

# **UNDERGROUND STORAGE TANK CLOSURE GUIDANCE DOCUMENT**



**GOVERNMENT OF THE VIRGIN ISLANDS OF THE UNITED STATES  
DEPARTMENT OF PLANNING AND NATURAL RESOURCES  
DIVISION OF ENVIRONMENTAL PROTECTION**

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**Appendix C: UST Closure Checklist**

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## SECTION 1 – GENERAL INFORMATION

### 1.1 Introduction

The USVI Department of Planning and Natural Resources (DPNR) manages hazardous substance underground storage tanks (UST) through a permitting system under Virgin Islands Code (VIC) Title 12, Chapter 16, § 651 *et seq.*

The purpose of this document is to provide guidance for conducting a **petroleum** Underground Storage Tank (UST) system closure that meets the requirements of DPNR. This document is intended to be used in conjunction with the UST rules and regulations, and industry codes and standards. Appendix A contains a list of industry codes and standards that pertain to UST closures.

Closing other hazardous substance UST systems will be addressed on a case-by-case basis. Owners/operators should seek guidance for appropriate closure procedures by referring to the Code of Federal Regulations, 40 C.F.R. §280.71-280.74. The regulations and additional Environmental Protection Agency (EPA) guidance on UST closure may be obtained by calling the Agency's toll-free RCRA/Superfund Hotline at (800) 424-9346.

**An electronic copy of this UST Closure guidance document, and a copy of the VI UST Rules and Regulations (12 V.I.R&R.) can be uploaded from <http://dpmr.vi.gov/environmental-protection/underground-storage-tanks/>**

### 1.2 Temporary Closure

You may temporarily close your UST for up to 12 months by following these requirements for temporary closure:

- Continue to monitor for leaks by maintaining the UST's release detection. If your UST is empty, you do not need to maintain release detection. An UST is considered empty if no more than one inch of residue is present or not more than 0.3 percent by weight of the total capacity of the UST system remains in the system. Also, continue to monitor and maintain any corrosion protection systems. If a release is discovered, quickly stop the release, immediately notify DPNR, and take appropriate action to clean up the site.
- If the UST remains temporarily closed for more than 3 months, leave vent lines open, but cap and secure all other lines, pumps, man-ways, and ancillary equipment.

After 12 months of temporary closure, you have three options:

1. You must permanently close your UST if it doesn't meet the applicable requirements for new or upgraded USTs (except for spill and overfill).
2. You can ask DPNR for an extension beyond 12 months, if you provide an assessment that determines whether contamination is present at your site.

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3. Your UST can remain temporarily closed without needing an extension granted by DPNR if the UST meets the applicable requirements for new or upgraded USTs (except for spill and overflow) and the requirements noted above.

## 1.3 Permanent Closure

If you decide to close your UST permanently, there are two UST CLOSURE OPTIONS:

- Closure "in place" i.e. Abandonment in Place
- Closure by Removal from the Ground

Removal is recommended unless there are obstructions to access.

In both cases, the tank must be emptied and cleaned by removing all liquids, dangerous vapor levels, and accumulated sludge. These potentially very hazardous actions need to be carried out carefully by trained professionals who follow standard safety practices. If you leave the UST in the ground, have it filled with a harmless, chemically inactive solid, like sand.-

### 1.3.1 Prior to Permanently Closing a UST

At least 45 days prior to closing a UST system, a "Permit to Close Underground Storage Tank System" must be obtained from DPNR. A copy of the application form for a "Permit to Close Underground Storage Tank System" is provided in Appendix B. The permit application form can also be found on the DPNR website at <http://www.dpnr.vi.gov>. The permit fee is \$500.00. A UST Closure work plan must be submitted in support of the permit application.

Coordination should be made with local authorities prior to closing tanks in place. The VI Fire Services must be contacted prior to performing closure of USTs. Other permits may be applicable such as (not all inclusive):

- Coastal Zone Management Permit if site location is within the coastal zone;
- An excavation permit for land excavation/ground-breaking activities;
- A demolition permit if other ancillary structures are removed.

### 1.3.2 Permanent Closure Procedures and Qualified Personnel

In most cases, the DPNR recommends removal of the entire UST. It is recommended that in-place closure should be reserved for situations in which a structure, such as the foundation of a building or roadway, would be jeopardized by removal of the UST(s). If piping is to be closed in place, it should be capped at the ends. For additional guidance on closure of UST's, refer to 12 V.I.R&R. §654-9 and 40 CFR Part 280.71

Because of the inherent dangers in handling tanks (explosive vapors and potentially hazardous petroleum residuals), the DPNR recommends that only **qualified** and **experienced** personnel close UST systems. Knowledge of and experience with DPNR and EPA sampling procedures, industry standards, and OSHA regulations (29 CFR Part 1910 and Part 1926) are essential. Fatalities have resulted from mistakes made during tank closures. In addition, improper handling of the material in the UST's and piping can result in releases that require costly cleanups.

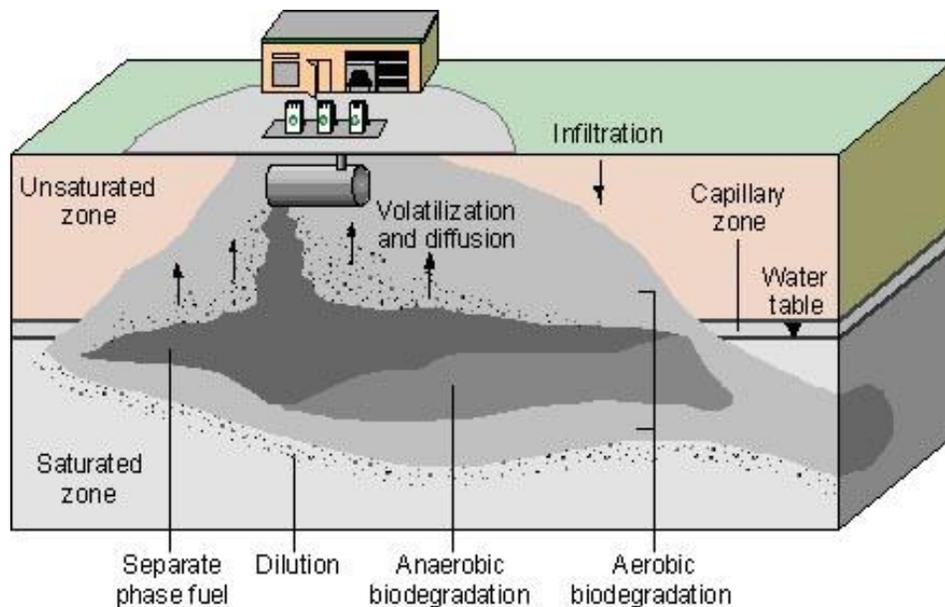
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It is the responsibility of the UST owner and/or operator to ensure that environmental sampling is conducted and that a UST Closure Report is completed & submitted to the DPNR. Sampling should be conducted as soon as possible; DPNR recommends within 48 hours of UST removal. The UST Closure Report, along with all supporting documentation, should be submitted within 30 days of receiving the laboratory data.

**All closure notifications, site investigations, sample results, reports, etc. are to be submitted to DPNR, Division of Environmental Protection, Underground Storage Tank Program, 45 Mars Hill, Frederiksted, VI 00841.**

## 1.4 Record keeping

You must maintain all records in accordance with 12 VIR&R §654-9(c) and 654-20 for at least 3 years after completion of the permanent closure.



**Figure 1-1: Potential migration pathways from a leaking petroleum UST**

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## SECTION 2 – REPORTING REQUIREMENTS

### 2.1 UST Registration

Prior to performing a UST closure, the UST owner must verify that the UST system has been registered with DPNR. Tank registration information can be verified by contacting the DPNR UST Program at (340) 773-1082. Please be prepared to provide the facility's name and address and UST owner's name. If the "Notification of Underground Storage Tanks" form (EPA Form 7530-1) has not been filed, then the UST owner must submit the form to DPNR, prior to obtaining a "Permit to Close Underground Storage Tank System".

### 2.2 Permit to Close Underground Storage Tank System

A "Permit to Close Underground Storage Tank System" must be obtained at least 45 days prior to UST closure. The application form for a "Permit to Close Underground Storage Tank System" must be completely filled out and submitted to DPNR (Appendix B). Once approved, a permit is issued by DPNR, and UST closure may proceed after providing DPNR with a 30-day notification. The permit becomes invalid if the closure is not initiated within one year after approval.

### 2.3 UST Closure Work Plan

Pursuant to 12 V.I.R&R. §654-9(c), a site assessment must be performed in accordance with a DPNR-approved UST Closure work plan. The UST Closure work plan must be submitted for DPNR approval in support of the application for a "Permit to Close Underground Storage Tank System" (see Section 2.2). The UST Closure work plan must follow the format and address the required elements of the UST Closure report described in Section 2.5.

