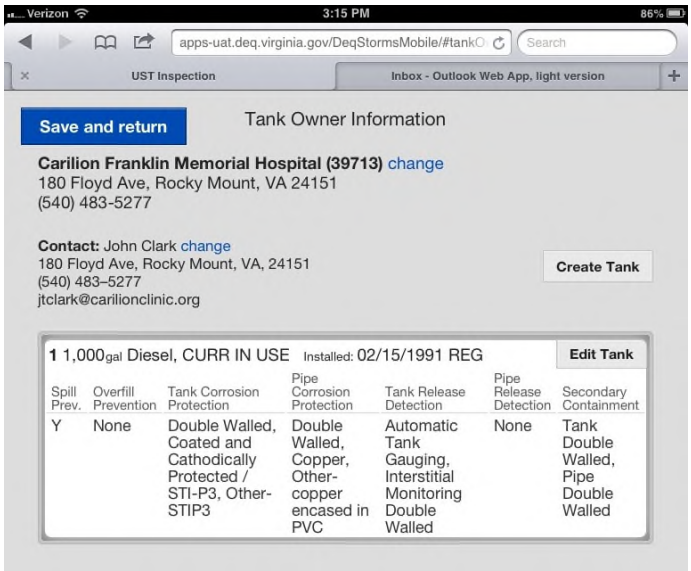
2.4 Tank Information

The CEDS registration tank details data will be loaded to the Tank Owner and Tank Detail Screens in the Inspection App. **Only the tanks owned by the selected tank owner will appear on the Tank Owner Information screen.**

2.4.1 Create Tank

Unregistered tank information may be added to the inspection record by tapping

Create Tank.



The inspector should edit existing tank information or create a new tank in the corresponding fields in accordance with the following instructions.

Note: Any modified tank information will not change the CEDS registration record. A new inspection record will be created that will contain the new inspection information.

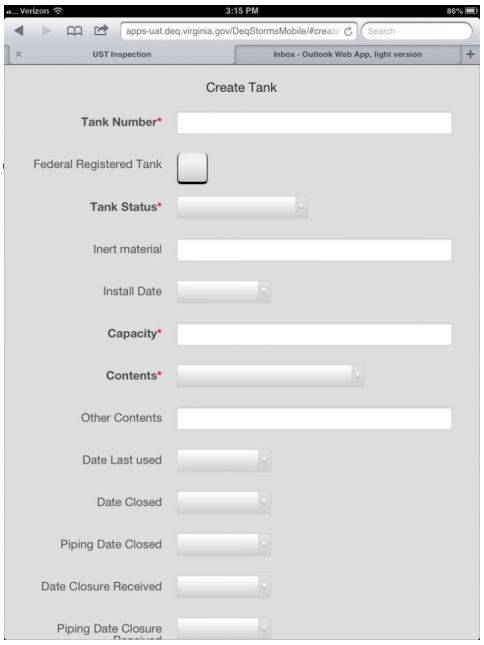
Tank #

Generally, tank numbers correspond to the tank numbers assigned by the tank owner. If an unregistered tank is encountered during an inspection, the inspector should assign a tank number similar to the owner's numbering system or assign the next available sequential number to the tank using current program guidelines. Each compartment of a compartmentalized tank should be noted as a separate tank[59]. Likewise, each tank in a manifolded system should be noted as a separate tank[60].

Federally Registered (Regulated) Tank

This box must be checked for all regulated USTs, in order for the inspector to complete the inspection for the Tank Owner.

[59] In CEDS, a "C" usually appears behind the tank identification number for compartmentalized tanks.
[60] In CEDS, an "M" usually appears behind the tank identification number for manifolded tanks.



Tank Status

The "Tank Status" field is one of the most important fields used to track "active" facilities for each inspection cycle. The terms "currently in use" and "temporarily out of use" must be used properly when entering CEDS data since tanks with those statuses are considered active tanks that must be periodically inspected. The use of each tank status is discussed in the CEDS Tank Statuses.

Date Installed

If CEDS lacks installation date information, then the inspector should insert information obtained from the site contact. If the inspector becomes aware of differences in installation dates between CEDS and the site contact's information, the inspector must make inquiries which resolve the differences and enter the information the inspector believes to be correct in the Inspection App. If only the year of installation is available, the inspector should use January as the month and one as the day. If the date of installation is unknown, then the inspector should leave the field blank. Because the date of installation determines the necessity for certain compliance requirements, the inspector should request additional information from the owner/operator to determine the installation date as accurately as possible. If the install date is unknown, put a note in the comment section as a possible noncompliance issue.

Tank Capacity

CEDS may contain information regarding the tank storage capacity. The inspector must determine from the interview of the site contact and onsite observations whether information reported in CEDS appears to be correct. If any disparity exists between CEDS information and

the interview or observation information, then the inspector should enter the most accurate information in the tank capacity blank(s). Accurate tank capacity information is critical because compliance requirements may differ according to tank size.

Contents

For tanks currently containing product, the substance stored in the UST on the date the inspection is conducted should be correctly identified. For tanks not currently containing product, the substance last stored should be entered. The choice of substances includes:

Asphalt
Denatured ethanol
Diesel
Diesel: Biodiesel
Diesel: Low Sulfur
Diesel: Off-road
Diesel: On-road
Diesel: Ultra Low Sulfur
Emer Generator (May be used to identify a UST used to fuel an emergency generator)
Fuel Oil
Fuel Oil #2
Fuel Oil #4
Fuel Oil #6
Gasoline
Gasoline: Aviation Gas
Gasoline: E85
Gasoline: Gasohol
Gasoline: Mid
Gasoline: Premium
Gasoline: Racing
Gasoline: Regular
Hazardous
Heating Oil
Hydraulic Oil
Jet Fuel
Kerosene
Kerosene: Clear
Kerosene: Dyed
Lube Oil
Mixture
Motor Oil
Other
Unknown
Used Oil

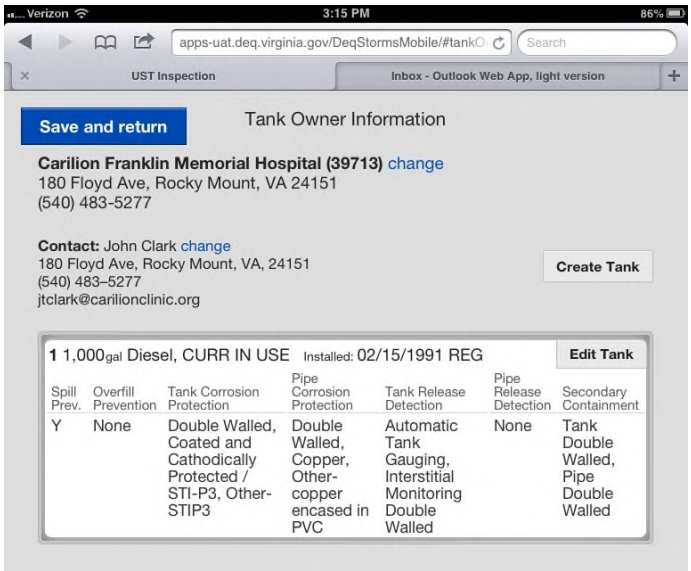
Where the substance is "other," "hazardous substance," or "mixture," the inspector must specify the substance(s) in the “Other Contents” field.

After all known tank information is entered, the inspector must use the Save button to save the data and return to the Tank Owner Information screen. The Cancel or Delete button may be used to return to the Tank Owner Information screen without saving the tank information.

2.4.2 Edit Tank

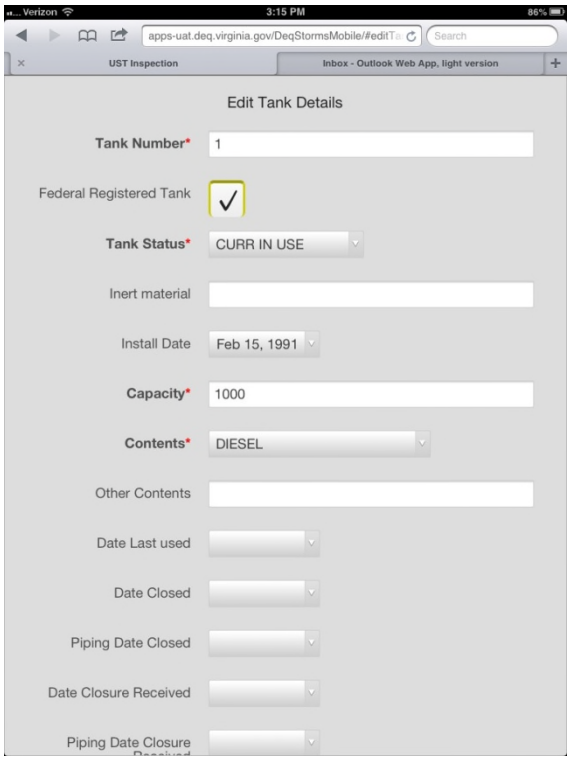
Tank registration information may be edited by tapping the Edit Tank button as shown[61]. When the mobile device is synced with CEDS, the new tank information will be stored as an inspection record (INS).

Note: The existing CEDS registration tank data will not be overwritten by the inspection record.



The inspector should enter the new/ revised tank information in the corresponding fields.

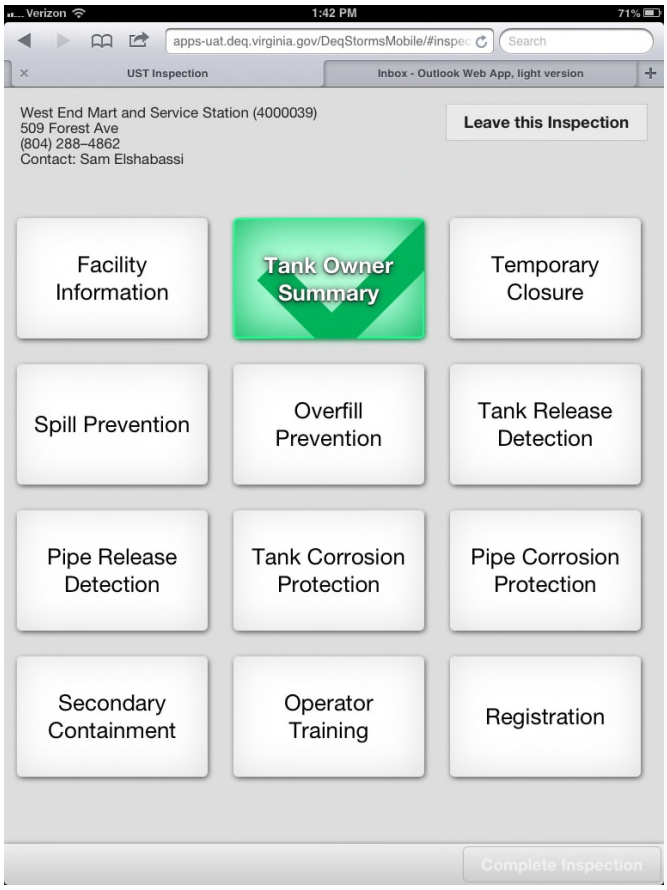
[61] Tank information may also be accessed and edited from each inspection category screen by tapping the “Edit Tank” button on the top right hand corner of the screen.



To save any edits to the tank information, the inspector must use the **Save** button to save the data and return to the previous screen. The **Cancel** or **Delete** buttons should be used to return to the previous screen without saving any edited tank information.

2.5 Compliance Evaluation

In order to evaluate compliance, the inspector will choose the appropriate inspection category by tapping the corresponding box on the inspection screen.


Verizon
1:42 PM
71%
apps-uat.deq.virginia.gov/DeqStormsMobile/#inspec
Search
UST Inspection
Inbox - Outlook Web App, light version
West End Mart and Service Station (4000039)
509 Forest Ave
(804) 288–4862
Contact: Sam Elshabassi
Leave this Inspection
Facility Information
Tank Owner Summary
Temporary Closure
Spill Prevention
Overfill Prevention
Tank Release Detection
Pipe Release Detection
Tank Corrosion Protection
Pipe Corrosion Protection
Secondary Containment
Operator Training
Registration
Complete Inspection

Each of the 12 inspection screens is similar in appearance and operation. There are four compliance options: yes, no, not required, and needs review. The inspector should choose the appropriate compliance option for each tank using the below descriptions:

Yes – The UST system meets ALL regulatory criteria within that category.

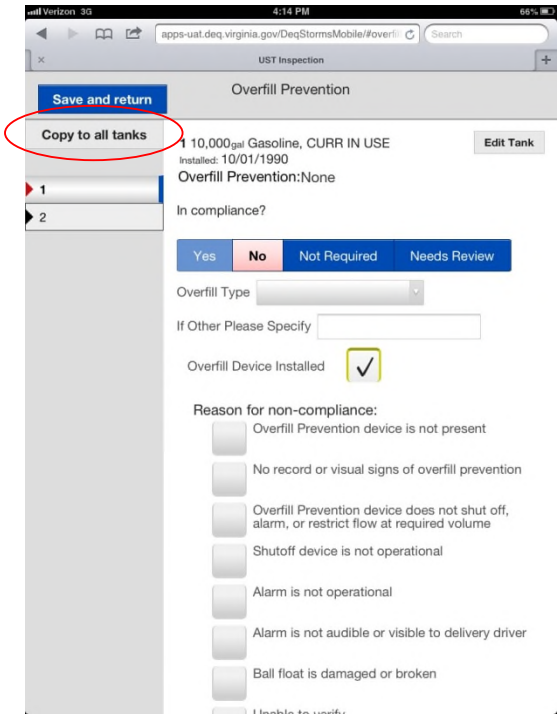
No – The UST system does NOT meet ALL regulatory criteria within that category**.** If "No" is chosen, then the inspector must indicate a reason or reasons for non-compliance by checking the appropriate corresponding box or boxes.

Not Required – The UST system is deferred by regulation from that inspection category or the item is not applicable. For example, tanks with transfers less than 25 gallons do not require spill or overfill protection/devices.

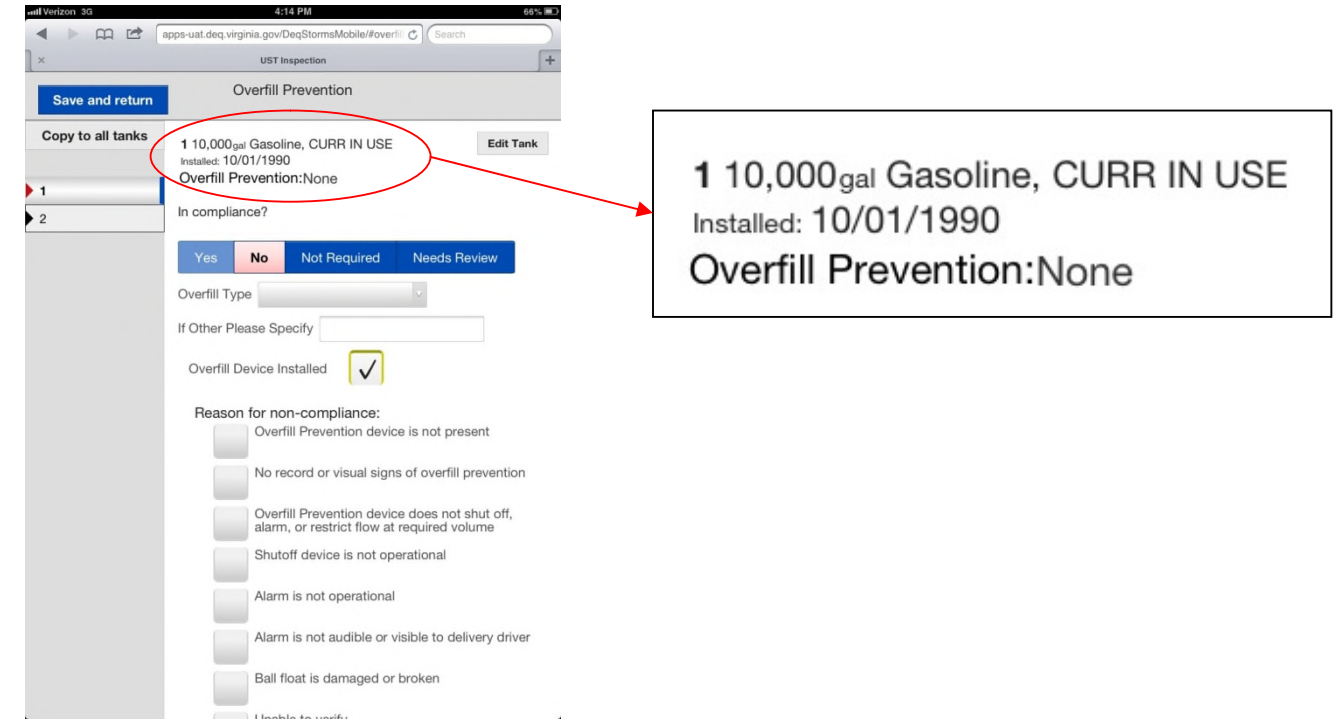
Needs Review – Use this option if peer review is necessary or compliance cannot be determined in the field.

Tank Numbers – Links to each tank are located on the left hand side of the screen just below the Copy to all tanks button. To access each tank and complete the inspection, the inspector must tap on **each** tank button and complete the applicable sections. However, if all inspection items (non-compliance reason, device type, and testing dates) are the same then the inspector may use the Copy to all tanks button as described below.

Copy to All – Use this function to copy compliance determinations, test data, and reasons for noncompliance to ALL tanks if applicable. The copied information may be removed from particular tank(s) by choosing that tank and selecting different compliance options (the initially copied data will remain for tanks without changes).



Each inspection screen contains a tank detail summary similar to the following:



The corresponding tank detail summary data fields are defined as follows:

[Tank Id Number] [Tank Capacity][Tank Contents][Tank Status]

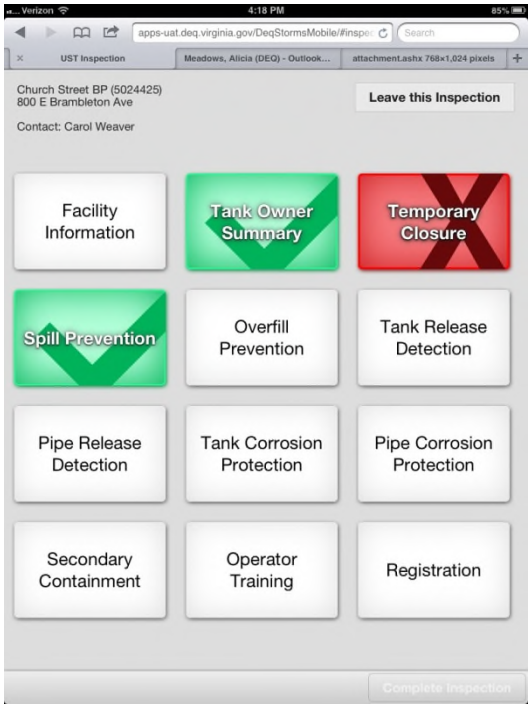
[Installation Date]
[Compliance Category: CEDS field data]

If the tank details are incorrect, or the inspector needs to view additional tank details from this screen, the Edit Tank button in the top right hand corner of the inspection screen can be used to access the "Tank Details" information and amend any of the tank information. This information can be amended according to the instructions located in Section 2.2.3: Tank Information .

Inspection category-specific reasons for non-compliance and the associated definitions may be found in the Inspection App Help Documents located in (Appendix C).

When the inspector has completed a particular section of the inspection, they can tap Save and return in the top left hand corner of the exit screen. The inspector can return at any time to the inspection screen to amend information during the completion of the inspection.

If any items were identified as non-compliant on each inspection compliance screen, the corresponding inspection category button on the main inspection screen will turn red with an X, as shown. If in compliance, then the corresponding button will turn green with a check.



2.5.1 Temporary Closure

If any active USTs have the “temporary out of use” tank status, then the “Temporary Closure” inspection category will be enabled for inspector use. Conversely, if temporarily out of use tanks do not exist for the facility, then the “Temporary Closure” option will not be available (grayed out).

2.5.2 Spill Prevention

The Spill Prevention inspection screen may be accessed by tapping

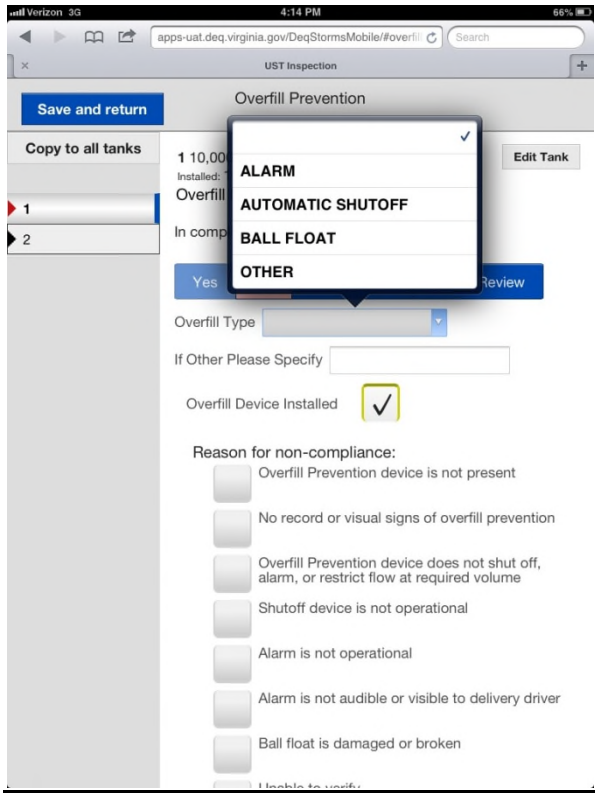
from the main screen. The tank detail summary will indicate if spill prevention (Y/N) is available for the tank highlighted.

2.5.3 Overfill Prevention

The Overfill Prevention inspection screen may be accessed by tapping

from the main screen.

Unlike most of the inspection screens, the overfill prevention screen defaults to a “No” compliance status until the inspector chooses an “Overfill Type” from the List of Values (LOV). The LOV options include alarm, automatic shutoff, ball float, or other. Once an overfill type is chosen, the inspector may choose the appropriate compliance option. Also, the “Overfill Device Installed” box will be automatically checked if CEDS indicates that an overfill device is installed on the tank.



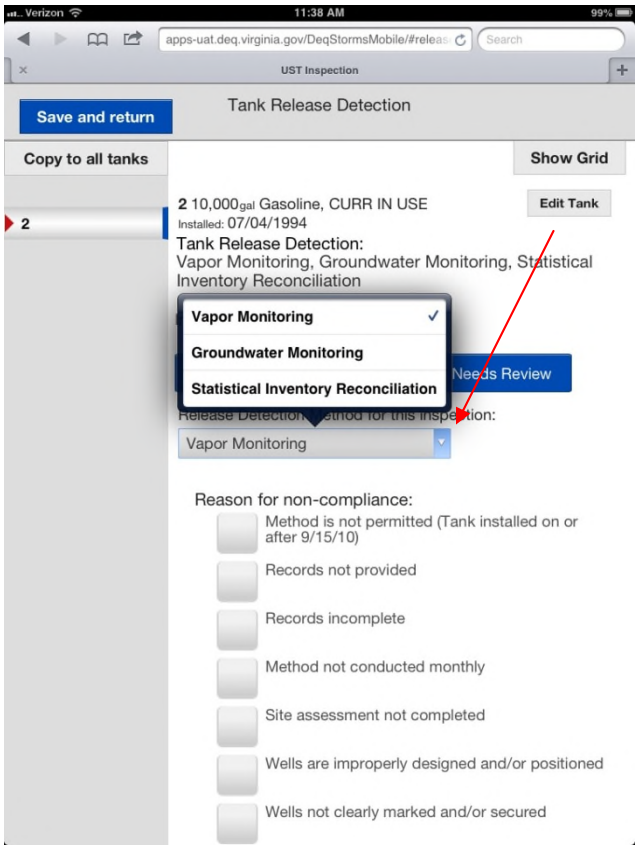
2.5.4 Tank Release Detection

The Tank Release Detection (RD) inspection screen may be accessed by tapping from the main inspection screen.

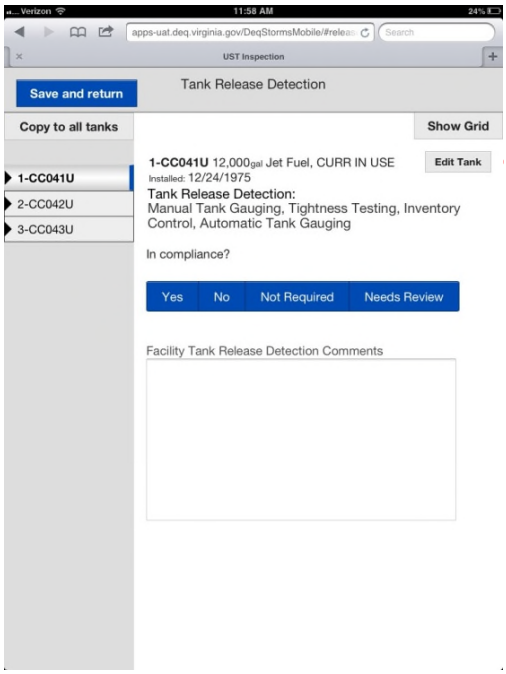
The tank RD inspection screen differs from other screens since its reasons for noncompliance are based upon each tank's RD method and it contains a "Grid" to record monthly RD record results.

Although, there may be multiple RD methods that appear on the Tank Details screen, the tank RD reasons for noncompliance are unique to each RD method. If multiple methods of release detection are marked in the CEDS registration data, then each of these methods will appear in the List of Values (LOV) for "Release Detection Method for this inspection". The inspector should choose the primary method of tank release detection[62] for each tank.

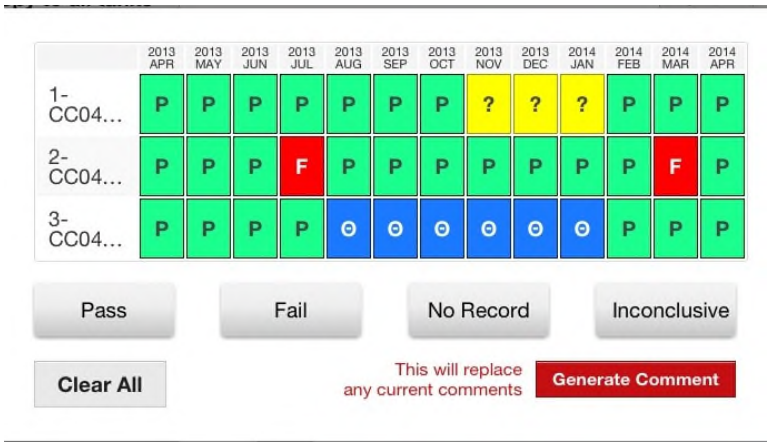
[62] The primary method of tank release detection is typically the "in" compliance method or the method with the least deficiencies.