### 2.4 Thirty-Day Notification Prior to Closure

Once a "Permit to Close Underground Storage Tank System" has been obtained, the UST owner must notify DPNR by fax, email, or telephone 30 days prior to the scheduled date of the UST closure. A representative designated by the UST owner or the closure contractor may make the notification for the owner. Failure to notify DPNR at least 30 days prior to implementing the closure is a violation of the "Permit to Close Underground Storage Tank System". The purpose of the notification is for DPNR to schedule inspections during closure-critical juncture activities at the site.

### 2.5 UST Closure Report

#### 2.5.1 General

The goal of any closure assessment is to determine if a leak or release from the UST system has occurred. This is done by measuring for potential releases from the UST system in locations at which

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releases would most likely occur. In addition, a proper assessment makes use of all readily available and pertinent information for the site, including background information on leak detection.

The following elements should be included as part of the site assessment and be included in the UST Closure report. :

(1) Background description of the site: location, use of facility, etc., and summary of leak detection results where available. Include a detailed diagram of the site showing location of removed tank(s), pump(s), lines, buildings, monitoring wells, locations of soil screening and sampling, and other pertinent site features.

(2) Description of the closure actions to be taken, e.g. number, size, construction type and stored material of USTs closed. Include a brief description of closure method including final disposition of the tanks and any wastes generated by tank cleaning operations. Note that Copies of manifests generated for the site should be included in the closure report.

(3) Description of the condition of each tank removed or closed. Including the extent of corrosion and presence of holes in the tank or piping. Describe the conditions of piping/tank connections. This may require that compacted soils be removed from the tank prior to a visual inspection. A photograph documenting the condition of each removed UST is required.

(4) Description of the soil conditions in and surrounding the UST system excavation. Including soil types, gradation (where applicable), extent of compaction and any other notable physical characteristics. The soil classification system used to describe the soil must be stated in the closure assessment.

(5) Description of soil conditions relative to contamination with petroleum products or hazardous materials. The quality of the soils must be assessed by field or analytical sampling methods in several locations throughout the excavation area. Field screening instruments such as the photo-ionization detector (PID) or the flame ionization detector (FID) may be used at sites with USTs used to store gasoline, diesel and #2 fuel oil. A standard operating procedure, documentation of calibration of field equipment shall be made available to the DPNR upon request and must be included in the closure report. All of the soil screening results from the sidewalls, tank bottom, lines, pump island and fill pipe are to be recorded and tabulated in the closure report. When a release is observed during the tank closure, the DPNR must be notified.

(6) Description of the presence of groundwater at the site, including the distance between the tank bottom and the groundwater table. Depth to the water table shall be noted where encountered. Also describe the quality of groundwater based on visual and field screening observation methods and, where appropriate, laboratory analysis of water samples. The presence of any sheen or amount of free product shall be noted. During excavation an attempt to reach the groundwater table shall be made. The reach of the backhoe is considered the acceptable limit of this excavation effort. If groundwater monitoring wells are present, they should be gauged for the depth to groundwater and for the presence of free product.

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(7) All soil and water samples should be collected and handled according to proper chain of custody requirements and accepted sampling protocols. With the report, documentation of chain of custody and adherence to appropriate quality control and quality assurance measures shall be provided. Samples must be analyzed at laboratories approved by the DPNR or via reciprocity if located out of state.

(8) For sites located in the wellhead protection areas of community wells and non-transient non-community wells, as designated by DPNR, samples of the groundwater at the site are mandatory, unless the requirement is waived in writing by DPNR.

(9) Include identification of the groundwater use for the site/ surrounding area and characterize the use of groundwater resources in the site vicinity; e.g. private wells are in use nearby. The groundwater use shall be considered by DPNR in decisions regarding the extent of soil removal and/or other remedial efforts to be undertaken at the site.

(10) If contamination is identified on the site, note any other receptors, e.g. private wells, surface waters, storm drains, basements, which may be affected. Receptors should be evaluated to the extent feasible for indications of a release...

(11) The closure report must include a finding as to whether or not a release has or is likely to have occurred and caused contamination of the environment. It is the responsibility of the professional writing the report to clearly make this conclusion. Information such as depth to groundwater, soil type, soil screening and laboratory analytical results, etc. should be used in making this conclusion. Laboratory analytical results of any soil samples taken during the tank closure may be compared to the USVI Target Cleanup Levels. When the results of the closure assessment indicate that soil and/or groundwater has or likely has been impacted by a release, a site investigation should be recommended.

**It is not necessary in the closure report to characterize the full extent of any significant contamination found during the closure process since such sites will be expected to conduct a full site assessment/investigation. The closure assessment shall include recommendations for further action, where necessary. If no further action is required, it must be clearly stated in the report.**

**A completed Closure Report must be submitted to DPNR within 60 days following permanent closure. Consistency in reporting will expedite DPNR's review and response to the UST owner. An electronic copy as well as two separate hard copies of the Closure Report must be submitted in a format no larger than 8 1/2"x14".**

**Closure Reports that do not contain all of the required information will be rejected and returned to the UST owner for corrections or completion**

### 2.5.2 Site Drawing

A site drawing, drawn to scale, must include the following information:

1. General site layout.
2. Tank locations, sizes, and the substance(s) stored.
3. Location/distribution of pipings.

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4. Dispenser locations.
5. Depth to groundwater (if encountered).
6. Dimensions of the excavation (when excavation occurs).
7. North arrow.
8. Near-by structures such as buildings, landmarks, streets, etc.
9. Sample locations; Identifiers must be placed on the map for each sample location, and those identifiers must match the analytical table provided for all samples.

Note: Sample identification on the drawing must match the label on each sample container and chain-of-custody record.

## **2.5.3 Laboratory Analytical Results Table**

A Laboratory Analytical Results Table must be included with all Closure Reports. The Laboratory Analytical Results Table must include a sample number, the date collected, the constituents analyzed, the sample depth, the concentration of each constituent analyzed in mg/kg (for soils) and mg/L (for groundwater) units. Detected concentrations of constituents exceeding applicable soil target cleanup levels and groundwater MCLs must be highlighted.

## **2.5.4 Laboratory Analytical Report and Chain-of-Custody**

A copy of the final laboratory analytical report, including all sample results, QA/QC data and the chain-of-custody record, must be included in the Closure Report.

## **2.5.5 Manifests**

A copy of all manifests, bills of lading or receipts for the disposition of the tank(s), tank contents, sludge and contaminated soil and/or fluids must be included in the Closure Report

## **2.6 Reporting Evidence of a Release**

All owners, operators, employees, agents, contractors, or assigns having knowledge that evidence exists indicating a release from a UST system must report the contamination to the DPNR within 24 hours of discovery as per 12 V.I.R&R. §654-17(b). For UST closures, the UST owner or UST closure contractor must call DPNR within 24 hours of discovery in order to discuss all options that are available to close the site.

If any of the constituents analyzed exceeds the soil and water cleanup levels listed in 12 V.I. R&R. §654-34: Target Cleanup Levels or if free-phase product is discovered during the closure, the UST owner or UST closure contractor must notify the DPNR.

In cases where a release results in an emergency condition, the release must be reported to DPNR immediately, but in no case later than one hour, regardless of the amount released. For clarity, "emergency condition" is defined as "any condition which could reasonably be expected to endanger the health and safety of the public, cause significant adverse impact to the land, water or air environment, or cause severe damage to property".

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## SECTION 3 – GENERAL CLOSURE GUIDELINES

### 3.1 General Information

Proper work practices will keep contractors, employees, passers-by, and the environment safe. This section should be used for informational purposes only, as it does not contain all of the rules or reference documents required by DPNR regulations. A list of industry codes and standards that are referenced in the UST regulations relating to closing USTs can be found in Appendix A. The DPNR UST Closure Checklist is provided in Appendix C.

#### 3.1.1 Site Safety

All personnel working in the UST closure area should be familiar with the potential hazards and be aware of the appropriate health and safety measures needed to ensure a safe working environment. Employees must be advised of the chemical, physical, and toxicological properties of each substance that is known or expected to be present in the UST. Due to the nature of the flammable or combustible liquids stored in the UST, hazardous conditions should be expected to exist in the UST closure area.

Some recommended site safety practices are:

- Keep the UST closure area free of all sources of ignition. Confirm that all electrical service going to, under, or through the UST closure area is disconnected.
- Plan a safe working area by providing sufficient space for workers and equipment. Erect and maintain brightly colored barricades around the work space. The American Petroleum Institute (API) recommends placing barricades 50 feet in all directions from the edge of the excavation where possible. Consider traffic flow when barricading your work space. Since many locations are open for business during UST closures, arrange barricades to direct traffic away from the work space.
- Make sure anyone entering the work space is wearing a brightly colored safety vest and is wearing OSHA Level D personal protective equipment.
- A site-specific Health and Safety Plan (HASP) should be prepared and kept on-site to address potential safety and health hazards encountered in the work space. The HASP should include emergency telephone numbers and locations of the nearest medical facilities. The HASP should designate a site safety and health supervisor who has the authority to stop the project should worker health or safety become jeopardized. The HASP should be reviewed with the workers prior to any site activities and should be evaluated and updated as changing conditions warrant.

#### 3.1.2 Sloping or Shoring the Excavation

The UST closure should be conducted so that no one has to enter the excavation. Entry into an excavation is not only dangerous; it is also considered confined space entry. OSHA requires specific

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training for employees who must work in a confined space situation. A confined space is a space with limited ventilation, potential to accumulate or contain a hazardous atmosphere, exits that are not readily accessible, and not meant for continuous human occupancy. This includes excavations and trenches. If workers must occasionally enter an excavation, they should be properly trained in OSHA regulations for confined space entry and self-rescue. Compliance with all OSHA regulations for confined space entry and activities is required.

If workers are going to be working within the excavation, then sloping or shoring the excavation is required by OSHA. The OSHA Standard 29 CFR 1926.650-652 requires that employees in an excavation be protected from cave-ins.

There are four sloping options available:

1. Slope the excavation at an angle no steeper than 1½ feet horizontal to 1 foot vertical — expressed 1½:1 (29 CFR 1926.650-652, Subpart P, Appendix B).
2. Slope the excavation in accordance with the OSHA simplified soil classification system, which ranks soils according to their stability (29 CFR 1926.650-652, Subpart P, Appendices A and B).
3. Use a design created and sealed by a VI registered professional engineer.
4. Use a site-specific design sealed by a VI registered professional engineer.

An excavation that will be entered can be sloped ½:1, if it meets these criteria:

- the excavation is in Type A soil (the most stable soil type and is composed of cohesive clay, silty clay, clay loam, and sandy clay with an unconfined compressive strength of 1.5 tons per square foot or greater);
- the excavation will not be open more than 24 hours; and
- The excavation is no deeper than 20 feet.

Even in stable soils, however, if the excavation will be open longer than 24 hours, the sides must be sloped at least ¾:1.

Refer to the OSHA standard on excavation (29 CFR 1926, Subpart P) for more detailed guidance on sloping and shoring requirements.

### **3.1.3 Purging or Inerting the UST**

All underground storage tanks must be emptied, cleaned, and purged or inerted prior to removing the tank from the excavation. Caution must always be exercised when handling or working around USTs that have stored flammable or combustible liquids.

Purging is the removal of flammable vapors from a tank. Inerting is the removal or displacement of oxygen from a tank. Both purging and inerting cause flammable vapors to be expelled from the tank.

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Whether purging or inerting a UST, these recommended safety practices should be followed:

- Immediately before beginning work in the UST area or on the UST, check for vapor concentrations with a combustible gas indicator (CGI).
- Keep the UST closure area free of all sources of ignition. Vent all vapors at least 12 feet above grade and 3 feet above any adjacent roof lines.
- Dry ice (carbon dioxide [CO<sub>2</sub>] in solid form) can be used to inert a UST. API recommends adding a minimum of 1½ to 2 pounds of dry ice per 100 gallons of tank capacity. The dry ice should be shaved or crushed and must be distributed evenly over the greatest possible area of the tank.
- Never enter a tank that has been inerted with CO<sub>2</sub> or nitrogen (N<sub>2</sub>) as both of these methods will displace the oxygen inside the tank. If a tank has been inerted, a CGI will be misleading. Most CGI's require 10% by volume of oxygen to operate properly. Use an oxygen indicator to assess a tank that has been inerted. Be extremely careful when using an inert gas to displace the oxygen inside a tank. Inerting can affect the work space by displacing the oxygen outside the tank also.
- When inerting, the only way to know that a tank is safe for removal is to verify with an oxygen meter that the oxygen level in the tank is below 5%.
- Never use exhaust gas from an internal combustion engine to inert a tank.
- Ground all equipment and use low air or gas pressures to prevent a buildup of static electricity.
- Never discharge a CO<sub>2</sub> fire extinguisher into tanks containing a flammable vapor and air mixture.
- Never let the pressure inside a tank exceed 5 pounds per square inch gauge (psig) when introducing compressed air or gases.
- Flammable vapors can regenerate inside a UST even after purging or inerting. Check often for vapor concentrations with a CGI.

For more specific information of purging or inerting a UST, refer to API Publication 1604 and NFPA Publication 30.

### **3.1.4 Testing Equipment**

The tank atmosphere and the excavation area must be tested regularly for flammable or combustible vapor concentrations until the tank is removed from the site.

- A properly calibrated combustible gas indicator (CGI) or explosion meter must be used.

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- The person doing the testing must be completely familiar with the instrument and what the readings represent.
- Always test the environment for oxygen content first to be sure you can rely on the instrument. CGI's are inaccurate if a tank atmosphere contains less than 10% oxygen, as would happen if you inert a tank.
- If a tank is inerted, use an oxygen indicator to determine the oxygen concentration. Readings that show a tank to be oxygen-deficient should be safe. A fire needs air with at least 11% oxygen to burn.
- Do not take readings through a drop tube.
- Take readings at each end and in the middle of the tank and at a minimum of three levels in the tank: the bottom, center, and top.
- Readings of less than 10% of the lower explosive limit (LEL) must be obtained before a tank is safe to remove from the ground.

### 3.2 Accredited Laboratories

All closure samples must be submitted to an accredited laboratory for analysis. Documentation must be provided to show that the laboratory is certified in the Virgin Islands or via reciprocity. Laboratory must be able to conduct analyses for the applicable parameters listed in the closure work plan as specified by EPA SW-846 protocol for the appropriate analytical method.

**ATTACH ALL ORIGINAL LABORATORY DATA, INCLUDING THE QUALITY CONTROL (QC) INFORMATION AND CHAIN OF CUSTODY, TO THE UST CLOSURE REPORT. ONLY AN ACCREDITED LABORATORY SHOULD ANALYZE ENVIRONMENTAL SAMPLES. THE LABORATORY SHOULD USE EPA SW-846 SPECIFIED METHODS.**

### 3.3 UST System Removal and Labeling

Unless permanently closing a UST system in place, all tanks and piping must be removed from the ground. Ensure that all residues remaining in the tanks and piping are removed and prevented from reaching the soil. Tanks and piping must be emptied and purged or inerted prior to removing from the ground. Plug any openings in the tank, leaving a 1/8 inch hole to prevent over-pressuring due to temperature changes.

Tanks must be labeled prior to removing from the site. API recommends the following information:

- TANK HAS CONTAINED LEADED GASOLINE (use applicable designation, i.e., GASOLINE, LEADED GASOLINE, DIESEL, USED OIL)
- NOT VAPOR-FREE

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- NOT SUITABLE FOR STORAGE OF FOOD OR LIQUIDS INTENDED FOR HUMAN OR ANIMAL CONSUMPTION
- DATE OF REMOVAL: MONTH/DAY/YEAR

Tanks that have held leaded gasoline, or if the history is unknown, should also be clearly labeled with the following information:

- TANK HAS CONTAINED LEADED GASOLINE
- LEAD VAPORS MAY BE RELEASED IF HEAT IS APPLIED TO THE TANK SHELL

Tanks should be cut up, crushed, or removed from site as soon as possible. Always retest the tank to ensure that the LEL level is below 10% or the oxygen level is below 5% before the tank leaves the site. Be sure the tank is properly secured before transporting.

### **3.4 UST Disposal and UST Re-Use**

Although the VI UST Rules and regulations do not disallow re-use of UST's, DPNR discourages this practice. All used tanks to be reinstalled, are subject to VI and federal requirements for new UST systems. Prior to re-use, all used tanks must be recertified by the manufacturer, a manufacturer's representative, or VI registered Professional Engineer.

Tanks must be properly disposed in accordance with all applicable federal, state, and local regulations when they are no longer suitable for storing flammable or combustible liquids. Approval from the VI Fire Marshal and DPNR should be obtained prior to re-using tanks as aboveground storage tanks.

Either a proof of disposal or a bill of sale when transferring ownership is required in the UST Closure Report.

### **3.5 Closing UST Systems in Place**

Underground storage tanks should only be closed in place whenever removal would potentially damage adjacent equipment or structures or may be physically impossible. Another factor to consider is whether or not excavation is required in order to remediate contamination from the site.

Tanks must be emptied and cleaned prior to closing in place. All product, liquids, and accumulated sludge must be removed from the tank(s) and must be properly recycled or disposed. Once the tank has been determined vapor free, filling the tank with a solid inert material through openings in the top of the tank can begin. It is important to fill the tank completely with a solid inert material, such as concrete or sand. After the tank is filled with solid inert material, all tank openings must be covered, plugged, or capped. If excavation was required around the tank to locate tank openings, then the excavation should be backfilled. Disconnect and remove the vent line(s) if accessible. If the vent lines are not accessible, remove the portion above the surface and cap both ends.

When closing UST systems in place, the product piping must be rendered unusable. Piping can be rendered unusable by removing as much piping as possible or filling as much of the piping as possible with a solid inert material. Any accessible piping should be capped.