Verizon
11:38 AM
99%
apps-uat.deq.virginia.gov/DeqStormsMobile/#releas
Search
UST Inspection
Save and return
Tank Release Detection
Copy to all tanks
Show Grid
2
2 10,000gal Gasoline, CURR IN USE
Edit Tank
Installed: 07/04/1994
Tank Release Detection:
Vapor Monitoring, Groundwater Monitoring, Statistical Inventory Reconciliation
Vapor Monitoring
Groundwater Monitoring
Statistical Inventory Reconciliation
Needs Review
Vapor Monitoring
Reason for non-compliance:
Method is not permitted (Tank installed on or after 9/15/10)
Records not provided
Records incomplete
Method not conducted monthly
Site assessment not completed
Wells are improperly designed and/or positioned
Wells not clearly marked and/or secured

If the CEDS registration information is incorrect, then the inspector can edit the tank details by tapping the **Edit Tank** button to access the "Edit Tank Details" as shown below:



The inspector may use the "Grid" to record the release detection results for at least the most recent 8 months of the past 12. The "Grid" can be accessed by tapping **Show Grid** located in the top right corner of the tank RD screen.



<u>Grid Key:</u>

Pass = P	Color: Green
Fail = F	Color: Red
No Record = Ʊ	Color: Blue
Inconclusive = ?	Color: Yellow

The inspector may choose Pass, Fail, No Record, or Inconclusive for each month by tapping the appropriate result and then tapping the corresponding cell. The result may be copied by swiping to corresponding cells. It is possible to amend the results by tapping on the correct result and then tapping the appropriate cell.

The inspector may clear all results by tapping the "Clear All" button in the bottom left hand corner of the grid.

The inspector must tap the red "Generate Comment" box at the bottom right hand corner of the grid to copy the results as text into the "Facility Tank Release Detection Comments" field. **The results must be placed in the comments field in order to appear on the inspection report.**

2.5.5 Piping Release Detection

The Piping Release Detection inspection screen may be accessed by tapping the Pipe Release Detection box from the main screen.

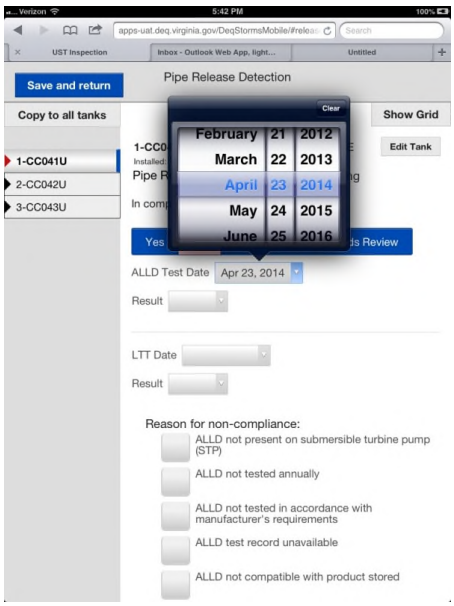
Unlike the Tank RD reasons for non-compliance, the piping release detection reasons are not linked to the specific RD method, rather they are linked to the piping type (suction or pressurized). Additionally, the list of noncompliance reasons will contain generalized reasons for any secondary method used. The inspector needs to ensure that the appropriate piping type (pressure/suction) is marked in order to view the appropriate non-compliance reasons. When no piping RD method is marked under Tank Details, the non-compliance reasons associated with no release detection will be available. The piping type and material of construction may be changed by accessing the "Edit Tank Details" from the piping RD screen by tapping the Edit Tank button in the top right hand corner of the screen.

The Piping RD screen also contains a grid to record RD results. The inspector should use the "Grid" to record the release detection results for the most recent 8 months of 12. The "Grid" may be accessed by tapping the Show Grid button in the top right corner of the piping RD screen. The operation of the grid is discussed in the previous Tank Release Detection section.

If the piping type is marked as pressurized, then automatic line leak detector (ALLD) test and line tightness test (LTT) date and result fields are available to enter the test data. The inspector should record the actual most recent test dates and results. If a date is incorrectly entered, the inspector may tap the Clear button on the top right hand corner of the date pop up window to clear the date and re-enter a new date. The ALLD and LTT data may be copied to all tanks by using the Copy to all tanks button as long as the piping type and release detection method are the same for all piping. If either the piping type or release detection method is different for a

particular tank(s), the test data may not be copied correctly due to the way the application logic is linked.

Note: The "Copy to All Tanks" function should not be used if the piping is different types (pressurized or suction) because it may cause erroneous information to be copied to the wrong tank. This is a known bug currently in the inspection application that should be resolved with a future release of the application.

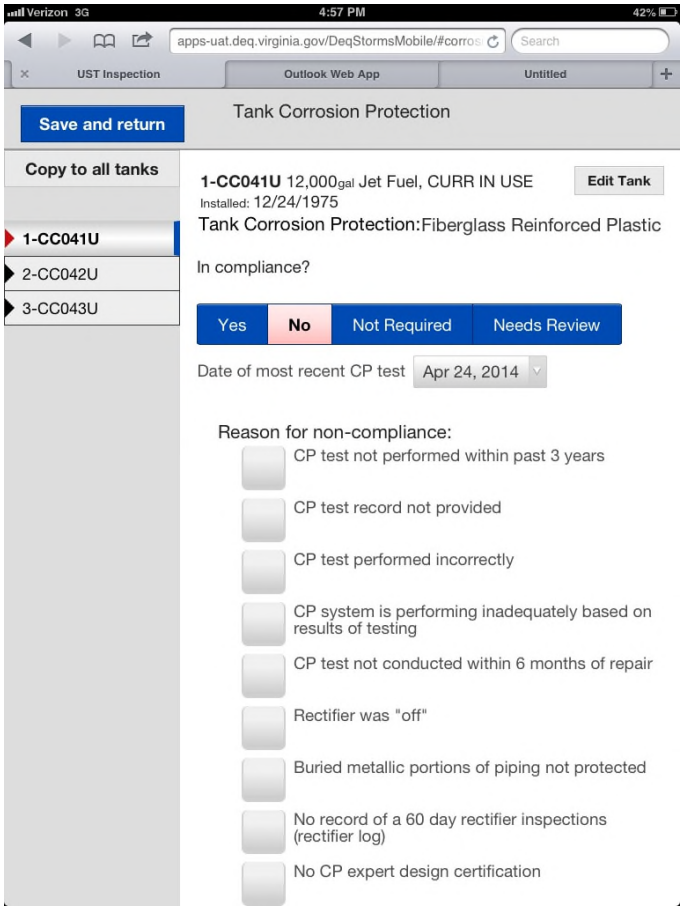


2.5.6 Tank Corrosion Protection

The Tank Corrosion Protection inspection screen may be accessed by tapping the Tank Corrosion Protection box from the main screen.

If the tank is made from or coated with an approved non-corrodible material, then the Yes button should be chosen to indicate that the tank is in compliance with corrosion protection requirements. If the tank is cathodically protected steel and/or lined, the inspector should determine the tank's compliance status. If any corrosion protection issues exist, then the inspector should choose No and mark the appropriate reason for noncompliance by tapping the corresponding box. Internal liner inspection information may be recorded in the tank corrosion protection comment field, if needed.

If the tank is cathodically protected then the inspector should enter the date of the most recent Cathodic Protection (CP) test in the CP test date field (shown below).



2.5.7 Pipe Corrosion Protection

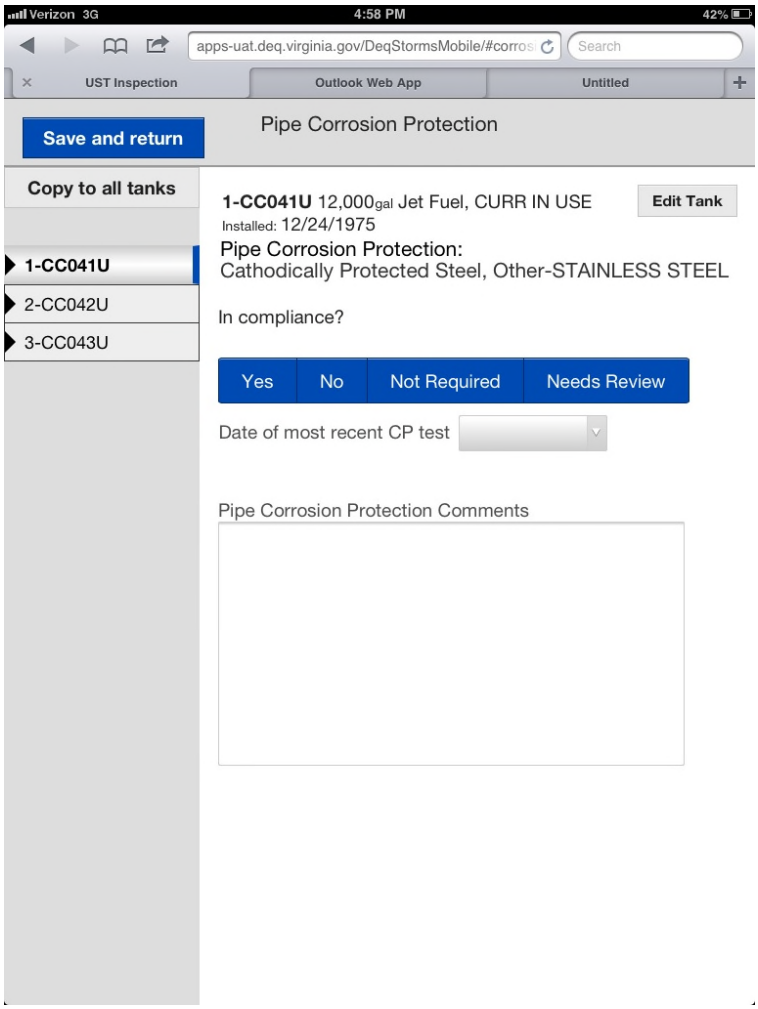
The Pipe Corrosion Protection inspection screen may be accessed by tapping

box from the main screen.

If all piping, including piping connectors, is made from non-corrodible material, then the

button should be chosen to indicate that the piping is in compliance with corrosion protection requirements. If the piping, or any portion of the piping, including connectors, is cathodically protected steel, the inspector should determine the compliance status and indicate any reasons for non-compliance by tapping the corresponding box.

If the piping is cathodically protected then the inspector should enter the date of the most recent Cathodic Protection (CP) test in the CP test date field (shown below).



2.5.8 Secondary Containment

The Secondary Containment inspection screen may be accessed by tapping the Secondary Containment box from the main screen.

The inspector should mark the Not Required compliance option if the tanks and/or piping were installed prior to 9/15/10. For tanks and/or piping installed on or after 9/15/10, the inspector should evaluate compliance with secondary containment requirements and mark the appropriate compliance status.

2.5.9 Operator Training

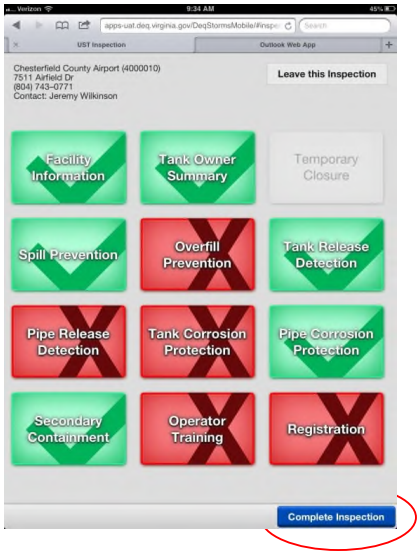
The Operator Training inspection screen may be accessed by tapping the Operator Training box from the main screen. The inspector should evaluate compliance with operator training requirements and mark the appropriate compliance status.

2.5.10 Registration

The Registration inspection screen may be accessed by tapping the Registration box from the main screen. The inspector should evaluate compliance with registration requirements and mark the appropriate compliance status. If any registration data is missing or incorrect, the inspector should record the correct information in the registration comments box.

2.6 Inspection Completion

After all inspection categories have been completed—indicated by green or red colored boxes—the inspector should tap the Complete Inspection button in the bottom right hand corner of the screen to navigate to the inspection summary screen.

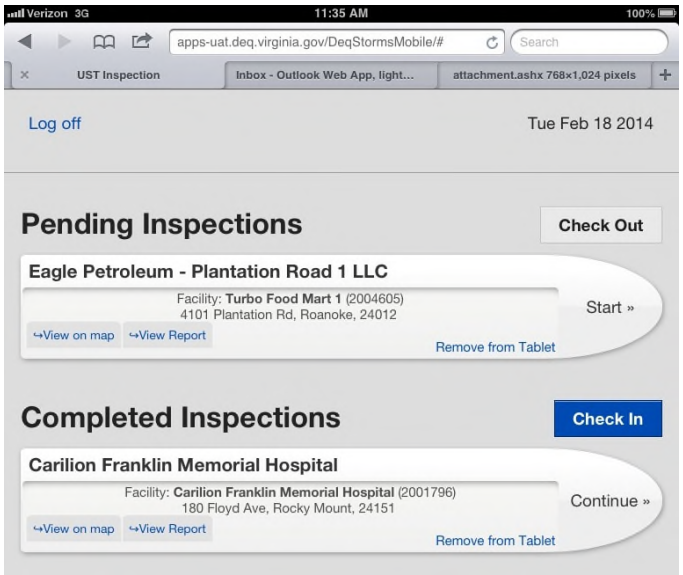


After Complete Inspection is pressed, the Inspection Summary screen appears. The summary screen indicates each inspection category, the compliance status, the tanks and associated deficiencies, actions to take, the inspection date and all comments.

The inspector should verify that all information on the inspection summary is correct. The inspector has the option to change the actual date of the inspection by tapping the inspection date and changing the date by using the calendar function provided.

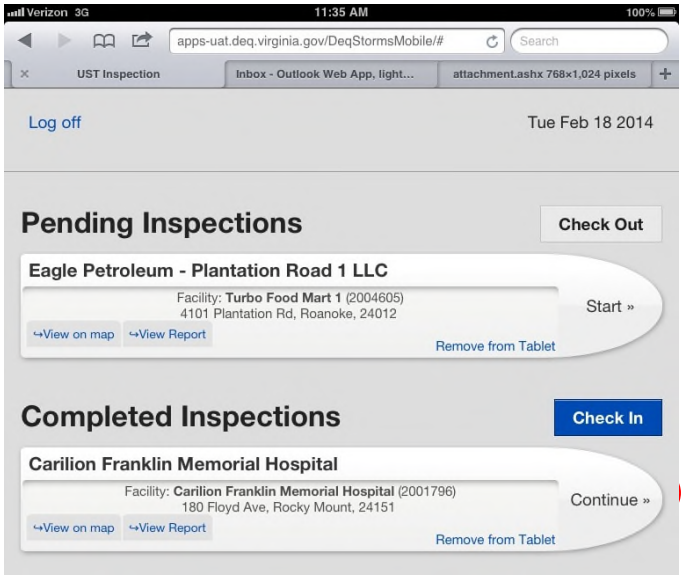
If any information is incorrect, the inspector may tap « Back on the bottom left hand corner, to return to the inspection and make any necessary changes.

If all inspection information is correct, then the inspector may press Submit » to return to the Pending/Completed Inspections screen.



From the Pending/Completed Inspections screen, the inspector may tap on ↪View Report option next to the “view on map” option at the facility bar to view the UST Facility Inspection Report

(Appendix D). If any of the inspection information is incorrect or missing, the inspector may return to the inspection by pressing “Continue”.



2.6.1 Facility Check In

Once all facility inspection information has been captured correctly, the inspector can tap **Check In** to upload the inspection to the CEDS Tank Facility website. Once the facility is checked in and properly uploaded, **it will disappear from the “Completed Inspections” view.**

The inspector can log off the Inspection App by tapping Log off on the top left hand corner of the Pending/Completed Inspection screen.

NOTE: The inspector should always log off when the application is not in use so application updates will take place and to prevent unauthorized access to the Inspection App. Any inspection information that has not been “checked in” will be available when the inspector logs back into the Inspection App.

3 UST Facility Inspection Report

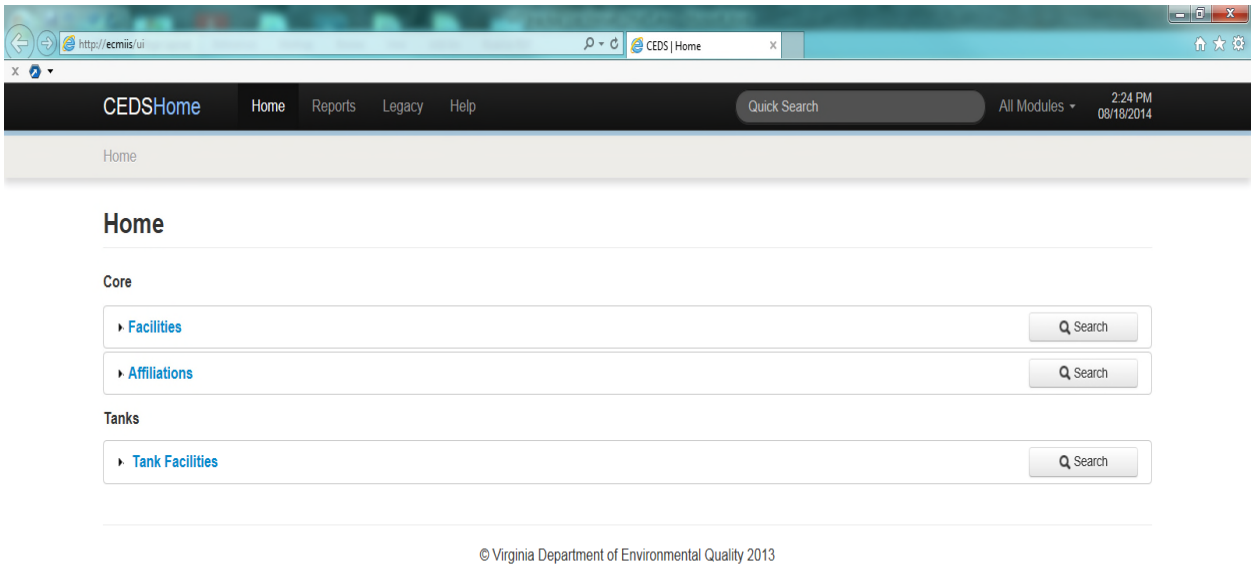
Once the inspection has been checked in from the Inspection App, the inspection information will be visible for viewing/modifying through the new CEDS Tank Facility website and through Legacy CEDS[63] for some of the information. The mobile inspection information can then be

[63] Legacy CEDS is the original Oracle based CEDS database.

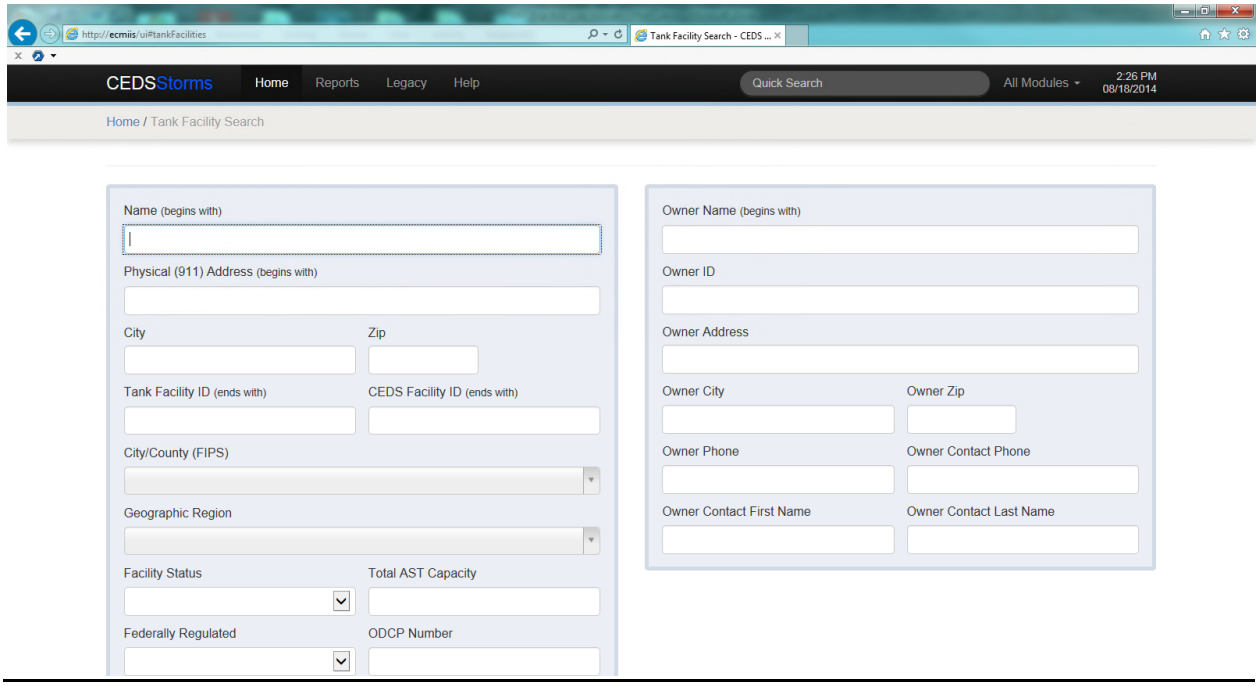
viewed, edited, and the inspection report printed from the new CEDS Tank Facility website or Legacy CEDS.

3.1 Accessing the Inspection Data and Report

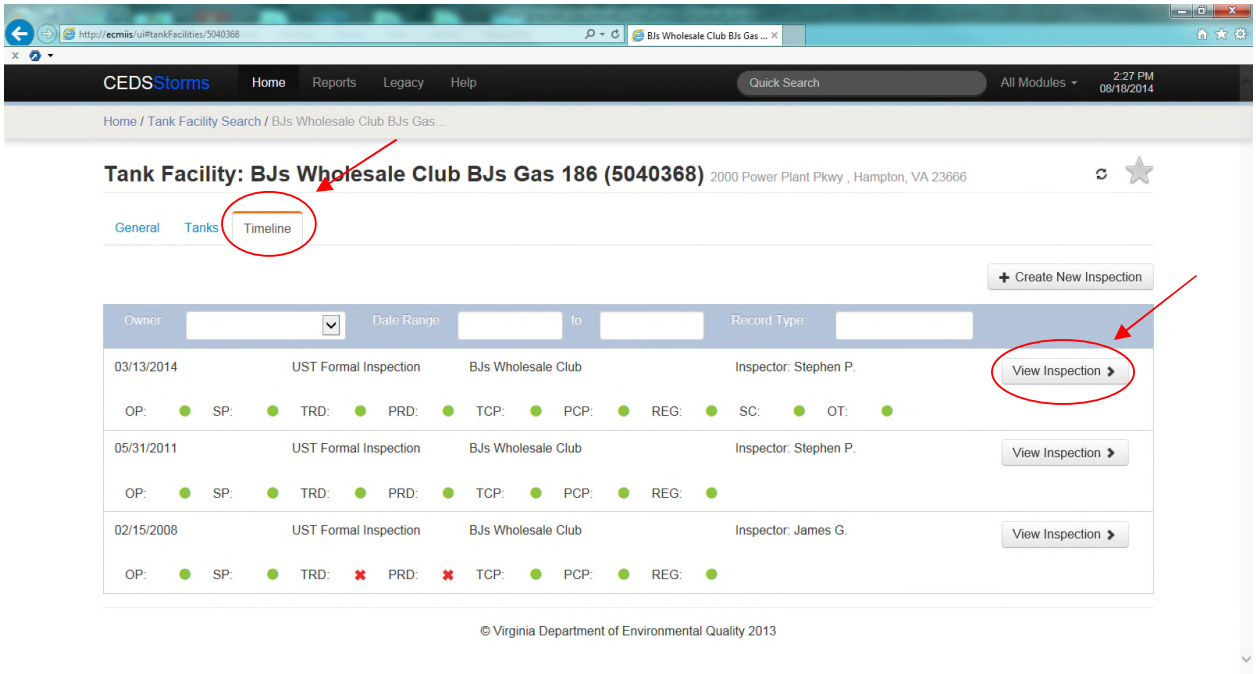
In order to view the inspection, the inspector should access the new CEDS Home screen by using the following URL: http://ecmiis/ui. Then, the inspector should click the "Search" button to the right of "Tank Facilities". The Tank Facility search screen will appear and the inspector can query for the inspected facility using one or more of the query parameters.



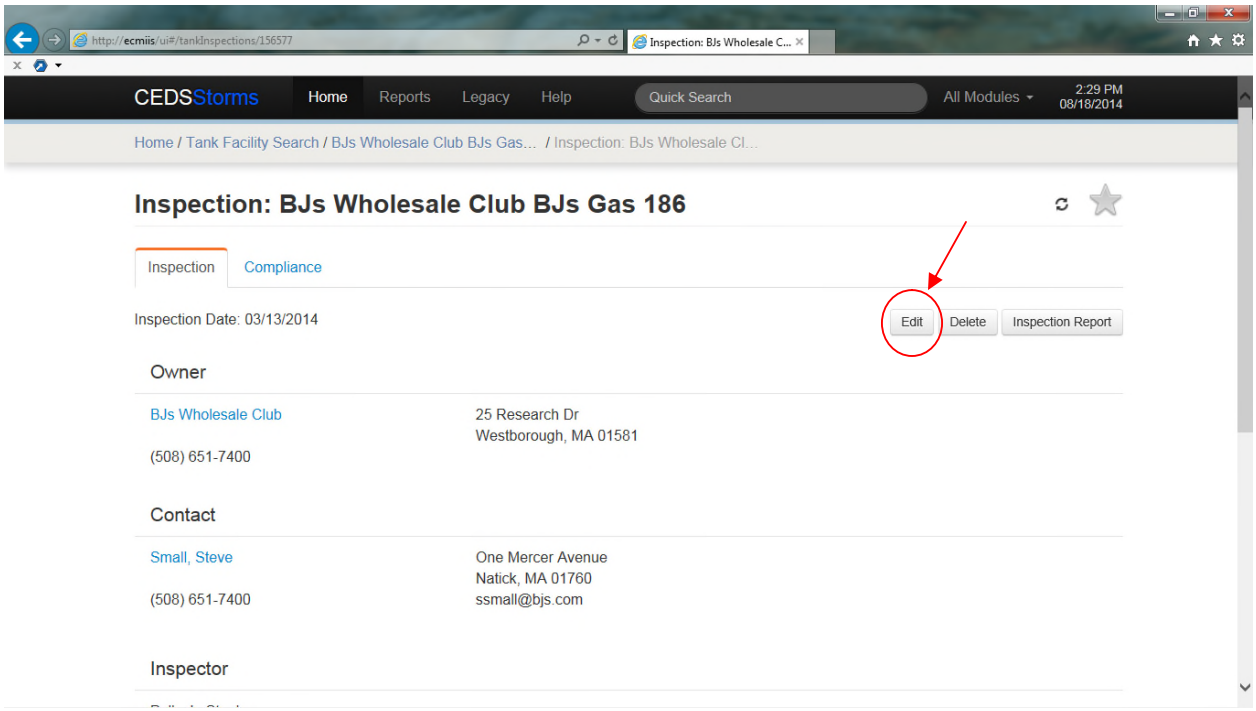
Search Screen:



Once the search result list appears, click on the name of the appropriate facility to access it. Then, navigate to the Timeline tab and access the inspection. Tap the "View Inspection" button associated with the proper inspection to access it.

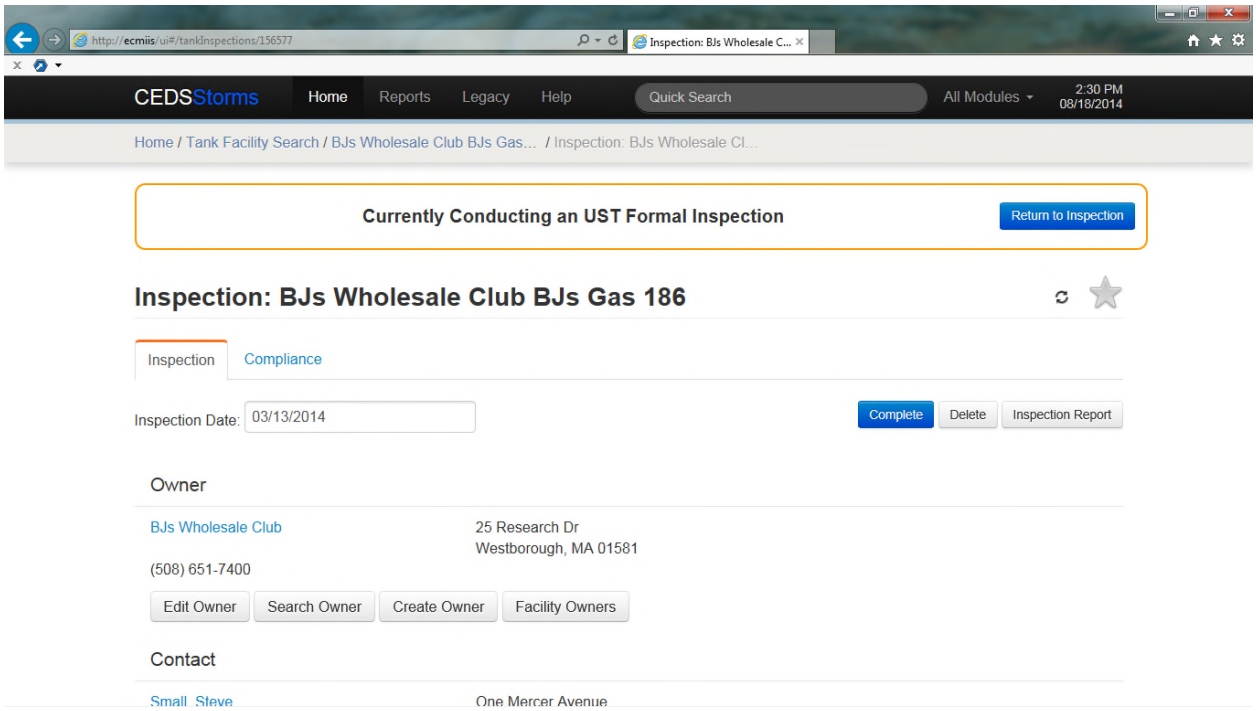


From the “Inspection Screen”, the inspection data can be edited by double-clicking the “edit” button on the top right hand corner of the screen. Then the owner, contact, inspector, or tank information may be edited by selecting the appropriate buttons or hyperlinks on the page.



The entire tank inspection may be deleted by choosing the “delete” button in the right hand corner. **If the entire inspection is deleted it cannot be retrieved from CEDS or the Inspection App.** It will need to be completely recreated in new CEDS or in the Inspection App.

The “Inspection Report” button can be chosen to view a .pdf file of the inspection report (Appendix D). The report may then be added to ECM or printed.



4 How to Store Files on IPad

Although many functions of the IPad are limited, files may be stored on the IPad using the iBooks application (app). You may wish to store reference manuals or specific facility compliance information on your IPad for reference while in the field. The file must be a .pdf format.

<u>Follow these instructions to store .pdf files on the IPad:</u>

1. If the file is not a .pdf file, use Nuance to convert it to a .pdf format.

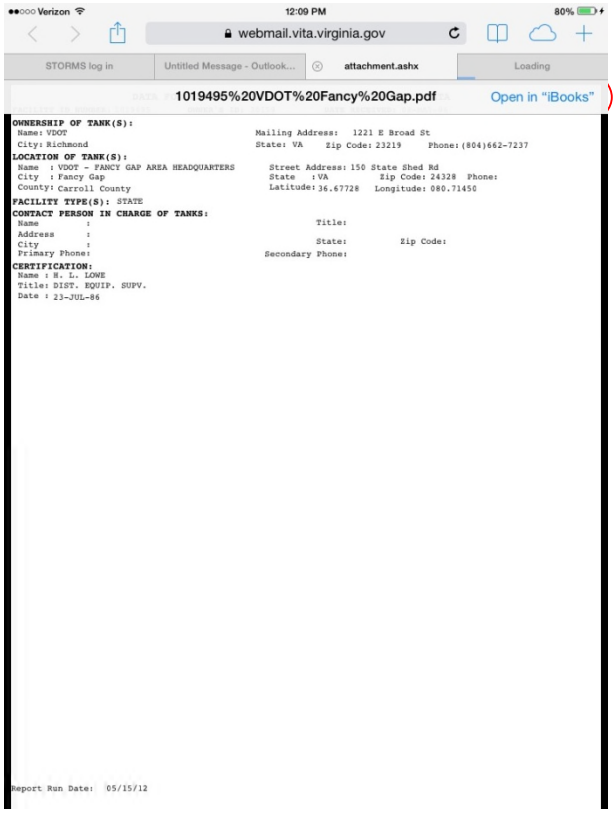
2. From your laptop or desktop, email yourself the document which you would like to store on the IPad.

3. Choose the Outlook Web Application from the Home screen.

4. Open you Outlook email using the Outlook Web App. Use the same username and password you use to log into Windows or your computer.

5. Open the email and attachment from Step 2. The attachment may be opened by tapping on its name from the body of the email.

6. At the top right hand corner of the IPad, click on the blue “Open in iBooks” option. If the option is not available, tap at the top of your document and the option should briefly appear.

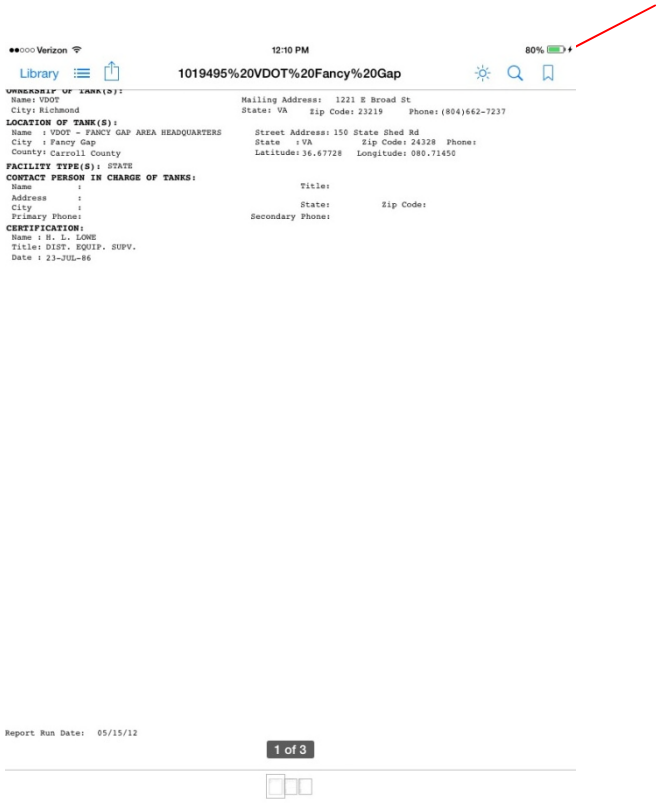


7. The .pdf document will automatically be saved in iBooks “PDFs” documents.

8. In order to access the document in the future, tap

from the IPad Home screen. You will then see all your stored PDFs.

9. Tap on the document you wish to view. You can scroll through the document pages by swiping left and right. You may also press the search icon to search the document using keywords.



Spill Prevention

Compliance Options:

Yes: Use this option if the spill prevention/bucket is present and meets the ALL regulatory criteria.

No: Use this option if spill prevention/bucket does NOT meet ALL regulatory criteria.

Not Required: Use this option if spill prevention is not required by the regulation (i.e. tank does not receive more than 25 gallons at a time).

Needs Review: Use this option if peer review is necessary or compliance may not be determined in the field.

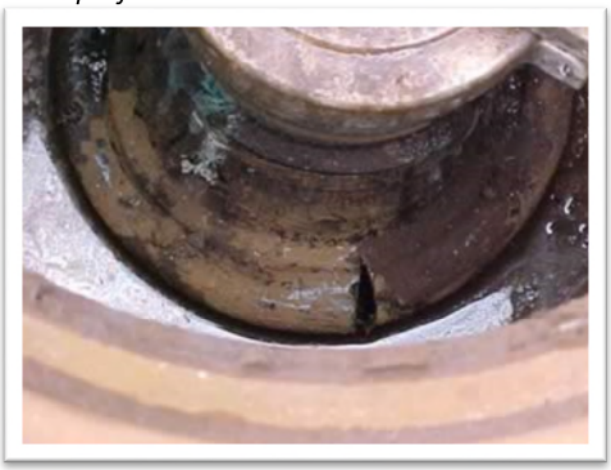
Copy to All: Use this function to copy compliance determination and reason for compliance to ALL tanks. The copied information may be removed from particular tank(s) by choosing that tank and selecting different compliance options (the copied data will remain for tanks where the information is not changed after selecting "copy to all tanks").

Reasons for Noncompliance

- **Spill prevention device is not present.**
  - *Ex. Fill port without spill containment. See right photo below.*

- **Spill Prevention device has holes and/or cracks.** See left photo below.

- **Unable to verify.**
  - *Ex. Vehicles were parked on top of fill ports so physical inspection of the fill ports was not able to be performed.*



Overfill Prevention

Compliance Options:
Yes: Use this option if the overfill prevention device is present and meets the ALL regulatory criteria.

No: Use this option if the overfill prevention device does NOT meet ALL regulatory criteria.

Not Required: Use this option if overfill prevention is not required by the regulation (i.e. tank does not receive more than 25 gallons at a time).

Needs Review: Use this option if peer review is necessary or compliance may not be determined in the field.

Copy to All: Use this function to copy compliance determination and reason for compliance to ALL tanks. The copied information may be removed from particular tank(s) by choosing that tank and selecting different compliance options (the copied data will remain for tanks where the information is not changed after selecting "copy to all tanks").

Reasons for Noncompliance

- **Overfill Prevention device is not present.**

- **No record or visual signs of overfill prevention.** Evidence of overfill prevention was not provided during the inspection. UST Registration form Notification for Underground Storage Tanks Form 7530 does not indicate overfill was installed.

- **Overfill Prevention device does not shut off, alarm, or restrict flow at required volume.**
  - Ex. Shutoff valve is not properly positioned to flow or alert driver at 95% full.

- **Shutoff device is not operational.**
  - Ex. Stick has been placed in fill riser and is impeding the shut off valve.

- **Alarm is not operational.**

- **Alarm is not audible or visible to delivery driver.** Alarm must be outside where the transport can hear or see the alarm while delivering fuel.

- **Ball float is damaged or broken.**

- **Unable to verify.** Choose this option if the Notification for Underground Storage Tanks Form 7530 does not indicate that overfill prevention exists and you could not verify that overfill exists. Ex. The registration data does not indicate that overfill exists and a car is parked on top of the tanks so you can not verify if a shut off valve exists.

- **Other.**

Temporary Closure

Compliance Options:

Yes: Use this option if the UST system meets all the regulatory requirements for temporary closure.

No: Use this option if the UST system does NOT meet ALL regulatory criteria for temporary closure.

Not Required: This option is not applicable for temporary closure.

Needs Review: Use this option if peer review is necessary or compliance may not be determined in the field.

Copy to All: Use this function to copy compliance determination and reason for compliance to ALL tanks. The copied information may be removed from particular tank(s) by choosing that tank and selecting different compliance options (the copied data will remain for tanks where the information is not changed after selecting "copy to all tanks").

Reasons for Noncompliance

- **Necessary equipment not secured.** All lines, pumps, manways, and ancillary equipment should be capped and secured. Locks or bolts are acceptable means of securing the fill pipes and dispenser nozzles.

- **Vent line closed/not functioning.** Vent lines must remain open to allow the vapors to escape the UST and avoid an explosion.

- **Building permit not obtained.**

- **Corrosion protection system not maintained.** Cathodic protection (CP) systems must be maintained even if the tank(s) is empty. The CP system must remain "on". CP systems should be tested every 3 years. Rectifiers must be checked every 60 days, for impressed current systems.

- **Release detection not conducted.** Tank and Piping release detection must be conducted if the tank contains greater than 1 inch of fuel.

- **Other**

Note: UST systems may remain temporarily closed indefinitely unless they are not protected against corrosion.

Inventory Control and Tank Tightness Testing (IC + TTT)

Compliance Options:

Yes: Use this option if tank release detection method meets ALL the regulatory criteria for IC+TTT.

No: Use this option if tank release detection method does NOT meet ALL regulatory criteria for IC+TTT.

Not Required: Use this option if release detection is not required by the regulation (i.e., emergency generator tanks installed prior to 9/15/10 or empty temporarily out of use tanks).

Needs Review: Use this option if peer review is necessary or compliance may not be determined in the field.

Copy to All: Use this function to copy compliance determination and reason for compliance to ALL tanks. The copied information may be removed from particular tank(s) by choosing that tank and selecting different compliance options (the copied data will remain for tanks where the information is not changed after selecting "copy to all tanks").

Reasons for Noncompliance

- **Tank was installed or upgraded >10 yrs ago.** IC + TTT cannot be used if UST was installed or protected against corrosion >10 years ago (method expired).

- **Method not permitted (UST installed on or after 9/15/10).** IC +TTT may not be used for tanks installed on or after 9/15/10. Interstitial monitoring must be used for tanks installed on or after 9/15/10.

- **Records not provided.** If no records are provided use this option. The most recent 8 months of records must be provided.
  - *Ex. Records kept off-site and not available before or at the time of the inspection.*

- **Records incomplete.** If some, but not all (most recent 8 months only), records are provided use this option.
  - *Ex. Missing 1 out of 8 months Inventory Control monthly record log sheet.*

- **Method not conducted at least monthly.** *Choose this option if IC is not conducted at least once a month (wi*th intervals no longer than 45 days).
  - *Ex. No IC records for some months due to not being performed.*

- **Not sticking tank daily.** Choose this option if the level of product in the UST has not been checked every day of normal operation.

- **Not reconciling data.** Choose this option if the daily overages and shortages were not reconciled within 1% plus 130 gallons of the tanks monthly throughput every month for the past 8 months.

- **Equipment not capable of 1/8 inch measurements.**

- *Ex. Stick broken, button missing from bottom of stick, stick doesn't have 1/8th inch measurements, etc.*

- **Not monitoring for water monthly.** Choose this option if records were not provided to indicate that water levels inside the tank were checked at least monthly.

- **TTT not conducted within past 5 years.** Choose this option if a TTT was not provided at the time of inspection.

Manual Tank Gauging (MTG)

Compliance Options:

Yes: Use this option if the tank release detection method meets ALL regulatory criteria for MTG.

No: Use this option if the tank release detection method does NOT meet ALL regulatory criteria for MTG.

Not Required: Use this option if release detection is not required by the regulation (i.e., emergency generator tanks installed prior to 9/15/10 or empty temporarily out of use tanks).

Needs Review: Use this option if peer review is necessary or compliance may not be determined in field.

Copy to All: Use this function to copy the compliance determination and reason for non-compliance to ALL tanks. The copied information may be removed from particular tank(s) by choosing that tank and selecting different compliance options (the copied data will remain for tanks where the information is not changed after selecting "copy to all tanks").

Reasons for Noncompliance

- **Method has expired.** MTG may only be used for 10 years after install/upgrade date if the tank is 1,001-2,000 gallons.

- **Method is not permitted (Tank is greater than 2,000 gallons).** MTG may only be used for tanks that are 2,000 gallons or smaller.

- **Method is not permitted (Tank installed on or after 9/15/10).** MTG may not be used for tanks installed on or after 9/15/10. Interstitial monitoring must be used for tanks installed on or after 9/15/10.

- **Records not provided.** If no records are provided use this option. The most recent 8 months of records must be provided.
  - *Ex. Records kept off-site and not available before or at the time of the inspection.*

- **Records incomplete.** If some, but not all (most recent 8 months only), records are provided use this option.
  - *Ex. Missing 1 out of 8 months MTG monthly record log sheet.*

- **Method not conducted at least weekly.** Use this option if the Tank(s) were not taken out of service weekly for specified period of time (see Table 1-1 below).

- **Not reconciling data.** Data must be reconciled monthly by averaging the 4 weekly readings and comparing with the results in Table 1-1.

- **Equipment not capable of 1/8 inch measurements.** Use this option if the stick is not in good condition. The white tip button should be visible and the measuring stick should be marked off in legible 1/8 inch readings.

- **TTT not conducted within past 5 years.** Tanks between 551-1,000 gallons must be tightness tested every 5 years unless the tank diameter is 48" or 64". **Tanks 1,001-2,000 gallons must be tightness tested every 5 years if using MTG.**

- Additional Reference: http://www.epa.gov/swerust1/pubs/manltank.pdf.

Table 1-1

Tank Size	Minimum Duration of Test	Weekly Standard (1 test)	Monthly Standard (4 test average)
Up to 550 gallons	36 hours	10 gallons	5 gallons
551-1,000 gallons (when tank diameter is 64")	44 hours	9 gallons	4 gallons
551-1,000 gallons (when tank diameter is 48")	58 hours	12 gallons	6 gallons
551-1,000 gallons (also requires tank tightness test every 5 years)	36 hours	13 gallons	7 gallons
1,001-2,000 gallons (also requires periodic tank tightness testing)	36 hours	26 gallons	13 gallons

Automatic Tank Gauge (ATG)

Compliance Options:

Yes: Use this option if tank release detection method meets ALL the regulatory criteria for ATG.

No: Use this option if tank release detection method does NOT meet ALL regulatory criteria for ATG.

Not Required: Use this option if release detection is not required by the regulation (i.e., emergency generator tanks installed prior to 9/15/10 or empty temporarily out of use tanks).

Needs Review: Use this option if peer review is necessary or compliance may not be determined in the field.

Copy to All: Use this function to copy compliance determination and reason for compliance to ALL tanks. The copied information may be removed from particular tank(s) by choosing that tank and selecting different compliance options (the copied data will remain for tanks where the information is not changed after selecting "copy to all tanks").

Reasons for Noncompliance

- **Method not permitted (UST installed on or after 9/15/10).** ATG may not be used for tanks installed on or after 9/15/10. Interstitial monitoring must be used for tanks installed on or after 9/15/10.

- **Records not provided.** If no records are provided use this option. The most recent 8 months of records must be provided.

  - *Ex. Records kept off-site and not available before or at the time of the inspection.*

- **Records incomplete.** If some, but not all (most recent 8 months only), records are provided use this option.
  - *Ex. Missing 1 out of 8 months ATG in-tank tests.*

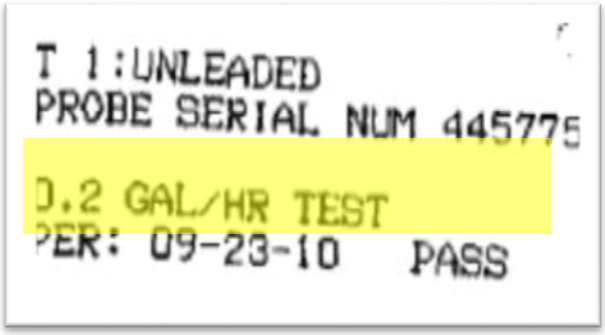
- **Method not conducted monthly.** Choose this option if ATG is not conducted at least once a month (with intervals no longer than 45 days).
  - *Ex. No ATG records for some months due to not being performed or low level fuel errors.*

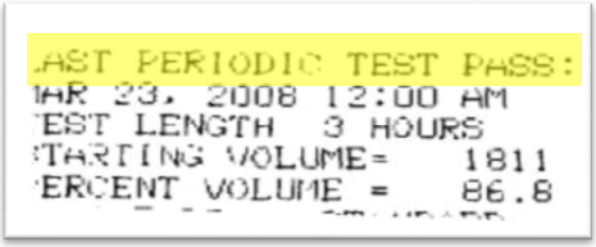
- **ATG improperly set up.** Choose this option if it appears that ATG is not set up properly. The ATG Setup will need to be printed to see this kind of detail.
  - *Ex. Thermal coefficient not correct for the product stored.*

- **Invalid test results (no pass/fail result).** ATG has not conducted a valid test (does not provides a Pass or Fail result).
  - *Ex. Low Level Test Error due to low product in the tank at the time of the test.*

Hints/Tips

1. Monthly report must be from a “periodic test” or say “0.2gph”. “Gross” tests are not valid monthly tests. “Annual” (0.1gph) tests must be conducted every month to meet the regulatory requirements.
2. If UST has a ball float for overfill prevention, check that the ATG probe cap is air tight and not broken.
3. If tanks are manifolded, many ATGs require siphon break valves or CSLD/SCALD software to conduct a proper in-tank test. Check with the manufacturer for specifications.
4. For tanks larger than 15,000 gallons, the ATG model number and software should be noted in order to ensure the ATG model and software are compatible with tanks larger than 15,000 gallons.





Interstitial Monitoring (IM)

Compliance Options:

Yes: Use this option if the tank release detection method meets ALL regulatory criteria for IM.

No: Use this option if the tank release detection method does NOT meet ALL regulatory criteria for IM.

Not Required: Use this option if release detection is not required by the regulation (i.e., emergency generator tanks installed prior to 9/15/10 or empty temporarily out of use tanks).

Needs Review: Use this option if peer review is necessary or compliance may not be determined in the field.

Copy to All: Use this function to copy the compliance determination and reason for non-compliance to ALL tanks. The copied information may be removed from particular tank(s) by choosing that tank and selecting different compliance options (the copied data will remain for tanks where the information is not changed after selecting "copy to all tanks").

Reasons for Non-compliance

- **Records not provided.** If no records are provided use this option. The most recent 8 months of records must be provided.
  - *Ex. Records kept off-site and not available before or at the time of the inspection.*

- **Records incomplete.** If some, but not all (most recent 8 months only), records are provided use this option.
  - *Ex. Missing 1 out of 8 months ATG in-tank tests.*

- **Method not conducted monthly.** IM must be conducted at least once a month (with intervals no longer than 45 days).
  - *Ex. No ATG records for some months due to not being performed or low level fuel errors.*

- **Sensors are positioned/installed improperly.** Interstitial Monitoring sensors should be positioned and installed in accordance with the manufacturer's requirements.

- **Device is set up/programmed improperly.**

Hints/Tips

- Interstitial Monitoring **must** be used for release detection for tanks installed on or after 9/15/10.

Vapor Monitoring (VM)

Compliance Options:

Yes: Use this option if the tank release detection method meets ALL regulatory criteria for VM.

No: Use this option if the tank release detection method does NOT meet ALL regulatory criteria for VM.

Not Required: Use this option if release detection is not required by the regulation (i.e., emergency generator tanks installed prior to 9/15/10 or empty temporarily out of use tanks).

Needs Review: Use this option if peer review is necessary or compliance may not be determined in field.

Copy to All: Use this function to copy the compliance determination and reason for non-compliance to ALL tanks. The copied information may be removed from particular tank(s) by choosing that tank and selecting different compliance options (the copied data will remain for tanks where the information is not changed after selecting "copy to all tanks").

Reasons for Noncompliance

- **Method is not permitted.** VM may not be used as a method of release detection for tanks installed on or after 9/15/10. Interstitial Monitoring must be used for release detection for tanks installed on or after 9/15/10.

- **Records not provided.** If no records are provided use this option. The most recent 8 months of records must be provided.

- **Records incomplete.** If some, but not all (most recent 8 months only), records are provided use this option.

- **Method not conducted monthly.** VM must be conducted at least once a month (with intervals no longer than 45 days).

- **Site assessment not completed.** A site assessment must be completed. The site assessment should follow the Evaluation of Vapor Monitoring Data for Petroleum Storage Tank Release Detection guidance. The site assessment may be conducted by the tank owner/operator as long as the assessment addresses the following:

  a. The backfill should be sufficiently porous to allow migration of vapors from the tank system to the vapor monitoring points. Most commonly used backfill materials such as sand or pea gravel are sufficiently porous whereas native clay soils may not be porous enough for vapor migration.
  b. The product stored in the tank must be sufficiently volatile to be detected if it is released. Vapor monitoring is an acceptable method for a volatile substance such as gasoline, but not for heavy, less volatile petroleum products such as crude oil or residual fuel oils. The ability to vapor monitor middle distillates such as diesel and kerosene is questionable.
  c. The measurement of vapors cannot be rendered inoperative by groundwater changes, rainfall, soil moisture, or other site conditions. Groundwater should not be present in the vapor monitoring wells.

d. Background contamination levels must be determined. The Evaluation of Vapor Monitoring Data for Petroleum Storage Tank Release Detection guidance contains instructions for determining background contamination levels.