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If laboratory analytical results indicate that further corrective action is warranted, the UST owner, property owner, UST closure contractor, and DPNR staff should discuss all available remediation and closure options prior to closing in place.

## 3.6 Sample Collection Procedures

### 3.6.1 General Requirements

Sample handling should not result in cross-contamination or loss of contaminants. Since gasoline and some other petroleum products consist largely of volatile organic compounds, special care in the sample collection is required due to the high potential for loss of these volatile compounds from the sample. EPA SW-846 Method 5035 must be followed when collecting samples for volatile analysis.

All samples must be collected in the container specified by EPA SW-846 protocol for the appropriate analytical method. Care should be exercised to ensure that the samples are received by the laboratory within the recommended holding times.

Written documentation in the form of a chain-of-custody record must accompany all samples from the time of collection to the time of delivery to the lab. The possession or custody of samples must be traceable from the time of collection until the time the sample is submitted to the laboratory for analysis. The sample containers must be either secured to prevent tampering and placed in a designated, secured area or kept in the actual physical possession of the sampler.

If chain-of-custody procedures are not followed, the integrity of the samples is compromised and the analysis is considered invalid.

### 3.6.2 Quality Assurance Project Plan

The Quality Assurance Project Plan (QAPP) must be submitted as an attachment to the Closure Workplan. At a minimum, the QAPP must address the following:

- Follow the format and include elements of EPA QA/R-5.
- Signatures of all key individuals involved in the project
- Organizational chart as it relates to the decision making process.
- List all the individuals involved in the project along with their duties.
- Documents lab's certification and ability to analyze applicable parameters; and analytical method detection limits.
- Describe how the field instruments (CGI, PID, FID, etc) will be maintained and calibrated.
- Describe the dimension for the sample area, the number of samples to be taken, and the holding time and preservation techniques used for each contaminant.
- Describe the type of observations that will be recorded in notebooks.
- Describe the process and identify the person responsible for validating all data.

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## **3.6.3 Sample Labeling**

The sampler must label the sample container with a sample tag (usually an adhesive label) using waterproof ink at the time of sample collection. The sample tag must include the following information:

1. Sample identification
2. Collection date and time
3. Analysis required
4. Sampler's initials

Note: The sample identification on the site drawing must match the label on the sample container.

## **3.6.4 Chain-of-Custody Record**

A chain-of-custody record must be completed for all samples that will be analyzed by the laboratory. This record must be filled out in the field at the time of sampling. The chain-of-custody must accompany the samples as they are transferred to the laboratory. Upon transfer of the samples, each person handling the samples must sign, date, and note on the record the time they received the samples.

Each chain-of-custody record must include:

1. Sample identification
2. Name and address of the site
3. Date and time of sample collection
4. Location of each sample
5. Number of samples
6. Analysis to be performed
7. Comments or remarks section (e.g., field conditions)
8. Appropriate places for signatures of sampler and person(s) assuming custody of sample and the identification of common carriers

Completed chain-of-custody records must be submitted for all samples and included with the UST Closure report.

## **3.7 Contaminated Soil Disposal**

Contaminated soil generated during UST closure activities must be managed properly. Contaminated soil may be either re-used either on-site or off-site; or properly disposed.

Contaminated soil that is disposed is subject to solid and hazardous waste regulations. Non-hazardous contaminated soil may be disposed at solid waste disposal facilities permitted to receive industrial solid waste.

Contaminated soil that has been determined to be hazardous must be disposed at a hazardous waste disposal facility. Contact the appropriate disposal facility to determine the applicable waste profile requirements. For information about hazardous waste accumulation time, transporters, disposal, and disposal facilities, contact DPNR at (340) 774-3320 for St. Thomas/St. John district, or (340) 773-1062 for St. Croix district.

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## 3.8 Contaminated Water Disposal

Contaminated water may be generated during tank cleaning activities and during tank hold de-watering activities. Contaminated water generated during any UST closure activity must be managed properly. Contaminated water may be

- a. discharged if a water discharge permit is obtained or
- b. properly disposed at a permitted waste disposal facilities.

### 3.8.1 Water discharge permit

A permit from DPNR Water Pollution Control Program must be obtained prior to discharging ground or surface waters which have accumulated in the tank hold. For information regarding water permits, contact the TPDES Permit Section of DPNR at (340) 774-3320 for St. Thomas/St. John district, or (340) 773-1062 for St. Croix district.

### 3.8.2 Contaminated Water Disposal at permitted facilities

Tank wash water generated during tank cleaning operations or water that accumulates in a tank hold is subject to solid and hazardous waste regulations.

Non-hazardous contaminated water may be disposed at solid waste disposal facilities permitted to receive industrial solid waste. Contaminated water that has been determined to be hazardous must be disposed at a hazardous waste disposal facility. Contact the appropriate disposal facility to determine the applicable waste profile requirements. For information about hazardous waste accumulation time, transporters, disposal, and disposal facilities, contact DPNR at (340) 774-3320 for St. Thomas/St. John district, or (340) 773-1062 for St. Croix district.

Underground Storage Tank Release Detection

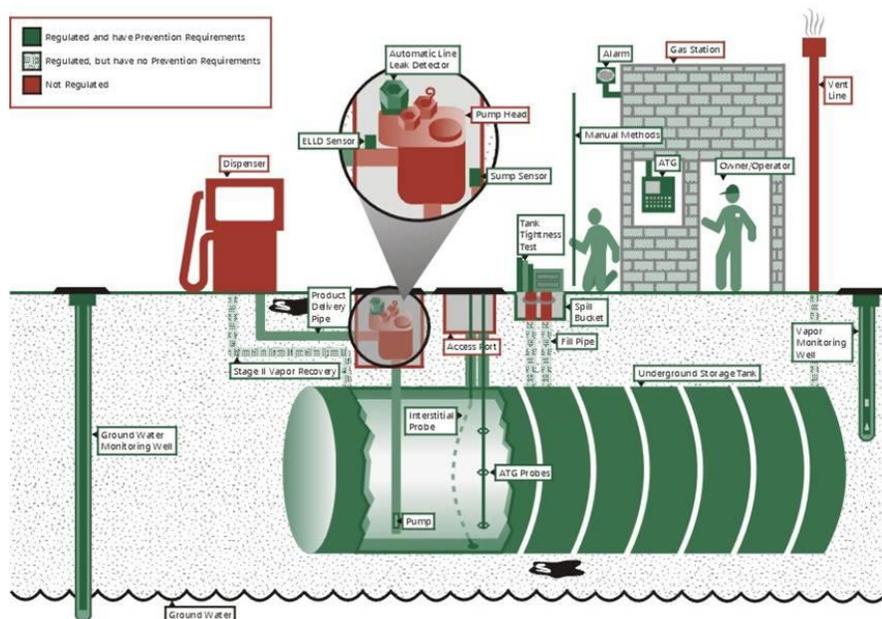


Figure 3-1

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## SECTION 4 – CLOSURE SAMPLE LOCATIONS

### 4.1 General Requirements

For all tanks removed from the ground, soil samples should be collected from native soil beneath the tank bottom, and at least one of the samples should be collected beneath the fill port end. If bedrock is encountered during excavation activities, collect the appropriate number of samples just above bedrock (at the soil/bedrock interface).

For tanks closed in place, a minimum of two soil samples are required (one at each end); samples are to be collected as close to the tank as possible. For tanks closed in-place that are greater than 10,000 gallons, one additional sample (collected adjacent to and beneath the middle of the tank) is required for every 10,000 gallons greater than 10,000 gallons.

If groundwater is encountered in the excavation, a groundwater sample **MUST** be collected. In general, one groundwater sample can be collected from beneath a single tank pit. However, if the tank pit is very large and one groundwater sample will not adequately characterize the groundwater conditions beneath the tank pit, then two groundwater samples may be necessary. Groundwater samples should be collected beneath the most contaminated soils.

### 4.2 Required Number of Soil Samples

Table 4-1 lists the required number of soil samples. If groundwater is encountered, then only one soil sample is required beneath each tank. Additional soil sampling is required if initial soil samples contain detectable concentrations of BTEX, PAH's, and/or TPH-GRO/DRO. Sampling must continue at depth (referred to as vertical delineation) until BTEX and PAH's are below detection limit and TPH-GRO/DRO is below 460 mg/kg.

If the dispensers are not located over the tanks, then piping and dispenser samples will be necessary. One soil sample is required for every 10 feet of closed piping, and one soil sample is required for every 10 feet of contiguous dispenser island. Samples should be collected from native soil and at worst-case locations (joints, elbows, fittings, visible contamination, etc.).

### 4.3 Target Constituents & Analytical Methods

Table 4-2 lists the Analytical Requirements & Detection Limits. For tanks, piping and/or dispenser island associated with gasoline, soil samples should be analyzed for BTEX (using EPA Method 5035-8021B or 5035-8260B) and TPH-GRO (using EPA Method 8015B-GRO). Groundwater samples should only be analyzed for BTEX (using EPA Method 5030-8021B or 5030-8260B).