- **Wells are improperly designed and/or positioned.** An inspector may use their expertise to determine if the wells are properly designed and positioned. Further investigation may be necessary by an environmental consultant for atypical installations.

- **Wells not clearly marked and/or secured.** Proper markings may be the official API triangle symbol or a label indicating the well is a monitoring well and should not be filled. Lids that are bolted down or are locked are considered secured. Any of the following are acceptable markings.

Groundwater Monitoring (GWM)

Compliance Options:

Yes: Use this option if tank release detection method meets ALL the regulatory criteria for GWM.

No: Use this option if tank release detection method does NOT meet ALL regulatory criteria for GWM.

Not Required: Use this option if release detection is not required by the regulation (i.e., emergency generator tanks installed prior to 9/15/10 or empty temporarily out of use tanks).

Needs Review: Use this option if peer review is necessary or compliance may not be determined in the field.

Copy to All: Use this function to copy compliance determination and reason for compliance to ALL tanks. The copied information may be removed from particular tank(s) by choosing that tank and selecting different compliance options (the copied data will remain for tanks where the information is not changed after selecting "copy to all tanks").

Reasons for Noncompliance

- **Method is not permitted (UST installed on or after 9/15/10).** GWM may not be used as a method of release detection for tanks installed on or after 9/15/10. Interstitial Monitoring must be used for release detection for tanks installed on or after 9/15/10.

- **Records not provided.** If no records are provided use this option. The most recent 8 months of records must be provided.

- **Records incomplete.** If some, but not all (most recent 8 months only), records are provided use this option.

- **Method not conducted monthly.** GWM must be conducted at least once a month (with intervals no longer than 45 days).

- **Site assessment not completed.** A site assessment must be completed. The site assessment may be conducted by the tank owner/operator as long as the assessment addresses the following:
  a. Substance stored is not readily miscible in water and has a specific gravity of less than one;
  b. Ground water is never more than 20 feet from the ground surface and the hydraulic conductivity of the soils between the UST system and the monitoring wells or devices is not less than 0.01 cm/sec (e.g. the soil should consist of gravels coarse to medium sands, coarse silts or other permeable materials);
  c. The slotted portion of the monitoring well casing must be designed to prevent migration of natural soils of filter pack into the well and to allow entry of regulated substance on the water table into the well under both high and low ground water conditions;
  d. Monitoring wells shall be sealed from the ground surface to the top of the filter pack;
  e. Monitoring wells or devices intercept the excavation zone or are as close to it as is technically feasible;
  f. The continuous monitoring devices or manual methods used can detect the presence of at least 1/8 of an inch of free product on top of the groundwater in the monitoring wells.

- **Groundwater is never more than 20 feet from surface.**

- **Wells are improperly designed and/or positioned.** An inspector may use their expertise to determine if the wells are properly designed and positioned. Further investigation may be necessary by the owner's environmental consultant for atypical installations.

- **Wells not clearly marked and/or secured.** Proper markings may be the official API triangle symbol or a label indicating the well is a monitoring well and should not be filled. Lids that are bolted down or are locked are considered secured.

- **Product miscible in water.** The stored substance should not be "dissolvable" in water. Petroleum products are not miscible in water.

- **Product specific gravity is less than one.**

- **Monitoring device cannot detect at least 1/8 inch of product.**

Statistical Inventory Reconciliation (SIR)

Compliance Options:

Yes: Use this option if tank release detection method meets ALL the regulatory criteria for SIR.

No: Use this option if tank release detection method does NOT meet ALL regulatory criteria for SIR.

Not Required: Use this option if release detection is not required by the regulation (i.e., emergency generator tanks installed prior to 9/15/10 or empty temporarily out of use tanks).

Needs Review: Use this option if peer review is necessary or compliance may not be determined in field.

Copy to All: Use this function to copy compliance determination and reason for compliance to ALL tanks. The copied information may be removed from particular tank(s) by choosing that tank and selecting different compliance options (the copied data will remain for tanks where the information is not changed after selecting "copy to all tanks").

Reasons for Noncompliance

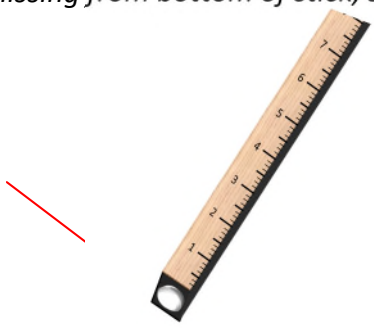
- **Method not permitted (UST installed on or after 9/15/10).** SIR may not be used for tanks installed on or after 9/15/10. Interstitial monitoring must be used for tanks installed on or after 9/15/10.

- **Records not provided.** If no records are provided use this option. The most recent 8 months of records must be provided.
  - *Ex. Records kept off-site and not available before or at the time of the inspection.*

- **Records incomplete.** If some, but not all (most recent 8 months only), records are provided use this option.
  - *Ex. Missing 1 out of 8 months SIR results.*

- **Method not conducted monthly.** Choose this option if ATG is not conducted at least once a month (with intervals no longer than 45 days).
  - *Ex. No SIR records for some months due to not being performed or low level fuel errors.*

- **Equipment not capable of 1/8 inch measurements.**
  - *Ex. Stick broken, button missing from bottom of stick, stick doesn't have 1/8th inch measurements, etc.*



Piping Release Detection
Pressurized Piping

Compliance Options:

Yes – Use this option if piping release detection method meets ALL the regulatory criteria for piping release detection.

No – Use this option if piping release detection method does NOT meet ALL regulatory criteria for piping release detection.

Not Required – Use this option if piping release detection is not required by the regulation (i.e., safe suction piping, emergency generator piping installed prior to 9/15/10, or empty temporarily out of use tank.

Needs Review – Use this option if peer review is necessary or compliance may not be determined in the field.

Copy to All – Use this function to copy the compliance determination, the reason for non-compliance, and the testing dates to ALL tanks. The copied information may be removed from particular tank(s) by choosing the tank and selecting different compliance options (the copied data will remain for tanks where the information is not changed after selecting "copy to all tanks").

ALLD Test Date: Enter the automatic line leak detector (ALLD) test date from the most recent record provided.

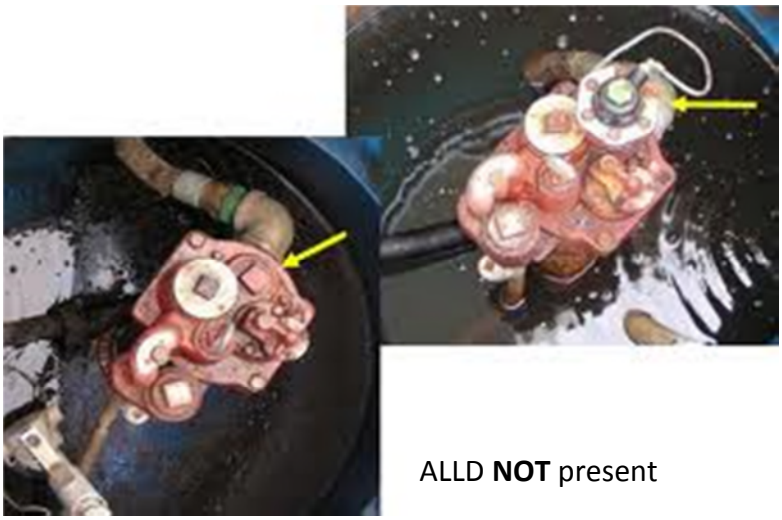
Result: Choose "Passed" or "Failed" as indicated on the most recent ALLD test record provided.

LTT Date: Enter the line tightness test (LTT) date from the most recent record provided.

Result: Choose "Passed" or "Failed" as indicated on the most recent LTT record provided.

Reasons for Noncompliance

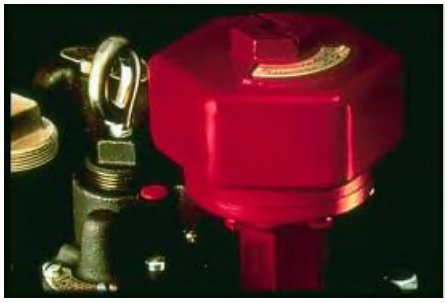
- **ALLD not present on submersible turbine pump (STP).**



ALLD Present

ALLD **NOT** present

- **ALLD not tested annually.** Facility contact indicated that the ALLD was not tested within the past 12 months and an operable sump sensor was not present to act as the ALLD.
- **ALLD not tested in accordance with manufacturer's requirements.** Review of available records indicated that the ALLD was tested improperly.
- **ALLD test record unavailable.** ALLD test records were not provided during the inspection and an operable sump sensor was not present to act as the ALLD.
- **ALLD not compatible with product stored.** According to the manufacturer, Red Jacket Diesel ALLDs (green center) may <u>not</u> be used for gasoline. Red Jacket Diesel ALLDs may be used for diesel or kerosene systems. However, Red Jacket Gasoline ALLDs may be used for all products. Sump sensors used as ALLDs must be compatible with stored product.
- **ALLD failed and not replaced.**
- **Unable to verify presence of ALLD.** Use this option if unable to access the STP sump to verify the presence or absence of an ALLD.



- **Method is not permitted (piping is installed on or after 9/15/10).** Only interstitial monitoring may be used as a method of release detection for piping installed on or after 9/15/10. If greater than 50% of the piping was replaced on or after 9/15/10, then all of the piping must have been replaced and interstitial monitoring instituted on the new/replaced piping.

Ex. Replaced 9 ft of SW FRP piping for Tank 1 (total T1 piping length is 20ft). Secondary release detection method may be any of the normally acceptable methods.
Ex. Replaced 11 ft of SW FRP piping for Tank 1 (total T1 piping length is 20 ft). Secondary method must be interstitial monitoring and all 20 ft. of piping must have been replaced.

- **Line tightness test (LTT) not conducted annually**. A review of the most recent line tightness test record indicated that the test was not conducted within the past year.
- **Line tightness test (LTT) record unavailable.** The facility contact indicated that a line tightness test had been conducted, but the test was not provided on or before the inspection.
- **Monthly monitoring records not provided**. Documentation was not provided to demonstrate that a second method of release detection, either annual line tightness testing or monthly monitoring, had been conducted on the pressurized piping.
- **Monthly monitoring records incomplete**. If some, but not all (most recent 8 months only), records are provided use this option. *Ex. Missing 1 out of 8 months SIR results.*
- **Method not conducted monthly.** Tests not performed monthly according to compliance contact (with intervals no longer than 45 days).
- **Device is set up/programmed improperly.**
  Ex. Electronic line leak detector not programmed to test piping.
- **Sensors are positioned/installed improperly.** Not positioned on bottom of sump.
- **Equipment is not compatible with substance stored.**
  Ex. Red Jacket FX1DV (diesel leak detector) installed on gasoline UST.
- **Site assessment not completed** (for groundwater or vapor monitoring).
- **Wells are improperly designed and/or positioned** (for groundwater or vapor monitoring).
  Wells not clearly marked and/or secured (for groundwater or vapor monitoring).
- **Wells not clearly marked and/or secured.** Use this option if groundwater or vapor monitoring is the method of release detection and the wells are not properly labeled and secured. Wells are typically labeled via a manhole cover with a black triangle and white background. However, any type of label that clearly identifies the well as a monitoring well will suffice. Wells may be secured with a lock, steel pipe cap that may only be removed with a pipe wrench, or a bolted down manhole cover.

Tank and Piping Corrosion Protection

Compliance Options:

Yes: Use this option if the tank/piping is properly protected against corrosion and meets ALL regulatory criteria for corrosion protection.

- *Ex. Tank is constructed of fiberglass reinforced plastic.*
- *Ex. Tank is cathodically protected and meets all regulatory requirements for cathodic protection systems.*
- *Ex. Tank has an internal liner that has been inspected within the first 10 or subsequent 5 years.*

No: Use this option if the tank/piping is not protected against corrosion or the cathodic protection system does NOT meet ALL regulatory criteria.

- *Ex. Tank is bare steel.*
- *Ex. Tank is cathodically protected (CP) but the last CP test was conducted >3 years ago.*

Not Required: This option may not be used since corrosion protection is required for all regulated tanks.

Needs Review: Use this option if peer review is necessary or compliance may not be determined in field.

Copy to All: Use this function to copy compliance determination and reason for compliance to ALL tanks. The copied information may be removed from particular tank(s) by choosing that tank and selecting different compliance options (the copied data will remain for tanks where the information is not changed after selecting "copy to all tanks").

Date of most recent CP test: Enter the date of the most recent cathodic protection test record provided (if applicable). Leave blank if the tank is not cathodically protected.

Reasons for Noncompliance

- **CP test not performed within past 3 years.** Test not performed according to compliance contact.

- **CP test record not provided.** No records available at the time of the inspection.

- **CP test performed incorrectly.**
  - *Ex. No remote test performed on a galvanically protected UST (sti-P3®) as required in CP Manual*

- **CP system is performing inadequately based on results of testing.**
  - *Ex. UST test result lower than -850mV. UST failed CP testing.*

- **CP test not conducted within 6 months of repair.** Test record was not provided to show that the system was retested.

- **Rectifier was "off".**
  - *Ex: The actual rectifier switch is turned to the off position, the breaker is off, or the site power is off.*
- **Buried metallic portions of piping not protected.** Could be steel piping or buried flex connectors.

- **No record of a 60 day rectifier inspections (rectifier log).** Rectifier log was not provided before or during the inspection.

- **No CP expert design certification.**

- **No tank lining periodic internal inspection**. This is due within 10 years after installation and every 5 years thereafter.

- **No Integrity Assessment prior to upgrade.**

- **CP system repair not conducted properly.**
  - *Ex. No ability to perform an instant-off reading after supplemental anodes were installed.*

- **CP system is installed improperly.**
  - *Ex. Continuity reading on sti-P3® tank indicates that tank is continuous with the pump and piping.*

- **No evidence that tanks are protected against corrosion.**
  - *Ex. Older tanks with a CP test that has a reading indicating that they are bare steel.*
  - *Ex. Bare steel tank.*

- **No evidence that piping is protected against corrosion.**
  - *Ex. CP test has a reading indicating that the piping is bare steel.*
  - *Ex. Bare steel piping.*

Secondary Containment

Compliance Options:

Yes: Use this option if the UST system meets the regulatory requirements for secondary containment at the time of inspection. Note that interstitial monitoring requirements are evaluated under tank and/or piping release detection.

No: Use this option if the UST does not meet all regulatory requirements for secondary containment.

Not Required: This option should be used if secondary containment requirements do not apply to the tank and/or piping. Ex. UST system installed prior to September 15, 2010.

Needs Review: Use this option if peer review is necessary or compliance may not be determined in field.

Copy to All: Use this function to copy compliance determination and reason for compliance to ALL tanks. The copied information may be removed from particular tank(s) by choosing that tank and selecting different compliance options (the copied data will remain for tanks where the information is not changed after selecting "copy to all tanks").

Reasons for Noncompliance

- **Tank is not secondarily contained.** Tanks installed on or after 9/15/10 must be double-walled or secondarily contained.

- **Piping is not secondarily contained.** Piping installed on or after 9/15/10 must be double-walled or secondarily contained. If more than 50% of the piping is replaced on or after 9/15/10, the new/replaced piping must be double-walled or secondarily contained.

- **Under-dispenser containment (UDC) not present.** UDC must be installed under every dispenser installed with a change of connecting pipe on or after 9/15/10. If greater than 50% of the piping run is replaced on or after 9/15/10 and the piping connectors are also replaced, UDC must be installed for that particular pipe.

- **Other**

Operator Training

Compliance Options:

Yes: Use this option if the operator training is present and meets the ALL regulatory criteria.

No: Use this option if operating training does NOT meet ALL regulatory criteria.

Not Required: Use this option if spill prevention is not required by the regulation (i.e. empty temporarily out of use tanks).

Needs Review: Use this option if peer review is necessary or compliance may not be determined in the field.

Copy to All: Use this function to copy compliance determination and reason for compliance to ALL tanks. The copied information may be removed from particular tank(s) by choosing that tank and selecting different compliance options (the copied data will remain for tanks where the information is not changed after selecting "copy to all tanks").

Reasons for Noncompliance

- **Designation of Operators not provided.** Some type of record indicates the person(s) that fulfills the Class A, Class B, and Class C operator(s) roles. This may be an informal document.

- **Class A training certificate not provided.** Certificate may exist but Owner/Operator has not provided it at the time of the inspection.

- **Class B training certificate not provided.** Certificate may exist but Owner/Operator has not provided it at the time of the inspection.

- **Class C training record not provided.** Records may exist but Owner/Operator has not provided them at the time of the inspection.

- **Training provider is not DEQ approved.** Approved training providers may be obtained from DEQ's website . If training provider does not appear on "DEQ's List of Approved Providers", contact the UST Compliance Coordinator.

- **Emergency Response Procedures not provided.** Procedures may exist but Owner/Operator has not provided them at the time of the inspection.

- **Emergency Response Procedures not kept on site.**

- **Emergency Response Procedures were not posted for unmanned facilities.**

- **Class A, Class B, or Class C operator not on site during all operating hours (manned facilities).**

Registration

Compliance Options:

Yes: Use this option if the UST system is registered and all (UST Form 7530) registration information is correct at the time of inspection.

No: Use this option if the UST system is not registered or the current registration information is incorrect.

Not Required: Do not use this option. Registration is required for all regulated UST systems.

Needs Review: Use this option if peer review is necessary or compliance may not be determined in field.

Copy to All: Use this function to copy compliance determination and reason for compliance to ALL tanks. The copied information may be removed from particular tank(s) by choosing that tank and selecting different compliance options (the copied data will remain for tanks where the information is not changed after selecting "copy to all tanks").

Reasons for Noncompliance

- **Never Registered**. DEQ does not have a registration record for the tank and/or piping.

- **Incorrect Registration: Incorrect Owner Information**

- **Incorrect Registration: Substance Stored.**
  - Ex. Tank contains diesel, but is registered as gasoline.

- **Incorrect Registration: Tank Material of Construction.**
  - Ex. Tank is registered as fiberglass, but is actually composite.

- **Incorrect Registration: Piping Material of Construction.**
  - Ex. Piping is registered as fiberglass, but is actually polyflexible piping.

- **Incorrect Registration: Piping Type (pressurized vs. suction)**

- **Incorrect Registration: Tank Release Detection**

- **Incorrect Registration: Piping Release Detection**

- **Incorrect Registration: Spill Prevention**

- **Incorrect Registration: Overfill Prevention device type**

- **Tank Closure.** Tank has been removed from ground or closed in ground but has not been registered as such.

- **Piping Closure.** Piping has been removed from ground or closed in ground but has not been registered as such.

- **Tank and Piping Closure.** Entire UST System (tank and piping) has been removed from ground or closed in ground but has not been registered as such.

- **Temporary Closure.** The UST system has been placed in proper temporary closure but has not yet been registered as such.

- **Other**

Underground Storage Tank Facility Inspection Report

Facility Information

Facility Id:	5040368	Inspection Date:	3/13/2014
Registered Name:	BJs Wholesale Club BJs	Inspected by:	Stephen Pollock
Registered Address:	Hampton VA, 23666		
Actual Address:	2000 Power Plant Pkwy Hampton VA, 23666		

Tank Owner

Gas 186

2000 Power Plant Pkwy

BJs Wholesale Club
25 Research Dr

Westborough MA, 01581

(508) 651-7400

Tank Owner Contact

Steve Small

One Mercer Avenue

Natick MA, 01760

(508) 651-7400

ssmall@bjs.com

Compliance Summary

Areas of Noncompliance

Spill Protection

This inspection did not identify any Spill Protection compliance issues which need to be addressed at this time.

Overfill Protection

This inspection did not identify any Overfill Protection compliance issues which need to be addressed at this time.

Pipe Release Detection

This inspection did not identify any Pipe Release Detection compliance issues which need to be addressed at this time.

Tank Release Detection

This inspection did not identify any Tank Release Detection compliance issues which need to be addressed at this time.

Pipe Corrosion Protection

This inspection did not identify any Pipe Corrosion Protection compliance issues which need to be addressed at this time.

Tank Corrosion Protection

This inspection did not identify any Tank Corrosion Protection compliance issues which need to be addressed at this time.

Secondary Containment

This inspection did not identify any Secondary Containment compliance issues which need to be addressed at this time.

Temporary Closure

This inspection did not identify any Temporary Closure compliance issues which need to be addressed at this time.

Operator Training

This inspection did not identify any Operator Training compliance issues which need to be addressed at this time.

Registration

This inspection did not identify any Registration compliance issues which need to be addressed at this time.

Inspection Comments

Spill Protection

Spill buckets installed.

Tank Release Detection

Pipe: Interstitial monitoring with line leak detector testing. UST 3-CA (unlead 2 on Veeder Root) is the secondary manifold tank with no STP.

Tank 1:

No Records

Fail

Pass: Mar2013, Apr2013, May2013, Jun2013, Jul2013, Aug2013, Sep2013, Oct2013,

Nov2013, Dec2013, Jan2014, Feb2014, Mar2014

Inconclusive

Tank 2-CA:

No Records

Fail

Pass: Mar2013, Apr2013, May2013, Jun2013, Jul2013, Aug2013, Sep2013, Oct2013,

Nov2013, Dec2013, Jan2014, Feb2014, Mar2014

Inconclusive

Tank 3-CA:

No Records

Fail

Pass: Mar2013, Apr2013, May2013, Jun2013, Jul2013, Aug2013, Sep2013, Oct2013,

Nov2013, Dec2013, Jan2014, Feb2014, Mar2014

Inconclusive

Tank: Tank 1:

No Records

Fail

Pass: Mar2013, Apr2013, May2013, Jun2013, Jul2013, Aug2013, Sep2013, Oct2013,

Nov2013, Dec2013, Jan2014, Feb2014, Mar2014

Inconclusive

Tank 2-CA:

No Records

Fail

Pass: Mar2013, Apr2013, May2013, Jun2013, Jul2013, Aug2013, Sep2013, Oct2013,

Nov2013, Dec2013, Jan2014, Feb2014, Mar2014

Inconclusive

Tank 3-CA:

No Records

Fail

Pass: Mar2013, Apr2013, May2013, Jun2013, Jul2013, Aug2013, Sep2013, Oct2013,

Nov2013, Dec2013, Jan2014, Feb2014, Mar2014

Inconclusive

Pipe Release Detection

Pipe: Interstitial monitoring with line leak detector testing. UST 3-CA (unlead 2 on Veeder Root) is the secondary manifold tank with no STP.

Tank 1:

No Records

Fail

Pass: Mar2013, Apr2013, May2013, Jun2013, Jul2013, Aug2013, Sep2013, Oct2013,

Nov2013, Dec2013, Jan2014, Feb2014, Mar2014

Inconclusive

Tank 2-CA:

No Records

Fail

Pass: Mar2013, Apr2013, May2013, Jun2013, Jul2013, Aug2013, Sep2013, Oct2013,

Nov2013, Dec2013, Jan2014, Feb2014, Mar2014

Inconclusive

Tank 3-CA:

No Records

Fail

Pass: Mar2013, Apr2013, May2013, Jun2013, Jul2013, Aug2013, Sep2013, Oct2013,

Nov2013, Dec2013, Jan2014, Feb2014, Mar2014

Inconclusive

Tank: Tank 1:

No Records

Fail

Pass: Mar2013, Apr2013, May2013, Jun2013, Jul2013, Aug2013, Sep2013, Oct2013,

Nov2013, Dec2013, Jan2014, Feb2014, Mar2014

Inconclusive

Tank 2-CA:

No Records

Fail

Pass: Mar2013, Apr2013, May2013, Jun2013, Jul2013, Aug2013, Sep2013, Oct2013, Nov2013, Dec2013, Jan2014, Feb2014, Mar2014

Inconclusive

Tank 3-CA:

No Records

Fail

Pass: Mar2013, Apr2013, May2013, Jun2013, Jul2013, Aug2013, Sep2013, Oct2013, Nov2013, Dec2013, Jan2014, Feb2014, Mar2014

Inconclusive

Tank Information

Tank 1 20000 (gal) GASOLINE: REGULAR

Tank Status:	CURR IN USE	Spill Prevention:	Y
Date Installed:	11/8/2006	Overfill Device:	AUTOMATIC SHUTOFF

Tank 2-CA 12000 (gal) GASOLINE: PREMIUM

Tank Status:	CURR IN USE	Spill Prevention:	Y
Date Installed:	11/8/2006	Overfill Device:	AUTOMATIC SHUTOFF

Tank 3-CA 8000 (gal) GASOLINE: REGULAR

Tank Status:	CURR IN USE	Spill Prevention:	Y
Date Installed:	11/8/2006	Overfill Device:	AUTOMATIC SHUTOFF

Material of Construction

Tank Num	Tank Materials	Piping Materials
1	Double Walled, Fiberglass Reinforced Plastic	Double Walled, Secondary Containment
2 - C A	DoubleWalled,FiberglassReinforcedPlastic	DoubleWalled,SecondaryContainment
3 - C A	DoubleWalled,FiberglassReinforcedPlastic	DoubleWalled,SecondaryContainment

Release Detection

Tank Num	TankRDMethod	PipingType(RD Method)	LastLTT	LTTPassed	LastALLD test	ALLDtestPassed
1	Interstitial MonitoringDoubleWalled	PRESSURE (Interstitial Monitoring Double Walled, Automatic Line Leak Detection)		N/A	10/8/2013	Passed
2 - CA	Interstitial MonitoringDoubleWalled	PRESSURE (Interstitial Monitoring Double Walled, Automatic Line Leak Detection)		N/A	10/8/2013	Passed
3 - CA	Interstitial MonitoringDoubleWalled	PRESSURE (Interstitial Monitoring Double Walled, Automatic Line Leak Detection)		N/A		N/A

Corrosion Protection System

Tank Num	Tank CP	Last Tank CP Test	Pipe CP	Last Pipe CP Test
1	Y		Y	
2-CA	Y		Y	
3-CA	Y		Y	

Site Sketch

Appendix F **- Paper Inspection Log**

Underground Storage Tank Facility Inspection Log

(Information must be entered into CEDS for Official Inspection Report)

Facility Information

Facility Id # _____ Inspection Date: _____

Inspector: _____

Actual Facility Name:_____

Actual Facility Address: _____

_____

_____

Facility Phone Number: _____ Facility Type: _____

Tank Owner:

Name_____

Address:_____

_____

_____

Phone Number: _____

Email Address:_____

Tank Owner Contact:

Name:_____

Address:_____

_____

_____

Phone Number:_____

Email Address:_____

Facility Contact (On-site contact)

Name: _____ Phone:_____ E-mail: _____

Tank Information

Currently In Use or Temporarily Out of Use Tanks

	Tank 1	Tank 2	Tank 3	Tank 4	Tank 5	Tank 6
Tank Status						
Date Installed						
Tank Capacity						
Contents						
Date Last Used (if applicable)						
Tank Material						
Piping Material						
Piping Type (pressure or suction)						
Tank Release Detection						
Piping Release Detection						
Spill Device Installed? (Y/N)						

Permanently Closed Tanks

	Tank 1	Tank 2	Tank 3	Tank 4	Tank 5	Tank 6
Tank Status						
Date Installed						
Tank Capacity						
Contents						
Date Last Used						
Date Closed						
Tank Material						
Piping Material						

Comments:

_____
_____
_____
_____

Temporary Closure

Reason(s) for non-compliance: Applicable Tank Numbers:

— Necessary equipment not secured _____
— Vent line closed/not functioning _____
— Building Permit not obtained _____
— Corrosion protection system not maintained _____
— Release detection not conducted _____
— Other _____

Comments:

_____
_____
_____

Spill Prevention

Reason(s) for non-compliance:	Applicable Tank Numbers:
— Spill prevention device is not present	_____
— Spill Prevention device has holes and/or cracks	_____
— Unable to verify	_____
— Other	_____

Comments:

_____

_____

Overfill Prevention

Overfill Type: _____

Reason(s) for non-compliance:	Applicable Tank Numbers:
— Overfill Prevention device is not present	_____
— No record or visual signs of overfill prevention	_____
— Overfill Prevention device does not shut off, alarm, or restrict flow at required volume	_____
— Shutoff device is not operational	_____
— Alarm is not operational	_____
— Alarm is not audible or visible to delivery driver	_____
— Ball float appears to be damaged or broken	_____
— Unable to verify	_____
— Other	_____

Tank Release Detection

Inventory Control and Tank Tightness Testing

Records Review:

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Tank 1												
Tank 2												
Tank 3												
Tank 4												
Tank 5												
Tank 6												

Reason(s) for non-compliance:

- ___ Tank was installed or upgraded > 10 yrs ago
- ___ Method is not permitted (Tank installed on or after 9/15/10)
- ___ Records not provided
- ___ Records incomplete
- ___ Method not conducted at least monthly
- ___ Not sticking tank daily
- ___ Not reconciling data
- ___ Equipment not capable of 1/8 inch measurements
- ___ Not monitoring for water monthly
- ___ TTT not conducted within past 5 years
- ___ Other

Comments:_____
_____
_____
_____

Manual Tank Gauging

Records Review:

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Tank 1												
Tank 2												
Tank 3												
Tank 4												
Tank 5												
Tank 6												

Reason(s) for non-compliance:

- ___ Method has expired
- ___ Method is not permitted (Tank is greater than 2,000 gallons)
- ___ Method is not permitted (Tank installed on or after 9/15/10)
- ___ Records not provided
- ___ Records incomplete
- ___ Method not conducted at least weekly
- ___ Not reconciling data
- ___ Equipment not capable of 1/8 inch measurements
- ___ TTT not conducted within past 5 years
- ___ Other

Comments:_____
_____
_____
_____

Automatic Tank Gauging

Records Review:

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Tank 1												
Tank 2												
Tank 3												
Tank 4												
Tank 5												
Tank 6												

Reason(s) for non-compliance:

- ___ Method is not permitted (Tank installed on or after 9/15/10)
- ___ Records not provided
- ___ Records incomplete
- ___ Method not conducted monthly
- ___ ATG improperly setup
- ___ Invalid test results (no pass/fail result)

— Other

Comments:_____
_____
_____
_____

Vapor Monitoring

Records Review:

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Tank 1												
Tank 2												
Tank 3												
Tank 4												
Tank 5												
Tank 6												

Reason(s) for non-compliance:

— Method is not permitted (Tank installed on or after 9/15/10)
— Records not provided
— Records incomplete
— Method not conducted monthly
— Site assessment not completed
— Wells are improperly designed and/or positioned
— Wells not clearly marked and/or secured
— Other

Comments:_____
_____
_____
_____

Groundwater Monitoring

Records Review:

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Tank 1												
Tank 2												
Tank 3												
Tank 4												
Tank 5												
Tank 6												

Reason(s) for non-compliance:

- ___ Method is not permitted (Tank installed on or after 9/15/10)
- ___ Records not provided
- ___ Records incomplete
- ___ Method not conducted monthly
- ___ Site assessment not completed
- ___ Groundwater is more than 20 feet from surface
- ___ Wells are improperly designed and/or positioned
- ___ Wells not clearly marked and/or secured
- ___ Product miscible in water
- ___ Product specific gravity > 1
- ___ Monitoring device cannot detect at least 1/8 inch product
- ___ Other

Comments:_____

_____

_____

Interstitial Monitoring

Records Review:

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Tank 1												
Tank 2												
Tank 3												
Tank 4												
Tank 5												
Tank 6												

Reason(s) for non-compliance:

- ___ Records not provided
- ___ Records incomplete

— Method not conducted monthly
— Device is set up/programmed improperly
— Other

Comments:_____
_____
_____

SIR

Records Review:

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Tank 1												
Tank 2												
Tank 3												
Tank 4												
Tank 5												
Tank 6												

Reason(s) for non-compliance:
— Method is not permitted (Tank installed on or after 9/15/10)
— Records not provided
— Records incomplete
— Method not conducted monthly
— Equipment not capable of 1/8 inch measurements
— Other

Comments:_____
_____
_____

No Tank Release Detection

Reason(s) for non-compliance:
— Facility contact indicated that release detection was not performed
— Release detection records were not provided
— Other
Comments:_____
_____
_____

Piping Release Detection

Pressurized Piping Release Detection

	Tank 1	Tank 2	Tank 3	Tank 4	Tank 5	Tank 6
ALLD Test Date						
Test Result						
Date Last Line Tightness Test						
Line Tightness Test Result						

Records Review:

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Tank 1												
Tank 2												
Tank 3												
Tank 4												
Tank 5												
Tank 6												

Reason(s) for noncompliance:

- ALLD not present on submersible turbine pump (STP)
- ALLD not tested annually
- ALLD not tested in accordance with manufacturer's requirements
- ALLD test record unavailable
- ALLD not compatible with product stored
- ALLD failed and not replaced
- Unable to verify presence of ALLD
- Method is not permitted (piping installed on or after 9/15/10)
- Line tightness test (LTT) not conducted annually
- Line tightness test (LTT) record unavailable
- Monthly monitoring records not provided
- Monthly monitoring records incomplete
- Method not conducted monthly
- Facility contact indicated that release detection was not performed
- Device is set up/programmed improperly
- Sensors are positioned/installed improperly
- Equipment is not compatible with substance stored
- Site assessment not completed

— Wells are improperly designed and/or positioned
— Wells not clearly marked and/or secured
— Groundwater is more than 20 feet from surface
— Other

Comments:
_____
_____
_____
_____

Suction (valve at tank) Piping Release Detection

	Tank 1	Tank 2	Tank 3	Tank 4	Tank 5	Tank 6
Date Last Line Tightness Test						
Line Tightness Test Result						

Records Review:

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Tank 1												
Tank 2												
Tank 3												
Tank 4												
Tank 5												
Tank 6												

Reason(s) for noncompliance:

— Method is not permitted (piping installed on or after 9/15/10)
— Line tightness test (LTT) not conducted every 3 years
— Line tightness test (LTT) record unavailable
— Monthly monitoring records not provided
— Monthly monitoring records incomplete
— Method not conducted monthly
— Facility contact indicated that release detection was not performed
— Device is set up/programmed improperly
— Sensors are positioned/installed improperly
— Equipment is not compatible with substance stored
— Site assessment not completed
— Wells are improperly designed and/or positioned
— Wells not clearly marked and/or secured

— Groundwater is more than 20 feet from surface
— Other

Comments:

_____
_____
_____

Tank and Piping Corrosion Protection System

	Tank 1	Tank 2	Tank 3	Tank 4	Tank 5	Tank 6
Date of most recent CP test						
CP Test Result						

Reason(s) for noncompliance:

— CP test not performed within past 3 years
— CP test record not provided
— CP test performed incorrectly
— CP system is performing inadequately based on results of testing
— CP test not conducted within 6 months of repair
— Rectifier was "off"
— Buried metallic portions of piping not protected
— No record of a 60 day rectifier inspections (rectifier log)
— No CP expert design certification
— No tank lining periodic internal inspection
— No Integrity Assessment prior to upgrade
— CP system repair not conducted properly
— CP system appears to be installed improperly
— No evidence that tanks are protected against corrosion
— No evidence that piping is protected against corrosion
— Other

Comments:

_____
_____
_____

Secondary Containment

Reason(s) for noncompliance:

- ___ Tank is not secondarily contained
- ___ Piping is not secondarily contained
- ___ Under-dispenser containment (UDC) not present
- ___ Other

Comments:

_____
_____
_____
_____

Operator Training

Reason(s) for noncompliance:

- ___ Designation of Operators not provided
- ___ Class A training certificate not provided
- ___ Class B training certificate not provided
- ___ Class C training record not provided
- ___ Training provider is not DEQ approved
- ___ Emergency Response Procedures not provided
- ___ Emergency Response Procedures not kept on site
- ___ Emergency Response Procedures were not posted for unmanned facilities
- ___ Class A, Class B, or Class C operator not on site during all operating hours (manned facilities)
- ___ Other

Comments:

_____
_____
_____
_____

Registration

Reason(s) for noncompliance:

- ___ Tank and Piping Closure
- ___ Temporary Closure
- ___ Never Registered
- ___ Incorrect Registration: Incorrect Owner Information
- ___ Incorrect Registration: Substance Stored
- ___ Incorrect Registration: Tank Material of Construction
- ___ Incorrect Registration: Piping Material of Construction
- ___ Incorrect Registration: Piping Type (pressurized vs. suction)
- ___ Incorrect Registration: Tank Release Detection
- ___ Incorrect Registration: Piping Release Detection
- ___ Incorrect Registration: Spill Prevention
- ___ Incorrect Registration: Overfill Prevention device type
- ___ Tank Closure
- ___ Piping Closure
- ___ Other

Comments:

_____

_____

_____

_____

Appendix G - **Virginia DEQ Compliance Measures for UST Inspections**

Tank Release Detection	
Inventory Control + Tank Tightness Testing (IC+TTT)	1. Tanks must be less than 10 years old or upgraded within the past 10 years to use method. 2. Tanks must have been installed prior to September 15, 2010. 3. Records provided for the most recent 8 months. 4. Method is conducted at least monthly with interval no longer than 45 days. 5. Records must reflect regular sticking of the tank and proper reconciliation (1% + 130 gallons). 6. Equipment is capable of 1/8-inch measurement gauge stick or other instrument). 7. Water is monitored at least monthly. 8. Tank tightness test conducted within past 5 years.
Manual Tank Gauging (MTG)	1. Method has not expired for use (if tank is between 1,001-2,000 gallons, MTG cannot be used after 10 years). 2. Tank size is appropriate for using MTG (if tank is greater than 2,000 gallons MTG cannot be used). 3. Tanks must have been installed prior to September 15, 2010. 4. Records provided for the most recent 8 months. 5. Method is conducted at least monthly with interval no longer than 45 days. 6. Records must reflect regular sticking (weekly and monthly) of the tank and proper reconciliation. 7. Equipment is capable of 1/8-inch measurement (gauge, stick, or other instrument). 8. Tank tightness test record indicates test performed within the past 5 years (if tank is between 1,001-2,000 gallons and the diameter is not 48 or 64 inches).
Automatic Tank Gauging (ATG)	1. Tanks must have been installed prior to September 15, 2010. 2. Records provided for the most recent 8 months. 3. Method is conducted at least monthly with interval no longer than 45 days. 4. ATG is set up properly. 5. ATG conducts a valid test (provides a Pass or Fail result).
Vapor Monitoring	1. Tanks must have been installed prior to September 15, 2010. 2. Records provided for the most recent 8 months. 3. Method is conducted at least monthly with interval no longer than 45 days. 4. Site assessment has been done for vapor monitoring (follow Technical Manual Guidance 01-2024D) (DEQ Vapor Monitoring Guidance – Evaluation of Vapor Monitoring Data for Release Detection). 5. Wells are properly designed and positioned. 6. Wells are clearly marked and secured.
Groundwater Monitoring	1. Tanks must have been installed prior to September 15, 2010. 2. Records provided for the most recent 8 months. 3. Method is conducted at least monthly with interval no longer than 45 days. 4. Substance stored is not readily miscible in water and has a specific gravity <1. 5. Wells are properly designed and positioned. 6. Wells are clearly marked and secured. 7. Site assessment has been done for ground water monitoring. 8. Monitoring device can detect at least 1/8 inch of free product on groundwater.

Statistical Inventory Reconciliation (SIR) & Other Methods	1. Tanks must have been installed prior to September 15, 2010. 2. Records provided for the most recent 8 months. 3. SIR must be conducted every 30 days. After <u>each</u> 30 day period, the tank owner must have the <u>analyzed</u> data record on-file within 30 days of the last day data was collected. 4. Monitoring device can measure product levels to 1/8 inch accuracy.
Piping Release Detection	
Pressure Piping	**Two forms of piping release detection (catastrophic and periodic) must be performed.** **<u>Catastrophic</u>** An automatic line leak detector (ALLD) must be present on each submersible turbine pump. a. Mechanical ALLD must be tested annually in accordance with manufacturer's requirements (if any). b. Electronic ALLD and sump sensors must be tested annually. Generally, self tests (where applicable) will be accepted until a regulatory change. c. Test record available for test conducted within past 12 months. d. Appropriate ALLD installed for product stored. **<u>Periodic (tightness testing or monthly monitoring)</u>** ***Line Tightness Testing*** 1. Annual line tightness testing must be conducted in accordance with the regulation by either: a. Precision line tightness test must be conducted annually if a monthly monitoring method is not performed. b. A 0.1 gph annual leak test @ 95/5 accuracy may be conducted from an electronic line leak detector for each piping run in place of a precision line tightness test. 2. Record must be provided for precision line tightness test conducted within the past year. ***Monthly Monitoring*** 1) Records provided for the most recent 8 months for monthly monitoring method. 1) Method is conducted at least monthly with interval no longer than 45 days. 2) Monthly monitoring method must be performed in accordance with the tank requirements noted above. 3) Sensors used for secondarily contained piping systems must be positioned in accordance with the manufacturer's requirements. 4) Equipment should be compatible with substance stored. 5) Interstitial Monitoring systems must be designed, constructed, and installed to detect a leak from any portion of the tank that routinely contains product. 6) Secondary containment systems must be designed, constructed, and installed to contain regulated substances released from the tank system until they are detected or removed and prevent the release of regulated substances to the environment at any time during the operational life of the UST system.
Suction Piping	**<u>Safe suction piping (no valve at tank)</u>** 1. Release detection is not required. **<u>US Suction (valve at tank) (tightness test or monthly monitoring)</u>** ***Line Tightness Test*** 1. Precision line tightness test must be conducted every 3 years if a monthly monitoring method is not performed. 2. Line tightness testing must be conducted every 3 years and in accordance with the regulation. 3. Record must be provided for precision line tightness test conducted within past 3 years. ***Monthly Monitoring***

	1. Records provided for the most recent 8 months for monthly monitoring method. 2. Method is conducted at least monthly with interval no longer than 45 days. 3. Monthly monitoring method must be performed in accordance with the tank requirements noted above. 4. Sensors used for secondarily contained piping systems must be positioned in accordance with the manufacturer's requirements.
Performance Standards	
Spill Prevention	1. Spill prevention device is present for tanks receiving deliveries greater than 25 gallons. 2. Spill prevention device does not have any holes or cracks.
Overfill Prevention	1. Overfill Prevention device is present for tanks receiving deliveries greater than 25 gallons. 2. If overfill prevention cannot be visually verified, the VA Notification Form, installation records, or owner states it is present. 3. Overfill prevention device shuts off, alarms, or restricts flow at required volume. (This should be a "hands-off" verification ONLY). 4. Automatic shutoff, if present, is operational (i.e., device not tampered with, blocked or disabled by stick or other device). 5. Alarm, if present, appears to be operational. 6. Alarm, if present, is audible or visible to delivery driver. 7. Ball float, if present, does not appear to be damaged or broken (if able to visually verify).
Corrosion Protection	**Corrosion Resistant Materials (Tanks and Piping)** 1. Tank and piping material of construction is registered on VA 7530 Form as a corrosion resistant material (unless other evidence to the contrary). 2. Verify owner records of material of construction only if discrepancies exist between field observations and VA 7530 form. **Internally Lined Tanks** 1. Lined tanks are inspected periodically and lining is in compliance (10 yr. initial and 5 yrs. thereafter). 2. Most recent lining inspection records are provided. **Cathodically Protected (CP) (Tanks and Piping)** ***Galvanic*** 1. Metallic portions of UST system that are in contact with soil are cathodically protected. 2. Most recent CP system test occurred within the past 3 years. 3. CP system test record provided. 4. CP systems were tested within 6 months of repair of any cathodically protected UST system. 5. CP system is tested in accordance with the current DEQ Guidelines for Underground Storage Tank Cathodic Protection Evaluation. 6. CP system is performing adequately based on results of testing; -or- 7. CP system repairs must be conducted in accordance with DEQ Guidelines for Underground Storage Tank Cathodic Protection Evaluation and nationally recognized industry standards. 8. CP system installed in accordance with DEQ Guidelines for Underground Storage Tank Cathodic Protection Evaluation and nationally recognized industry standards. ***Impressed Current*** 1. Metallic portions of UST system that are in contact with soil are cathodically protected. 2. Most recent CP system test occurred within the past 3 years. 3. Most recent CP system test records provided. 4. CP systems were tested within 6 months of repair of any cathodically protected UST system. 5. CP system is tested in accordance with DEQ Guidelines for Underground Storage Tank Cathodic Protection Evaluation and nationally recognized industry standards. 6. CP system is performing adequately based on results of testing; -or- 7. CP system repairs must be conducted in accordance with DEQ Guidelines for Underground Storage Tank Cathodic Protection Evaluations and nationally recognized industry standards. 8. CP system installed in accordance with the current DEQ Guidelines for Underground Storage Tank

	Cathodic Protection Evaluation and nationally recognized industry standards. 9. Rectifier is "on" at time of inspection. 10. Rectifier is inspected every 60 days (rectifier logs) and most recent log is provided.
Temporary Closure	
	1. UST system has been properly registered temporarily out of use. 2. Building permit or "Building Permit Certification Form" was obtained for temporary closure. 3. Fill caps, man ways, and ancillary equipment has been properly secured if UST system was last used at least three months ago. 4. Vent lines were left open and functioning. 5. Corrosion protection system is being maintained properly. 6. Release Detection if conducted if the tank contains greater than 1 inch of fuel
Financial Responsibility (CO-OFA ONLY after FY13)	
	1. Owner indicates ability to demonstrate required financial responsibility to DEQ CO-OFA.
Registration	
	1. Correct registration required for compliance at time of inspection.
Operator Training	
	1. Designation of Operators list has been provided. 2. Class A, B, and C training certificates/records have been provided. 3. Training program is Virginia approved or approved via reciprocity. 4. Emergency Response instructions present for manned facilities and posted for unmanned facilities. 5. Retraining is completed when required.
Secondary Containment	
	1. Correct secondary containment and under-dispenser containment required for installations/replacements conducted on or after 9/15/10. 2. Facility is conducting interstitial monitoring for tanks and/or piping installed/replaced on or after 9/15/10. 3. Secondary Containment equipment does not contain any cracks, holes, or other conduits for product to be released from at least 4 inches above any piping penetrations.
Suspected Release	
	1. Suspected releases have been reported and investigated in accordance with DEQ's Technical Manual Guidance 01-2024D.

Appendix H **– UST Formal Inspection Notification Letter**

FORMAL INSPECTION NOTIFICATION LETTER

[Month Day, Year]

[Mr. /Mrs. /Ms. /Dr. UST owner/ representative]
[Company/owner name]
[Owner address]
[City, State Zip Code]

SENT VIA EMAIL ONLY
[email address]

Re: Underground Storage Tank (UST) Formal Inspection
Facility ID# [*******], [Facility's name], [Facility's street address], [Facility's city]

Dear [Mr. /Mrs. /Ms. /Dr. UST owner/ representative]:

The Department of Environmental Quality (DEQ) [Insert Regional Office Name] Regional Office will conduct a UST compliance inspection at [Insert Time] on [Month Day, Year], at the referenced UST facility. Please ensure that an authorized representative, such as the Class B operator, is prepared to remove manhole covers to expose equipment, demonstrate its proper operation, and answer the inspector's UST compliance questions. Also, have the following original records available and provide copies of each, if requested:

1. Twelve most recent months of release detection records for tanks and piping;

2. Corrosion protection operation and maintenance records & documentation of tank/piping types;

3. Installation, warranty, repair and monitoring records verifying UST release prevention compliance;

4. Evidence of functional spill and overfill prevention devices;

5. Current notification form(s) to include assessment for changes in service since the previous inspection;

6. Class A, B, and C operator training certifications, the facility's list of instructions or procedures to be followed by Class C operators and any other related operator training documentation.

This inspection is pursuant to the authority granted in Virginia Code § 62.1-44.20 and § 62.1-44.34:9 and Virginia Regulation 9 VAC 25-580-120 and -360. If you have questions regarding the inspection, please feel free to contact me at [Insert Inspector Phone Number] or by email at [Insert inspector's email address]. Also, to learn more about UST compliance visit Virginia DEQ's Petroleum Program webpage at http://www.deq.virginia.gov/Programs/LandProtectionRevitalization/PetroleumProgram.aspx .

Sincerely,

[Inspector's name]
[Inspector's title]

Appendix I **– UST Temporary Closure Fact Sheet**

Fact Sheet: Regulated Underground Storage Tank (UST) Temporary Closure

Steps to Follow:

1. Contact the local Building Official (or designated fire official) and obtain a building permit, and comply with any local inspection requirements.

2. Owners and operators must continue operation and maintenance of all corrosion protection, release detection, and comply with operator training requirements during the temporary closure period—but operator training and release detection are not required as long as the UST remains empty. The UST system is empty when no more than 1 inch of residue, or 0.3% by weight of the total capacity of the UST system, remains in the system.

3. Cathodic protection tests must continue to be conducted every 3 years for cathodically protected tanks and/or piping. Likewise, impressed current systems must remain "on" and the rectifier read every 60 days and records kept. Internal lining inspections must continue to be conducted 10 years after liner installation and every 5 years thereafter.

4. The owner or operator of a UST must submit a UST Notification Form (Form 7530) to DEQ within 30 days following cessation of use of that UST. The owner/operator may provide notice for several tanks at the same facility using one notification form, but owners or operators with temporary closed tanks at more than one facility must file a separate notification for each facility.

5. Once an UST system has been temporarily closed for three months, the product lines, pumps, manways, and ancillary equipment must be capped and secured; the vent lines must remain open and functioning.

6. Owners/operators of new or upgraded USTs may go into temporary closure indefinitely as long as all requirements are being met. Spill and overfill requirements do not need to be met for temporary closure.

7. Owners/Operators must maintain financial responsibility requirements throughout the temporary closure period unless the tank is empty.

Additional information regarding temporary closure requirements or other UST requirements may be obtained by reviewing the UST regulation at 9VAC25-580.310 or contacting a DEQ tank staff member at the following phone numbers:

Central Office:

Office of Spill, Response, and Remediation	(804)698-4010

Regional Offices:

Tidewater Region (Virginia Beach)	(757)518-2000
Northern Region (Woodbridge)	(703)583-3800
Piedmont Region (Richmond)	(804)527-5020
Valley Region (Harrisonburg)	(540)574-7800
Blue Ridge Region (Roanoke)	(540)562-6700
Blue Ridge Region (Lynchburg)	(434)582-5120
Southwest Region (Abingdon)	(276)676-4800

Appendix J **– UST Building Permit Certification Form**

VIRGINIA PETROLEUM STORAGE TANK PROGRAM--BUILDING PERMIT CERTIFICATION	**STATE USE ONLY:** **ID No._____** **Date Rec'd_____**
I. Owner Information Owner Name:_____ Address:_____ _____ _____ Phone: (_____) _____	II. Tank Location Information Facility Name:_____ Address:_____ _____ _____ Phone: (_____) _____
TANK INFORMATION **Tank No. _____**	**TANK INFORMATION** **Tank No. _____**
Date closed/removed:	Date closed/removed:
Capacity (# gallons):	Capacity (# gallons):
Substance Stored: _____Gasoline _____Heating Oil _____Diesel _____Used Oil _____Gasohol _____Other (Please specify: _____Kerosene _____)	Substance Stored: _____Gasoline _____Heating Oil _____Diesel _____Used Oil _____Gasohol _____Other (Please specify: _____Kerosene _____)
The reason no building permit has been provided to the Department of Environmental Quality for the closure/removal of this tank is (check the applicable blank): _____although a building permit was obtained at the time of the closure/removal, the building official was unable to provide a copy. _____although I attempted to obtain a building permit at the time of the closure/removal, staff at the building official's office informed me a building permit was not required. _____at the time of the closure/removal I was not aware that a building permit was required and failed to request one.	The reason no building permit has been provided to the Department of Environmental Quality for the closure/removal of this tank is (check the applicable blank): _____although a building permit was obtained at the time of the closure/removal, the building official has refused to provide a copy. _____although I attempted to obtain a building permit at the time of the closure/removal, staff at the building official's office informed me a building permit was not required. _____at the time of the closure/removal I was not aware that a building permit was required and failed to request one.

Certification: I certify that the information submitted in this document is true, accurate and complete to the best of my knowledge and belief.

_____ _____ _____

Owner Signature Title (if any) Date

Appendix K **– EPA Letter Regarding Manual Tank Gauging**

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

April 6, 1990

OFFICE OF
SOLID WASTE AND EMERGENCY
RESPONSE

Ms. Priscilla Young
American Petroleum Institute
1220 L Street, NW
Washington, DC

Dear Ms. Young:

Thank you for your letter of January 12, 1990, regarding the use of manual tank gauging as the sole leak detection method for tank of 1000 nominal capacity. We have carefully reviewed the calculations you submitted and have concluded that, when conducted in accordance with the procedures described in the attachment, manual tank gauging meets the performance standards in 40 CFR 280.43(h)(1) for tanks of nominal capacity of 1000 gallons or less. Thus, for tanks of this size manual tank gauging can be used as the sole means of meeting the leak detection requirements.