For tanks, piping and/or dispenser island associated with substances other than gasoline or if there is uncertainty as to what the tanks historically stored, soil samples should be analyzed for BTEX, PAH's (using EPA Method 8270C or 8310), TPH-GRO, and TPH-DRO (using EPA Method 8015B-DRO). Groundwater samples must be analyzed for BTEX and PAH's (using EPA Method 8270C).

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In the rare case that the tanks/piping/dispensers contained a substance other than a type of petroleum, the owner must define those target constituents and detection limits that would best determine if a release from the piping/dispensers impacted the soil and/or groundwater.

Please note that method 8260B is preferred over method 8021B when analyzing samples for BTEX, and method 8270C is preferred over method 8310 when analyzing samples for PAH's. Using method 8021B and/or 8310 may result in the misidentification of compounds or matrix interference.

ATTACH ALL ORIGINAL LABORATORY DATA, INCLUDING THE QUALITY CONTROL (QC) INFORMATION AND CHAIN OF CUSTODY, TO THE UST CLOSURE REPORT. ONLY AN ACCREDITED LABORATORY SHOULD ANALYZE ENVIRONMENTAL SAMPLES. THE LABORATORY SHOULD USE EPA SW-846 SPECIFIED METHODS.

## 4.4 Soil Vertical Delineation Sampling

### 4.4.1 Tank Sampling

If any of the initial soil samples collected beneath a tank have detectable concentrations of BTEX, PAH's, or TPH-GRO/DRO, then sampling must continue vertically (at depth) until BTEX and PAH's are below detection limit and TPH-GRO/DRO is less than 460 mg/kg. When collecting delineation samples, it is not necessary to analyze for a constituent that was below detection limit in the initial soil sample(s). If PAH's were detected in the initial soil samples, but there is no applicable soil threshold for the PAH's detected, then delineation samples do not have to be analyzed for PAH's.

If groundwater is encountered before soil contamination can be delineated to below detection limits, then a groundwater sample must be collected. In lieu of collecting multiple soil samples for vertical delineation, a groundwater sample may be collected. In most cases, the collection of one groundwater sample beneath the tank pit eliminates the need for vertical delineation of soil contamination at all sampling locations within the tank pit. For example, if vertical delineation is required at three soil sampling locations within the tank pit, then only one groundwater sample would need to be collected (instead of 3 or more soil samples) in order to satisfy the requirements for vertical delineation of soil contamination. However, for a very large tank pit, two groundwater samples may be needed to adequately characterize groundwater conditions beneath the tank pit.

If bedrock is encountered when removing the tanks and the initial soil samples collected at the bedrock/soil interface have contamination above appropriate detection limits, a boring/monitoring well will need to be installed into bedrock. If groundwater is not encountered within 24 hours after drilling twenty (20) feet into bedrock, drilling may be stopped and the boring may be abandoned. The soil contamination is considered vertically delineated and no additional sampling is required. However, if groundwater is encountered within the first twenty (20) feet, it will be necessary to install a monitoring well and collect a groundwater sample.

### 4.4.2. Required Tank Sampling When UST Information is Not Available (System Previously Closed)

If the tank pit locations can be identified, then collect one soil sample and one groundwater sample from beneath each tank pit. If it is unclear where the tank pit(s) were located, then use all available

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resources to best determine where the tanks may have been located and collect the samples at the down gradient edge of each suspected tank pit. Soil samples should be collected above the water table and at the depth where PID/FID readings were the highest.

### **4.4.3 Piping/Dispenser Island Sampling**

If any of the initial soil samples collected beneath the piping and/or dispensers have detectable concentrations of BTEX, PAH's, or TPH-GRO/DRO, then sampling must continue vertically (at depth) until BTEX and PAH's are below detection limit and TPH-GRO/DRO is less than 460 mg/kg. When collecting delineation samples, it is not necessary to analyze for a constituent that was below detection limit in the initial soil sample(s). If PAH's were detected in the initial soil samples, but there is no applicable soil threshold for the PAH's detected, then delineation samples do not have to be analyzed for PAH's.

In lieu of collecting multiple soil samples for vertical delineation, a groundwater sample may be collected at each location requiring vertical delineation. If any two sampling locations requiring vertical delineation are less than 10 feet apart, then the collection of one groundwater sample will suffice for the vertical delineation of soil contamination at both locations.

### **4.4.4 Required Dispenser Sampling When UST Information is Not Available (System Previously Closed)**

If the UST system was previously removed but locations of the former dispenser islands can be determined, then collect one soil sample and one groundwater sample beneath each former dispenser island. If it is unclear where the former dispenser islands were located, then use all available resources to determine where they may have been located and collect one soil sample and one groundwater sample at the down gradient side of each suspected island. Soil samples should be collected above the water table and at the depth where PID/FID readings were the highest.

## **4.5 Stockpile Sampling**

One soil sample is required for every 100 cubic yards of stockpiled soil generated during closure activities. Samples should be analyzed for the same constituents as the tank, piping, and dispenser samples. The DPNR does not recommend stockpiling soils on-site for more than 90 days, and stockpiled soil should be placed in drums or wrapped in plastic sheeting.

Stockpiled soil can only be placed back into the excavation if one of the following criteria is met:

- a. The analytical results of samples from the stockpiled soil are less than the applicable Soil Target Cleanup Levels and TPH-GRO or DRO is less than 460 mg/kg, and no visible free product is present in the soil.
- b. The analytical results of samples from the stockpiled soil exceed applicable Threshold Levels, but a Soil Pile Management Plan is approved by DPNR that will address in-situ remediation of the contaminated soil.

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- c. Groundwater contamination has been identified above regulatory standards, and the Remedial Action Work Plan is approved by DPNR to address the in-situ remediation of the contaminated soil and groundwater.

A copy of all manifests for the disposition of the contaminated soil must be included in the Closure Report.

### 4.6 Over-excavation Sampling

Over-excavation is defined as any soil excavation beyond three (3) feet from the outermost sides and ends of any UST, beyond one (1) foot from the bottom of the deepest UST, or beyond one (1) foot from the piping or dispensers. If more than one UST is present in the pit, and the UST's are laid side-by-side, measurement will extend from the sides of the outermost UST's and the ends of the UST's. If the UST's are laid end-to-end, measurement will extend from the ends of the outermost UST's and the sides of the UST's. If over-excavation is performed in order to remove contaminated soil, then the following confirmatory samples must be collected in addition to the required tank, piping, and dispenser sampling discussed in Section 4.2 above:

- a. one soil sample every 10 linear feet along the base of the sides (within 1 foot of the bottom of the excavation),
- b. one soil sample per 100 square feet along the bottom of the excavation,
- c. one soil sample per 100 cubic yards of stockpiled soil (see "Stockpile Sampling" above).

### 4.7 Groundwater Sampling

If groundwater is encountered in the excavation, a groundwater sample MUST be collected. In general, one groundwater sample can be collected from beneath a single tank pit. However, if the tank pit is very large and one groundwater sample will not adequately characterize the groundwater conditions beneath the tank pit, then two groundwater samples may be necessary. Groundwater samples should be collected beneath the most contaminated soils. Please refer to Table 4-1, Sampling Requirements and Table 4-2, Analytical Requirements & Detection Limits for additional information.

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**Table 4-1: Sampling Requirements**

| <b>Tanks</b>              |   | <b>Piping</b>   | <b>Dispensers</b>   |
|---------------------------|---|---|---|
| <b>Capacity (gallons)</b> | <b>Minimum Number of Soil Samples Required*</b>                     | If piping is not located directly above the tanks, then 1 soil sample is required for every 10 feet of piping** | If the dispenser islands are not located directly above tanks, then 1 sample is required for every 10 feet of contiguous dispenser island** |
| <1,000                    | 1 (2 if tank was closed in place)                                   |   |   |
| 1,000-10,000              | 2   |   |   |
| >10,000                   | 2 +1 additional sample for every 10,000 gallons greater than 12,501 |   |   |

**NOTES:**

\*If groundwater is encountered, then only one soil sample is required beneath each tank. Additional soil sampling is required if initial soil samples contain detectable concentrations of BTEX, PAH's, and/or TPH-GRO/DRO. Sampling must continue at depth (referred to as vertical delineation) until BTEX and PAH's are below detection limit and TPH-GRO/DRO is below 460 mg/kg.

\*\*This may not apply if only closing piping and/or dispensers above an active tank system

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**Table 4-2: Analytical Requirements & Detection Limits**

| Product Stored  | Target Constituents               | Analytical Methods (Soil)  | Analytical Methods (Groundwater)               |
|---|-----------------------------------|--|--|
| Gasoline or Aviation Gas Only<br>(Affidavit Required)   | BTEX and<br>TPH-GRO               | BTEX: 8260B/8021B<br>(5035)<br>TPH-GRO (8015B)                               | BTEX: 8260B/8021B (5030)                       |
| Unknown Petroleum Contents, Jet Fuel A,<br>Jet Fuel B, Mineral Spirits or Kerosene,<br>Used Oil, Diesel Fuel Oil (#2, #4, #5,<br>#6), Motor Oil, or Hydraulic Oil | BTEX, PAH's, and<br>TPH-GRO & DRO | BTEX: 8260B/8021<br>(5035)<br>PAH's: 8270C, 8310<br>TPH-GRO & DRO<br>(8015B) | BTEX: 8260B/8021B (5030)<br>PAH's: 8270C, 8310 |

| Method                                       | 5035-8021B<br>(BTEX-Soil) | 5035-8260B<br>(BTEX-Soil) | 5030-8021B<br>(BTEX-<br>Groundwater) | 5030-8260B<br>(BTEX-<br>Groundwater) | 8270C/8310<br>(PAH's-Soil)             | 8270C<br>(PAH's-<br>Groundwater<br>) | 8015B<br>(TPH-<br>GRO/DRO-Soil) |
|--|---------------------------|---------------------------|--------------------------------------|--------------------------------------|--|--------------------------------------|---------------------------------|
| Minimum<br>Quantitation &<br>Reporting Limit | 0.001-0.005<br>mg/kg      | 0.005 mg/kg               | 1-5 µg/l                             | 5 µg/l                               | 0.660 mg/kg<br>for each<br>constituent | 10 µg/l for<br>each<br>constituent   | 10 mg/kg or less                |

NOTE: In the rare case that a tank contained a substance other than a type of petroleum, the owner must define those target constituents and detection limits that would best determine if a release from the tank impacted the soil and/or groundwater.

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## SECTION 5 – SAMPLE RESULTS INTERPRETATION

### 5.1 General Information

If any of the constituents analyzed exceeds the soil and water cleanup levels listed in 12 V.I. R&R. §654-34: Target Cleanup Levels or if free-phase product is discovered during the closure, the UST owner or UST closure contractor must immediately notify the DPNR.

If any of the COCs exceed the USVI standards and/or EPA RSL, further evaluation is required. Further evaluation can consist of additional analysis (TPH fraction, etc.), limited excavation or placing institutional controls on the property.

### 5.2 Total Petroleum Hydrocarbon Fraction Analysis

If the Total Petroleum Hydrocarbon (TPH) mixture (TPH-GRO, TPH-DRO, and/or TPH-ORO) concentration exceeds the soil standard, then analyzing for TPH fractions is required. TPH fraction analysis is only required on the sample that exhibits the highest specific TPH mixture concentration. The analytical methods suggested for the identification of the designated hydrocarbon fractions include the Massachusetts Department of Environmental Protection's VPH/EPH (volatile petroleum hydrocarbons/extractable petroleum hydrocarbon) Method and the Texas Commission on Environmental Quality Method 1006. When requesting these analyses, the data user must specify that the carbon ranges to be reported as shown in Table 5-1, and that the results be reported on a "wet-weight" basis.

**Table 5-1: Hydrocarbon Fractions for TPH Mixtures**

| Indicator Compound                               | TPH-GRO C <sub>&gt;6</sub> - C <sub>8</sub><br>(Purgeable) | TPH-DRO C <sub>10</sub> - C <sub>28</sub><br>(Extractable) | TPH-ORO C <sub>&gt;28</sub><br>(Extractable) |
|--|--|--|--|
| Aliphatics C <sub>&gt;6</sub> - C <sub>8</sub>   | X  |  |  |
| Aliphatics C <sub>&gt;8</sub> - C <sub>10</sub>  | X  |  |  |
| Aliphatics C <sub>&gt;10</sub> - C <sub>12</sub> |  | X  |  |
| Aliphatics C <sub>&gt;12</sub> - C <sub>16</sub> |  | X  |  |
| Aliphatics C <sub>&gt;16</sub> - C <sub>35</sub> |  | X  | X  |
| Aromatics C <sub>&gt;8</sub> - C <sub>10</sub>   | X  |  |  |
| Aromatics C <sub>&gt;10</sub> - C <sub>12</sub>  |  | X  |  |
| Aromatics C <sub>&gt;12</sub> - C <sub>16</sub>  |  | X  |  |
| Aromatics C <sub>&gt;16</sub> - C <sub>21</sub>  |  | X  |  |
| Aromatics C <sub>&gt;21</sub> - C <sub>35</sub>  |  |  | X  |

### 5.3 USVI soil cleanup standards versus EPA RSLs

The following table provides the USVI soil cleanup standards and the corresponding EPA RSLs for TPH, VOCs and PAHs. An electronic copy of 12 V.I. R&R. §654-34 is available at: <http://dpr.vi.gov/environmental-protection/underground-storage-tanks/>

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**Table 5-2: Soil Cleanup Standards**

| Parameters                                    | USVI DPNR<br>(mg/kg) | EPA RSL (mg/kg) |
|---|----------------------|-----------------|
| <b>Total Petroleum Hydrocarbons (SW8015C)</b> |                      |                 |
| TPH-Diesel                                    | 460                  | --              |
| TPH-Gasoline                                  | 460                  | --              |
| <b>Volatile Organic Compounds (SW8260B)</b>   |                      |                 |
| 1,1,1-TRICHLOROETHANE                         | --                   | 8700            |
| 1,1,2,2-TETRACHLOROETHANE                     | --                   | 0.56            |
| 1,1,2-TRICHLOROETHANE                         | --                   | 1.1             |
| 1,1-DICHLOROETHANE                            | --                   | 3.3             |
| 1,1-DICHLOROETHENE                            | --                   | 240             |
| 1,2,3-TRICHLOROBENZENE                        | --                   | 49              |
| 1,2,4-TRICHLOROBENZENE                        | --                   | 22              |
| 1,2-DIBROMO-3-CHLOROPROPANE                   | --                   | 0.0053          |
| 1,2-DIBROMOETHANE (EDB)                       | --                   | 0.034           |
| 1,2-DICHLOROBENZENE                           | --                   | 1900            |
| 1,2-DICHLOROETHANE                            | 0.5                  | 0.43            |
| 1,2-DICHLOROPROPANE                           | --                   | 0.94            |
| 1,3-DICHLOROBENZENE                           | --                   | --              |
| 1,4-DICHLOROBENZENE                           | --                   | 2.4             |
| 2-HEXANONE                                    | --                   | 210             |
| ACETONE                                       | --                   | 61000           |
| BENZENE                                       | 1.2                  | 1.1             |
| BROMOCHLOROMETHANE                            | --                   | 160             |

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|   |      |       |
|---|------|-------|
| BROMODICHLOROMETHANE                          | --   | 0.27  |
| BROMOFORM                                     | --   | 62    |
| BROMOMETHANE                                  | --   | 7.3   |
| CARBON DISULFIDE                              | --   | 820   |
| CARBON TETRACHLORIDE                          | --   | 0.61  |
| CHLOROBENZENE                                 | --   | 290   |
| CHLOROETHANE                                  | --   | 15000 |
| CHLOROFORM                                    | --   | 0.29  |
| CHLOROMETHANE                                 | --   | 120   |
| cis-1,2-DICHLOROETHYLENE                      | --   | 160   |
| cis-1,3-DICHLOROPROPENE                       | --   | 1.7   |
| CYCLOHEXANE                                   | --   | 7000  |
| DIBROMOCHLOROMETHANE                          | --   | 0.68  |
| DICHLORODIFLUOROMETHANE                       | --   | 94    |
| ETHYL BENZENE                                 | 1500 | 5.4   |
| FREON 113                                     | --   | 43000 |
| ISOPROPYL BENZENE                             | --   | 2100  |
| M,P-XYLENES                                   | 130  | 590   |
| METHYL ACETATE                                | --   | 78000 |
| METHYL ETHYL KETONE (2-BUTANONE)              | --   | 28000 |
| METHYL ISOBUTYL KETONE (4-METHYL-2-PENTANONE) | --   | 5300  |
| METHYL TERT-BUTYL ETHER (MTBE)                | 4400 | 43    |
| METHYLCYCLOHEXANE                             | --   | --    |
| METHYLENE CHLORIDE                            | --   | 56    |
| O-XYLENE (1,2-DIMETHYLBENZENE)                | 130  | 690   |
| STYRENE                                       | --   | 6300  |
| TETRACHLOROETHENE (PCE)                       | --   | 22    |