If you have any questions regarding this response please give me a call.

Sincerely,

/s/

Ronald Brand, Director
Office of Underground Storage Tanks

Appendix L – **Evaluation of Vapor Monitoring Data for Release Detection**

Evaluation of Vapor Monitoring Data for Release Detection

Issue Statement

Vapor monitoring is one of the options that tank owners/operators have to meet the release detection requirements of the UST Technical Regulation or the Facility and AST Regulation. Vapor monitors used for release detection must be able to detect any significant increase in concentration above the background of the regulated substance stored in the tank system. The issue regarding what constitutes a "significant" increase in vapor concentrations at a site has been raised by DEQ staff that perform AST and UST compliance inspections. This memo provides guidelines and a procedure that staff and tank owners/operators may use to evaluate vapor monitoring data to determine if a release should be suspected.

Regulatory Requirements - Vapor Monitoring for Release Detection

Release detection is required for regulated USTs and ASTs. Section 160 of the UST Technical Regulation requires vapor monitoring systems be designed to detect releases at the earliest time possible. The Facility and AST Regulation requires the system of release detection that will be used at the facility to be described in the Oil Discharge Contingency Plan submitted for that facility.

Vapor monitoring is one of the release detection options at storage tank facilities. Vapor monitoring systems must be placed in the backfill around the tank(s) and the backfill must be sufficiently porous to allow migration of vapors from the tank system to the vapor monitoring points. The regulated substance or tracer stored in the tank must be sufficiently volatile to be detected if it is released. The measurement of vapors cannot be rendered inoperative by ground water changes, rainfall, soil moisture, or other site conditions. The level of background contamination at the site must not interfere with the detection of releases and the site must be assessed to ensure compliance with regulatory requirements. Tanks and lines must be monitored for releases at least once every thirty (30) days. The monitoring method used also should not allow a release to go undetected for greater than 30 days.

Recommendations for Determining if a Release Should be Suspected

In order to comply with the requirement of timely release discovery, tank owners/operators must evaluate the site to determine if vapor monitoring is an appropriate release detection method for the site. The method used to determine if a release has occurred should account for site conditions including background vapor concentrations and the type of vapor monitoring equipment used at the site. Vapor monitoring equipment may be separated into two primary categories: (1) vapor sensors that are part of an automated tank monitoring system; and (2) vapor monitors that require the user to evaluate the data produced by the monitor to determine the significance of that data.

Vapor Sensors that are Part of an Automated Tank Monitoring System

Vendors of storage tank equipment have developed sensors that monitor vapor concentrations in vapor monitoring wells and provide this information directly to an automated tank monitoring system. These automated vapor monitors have pre-set vapor thresholds that alert the control unit for the tank system if vapor concentrations are above the factory set thresholds. Tank owners/operators using this type of vapor monitoring device need to demonstrate that the background conditions at their site will not interfere with the operation of the vapor sensor(s). After evaluating the site and determining that background conditions will not interfere with the proper operation of the vapor sensor, the tank owner/operator may use the pre-set threshold on the vapor sensor as the point at which a release should be suspected.

Vapor Monitoring Devices Requiring Action by User

Vapor monitoring devices that are not part of an automated system require the tank owner/operator to evaluate the monitoring data, determine the significance of that data, and determine if a release should be suspected. In order to determine the significance of monthly vapor monitoring data, tank owners/operators must determine background conditions at the site. Monthly monitoring data then must be compared with the background data to determine if a release should be suspected.

NOTE: Consistency in the vapor sample collection procedures and equipment used is of great importance. Changing instruments (e.g. PID to FID, FID to detector tube) will make it difficult to compare vapor readings and, ultimately, make it difficult to determine the significance of monthly monitoring data.

Determination of Background Vapor Conditions at a Site

Tank owners/operators using devices that require the operator of the device to determine the significance of the data, need to determine background vapor concentrations in each vapor monitoring well at the site. At sites with new vapor monitoring systems, background vapor concentrations must be determined within the first month after the AST or UST system is installed and filled with product. Background vapor concentrations must be determined for each vapor monitoring well by taking at least 20 vapor measurements from each well during the first month of operation. This background data must be collected using the same equipment and procedures that will be used to collect all subsequent vapor data. The data set for each well then may be considered to represent background conditions in that well.

Background vapor concentrations also must be determined for each vapor monitoring point at sites where the tank owner/operator is already using vapor monitoring as a release detection method and has never evaluated background conditions. Provided that a release has not occurred since the vapor monitoring system was installed, tank owners/operators at sites that are already using vapor monitoring as a release detection method may use their existing monthly vapor monitoring data to determine background vapor concentrations. As with the new installations, at least 20 vapor monitoring readings for each vapor monitoring well are needed to derive a background vapor concentration for that well. If the tank owner/operator has fewer than 20 vapor monitoring observations for a particular well, additional vapor readings must be taken during the first month after the effective date of this guidance so that there are at least 20 vapor monitoring observations for the well. For example, a tank owner/operator having 12 months of vapor monitoring data for a particular vapor monitoring well will need to collect at least 8 vapor readings during the month following the effective date of this guidance to determine the background vapor concentration for that well. The tank owner/operator then must evaluate the background data set and determine the concentration at which a release should be suspected.

Notes:

1. Petroleum vapors are heavier than the major gases in the atmosphere and will tend to be found in greatest concentration at or near the bottom of a vapor monitoring well. Sample collection procedures used at a site must account for this physical characteristic.
2. If the upper tolerance limit for the background data exceeds the upper range on the vapor monitoring instrument, vapor monitoring cannot be used as a release detection method at the site.

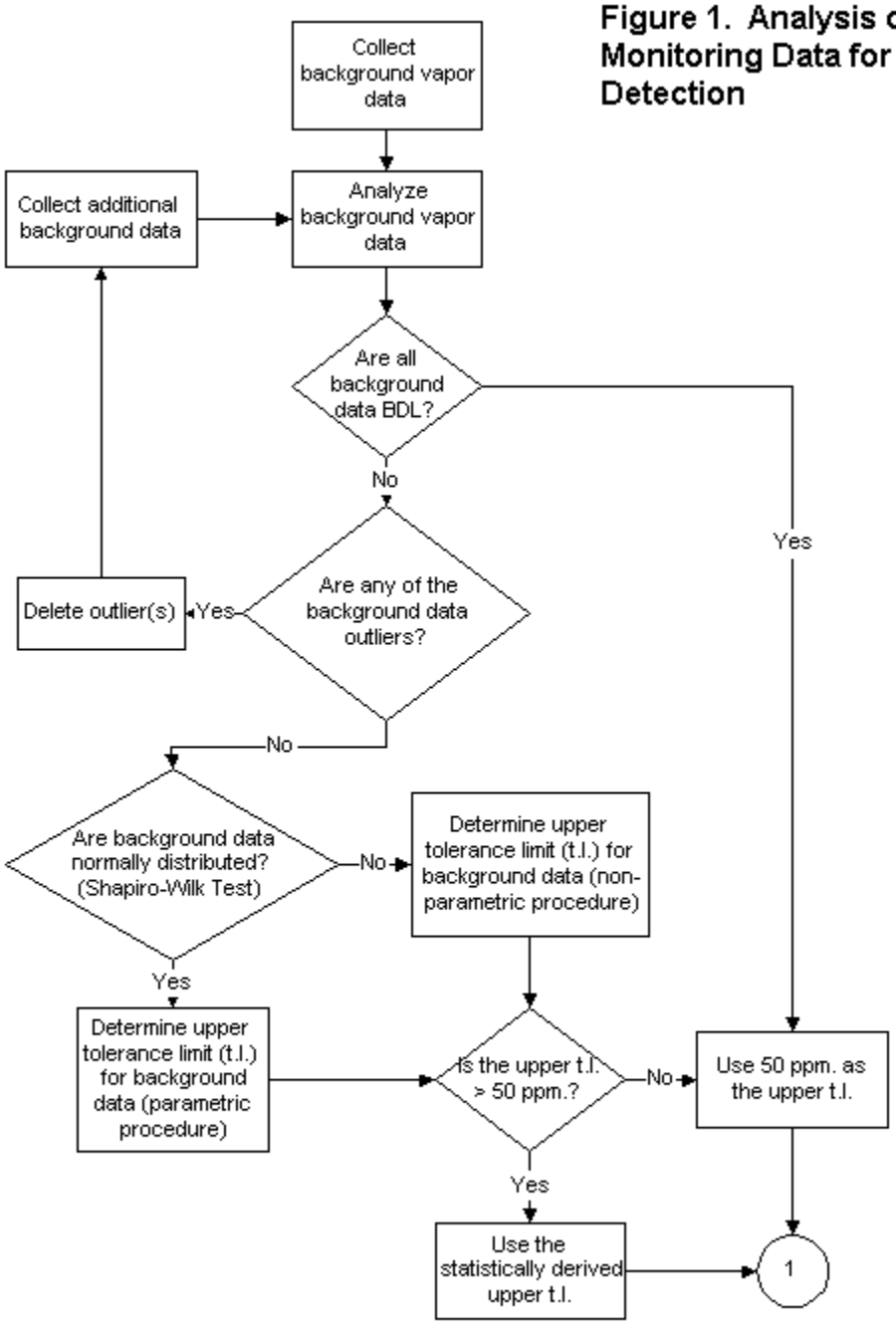
If no releases occur during the first year of system operation, the tank owner/operator may re-calculate the background concentration for each well by using the original background data and the monthly monitoring data from the previous year. This additional data should provide an even greater amount of information about ambient conditions (i.e. background) at the site. At the end of subsequent years, tank owners/operators may use data from that year and combine that data with monitoring data from the previous one or two years in determining background conditions at the site provided that no releases occurred during the year.

Data Evaluation Procedure

In order to determine if monthly monitoring data indicate a release may have occurred, the tank owner/operator, consultant, or DEQ staff needs to establish an upper tolerance limit for the background data. If the vapor concentration in the monthly monitoring sample for a well exceeds the upper tolerance limit, a release may have occurred. If the upper tolerance limit is exceeded, the tank owner/operator should report a suspected release to DEQ and collect at least four additional vapor samples from that well over the next five days. The mean of the monthly result that triggered the investigation plus the additional investigative samples then may be compared with the mean of the background data. If the mean of the monthly result plus investigative samples is statistically greater than the background mean, there is reason to suspect a release and the tank owner/operator should determine if the tank is leaking. See Figure 1 for a flowchart explaining a procedure that may be used for determining if a release should be suspected from vapor monitoring data.

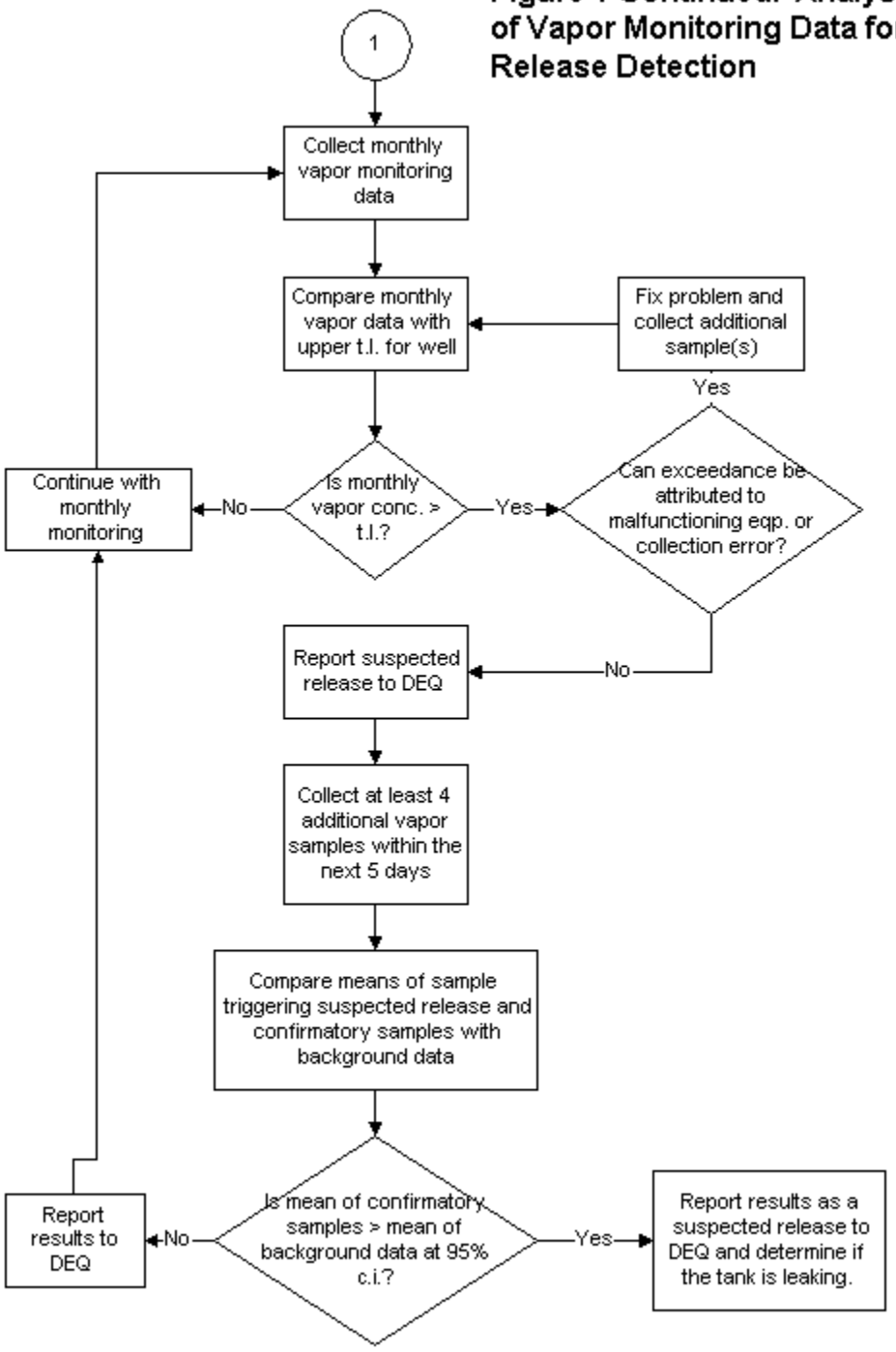
Statistical methods may be used to evaluate vapor monitoring data, estimate "background" concentrations, and determine when the data indicate a release should be suspected. Staff, tank owners/operators, and consultants may use the statistical procedure that follows to evaluate vapor monitoring data. A spreadsheet that will perform these statistical calculations is available for use by staff and tank owners/operators and is entitled: *Statistics-Vapor Monitoring for Release Detection*. A User's Guide explaining how to use the spreadsheet is attached to this guidance document.

Figure 1. Analysis of Vapor Monitoring Data for Release Detection



BDL = below detection limit

Figure 1 Continued. Analysis of Vapor Monitoring Data for Release Detection



c.i. = confidence interval

1. Analyze Background Data

After the background data are collected, the data must be analyzed to determine if any of the observations is an outlier. Outliers are data values that are unusually high or low relative to the rest of the data. Often, outliers may be attributed to sample collection, laboratory, or data entry errors. Data values that are outliers must be removed from the background data set in order to preserve the integrity of the data and allow a more accurate estimate of "background conditions" to be obtained.

A procedure that may be used to determine if data points are outliers is as follows:

1. Identify the potential outlier

2. Using all data points, including the suspected outlier, compute the mean and the standard deviation of the data set.

(1) Mean $\bar{X} = \dfrac{\sum_{i=1}^{n} X_i}{n}$

where: n = number of samples (vapor concentrations)
X_i = value of the ith sample

(2) Sample Variance: $s^2 = \dfrac{\sum_{i=1}^{n} (X_i - \bar{X})^2}{n - 1}$

(3) Sample Standard Deviation: $s = (s^2)^{1/2}$

3. Compute the outlier test statistic (T_n)

(4) $T_n = (X_i - \bar{X})/s$

4. Compare the outlier test statistic T_n with the critical point (t_c) from Table 1. If $T_n > t_c$, there is evidence that the suspected outlier is not consistent with the pattern of the data.

NOTE: A minimum of 20 data points are needed to estimate "background" conditions at a site. Outliers must be removed from the data background data set and additional background data will need to be collected if the removal of outliers results in less than 20 background data values.

Table 1. α - Level Critical Points (t_c) for One-Tailed Outlier Test					
n	t_c	n	t_c	n	t_c
20	2.557	30	2.759	41	2.877
21	2.580	31	2.773	42	2.887
22	2.603	32	2.783	43	2.896
23	2.624	33	2.786	44	2.905
24	2.644	34	2.799	45	2.914
25	2.663	35	2.811	46	2.923
26	2.681	36	2.823	47	2.931
27	2.698	37	2.835	48	2.940
28	2.714	38	2.846	49	2.948
29	2.730	39	2.857	50	2.956
30	2.745	40	2.866		

2. Evaluate Data Distribution

The distribution of the background data set determines the type(s) of statistical tests that may be used to analyze the data. Data that are normally distributed may be analyzed using parametric tests such as those based on the Student's t test. Data that are not normally distributed may be analyzed using non-parametric techniques.

NOTE: If all background data observations are below the instrument detection limit, it is not necessary to evaluate the data distribution. Non-parametric statistical techniques may be used to further analyze the data.

The Shapiro-Wilk test may be used to evaluate the background data set and determine if the data set is normally distributed. The Shapiro-Wilk test (Example 1) compares the quantiles from the sample data set (in this case, the background vapor samples) to the corresponding quantiles from a normal distribution. This test assumes that if the data set is normally distributed, the quantiles from that data set will be highly correlated with the quantiles from a normal distribution. The procedure for performing the Shapiro-Wilk test is as follows:

1. Order the data set from the smallest value to the greatest.

2. Compute the differences $[X_{(n-i+1)} + X_{(i)}]$ for each i = 1...n.

   X = data point (i.e. vapor concentration)
   n = number of samples

3. Determine k where k = n/2
   If n/2 is not an integer, round to the next highest whole number (e.g. if n/2 is 20.5, use 21)

4. Determine the Shapiro-Wilk coefficient a_{n-i+1} for i = 1...k. Use Table 2 (EPA 1998) to determine the Shapiro-Wilk Coefficient.

5. Compute b where:

$$(5) \quad b = \sum_{i=1}^{k} b_i = \sum_{i=1}^{k} a_{n-i+1} (X_{(n-i+1)} X_{(i)})$$

6. Compute the Shapiro-Wilk test statistic

$$(6) \quad W = [b/s(n-1)^{1/2}]^2$$

7. Determine the critical point of the test for a selected α using Table 3 (EPA 1998). Compare the Shapiro-Wilk Statistic (W) to the critical point. If the Shapiro-Wilk Statistic for the data set exceeds the critical point, there is no evidence to reject the assumption that the data are normally distributed. If the Shapiro-Wilk statistic is less than the critical point, there is evidence at the α level of significance that the background data are not normally distributed. If the background data are not normally distributed, non-parametric techniques should be used to evaluate the data.

3. Establish a Tolerance Limit for the Background Data

Monthly vapor monitoring measurements taken after background concentrations are established may be compared with a tolerance (TL) limit established for the background data set. A tolerance limit is a limit with a specified degree of coverage and level of confidence. A tolerance limit having 95 percent coverage and 95 percent confidence can be interpreted to contain at least 95 percent of the distribution of observations from background data with 95 percent confidence (DEQ 1998).

The Storage Tank Program will use a tolerance limit of 95% (i.e. this interval is expected to contain at least 95% of the distribution of observations from the background dataset with a 95% confidence). The upper 95th tolerance limit is justified by its consistency with the requirements for other release detection methods specified by the UST Technical Regulation.

If the statistically calculated upper tolerance limit is below 50 ppm, the Storage Tank Program will use a total organic vapor concentration of 50 ppm as an upper tolerance limit for the concentration at which additional data needs to be collected to determine if a release should be suspected. According to studies performed by the National Work Group on Leak Detection Evaluations, the detection limits for most of the automated vapor detectors presently on the market and tested by this group range from around 50 ppm to 500 ppm. The DEQ believes that using 50 ppm of total organic vapors as an upper tolerance limit in those cases where the calculated upper tolerance limit is below 50 ppm: (1) is consistent with the automated leak detectors on the market; and (2) will reduce the number of suspected releases caused by false positive vapor monitoring results.

Table 2. Coefficients [α_{n-i+1}] for Shapiro-Wilk Test of Normality, n = 2(1)50 (EPA 1998)

i/n	2	3	4	5	6	7	8	9	10	
1	.7071	.7071	.6872	.6646	.6431	.6233	.6052	.5888	.5739	
2		0	.1677	.2413	.2806	.3031	.3164	.3244	.3291	
3				0	.0875	.1401	.1743	.1976	.2141	
4						0	.0561	.0947	.1224	
5								0	.0399	
i/n	11	12	13	14	15	16	17	18	19	20
1	.5601	.5475	.5359	.5251	.5150	.5056	.4968	.4886	.4808	.4734
2	.3315	.3325	.3325	.3314	.3306	.3290	.3273	.3253	.3232	.3211
3	.2260	.2347	.2412	.2460	.2495	.2521	.2543	.2553	.2561	.2565
4	.1429	.1586	.1707	.1802	.1878	.1939	.1988	.2027	.2059	.2085
5	.0695	.0922	.1099	.1240	.1353	.1447	.1524	.1587	.1641	.1686
6	0	.0303	.0539	.0727	.0880	.1005	.1109	.1197	.1271	.1334
7			0	.0240	.0433	.0593	.0725	.0837	.0932	.1013
8					0	.0196	.0359	.0496	.0612	.0711
9							0	.0163	.0303	.0422
10									0	.0140
i/n	21	22	23	24	25	26	27	28	29	30
1	.4643	.4590	.4542	.4493	.4450	.4407	.4366	.4328	.4291	.4254
2	.3185	.3156	.3126	.3098	.3069	.3043	.3018	.2992	.2968	.2944
3	.2578	.2571	.2563	.2554	.2543	.2533	.2522	.2510	.2499	.2487
4	.2119	.2131	.2139	.2145	.2148	.2151	.2152	.2151	.2150	.2148
5	.1736	.1764	.1787	.1807	.1822	.1836	.1848	.1857	.1864	.1870
6	.1399	.1443	.1480	.1512	.1539	.1563	.1584	.1601	.1616	.1630
7	.1092	.1150	.1201	.1245	.1283	.1316	.1346	.1372	.1395	.1415
8	.0804	.0878	.0941	.0997	.1046	.1089	.1128	.1162	.1192	.1219
9	.0530	.0618	.0696	..0764	.0823	.0876	.0923	.0965	.1002	.1036
10	.0263	.0368	.0459	.0539	.0610	.0672	.0728	.0778	.0822	.0862
11	0	.0122	.0228	.0321	.0403	.0476	.0430	.0598	.0650	.0697
12			0	.0107	.0200	.0284	.0358	.0424	.0483	.0537
13					0	.0094	.0178	.0253	.0320	.0381
14							0	.0084	.0159	.0227
15									0	.0076

Table 2 Continued. Coefficients [α_{n-i+1}] for Shapiro-Wilk Test of Normality, n = 2(1)50 (EPA 1998)										
i/n	31	32	33	34	35	36	37	38	39	40
1	.4220	.4188	.4156	.4127	.4096	.4068	.4040	.4015	.3989	.3964
2	.2921	.2898	.2876	.2854	.2834	.2813	.2794	.2774	.2755	.2737
3	.2475	.2463	.2451	.2439	.2427	.2415	.2403	.2391	.2380	.2368
4	.2145	.2141	.2137	.2132	.2127	.2121	.2116	.2110	.2104	.2098
5	.1874	.1878	.1880	.1882	.1883	.1883	.1883	.1881	.1880	.1878
6	.1641	.1651	.1660	.1667	.1673	.1678	.1683	.1686	.1689	.1691
7	.1433	.1449	.1463	.1475	.1487	.1496	.1503	.1513	.1520	.1526
8	.1243	.1265	.1284	.1301	.1317	.1331	.1344	.1356	.1366	.1376
9	.1066	.1093	.1118	.1140	.1160	.1179	.1196	.1211	.1225	.1237
10	.0899	.0931	.0961	.0988	.1013	.1036	.1056	.1075	.1092	.1108
11	.0739	.0777	.0812	.0844	.0873	.0900	.0924	.0947	.0967	.0986
12	.0585	.0629	.0669	.0706	.0739	.0770	.0798	.0824	.0848	.0870
13	.0435	.0485	.0530	.0572	.0610	.0645	.0677	.0706	.0733	.0759
14	.0289	.0344	.0395	.0441	.0484	.0523	.0559	.0592	.0622	.0651
15	.0144	.0206	.0262	.0314	.0361	.0404	.0444	.0481	.0515	.0546
16	0	.0068	.0131	.0187	.0239	.0287	.0331	.0372	.0409	.0444
17			0	.0062	.0119	.0172	.0220	.0264	.0305	.0343
18					0	.0057	.0110	.0158	.0203	.0244
19							0	.0053	.0101	.0146
20									0	.0049
i/n	41	42	43	44	45	46	47	48	49	50
1	.3940	.3917	.3894	.3872	.3850	.3830	.3808	.3789	.3770	.3751
2	.2719	.2701	.2684	.2667	.2651	.2635	.2620	.2604	.2589	.2574
3	.2357	.2345	.2334	.2323	.2313	.2302	.2291	.2281	.2271	.2260
4	.2091	.2085	.2078	.2072	.2065	.2058	.2052	.2045	.2038	.2032
5	.1876	.1874	.1871	.1868	.1865	.1862	.1859	.1855	.1851	.1847
6	.1693	.1694	.1695	.1695	.1695	.1695	.1695	.1693	.1692	.1691
7	.1531	.1535	.1539	.1542	.1545	.1548	.1550	.1551	.1553	.1554
8	.1384	.1392	.1398	.1405	.1410	.1415	.1420	.1423	.1427	.1430
9	.1249	.1259	.1269	.1278	.1286	.1293	.1300	.1306	.1312	.1317
10	.1123	.1136	.1149	.1160	.1170	.1180	.1189	.1197	.1205	.1212
11	.1004	.1020	.1035	.1049	.1062	.1073	.1085	.1095	.1105	.1113
12	.0891	.0909	.0927	.0943	.0959	.0972	.0986	.0998	.1010	.1020
13	.0782	.0804	.0824	.0842	.0860	.0876	.0892	.0906	.0919	.0932
14	.0677	.0701	.0724	.0745	.0775	.0785	.0801	.0817	.0832	.0846
15	.0575	.0602	.0628	.0651	.0673	.0694	.0713	.0731	.0748	.0764
16	.0476	.0506	.0534	.0560	.0584	.0607	.0628	.0648	.0667	.0685
17	.0379	.0411	.0442	.0471	.0479	.0522	.0546	.0568	.0588	.0608
18	.0283	.0318	.0352	.0383	.0412	.0439	.0465	.0489	.0511	.0532
19	.0188	.0227	.0263	.0296	.0328	.0357	.0385	.0411	.0436	.0459
20	.0094	.0136	.0175	.0211	.0245	.0277	.0307	.0335	.0361	.0386
21	0	.0045	.0087	.0126	.0163	.0197	.0229	.0259	.0288	.0314
22			0	.0042	.0081	.0118	.0153	.0185	.0215	.0244
23					0	.0039	.0076	.0111	.0143	.0174
24							0	.0037	.0071	.0104
25									0	.0035

Table 3. α - Level Critical Points for Shapiro - Wilk Test, n = 3 (1) 50					
N/ α	.05 level significance	n/ α	.05 level significance	n/ α	.05 level significance
1	---	18	.897	35	.934
2	---	19	.901	36	.935
3	.767	20	.905	37	.936
4	.748	21	.908	38	.938
5	.762	22	.911	39	.939
6	.788	23	.914	40	.940
7	.803	24	.916	41	.941
8	.818	25	.918	42	.942
9	.829	26	.920	43	.943
10	.842	27	.923	44	.944
11	.850	28	.924	45	.945
12	.859	29	.926	46	.945
13	.866	30	.927	47	.946
14	.874	31	.929	48	.947
15	.881	32	.930	49	.947
16	.887	33	.931	50	.947
17	.892	34	.933		

Tolerance Limit - Normally Distributed Background Data

To calculate the upper 95th percent tolerance limit for the background data, determine the sample mean and standard deviation for the background data using equations 1 through 3. Next, use this mean and standard deviation along with the appropriate tolerance factor from Table 4 (Lieberman 1958) to determine the upper 95th percent tolerance limit for the background data set. Example 2 provides additional information about calculating an upper tolerance limit for normally distributed data.