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|   |       |       |
|---|-------|-------|
| TOLUENE   | --    | 5000  |
| trans-1,2-DICHLOROETHENE                              | --    | 150   |
| trans-1,3-DICHLOROPROPENE                             | --    | --    |
| TRICHLOROETHENE (TCE)                                 | --    | 0.91  |
| TRICHLOROFLUOROMETHANE                                | --    | 790   |
| VINYL CHLORIDE  | --    | 0.06  |
| XYLENES, TOTAL  | 130   | 630   |
| <b>Polynuclear Aromatic Hydrocarbons (SW8270DSIM)</b> |       |       |
| 1-METHYLNAPHTHALENE                                   | 200   | 16    |
| 2-METHYLNAPHTHALENE                                   | 210   | 230   |
| ACENAPHTHENE  | 2400  | 3400  |
| ACENAPHTHYLENE  | 1800  | --    |
| ANTHRACENE  | 21000 | 17000 |
| BENZO(a)ANTHRACENE                                    | --    | 0.15  |
| BENZO(a)PYRENE  | 0.1   | 0.015 |
| BENZO(b)FLUORANTHENE                                  | --    | 0.15  |
| BENZO(g,h,i)PERYLENE                                  | 2500  | --    |
| BENZO(k)FLUORANTHENE                                  | --    | 1.5   |
| CHRYSENE  | --    | 15    |
| DIBENZ(a,h)ANTHRACENE                                 | --    | 0.015 |
| FLUORANTHENE  | 3200  | 2300  |
| FLUORENE  | 2600  | 2300  |
| INDENO(1,2,3-C,D)PYRENE                               | --    | 0.15  |
| NAPHTHALENE   | 55    | 3.6   |
| PHENANTHRENE  | 2200  | --    |
| PYRENE  | 2400  | 1700  |

# UNDERGROUND STORAGE TANK CLOSURE GUIDANCE DOCUMENT

## 5.4 No Further Action Determination

Based on the findings of the Closure Report, DPNR will either:

- issue a No Further Action (NFA) determination letter or
- require additional site investigation and remediation.

Please note that DPNR uses soil cleanup criteria of 460 mg/kg Total Petroleum Hydrocarbons; and soil direct exposure target cleanup levels listed in 12 V.I.R&R. §654-34. Groundwater results will be evaluated using the national primary drinking water standards or MCLs. .

The DPNR will consider your conclusion for no further action (NFA) status if one of the following criteria is met:

1. Soil samples were collected from beneath the UST system and stockpile(s), and samples were below detection limit for BTEX and PAH's and TPH-GRO and/or DRO was less than 460 mg/kg.
2. Soil samples were collected from beneath the UST system and stockpile(s), and contamination was identified in some, or all of the samples collected. Soil contamination is below applicable Target Cleanup Levels, and those samples requiring vertical delineation were properly delineated to below detection limit for BTEX and PAH's and below 10 mg/kg for TPH-GRO and/or DRO.
3. Soil samples were collected, and contamination was identified in some, or all of the samples collected. Soil contamination is below Target Cleanup Levels. However, soil samples requiring vertical delineation were not delineated because groundwater was either voluntarily collected or encountered before vertical delineation could be achieved. BTEX and PAH's in groundwater were below applicable drinking water standards (MCL's).

In some rare cases, the site may not meet the conditions for no further action listed above but may still be eligible. The most common examples are sites in which contamination is the result of a previous release or sites in which groundwater contamination slightly exceeds drinking water standards or MCLs but no receptors are in close proximity (as verified by a risk-based site assessment).

Please note that it is at the sole discretion of the DPNR if no further action (NFA) status is granted. The DPNR will review all available information and data presented in the UST Closure Report to make a decision. Under no circumstances should the above conditions be modified in order to receive NFA status.

# UNDERGROUND STORAGE TANK CLOSURE GUIDANCE DOCUMENT

## 5.5 No Further Action with Institutional Controls

Based on a site specific risk based site assessment, restrictions on use and development may be imposed in lieu of requiring complete cleanup of contaminated soil or groundwater, through the use of Institutional Controls. Institutional controls are non-engineered instruments, for example administrative and legal controls that minimize the potential for human exposure and/or protect the integrity of the remedy. Institutional controls limit land or resource use and guide human behavior at a given site.

Institutional controls, imposed as part of risk-based cleanup to prevent disturbance or minimize exposure, may include the following:

- Prohibit of groundwater wells for potable water due to contaminants exceeding drinking water standards,
- Impose construction techniques for buildings to prevent vapor intrusion, or exposure to construction workers, or
- Limit construction in, under or over remedial caps.

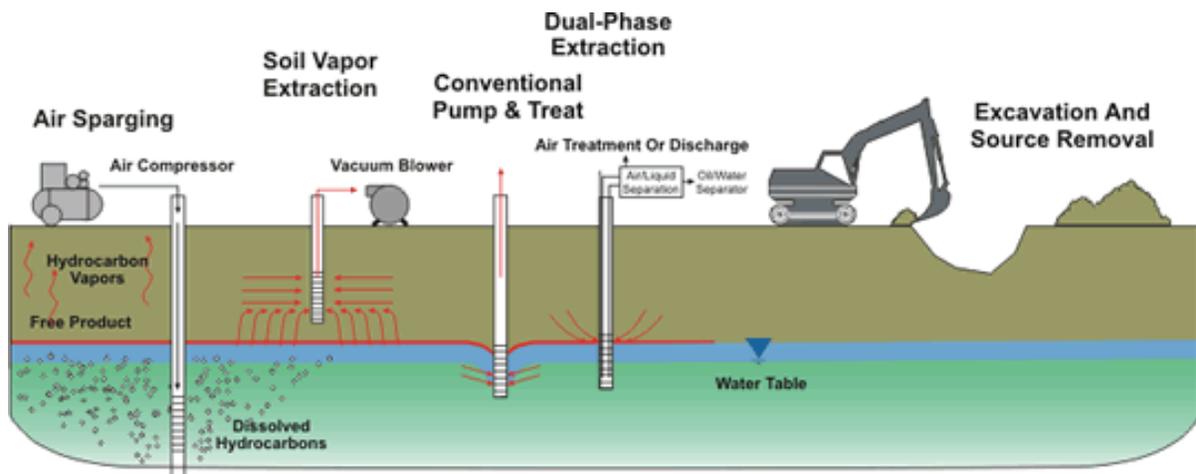
The required Institutional Controls will be implemented through property records via the following method (not all inclusive):

- Deed restrictions
- Environmental easements
- Environmental covenants

The goals of the Institutional Controls are:

- To put future purchasers on notice of contamination on the property,
- To restrict uses of designated areas on the property
- To restrict disturbance of remedies

The DPNR will review all available information and data presented in the UST Closure Report and the required supporting Site Specific Risk Based Assessment Report to make a decision.



**Figure 5-1: Site cleanup options**

# UNDERGROUND STORAGE TANK CLOSURE GUIDANCE DOCUMENT

## SECTION 6 – RECORD KEEPING

The owner and operator must keep permanent records of the UST closure and should document the UST closure procedure. You must maintain all records in accordance with 12 V.I.R.&.R §654-9(c) and 654-20 for at least 3 years after completion of the permanent closure.

Permanent records include (not all inclusive):

- DPNR approved UST Closure Work plan
- DPNR approved UST Closure Report; and all accompanying documents/records, such as site drawings, analytical results, etc.
- all correspondence with DPNR
- photographs of the tank closure activities (recommended)
- certificate of UST disposal
- soil, water, and sludge disposal manifests
- DPNR "No Further Action" letter

## **APPENDIX A**

### **Recommended Industry Codes and Standards for UST Closure**

"Removal and Disposal of Used Underground Storage Tanks" American Petroleum Institute  
Recommended Practice 1604

"Cleaning Petroleum Storage Tanks" American Petroleum Institute Publication 2015

"Interior Lining of Underground Storage Tanks" American Petroleum Institute Publication 1631

American Petroleum Institute  
12220 L Street, Northwest,  
Washington, D. C. 20005  
(202) 682-8000

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"Criteria for a Recommended Standard...Working in Confined Space"

The National Institute for Occupational Safety and Health  
Superintendent of Documents  
U.S. Government Printing Office  
Washington, D. C. 20402

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"Flammable and Combustible Liquids Code"  
NFPA 30

"Code for Motor Fuel Dispensing Facilities and Repair Garages"  
NFAP 30A

National Fire Protection Association  
1 Batterymarch Park  
Quincy, MA 02169-7471

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"29 Code of Federal Regulations (CFR) 1926 Subpart P – Excavations".  
<http://www.osha.gov>