(7) Sample Mean: $$\bar{X} = \frac{\sum_{i=1}^{n} X_i}{n}$$

Where: X_i = the value of the ith sample
n = the number of samples

(8) $$TL = \bar{X} + k(n, \gamma, 1-\alpha) * s$$

n = # of samples in background data set
k(n, γ, 1-α) = tolerance factor for one-sided normal tolerance interval

If the upper tolerance limit is less than 50 ppm, the tank owner/operator should use 50 ppm as the upper tolerance limit.

Example 1. Shapiro-Wilk Test for Normality (DEQ 1998)

i	X_i	$X_{(n-i+1)}$	$X_{(n-i+1)} - X_i$	a_{n-i+1} (see Table 2)	b_i
1	1	942	941	.4734	445.47
2	3.1	637	633.9	.3211	203.55
3	8.7	578	569.3	.2565	146.03
4	10	331	321	.2085	66.93
5	14	292	248	.1686	41.81
6	19	151	132	.1334	17.61
7	21.4	85.6	64.2	.1013	6.5
8	27	81.5	54.5	.0711	3.87
9	39	64.4	25.4	.0422	1.07
10	56	58.8	2.8	.0140	.04
11	58.8	56	-2.8		
12	64.4	39	-25.4		
13	81.5	27	-54.5		
14	85.6	21.4	-64.2		
15	151	19	-132		
16	262	14	-248		
17	331	10	-321		
18	578	8.7	-569.3		
19	637	3.1	-633.9		
20	942	1	-941		

$\sum b_i = 932.88$

s = 259.72 (see equations 2 and 3)
$W = [932.88/259.72\ (19)^{1/2}]^2$
W = .679

The $\alpha = .05$ level critical point for the Shapiro-Wilk test when n = 20 is .905. Since W < .905, there is evidence that the data do not follow a normal distribution..

NOTE: X_i is the background data set arranged in ascending order and $X_{(n-i+1)}$ is the background data set arranged in descending order.

Table 4. Tolerance Factors (k) for one-sided normal tolerance intervals with probability level (confidence factor) Y = .95 and coverage P = 95% (Lieberman, 1958)

N	k	n	k
3	7.655	20	2.396
4	5.145	21	2.371
5	4.202	22	2.350
6	3.707	23	2.329
7	3.399	24	2.309
8	3.188	25	2.292
9	3.031	30	2.220
10	2.911	35	2.166
11	2.815	40	2.125
12	2.736	45	2.092
13	2.670	50	2.065
14	2.614	55	2.036
15	2.566	60	2.017
16	2.523	65	2.000
17	2.486	70	1.986
18	2.443	75	1.972
19	2.423	100	1.924

Example 2. Establishing an upper tolerance limit for a normally distributed data set

Background data:

100	53	350	1000	1200	49	350	600	650	400
850	90	700	245	1345	75	130	550	920	240

$\bar{X}$ = 494.9
s = 401.6
k = 2.396 (from Table 3, 95% upper tolerance limit)

TL (tolerance limit) = 494.9 + 2.4 * 401.6
TL = 1459

Tolerance Limit - Background Data that are not Normally Distributed

When the background data are not normally distributed, the greatest concentration within the background data set may be used as an upper tolerance limit. The power of this type of tolerance limit, however, is heavily dependent upon the number of samples in the background data set. According to DEQ (1998), at least 60 background samples must be collected in order to guarantee at least 95 percent coverage.

In order to increase the coverage of the background data without having to collect 60 or more samples, an outlier test may be used to establish a concentration that would indicate the data point came from a population other than the background vapor conditions at the site. Individual data points within a sample of a population are evaluated using equation 4 to determine if any of the observations is an outlier. The potential outlier value (T_n) is then compared with a critical point for a one-tailed outlier test to determine if the observation is an outlier. Equation 4 may be re-arranged so that the concentration at which an observation is considered an outlier (X_n) may be determined (equation 9).

(9) $$X_n = T_n * s + \bar{X}$$

$T_n = t_c$, the critical point for the one-tailed outlier in Table 1.
n = # of background vapor observations

If the upper tolerance limit (in this case X_n) is less than 50 ppm, the tank owner/operator should use an upper tolerance limit of 50 ppm.

Example 3. Establishing an upper tolerance limit for a data set that is not normally distributed

Background data:
0 0 25 33 45 0 12 0 0 95
32 34 56 89 0 9 0 12 34 15

n = 20 $\bar{X}$ = 24.6 s = 28.7

$X_n = T_n * s + \bar{X}$
The critical value for Tn from Table 1 (n = 20) is 2.557

X_n = 2.557 * 28.7 + 24.6
X_n = 98

The upper tolerance limit that may be used for the background data set is 98.

4. Compare monthly data with the Upper Tolerance Limit

Once the upper 95th percent tolerance limit is estimated, the tank owner/operator should compare the monthly vapor reading for each well with the upper 95th percent tolerance limit for that well. If the monthly monitoring concentration is less than the upper tolerance limit for the well, the tank owner/operator should record the monthly monitoring concentration and continue on schedule with monthly monitoring. If a monthly monitoring reading exceeds the upper 95th percent tolerance limit for the vapor monitoring well, the tank owner/operator should: (1) report the results to

DEQ; and (2) collect at least four additional vapor readings from that well over the next five days to determine if the vapor concentration in that well has increased significantly over "background" vapor concentrations in that well.

5. Compare the Means

After at least four additional vapor readings are taken from the well where the upper tolerance level was exceeded, the sample mean of these vapor readings (the monthly reading that triggered the investigation plus the additional readings) should be determined. This mean should be compared with the background mean for that well to determine if there has been a statistically significant increase in the vapor concentration in the well.

Comparison of Means - Normally Distributed Data

A test statistic that may be used to compare these two sample means when the data are normally distributed is Welch's t-test. Welch's t-test is calculated as follows:

$$(10) \quad t = (\bar{X}_c - \bar{X}_b)/[\, s_c^2 / n_c + s_b^2/n_b]^{1/2}$$

where: $\bar{X}_c$ = the mean concentration of the monthly and additional samples collected

$\bar{X}_b$ = the background mean
s_c^2 = variance of the monthly and additional samples
s_b^2 = background variance
n_c = number of samples (monthly and additional samples) collected
n_b = number of samples used to estimate the "background" concentration

The t-statistic derived by equation 10 should be compared with the critical t-statistic (t_c) for the degrees of freedom represented by the data. Equation 10 may be used to calculate the degrees of freedom for the data. After calculating the degrees of freedom, the critical t-value (t_c) may be looked up in the student's t-table (Table 4). See Example 4 for additional information about the use of Welch's t-test.

$$(11) \quad df = [s_c^2/n_c + s_b^2/n_b]^2 \,/\, [(s_c^2/n_c)^2/(n_c-1) + (s_b^2/n_b)^2/(\, n_b-1)]$$

$$t_c = t_{(df,\,.95)}$$

If $t>t_c$, the null hypothesis of equal means between the two groups may be rejected and we may determine that the mean of the additional samples is significantly greater than the background mean.

Comparison of Means - Data that are not Normally Distributed

When additional data are collected following the exceedance of the upper tolerance limit, the data collected during the investigation need to be compared with the background data to determine if a release should be suspected. One way of performing this evaluation for data that are not normally distributed is to compare the upper confidence limit of the background mean with the mean of the monthly result that triggered the investigation plus the data collected as part of the investigation. The confidence limit is designed to contain the specified population parameter within a specified level of confidence or probability. For example, a 95 percent upper confidence limit of the mean having a value of 45 indicates that there is at least a 95 percent probability that the true mean of population is not greater than 45.

Table 4. Percentiles of the Student's t-Distribution					
df/p	.95	df/p	.95	df/p	.95
1	6.314	23	1.714	45	1.679
2	2.920	24	1.711	46	1.679
3	2.353	25	1.708	47	1.678
4	2.132	26	1.706	48	1.677
5	2.015	27	1.703	49	1.677
6	1.943	28	1.701	50	1.676
7	1.895	29	1.699	51	1.675
8	1.860	30	1.697	52	1.675
9	1.833	31	1.696	53	1.674
10	1.812	32	1.694	54	1.674
11	1.796	33	1.692	55	1.673
12	1.782	34	1.691	56	1.673
13	1.771	35	1.690	57	1.672
14	1.761	36	1.688	58	1.672
15	1.753	37	1.687	59	1.671
16	1.746	38	1.686	60	1.671
17	1.740	39	1.685	70	1.667
18	1.734	40	1.684	80	1.664
19	1.729	41	1.683	90	1.662
20	1.725	42	1.682	100	1.660
21	1.721	43	1.681		
22	1.717	44	1.680		

The Chebychev Inequality is a procedure that may be used to establish an upper confidence limit for data that are not normally distributed. Persons evaluating the data should calculate an upper confidence limit for the background data by using the Chebychev Inequality equation (equation 12).

(12) $UCL = \bar{X} + k * s/(n^{1/2})$

Where: UCL = the upper confidence limit
k = the 95% Chebychev upper confidence value (calculated from equation. 12)
n = number of observations (values) in the background data set

$\bar{X}$ = sample mean
s = sample standard deviation

(13) $k = (1/(1-cl/100) -1)^{1/2}$

Where cl = confidence limit (in this case 95 since we are using an upper 95% confidence interval)

The upper confidence limit of the background mean derived by the Chebychev equation then may be compared with the mean of the monthly vapor reading that triggered the release investigation plus the additional vapor samples collected as part of the release investigation. If the mean of the monthly result plus the investigative data exceeds the upper confidence limit of the background mean, a release may be suspected. The tank owner/operator must report this result to DEQ and determine if a release has occurred.

Example 4. Determining if the mean of monthly plus confirmatory samples exceeds the background mean (Normally Distributed Data).

Background Vapor Concentrations in ppm (data are normally distributed)

100	53	350	1000	1200	49	350	600	650	400
850	90	700	245	1345	75	130	550	920	240

$\bar{X}$ = 494.9 ppm ≈ 495 ppm
s = 401.6 ppm ≈ 402 ppm
k at the 95% confidence limit is 2.396

the upper tolerance limit (TL) = X + k * s = 1459 ppm

Monthly vapor monitoring is initiated at the site and the vapor reading for the eighth month is 1900 ppm. The tank owner/operator takes four additional vapor measurements over the next week and these concentrations are: 1400, 750, 1600, and 500 ppm. The mean of the monthly reading that triggered the investigative monitoring and the additional vapor readings is 1230 ppm. The standard deviation of these vapor concentrations is 587 ppm.

Welch's t-test may be used to determine if the mean of this data is statistically greater than the background mean.

$t = (X_c - X_b) / [s_c^2 / n_c + s_b^2 / n_b]^{1/2}$
$t = (1230 - 495) / [587^2 / 5 + 402^2 / 20]^{1/2}$
$t = 735/[68914 + 8080]^{1/2}$
$t = 2.65$

$df = [s_c^2/n_c + s_b^2/n_b]^2 / [(s_c^2/n_c)^2/(n_c-1) + (s_b^2/n_b)^2/(n_b-1)]$
$df = [587^2 / 5 + 402^2 / 20]^2 / (587^2/5)^2/4 + (402^2/20)^2/19]$
df = 5

The critical statistic (t_c) for 5 degrees of freedom is 2.015 (Table 4).
t > tc, therefore, we reject the null hypothesis that there is no significant difference between the two means at the 95th percent confidence level. At the 95th percent confidence level, there is evidence that the mean concentration of the additional vapor monitoring data is statistically greater than the background mean.

Example 5. Determining if the mean of monthly plus confirmatory samples exceeds the background mean (data that are not normally distributed).

Background data:
0 0 25 33 45 0 12 0 0 95
32 34 56 89 0 9 0 12 34 15

n = 20 $\bar{X}$ = 24.6 s = 28.7

Monthly monitoring and data from release investigation:
125 89 61 45 75

mean of monthly monitoring data and data from release investigation:
79

$UCL = \bar{X} + k * s/(n^{1/2})$

$k = (1/1\text{-}cl/100) -1)^{1/2}$
$k = (1/(1\text{-}95/100) - 1)^{1/2}$
$k = 4.359$

$UCL = 24.6 + 4.359 * 28.7/(20)^{1/2}$
$UCL = 52.6 \approx 53$

The mean of the monthly monitoring and data from the release investigation is greater than the upper confidence limit for the background data (79 > 53). A release should be suspected.

References

EPA. 1998. Draft EPA Guidance on Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities.

Lieberman, Gerald F. 1958. "Tables for One-Sided Statistical Tolerance Limits." Industrial Quality Control. Vol. XIV, No. 10.

Virginia Department of Environmental Quality (DEQ). 1998. Introduction to Groundwater/Soil Statistics.

DISCLAIMER

This document provides procedural guidance to the DEQ Storage Tank Program Staff. This document is guidance only. It does not establish or affect legal rights or obligations. It does not establish a binding norm and is not finally determinative of the issues addressed. Agency decisions in any particular case will be made by applying the State Water Control Law and the implementation regulations on the basis of site-specific facts.

USER'S GUIDE
STATISTICS - VAPOR MONITORING FOR RELEASE DETECTION

The purpose of this "user's guide" is to provide instructions for tank owners/operators who chose to use the spreadsheet developed by the DEQ Storage Tank Program entitled: : *Statistics - Vapor Monitoring for Release Detection*.

An upper tolerance limit, the concentration at which a release may be suspected, needs to be derived for each vapor monitoring well at a site or facility. The steps listed below need to be followed to derive an upper tolerance limit for a single vapor monitoring well.

1. Open the MS. Excel Spreadsheet entitled: *Statistics - Vapor Monitoring for Release Detection*. Make sure that the macro's are enabled when the file is opened.

2. Go to cell *A72* and clear all data by pressing the "**clear**" button.

3. Enter at least 20 vapor readings, the "background data set" for an individual vapor monitoring well into cells *A6* through *A55*. Data that are below the instrument detection limit should be entered as 1/2 of the detection limit (e.g. if the detection limit is 1, enter a value of .5). Enter only numeric values, do not enter units (e.g. parts per million; ppm).

   NOTE At least 20 data values must be entered into cells A6 through A55 for the spreadsheet to perform the necessary calculations.

4. After entering the background data, check cells *B6* through *B55* to determine if any of the background vapor concentrations is an outlier. If none of the background vapor readings is an outlier, go to step 7. If any of the cells indicates that the corresponding vapor reading is an outlier, remove the vapor reading from the background data set.

   NOTE: An outlier is a data value, in this case a vapor concentration, that is statistically improbable when the data distribution is evaluated. Outliers often are indicative of sample collection errors.

5. Collect one additional vapor reading for each outlier found in step 4.

6. Record the vapor reading(s) replacing the outlier(s) in the appropriate cell(s) in column A and go to step 4.

7. Go to cell *C5* and press the "**sort 1**" button.

8. Go to cell *D5* and press the "**sort 2**" button.

9. The value listed in cell *D11* is the <u>upper tolerance limit</u> for the background vapor concentrations at the site. The upper tolerance limit is the action level for the vapor monitoring well. Save the file (it is recommended that you change the name of the file to reflect the well number of the pertinent vapor monitoring point).

10. Close the file. If there is another vapor monitoring well for which an upper tolerance limit has not been determined, return to step 1 and determine the upper tolerance limit for that well. If upper tolerance limits have been determined for each well, monthly vapor monitoring for release detection may be initiated.

11. Perform release detection by monitoring vapor concentrations in each vapor monitoring well. This is required on a monthly basis.

12. Compare the monthly vapor monitoring concentration in each well with the upper tolerance limit for that well (cell *D11*). If the vapor concentration is below the upper tolerance limit, return to step 11. If the vapor concentration for any well exceeds the upper tolerance limit for that well, go to step 13.

13. Contact the DEQ Regional Office within 24 hours after discovering that a vapor monitoring result exceeded the upper tolerance limit for that particular well. The DEQ Regional Office staff will provide further instructions and a deadline for performing the tests needed to further evaluate whether the vapor monitoring data suggest a release has occurred.

14. Open the MS Excel Spreadsheet file for the vapor monitoring well in which the monthly vapor reading exceeded the upper tolerance limit. Make sure that the macro's are enabled when the file is opened.

15. Enter the vapor reading that exceeded the upper tolerance limit into cell *E6*.

16. Collect four (4) to nine (9) additional vapor readings from the vapor monitoring well over the next week and enter these values into cells *E7* through *E17*.

17. Go to cell *D14* and press "**copy A**".

18. Go to cell *D16* and press "**copy B**".

19. Report the results of the statistical test listed in cell *D65* to the Regional Office within the time specified by the Regional Office (see step 13)

Appendix M **– EPA Guidance Regarding Cathodic Protection Monitoring of Act-100® and Act-100U® Underground Storage Tanks with Cathodic Protection**

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

FEB 23, 1999

OFFICE OF SOLID WASTE AND
EMERGENCY RESPONSE

MEMORANDUM

SUBJECT: Guidance Regarding Cathodic Protection Monitoring of ACT-100® and ACT-100-U® Underground Storage Tanks with Cathodic Protection

FROM: Anna Hopkins Virbick, Director /s/
Office of Underground Storage Tanks

TO: State UST Program Managers
EPA Regional Program Managers

Pursuant to a request from the Steel Tank Institute (STI), the Environmental Protection Agency (EPA) is providing guidance regarding the cathodic protection (CP) monitoring of two underground storage tank (UST) technologies. The ACT-100® and, where accepted by implementing agencies according to EPA guidance dated June 25, 1998, ACT-100-U® tank technologies meet new tank standards at § 280.20 without the addition of cathodic protection. These tanks are corrosion protected by an external cladding which provides a dielectric barrier between the steel tank and the environment. As long as the integrity of the cladding is maintained, the addition of anodes to these types of tanks at installation provides an additional level of corrosion protection that is beyond the minimum requirements described in the federal regulations.

STI recently published a supplement to the installation instructions dated March 1998 for the ACT-100® and ACT-100-U® tank technologies (see attachments) that provides specific instructions for attaching factory-attached and field-attached anodes. Factory-attached anodes must be attached per the requirements of the STI-P3® specification and weld-on anode core bars must be coated at the factory according to the ACT-100® or ACT-100-U® specifications. For field-attached anodes, the anode wire must be connected to the lift lug or something which by design is not in contact with stored product. Instructions for wire connections and splices are also included. EPA believes that the installation instruction supplements and specifications ensure the integrity of the cladding is maintained. Historically, the ACT-100® specification (as far back as 1989) required complete cladding coverage over the entire tank, any external attachments must be designed in a manner which does not preclude the proper

application of the cladding material, and a spark test must be conducted over the entire surface of the tank after application of the cladding.

EPA believes that anytime CP is installed on an UST system, it should be operating properly. However, ACT-100® and, where accepted, ACT-100-U® tank technologies meet new tank standards without the addition of anodes. In addition, by following STI's March, 1998 installation instructions, tank manufacturers employ good tank management practices by requiring an initial test of the CP system and additional testing when construction or maintenance activity around the tank or anodes takes place.

Based upon the above discussion, EPA believes that monitoring of ACT-100® and, where accepted by implementing agencies, ACT-100-U® tanks with anodes should not be required. EPA recommends that implementing agencies determine the following for ACT-100® and, where accepted by implementing agencies, ACT-100-U® tanks:

Periodic monitoring of cathodic protection systems is not required in the following cases:

1. When factory installed anodes are included with a new ACT-100® or ACT-100-U® installation.

2. When field installed anodes are included with a new ACT-100® or ACT-100-U® installation.

Note: In cases where cathodic protection is retrofitted to a previously installed ACT-100® or ACT-100-U® tank, cathodic protection monitoring is required because the status of the cladding cannot be determined.

Please contact Paul Miller of my staff via E-mail at miller.paul@epa.gov or phone at (703) 603-7165 if you have questions regarding this guidance.

Attachments (2)

cc (w/o attachments): Wayne Geyer, Steel Tank Institute
David Wiley, OUST
OUST Management Team
Kathy Nam, OGC

Appendix N **– Secondary Containment Fact Sheets**

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY FACT SHEET
UNDERGROUND STORAGE TANK (UST) SECONDARY CONTAINMENT REQUIREMENTS

(See DEQ website: www.deq.virginia.gov & State UST Regulation http://lis.virginia.gov/cgi-bin/legp604.exe?000+reg+9VAC25-580)

Virginia regulations effective September 15, 2010 require secondary containment (e.g., double-walled tank and/or pipe and/or under-dispenser containment pan) for any new or replaced UST system(s) installed within 1,000 feet of a public water supply or potable well. In effect, virtually all new or replaced USTs must have secondary containment (see "distance" exemption below). It is important to note that release detection for secondarily contained equipment requires interstitial monitoring every 30 days.

The Virginia UST secondary containment requirements under 9VAC25-580 became effective September 15, 2010. §9VAC-25-580-50.7.A states:

> *Each new or replaced petroleum underground storage tank, or piping connected to any petroleum underground storage tank, installed within 1,000 feet of any existing community water system or existing potable drinking water well must be secondarily contained in accordance with 9VAC25-580-140 A. In the case of a replacement of a petroleum underground storage tank or the piping connected to the petroleum underground storage tank, the secondary containment requirements shall apply only to the specific petroleum underground storage tank or piping run being replaced, not to other petroleum underground storage tanks and connected pipes comprising such system. The entire piping run must be secondarily contained if more than 50% of the length of a piping run connected to a petroleum underground storage tank is to be replaced.*

IMPORTANT POINTS:

- In general, after September 15, 2010, no newly installed or newly replaced single-walled USTs or single-walled UST piping within 1,000 feet of a water supply will meet the new UST regulation requirements.
- Only the specific tank and/or piping run being installed or replaced is affected. This also applies to "transition sumps" in piping runs.
- Interstitial monitoring as a method of release detection requires that the interstitial space between the outer and inner wall of the tank/piping be monitored for the presence of product. This may be conducted manually (via visual inspection of the interstitial space using brines, vacuums, etc.) or electronically (via electronic sensors).
- If more than 50% of the UST product piping is being replaced, the entire pipe run must be replaced with secondarily contained (double-walled) piping.
- If 50% or less of product piping is removed and put back, secondary containment is not required. It will be the tank owner's responsibility to demonstrate that less than 50% of the piping was replaced. For complex piping systems, it is recommended that the tank owner contact DEQ to discuss secondary containment requirements prior to replacement and/or installation.
- New emergency generator USTs must have secondary containment and perform interstitial monitoring for release detection.
- Secondary containment systems will commonly be designed to meet a national standard such as UL971 (for piping). Secondary containment designs that do not meet national standards are acceptable if a professional engineer certifies the design.

UNDER-DISPENSER CONTAINMENT

- Each new motor fuel dispenser system (motor fuel dispenser and the equipment necessary to connect the dispenser to the UST system) shall have under dispenser containment (containment underneath a dispenser that will prevent leaks from the dispenser from reaching soil or groundwater). This applies when the dispenser system is installed within 1,000 feet of a public water supply or potable drinking water well.
- A motor fuel dispenser system is considered new when (1) it is installed at a location where there previously was none or (2) an existing dispenser is removed and replaced with another dispenser and the pipe component equipment used to connect the dispenser to the UST system is replaced.
- Motor fuel under-dispenser containment must meet the following requirements: be liquid-tight on its sides, bottom, and at any penetrations; be compatible with the substance conveyed by the piping; and allow for visual inspection and access to the components in the containment system or be electronically monitored (i.e., sensors).

- When new dispenser pans are installed in conjunction with required secondarily contained piping, the interstitial monitoring requirements for piping must be considered in the design of the system.
- When new dispenser pans are installed in conjunction with existing single-walled UST systems, they should be designed to allow the owner/operator to visually inspect or monitor by a sump sensor or other device.
- Dispenser "pans" are the common term for under-dispenser containment but any methods that achieve the same protections meet the regulatory requirement.
- For common system designs, replacing the piping connector as part of a dispenser replacement will trigger the requirement for under-dispenser containment at the UST system. A dispenser replacement **alone** (without pipe or pipe connector change-out) **does <u>not</u>** trigger the requirement for under-dispenser containment.

1,000 FOOT DISTANCE EXEMPTION

None of these requirements apply to UST systems or dispensers that are more than 1,000 feet from a community water system or potable water supply. For the purposes of this exemption, all underground water supply piping is considered part of the community water system. Since the majority of UST locations/stations will have a water distribution line or well onsite, very few tank locations in Virginia will qualify for this exemption. If a water distribution line or onsite well is planned as part of a new UST facility installation, it is enough to trigger the new secondary containment requirements.

Documentation required: If the distance between the new/replaced tank/pipe/dispenser and the water supply is between 1,000 and 2,000 feet, the tank owner must submit a distance map to the DEQ Regional Office certified by a licensed professional surveyor. If the distance is over 2,000 feet, the owner/operator must provide a map - no surveyor certification is required.

THE REQUIREMENT FOR UST SECONDARY CONTAINMENT DOES <u>NOT</u> APPLY TO:

- Petroleum UST tanks that are not new or not replaced in a manifolded UST system
- Piping runs that are not new or not replaced on petroleum USTs with multiple piping runs
- Safe suction piping (European suction) that meets the requirements at 9VAC 25-580.140.2(b)1-5
- Piping that manifolds two or more petroleum USTs together
- Repairs meant to restore a petroleum UST, pipe, or dispenser to operating condition. For this purpose, a repair is any activity that does not meet the definition of "replace"
- Other instances approved by the board where equivalent protection is provided

IF YOU HAVE ADDITIONAL QUESTIONS, DEQ STAFF MAY BE REACHED AT THE NUMBERS LISTED BELOW

Central Office (Richmond) (804) 698-4269

Regional Offices:
Tidewater Region (Virginia Beach) (757) 518-2000
Northern Region (Woodbridge) (703) 583-3800
Piedmont Region (Richmond) (804) 527-5020
Valley Region (Harrisonburg) (540) 574-7800
Blue Ridge Region (Roanoke) (540) 562-6700
Blue Ridge Region (Lynchburg) (434) 582-5120
Southwest Region (Abingdon) (276) 676-4800

Q. WHAT IS THE UST SECONDARY CONTAINMENT REQUIREMENT?

A. Virginia DEQ requires that all regulated UST tanks and/or pipes installed or replaced after September 15, 2010 to be secondarily contained (double-walled) and monitored for leaks between the double walls (interstitial space) at least every 30 days.

Q. AFTER SEPTEMBER 15, 2010 IN VIRGINIA, MUST I ALWAYS INSTALL A NEW UST TANK AND/OR PIPE WITH SECONDARY CONTAINMENT AND MONITOR IT?

A. In general, yes (except for rare cases where the UST is going in more than 1,000 feet from any water supply / water system).

Q. HOW IS THE 1,000 FOOT DISTANCE EXEMPTION FROM ANY WATER SUPPLY / SYSTEM CALCULATED?

A. For the purposes of this exemption, all underground water supply piping is considered part of any community water system. Since the majority of UST locations/stations will have a water distribution line or well onsite, very few tank locations in Virginia will qualify for this exemption. If an owner or operator intends to install a new petroleum UST that is located within 1,000 feet of any existing community water system or existing or planned potable drinking water well, then the secondary containment requirements apply. In those rare cases in which the exemption might apply, the tank owner must submit a map prepared by a licensed professional surveyor to DEQ showing the distance (>1,000' up to 2,000') to the nearest water supply at least 30 days prior to the installation. If it is over 2,000' distance from UST to water supply then only a map is required (not required to be prepared by a licensed professional surveyor).

Q. MY PROPERTY IS CURRENTLY LOCATED MORE THAN 1,000 FEET FROM A WATER LINE OR WELL. CAN I INSTALL A SINGLE-WALLED UST AND THEN LATER INSTALL A POTABLE WELL?

A. No. A new facility installation that will include a potable drinking water well within 1,000 feet is required to be secondarily contained, regardless of when the well is installed.

Q. WHAT ARE THE COMMON FORMS OF SECONDARY CONTAINMENT RELEASE DETECTION?

A. Interstitial monitoring via the use of sump, pipe, and tank sensors will likely be the most common forms used in addition to vacuum and brine systems for tanks.

Q. CAN I JUST REPLACE THE TANK AND USE THE OLD COMPLIANT SINGLE-WALLED PIPE?

A. Yes. But secondary containment and associated release detection requirements apply to the tank.

Q. CAN I JUST REPLACE THE ENTIRE PIPE BUT LEAVE THE OLD COMPLIANT SINGLE-WALLED TANK?

A. Yes. But secondary containment and associated release detection requirements apply to the pipe.

Q. WHAT IS THE UNDER-DISPENSER CONTAINMENT REQUIREMENT?

A. Each new motor fuel dispenser system installed within 1,000 feet of any existing community water system or existing potable drinking water well shall have containment underneath the dispenser that will prevent leaks from the dispenser from reaching soil or groundwater.

Q. CAN I REPLACE THE DISPENSER ALONE WITHOUT TRIGGERING UNDER DISPENSER CONTAINMENT?

A. Yes, if you can connect it to existing piping connectors. If you must change the piping connectors, then the under-dispenser containment requirement applies.

Q. IF I REPLACE A DISPENSER AND MODIFY THE PIPING CONNECTORS, DO I NEED TO REPLACE MY COMPLIANT SINGLE-WALLED PIPING WITH SECONDARILY CONTAINED (DOUBLE-WALLED) PIPING?

A. No. Replacement of a dispenser does not trigger secondary containment for the existing piping run.

Q. FOR REPLACEMENT PIPING, DO NEW TRANSITION SUMPS REQUIRE MONITORING?

A. Yes. They are considered a part of the secondary containment system.

Q. CAN I USE MY AUTOMATIC TANK GAUGE OR STATISTICAL INVENTORY RECONCILIATION (SIR) AS MY PRIMARY RELEASE DETECTION METHOD ON NEW SECONDARILY CONTAINED TANKS AND PIPE?

A. No. You must change to a secondary containment form of release detection (e.g., monitoring of the interstitial space using sensors, vacuum, brine, etc.).

Q. CAN I USE TANK TIGHTNESS TESTING AND LINE TIGHTNESS TESTING AS MY PRIMARY RELEASE DETECTION METHOD ON NEW SECONDARILY CONTAINED TANKS AND PIPE?

A. No. You must change to a secondary containment form of release detection, (e.g., monitoring of the interstitial space using sensors, vacuum, brine, etc.).

Q. WHAT IF I REPLACE BOTH A TANK AND 10 FEET OF THE 100 FEET OF PIPE?

A. Only the tank must be secondarily contained. The pipe change is a 10 foot "repair" since you did not replace more than 50% of piping run.

Q. WHAT ABOUT MANIFOLDED TANKS? CAN I REPLACE JUST ONE OF TWO, FOR EXAMPLE?

A. Yes. Only the tank replaced must be secondarily contained. Siphon bars between manifolded tanks can remain single-walled since they are similar to safe suction pipe (exempt).

Q. WHAT ABOUT NEW EMERGENCY GENERATOR TANKS?

A. Unlike the past, they must be secondarily contained and interstitially monitored. But the pipe on a replaced emergency generator tank system can remain single walled if the existing pipe is reused.

Q. DOES PIPING FOR OTHER USTS AT A COMPLEX PIPE SITE COUNT IN THE PIPING RUN LENGTH BEING REPLACED?

A. Generally no. When feasible, each tank and pipe run is judged separately.

Q. DOES SECONDARY CONTAINMENT APPLY TO SAFE SUCTION PIPING?

A. No. Safe suction piping (European suction) that meets the requirements is exempt.

Q. DOES SECONDARY CONTAINMENT APPLY TO UNSAFE SUCTION PIPING?

A. Yes.

Q. DOES THIS APPLY IF SOMEONE WANTS TO REOPEN THEIR TEMPORARILY-CLOSED UST?

A. No. Reopening an existing UST does not trigger the secondary containment requirement.

Q. WHAT HAPPENS WITH NEW OR REPLACED HOME HEATING OIL TANKS?

A. They are not regulated USTs so the secondary containment requirement does not apply.

Q. HOW DO I PROPERLY NOTIFY DEQ OF A SECONDARY CONTAINMENT INSTALLATION?

A. The DEQ Form 7530should have the "secondary containment" box checked if secondary containment of any kind has been added in part or completely for the UST system—"Date of Installation" noted too. If in part (e.g. 50%+ pipe repair), then use the "Other" box to describe this (form Section IX). When closing single-walled pipe, note the pipe closure and mark the "secondary containment" for any new pipe. If the dispenser has been changed out with attached (flex) connecting pipe, the new UDC should be noted under the "Other" section too.

Appendix O **- Operator Training Fact Sheets**

DESIGNATION OF CLASS A, B, AND C OPERATORS FACT SHEET

(See DEQ website: www.deq.virginia.gov & State UST Regulation http://lis.virginia.gov/cgi-bin/legp604.exe?000+reg+9VAC25-580)

Virginia Regulation 9VAC25-580-125 requires UST owners and operators to complete an approved or approvable UST Operator Training program by **August 8, 2012** and to prepare and maintain a list of designated Class A, Class B, and Class C Operators**.** Since each class of operator requires different levels of training and responsibility, it is necessary for each owner/operator to designate persons responsible for Class A, B, and C duties. Designated operators should be individuals. The UST owner must determine who best fits each role for their UST facilities.

Generally, tank owners/operators should:

1. Designate Class A, Class B, and Class C Operators for each facility,
2. Obtain UST Operator Training for all classes of operators,
3. Keep on file the designation and Certificates of Training for each trained operator for DEQ staff review upon inspection,
4. Conduct annual refresher training for all Class C operators, and
5. Ensure the emergency notification procedures are stored in a known location at the facility or posted if the facility is unmanned.

DESIGNATING UST OPERATORS

The "Underground Storage Tank (UST) Operator Class Designation Form – Single Facilities" may be used to document Class A, Class B, and Class C Operators. Any person designated for more than one class of operator must complete the required training for each operator class for which he/she is designated. Many training programs have combined Class A and Class B UST Operator Training into one program because Class A and Class B Operators will commonly be the same individual. Class C Operators generally will be trained by certified Class A and Class B Operators.

THERE ARE MULTIPLE WAYS TO DESIGNATE CLASS A, CLASS B, AND CLASS C OPERATORS

- Designate separate people as Class A, Class B, and/or Class C Operators.
- Designate the same person as Class A, Class B, and/or Class C. One person may be designated as the Class A, Class B, and Class C for many mom/pop type gas stations and/or facilities.
- Designate multiple people for each operator class at one or more facilities.
- Designate one person for multiple facilities.

WHEN DESIGNATING UST OPERATORS YOU SHOULD CONSIDER THE FOLLOWING

- When a facility is found to be non-compliant with certain portions of the UST regulations as a result of an inspection, all designated Class A and Class B Operators assigned to that facility may be required to repeat an approved UST Operator Training course no later than **90 days** from the date they are notified of a retraining requirement by DEQ.
- A new Class A and/or Class B Operator must be trained within **60 days** of assuming the duties for that class of operator.
- Class C Operators must be trained ***before*** assuming duties.
- A Class A or Class B Operator must be readily available and be able to be onsite at the facility within a reasonable time.
- A Class C Operator must be present when the facility is **manned**. Because of this requirement, tank owners should consider designating and training multiple Class C Operators for each facility.
- Class C Operators must be briefed on facility emergency response instructions every 12 months.
- The UST owner or operator shall incur the costs of training for designated operators.

CLASS A OPERATORS

§9VAC-25-580-125.A.1 of Virginia's UST Technical Regulation defines a Class A Operator:

…"Class A operator" means an operator who has primary responsibility to operate and maintain the underground storage tank system and facility. The Class A operator's responsibilities include managing resources and personnel, such as establishing work assignments, to achieve and maintain compliance with regulatory requirements. In general, Class A operators focus on the broader aspects of the underground storage tank statutory and regulatory requirements and standards necessary to properly operate and maintain the underground storage tank system and facility. Class A Operators are usually, but not always, tank owners or environmental managers and usually function at the highest level of regulatory compliance responsibility.

- The Class A Operator typically ensures that the appropriate individuals are designated as Class A, Class B, and Class C Operators and that those designated individuals are trained to properly operate and maintain the UST system(s), maintain appropriate records, and properly respond to emergencies such as spills or releases.
- A third party contractor may be designated as a Class A Operator.

CLASS B OPERATORS

§9VAC-25-580-125.A.2 of Virginia's UST Technical Regulation defines a Class B Operator:

…"Class B operator" means an operator who implements applicable underground storage tank regulatory requirements and standards in the field or at the underground storage tank facility. A Class B operator oversees and implements the day-to-day aspects of operations, maintenance, and recordkeeping for the underground storage tanks at one or more facilities.

- Class B Operators are individuals who are usually UST operators, UST managers, environmental managers, facility managers, facility superintendents, lessees, or operation's managers.
- Class B Operators are typically considered the facility "operators". UST owners and operators are jointly and severally liable for UST compliance with the regulation.
- A Class B Operator is responsible for the day to day operation of the USTs and maintaining the facility compliance records.
- A third party contractor may be designated as a Class B Operator.

CLASS C OPERATORS

§9VAC-25-580-125.A.3 of Virginia's UST Technical Regulation defines a Class C Operator:

…"Class C operator" means the person responsible for responding to alarms or other indications of emergencies caused by spills or releases from underground storage tank systems and equipment failures. A Class C operator generally is the first line of response to events indicating emergency conditions.

- Class C Operators are generally clerks or employees that control the dispensing or sale of the fuel.
- A certified and trained Class C Operator must be present when the facility is manned and available within a reasonable amount of time when the facility is unmanned.
- In most situations, it will be necessary to have multiple Class C Operators designated and trained.

IF YOU HAVE ADDITIONAL QUESTIONS, DEQ PHONE NUMBERS ARE LISTED BELOW

Alicia Meadows UST Operator Training /Compliance Coordinator	(434) 582-6201
Regional Offices:	
Tidewater Region (Virginia Beach)	(757)518-2000
Northern Region (Woodbridge)	(703)583-3800
Piedmont Region (Richmond)	(804)527-5020
Valley Region (Harrisonburg)	(540)574-7800
Blue Ridge Region (Roanoke)	(540)562-6700
Blue Ridge Region (Lynchburg)	(434)582-5120
Southwest Region (Abingdon)	(276)676-4800

Underground Storage Tank (UST) Operator Class Designation Form – Single Facilities

Virginia Regulation 9VAC25-580-125.F requires UST owners and operators to prepare and maintain a list of designated Class A, Class B, and Class C Operators by August 8, 2012. A copy of the operator class designees must be kept on site for manned facilities and readily available for unmanned facilities. This form may be used to designate Class A, B, and C Operators for each UST system(s) facility. UST Operator Training Certifications for the Class A, B, and C Operators may be attached to this form.

Part I. Facility Information		
Facility Name		
Facility Address		
City, State, Zip		
Facility Phone Number		
Name of Person Completing Form	Signature of Person Completing Form	Date Form Completed and Signed

Part II. Class A Operator Designation	
Name	
Title	
Company	
Phone Number	Email
Name	
Title	
Company	
Phone Number	Email
Name	
Title	
Company	
Phone Number	

Part III. Class B Operator Designation	
Name	
Title	
Company	
Phone Number	Email
Name	
Title	
Company	

Phone Number	Email
Name	
Title	
Company	
Phone Number	Email
Name	
Title	
Company	
Phone Number	Email

Part IV. Class C Operator Designation

Name		
Title		
Phone Number		
Date Initially Certified as Class C Operator	Trainer's Name	Trainer's Operator Class
Name		
Title		
Phone Number		
Date Initially Certified as Class C Operator	Trainer's Name	Trainer's Operator Class
Name		
Title		
Phone Number		
Date Initially Certified as Class C Operator	Trainer's Name	Trainer's Operator Class
Name		
Title		
Phone Number		
Date Initially Certified as Class C Operator	Trainer's Name	Trainer's Operator Class
Name		
Title		
Phone Number		
Date Initially Certified as Class C Operator	Trainer's Name	Trainer's Operator Class

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

UNDERGROUND STORAGE TANK (UST) CLASS A, CLASS B, AND CLASS C OPERATOR TRAINING PROGRAM APPROVAL PROCEDURES

All Class A and B Underground Storage Tank (UST) Operator Training programs must obtain approval from VA DEQ. Prior approval of a UST Operator Training program is not required to implement training, but is recommended. Class C training may be provided by a certified Class A and/or B Operator. DEQ will issue approval to the training provider contact via electronic mail. Training program approval will remain valid unless a revocation is issued by DEQ upon discovery that the training program does not meet regulatory requirements. Training providers are not required to submit spelling and/or format changes to an Operator Training program to DEQ for approval. However, if information is modified, added, or removed from the training program, the training program should be re-submitted to the DEQ UST Compliance Coordinator for review and possibly re-approval.

UST Operator Training programs for Class A, B, and C Operators should, at a minimum, contain the basic elements required by the Virginia UST regulation. Class C Operator Training programs do not require VA DEQ approval.

CLASS A OPERATOR TRAINING PROGRAM MINIMUM REQUIREMENTS

a. Spill and overfill prevention;
b. Release detection and related reporting requirements;
c. Corrosion protection;
d. Emergency response;
e. Product and equipment compatibility;
f. Financial responsibility;
g. Notification and storage tank registration requirements;
h. Temporary and permanent closure requirements; and
i. Class B and Class C Operator training requirements.

CLASS B OPERATOR TRAINING PROGRAM MINIMUM REQUIREMENTS

a. Spill and overfill prevention;
b. Release detection and related reporting requirements;
c. Corrosion protection and related testing;
d. Emergency response;
e. Product and equipment compatibility;
f. Reporting and recordkeeping requirements; and
g. Class C Operator Training requirements.

CLASS C OPERATOR TRAINING PROGRAM MINIMUM REQUIREMENTS

a. Information sufficient to enable the Class C Operator to take action in response to emergencies caused by spills or releases and alarms from UST system(s).
b. Written instructions or procedures for the Class C Operator to follow and to provide notification necessary in the event of emergency conditions.

TESTING AND CERTIFICATE REQUIREMENTS

The trainer must evaluate the operator on material presented in the training course by using an examination or demonstration to the trainer via hands-on application of operation and maintenance checks of underground storage tank equipment, including performance of release detection at the UST facility. The operator must score 80% or better on the evaluation/test to receive a training certificate for Class A, B, or A/B. An examination is not required for a Class C certification. **The trainer must provide the UST operator a training certificate upon successful completion of the training course.** Class A and Class B UST Operator Training Certificates should include the following information:

1. Legal First and Last Name of operator,
2. Class of operation (Class A and/or Class B),
3. Date of successful training completion based upon date that the examination was passed, and

4. Training provider's name, company, address, and telephone number.

TRAINER QUALIFICATIONS

Each trainer must be qualified to train Class A and/or Class B UST Operators and must document their qualifications to DEQ's satisfaction. Most training providers will need to hold a valid Class A and Class B training certificate. However, DEQ may consider a training provider qualified if that person can demonstrate an in depth understanding of Virginia's Underground Storage Tanks Technical Standards (9VAC25-580*)* and Petroleum Underground Storage Tank Financial Responsibility Requirements (9VAC25-590) through education and experience directly related to UST technology, UST systems operation and maintenance, and Virginia UST regulations.

AT A MINIMUM, THE FOLLOWING INFORMATION SHOULD BE SUBMITTED TO VIRGINIA DEQ FOR UST OPERATOR TRAINING PROGRAM APPROVAL:

1. The training provider's name, company, mailing address, e-mail address, telephone number, facsimile number, and website address (if applicable).
2. The title of the training course.
3. A synopsis of the training program.
4. A copy of the examination questions that will be used to evaluate operators including the answers to the questions. For hands-on applications, please submit a description of the evaluation process or an evaluation form. For on-line applications, Virginia's UST Compliance Coordinator should be provided access to the on-line training and the examination and the correct examination answers.
5. The name, mailing address, e-mail address, and telephone number for each trainer.
6. Each trainer's Class A and B training certificate or other documentation that describes and demonstrates the trainer's qualifications.
7. An attestation in writing, under signature to DEQ, that the training program is compliant with Virginia's UST Operator Training requirements.
8. If a training program has obtained approval in another state, the training provider must submit documentation of approval from the approving state (reciprocity) and above items 1-3. The other state's Operator Training program must also meet EPA's minimum UST Operator Training Grant Guidelines. Training program approval via reciprocity will not be granted for UST Operator Training programs that have been modified since original approval by the approving state and/or have been modified/tailored to meet Virginia's UST Regulations. Modified training programs will be considered new training programs and will need to be treated as such.

Training Program for approval and inquiries should be addressed to the following:

Alicia Meadows, UST Operator Training/Compliance Coordinator
Virginia Department of Environmental Quality
7705 Timberlake Rd.
Lynchburg, VA 24502
(434) 582-6201
Alicia.Meadows@deq.virginia.gov

NOTE: DEQ'S UST COMPLIANCE COORDINATOR MAY RANDOMLY REQUEST TO ATTEND AND EVALUATE TRAINING COURSES FOR APPROVAL AND APPROVAL RETENTION.

All approved general public training programs will be posted on DEQ's Petroleum Programs website located at www.deq.virginia.gov .

Appendix P **– Operator Training Retraining Request Letter**

[LETTERHEAD]

[Date]

[Addressee]

RE: Operator Retraining Requirement for [Facility Name], [Facility Address], [Facility ID No.]

Dear Mr. or Mrs. [Tank Owner/Operator's Last Name]:

On [Date CSO signed or Delivery Prohibition Decision Date], DEQ determined that the UST system located at [Facility Name], [Facility Address], is out of compliance with certain requirements of 9VAC25-580-30 through 9VAC25-580-190 of Virginia's UST Technical Regulation.

Consequently, all designated Class A and Class B operators for [Facility Name] must **again** successfully complete operator training in the following areas that were identified as out of compliance:
[*List of non-compliant areas such as spill prevention, overfill prevention, installation, repairs, notification requirements, tank and/or piping corrosion protection, operation and maintenance of corrosion protection systems, secondary containment, tank and/or piping release detection, recordkeeping, and suspected release reporting requirements*.]

Class A and Class B operators must complete the approved or approvable training course and submit documentation to DEQ no later than **[90 days from CSO or DP Decision Date]**. Additional information regarding Virginia's UST Operator Training requirements may be found at
http://www.deq.virginia.gov/Programs/LandProtectionRevitalization/PetroleumProgram/StorageTanks/UndergroundStorageTanks/SecondaryContainment,DeliveryProhibition.aspx.

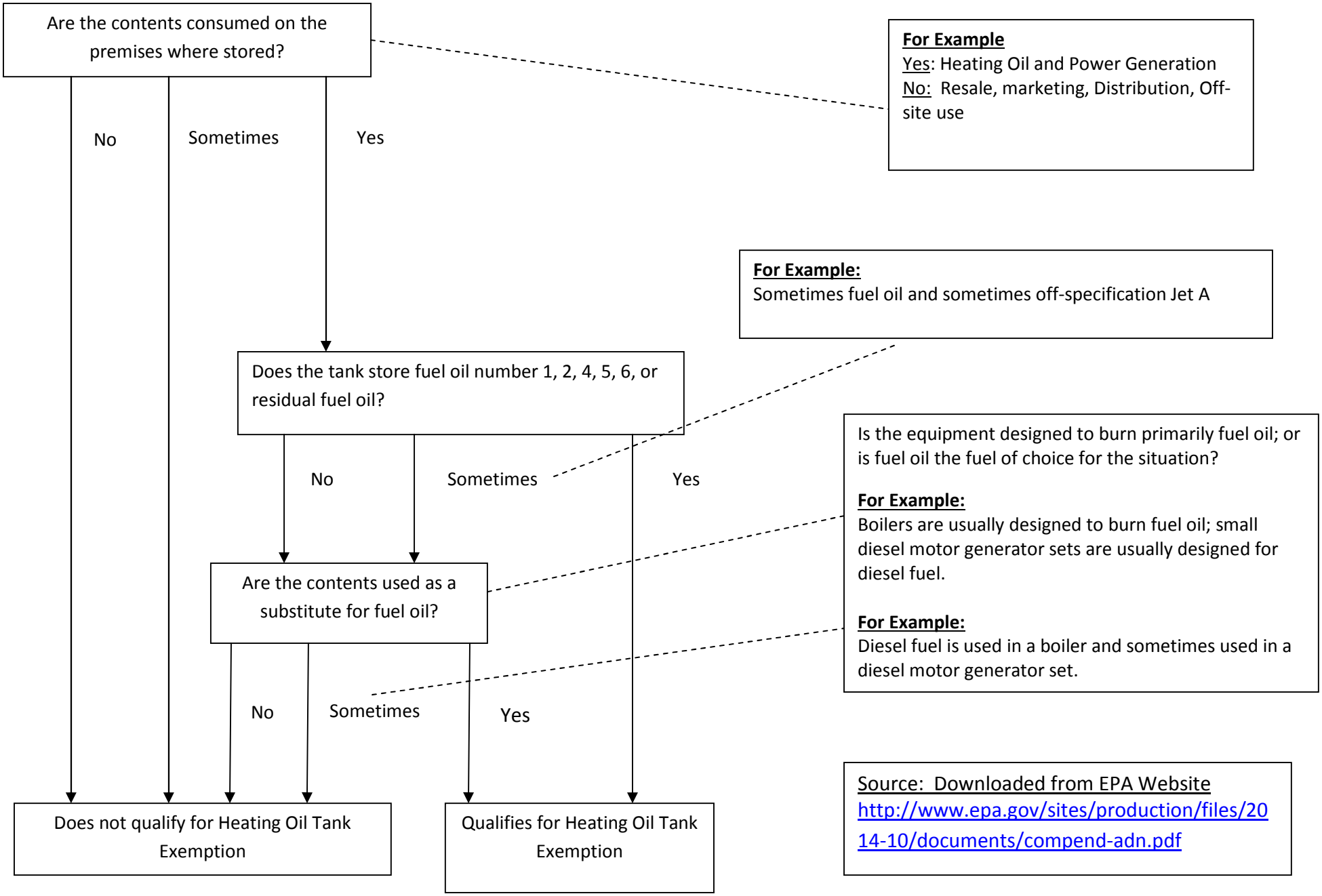
Please do not hesitate to contact me at [inspector's phone number] or [inspector's email address] if you have any questions regarding this requirement.

Sincerely,

[Inspector Name]
Petroleum Facility Inspector

cc: ECM Facility File
Alicia Meadows, DEQ-OSRR via e-mail

Appendix Q - **Does my tank qualify for the heating oil tank exemption?**



Source: Downloaded from EPA Website
http://www.epa.gov/sites/production/files/2014-10/documents/compend-adn.pdf