# APPENDIX B

## APPLICATION FOR PERMIT TO CLOSE UNDERGROUND STORAGE TANK FACILITY

|   |   |
|---|---|
|  | <p><b>DEPARTMENT OF PLANNING AND NATURAL RESOURCES</b><br/><b>DIVISION OF ENVIRONMENTAL PROTECTION</b></p> <p>45 Mars Hill<br/>Frederiksted<br/>St. Croix, VI 00840<br/>(340) 773-1082</p> <p>Cyril E. King Airport<br/>Terminal Building, 2<sup>nd</sup> Floor<br/>St. Thomas, VI 00802<br/>(340) 774-3320</p> <p style="color: green; text-align: center;"><b>APPLICATION FOR PERMIT TO CLOSE<br/>UNDERGROUND STORAGE TANK FACILITY</b></p> |
|---|---|

|   |                                  |   |
|---|----------------------------------|---|
| 1. PROPOSED METHOD OF CLOSURE:  | <input type="checkbox"/> REMOVAL | <input type="checkbox"/> CLOSURE IN PLACE |
| <p><b>SAMPLING PROTOCOL:</b> The tank owner/authorized representative is responsible for all sampling analyses and associated costs.</p> <ul style="list-style-type: none"> <li><u>For tank systems that are to be removed.</u> The excavation shall be exposed prior to the scheduled inspection and sampling points identified by the Department of Planning and Natural Resource-Division of Environmental Protection (DPNR-DEP) inspector. Sampling is required for both tank and piping. <b>The tank and piping must remain in the excavation until the DEP Inspector approves the removal.</b></li> <li><u>Tank systems to be closed in place.</u> Submit an alternate plan, which must include soil sampling, reason for closing the tank system in place and type of material to be used to fill the tank. Soil sampling and/or hydrostatic testing is also required for piping closures. Tank system closure in place will only be considered after evaluating the risks and hazards if the tank system were removed.</li> </ul> |                                  |   |

|   |       |          |   |       |          |
|---|-------|----------|---|-------|----------|
| <b>I. FACILITY / SITE INFORMATION</b>             |       |          |   |       |          |
| 2. SCHEDULED CLOSURE DATE _____                   |       |          | <input type="checkbox"/> APPLICATION FEE \$500 (Acct No. RV 4421) |       |          |
| (Must be submitted 45 days prior to installation) |       |          |   |       |          |
| PARCEL ID #: _____                                |       |          | FACILITY ID#: _____   |       |          |
| BUSINESS NAME                                     |       |          |   | PHONE |          |
| PHYSICAL ADDRESS                                  |       |          | MAILING ADDRESS   |       |          |
| CITY  | STATE | ZIP CODE | CITY  | STATE | ZIP CODE |
| <b>II. PROPERTY OWNER INFORMATION</b>             |       |          |   |       |          |
| 3. PROPERTY OWNER NAME                            |       |          |   | PHONE |          |
| MAILING ADDRESS                                   |       |          |   |       |          |
| CITY  |       |          | STATE   |       | ZIP CODE |

| <b>III. TANK OWNER INFORMATION</b>                                       |                  |                     |
|--|------------------|---------------------|
| 4. TANK OWNER NAME   | PHONE            |                     |
| MAILING ADDRESS  |                  |                     |
| CITY   | STATE            | ZIP CODE            |
| 5. <input type="checkbox"/> Notification Form (EPA Form 7530-1) Attached |                  |                     |
| 6. Total number of tanks to be closed _____                              |                  |                     |
| <b>NOTE: UST SYSTEMS INCLUDE TANK AND ALL ASSOCIATED PIPING.</b>         |                  |                     |
| ( ) APPROVED   | ( ) DISSAPPROVED | Date permit issued: |

| TANK NO. | CAPACITY | DATE INSTALLED | TANK COMPOSITION | TANK PRESENTLY IN USE? | MATERIALS STORED IN TANK |
|----------|----------|----------------|------------------|------------------------|--------------------------|
|          |          |                |                  |                        |                          |
|          |          |                |                  |                        |                          |
|          |          |                |                  |                        |                          |
|          |          |                |                  |                        |                          |
|          |          |                |                  |                        |                          |
|          |          |                |                  |                        |                          |
|          |          |                |                  |                        |                          |

8. Has the tank system ever failed or leaked?                       YES                       NO

9. Reason for tanks to be closed:

- Failure to meet current USVI/Federal requirements
- Replacement of existing tanks
- Tank system failure, describe

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Other, describe

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10. Previous owners and operators of the tanks:

| Dates | Owner/Operator |
|-------|----------------|
| _____ | _____          |
| _____ | _____          |
| _____ | _____          |
| _____ | _____          |
| _____ | _____          |
| _____ | _____          |

11. Is the UST site located in an area deemed extremely vulnerable to groundwater contamination, such as Wellhead Protection Areas?

YES     NO

12. Are there any public water wells or private water wells or other source of groundwater within 1000 ft. of the UST site?

YES     NO

13. Provide the results of a 1,000 ft. survey for water supply wells in the following table. (Contact Groundwater Program at DPNR-DEP for information (340) 773-1082-St. Croix, (340) 774-3320-St. Thomas/St. John)

| Name of Owner of Public Water Supply Well | Distance from UST Site | Depth of Well | Status: Active or Inactive? |
|---|------------------------|---------------|-----------------------------|
|   |                        |               |                             |
|   |                        |               |                             |
|   |                        |               |                             |
|   |                        |               |                             |
|   |                        |               |                             |

14. Indicate the current on-site land use and the most likely future land use. (Contact Comprehensive & Coastal Zone Planning at DPNR for information (340) 773-1082-St. Croix, (340) 774-3320-St. Thomas/St. John)

| Current On-Site Land Use |                          | Most Likely Future On-Site Land Use |                          |
|--------------------------|--------------------------|-------------------------------------|--------------------------|
| Residential              | <input type="checkbox"/> | Residential                         | <input type="checkbox"/> |
| Commercial               | <input type="checkbox"/> | Commercial                          | <input type="checkbox"/> |
| Other                    | <input type="checkbox"/> | Other                               | <input type="checkbox"/> |
| Describe:                |                          | Describe:                           |                          |

15. Disposal site of tank:

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**Note:** You must inform DEP of the physical address of where the tank and piping is to be disposed. **Plans will not be approved without this information.**

16. Attach (3) Copies of Plans Showing The Following:

1. Property lines, site address, scale, north arrow
2. Location of all existing structures.
3. Location of all existing underground storage tank facilities.
4. Location of underground storage tanks and piping to be closed.
5. Location of underground utility lines and vaults.

**General Requirements  
Application for Permit to Close  
UST Facility**

1. Required Inspection-Permit To Close: (A representative from DEP must be on site at the time the tank(s) are closed)

A. TANK SYSTEM CLOSURE BY REMOVAL:

- o The excavation shall be exposed prior to the scheduled inspection. The tank owner/authorized representative on site must submit a uniform hazardous waste manifest demonstrating that the tank has been properly decontaminated. A combustible gas instrument and soil sampling equipment must be on site. The DEP Inspector will identify sampling points. The tank and piping must remain in the excavation until DEP approves the removal.
- a. Attach a topographic map showing the location of the facility and a general site map showing the area surrounding the UST site.
- b. Attach plan and sectional views of the excavation and include the following:
  - 1. All appropriate excavation dimensions.
  - 2. All soil sample locations and depths using an appropriate method of identification.
  - 3. Location of areas of visible contamination.
  - 4. Former location of tank(s), including depth, with tank Identification Number.

c. Is the groundwater more than 5 feet below the bottom of the excavation?  YES  NO

If no provide the depth from the ground surface to the groundwater table. Feet: \_\_\_\_\_

Indicate method used to determine water table depth:

1. Excavation extended 5 feet below base of pit:  YES  NO

2. Boring or monitoring well:  YES  NO

3. Topographic features (Method must be approved by ADEM prior to use):  YES  NO

. Was there a notable odor found in the excavation?  YES  NO

If yes,

(1) The odor was (mild)(strong)(other)describe

\_\_\_\_\_

(2) The odor indicates what type of product: (gasoline)(diesel)  
(waste oil)(kerosene)(other) describe:

\_\_\_\_\_

e. Was there water in the excavation?  YES  NO  
If yes, how was it handled?

1. One time discharge to sanitary sewer with local approval?  YES  NO

2. Hauled to facility capable of treating constituents of petroleum products in water?  YES  NO

3. Hauled to local POTW with local approval?  YES  NO

4. Treated on-site with NPDES approved discharged?  YES  NO

5. Other? Explain:  
\_\_\_\_\_  
\_\_\_\_\_

f. Was free product found in the excavation?  YES  NO

If yes,  
(1) How was free product handled? Describe:  
\_\_\_\_\_

(2) What was the measured thickness of free product?  
\_\_\_\_\_

g. Were visible holes noted in the tank(s)?  YES  NO

If yes, indicate which tanks(s) by the Unique Tank Number:  
\_\_\_\_\_

Also, describe the location(s) and provide general description as to the size and number of holes for above noted tanks, (Example: 3 square feet of pinholes or 3 inch diameter hole):

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

h. Describe the soil type and thickness of all soil layers encountered in the excavation:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

i. Was the excavation backfilled?  YES  NO

If yes, provide the date of backfilling: \_\_\_\_\_

B. TANK SYSTEM CLOSURE IN PLACE:

- Soil sampling for tank(s) and piping.
- After approval of the alternate plan, the tank owner/authorized representative on site shall submit a uniform hazardous waste manifest demonstrating that the tank has been properly decontaminated. The DEP Inspector shall verify that the tank system has been properly emptied and will witness the filling with an approved inert substance. Piping must be closed at the same time as the tank.
  
- a. Attach a topographic map showing the location of the facility and a general site map showing the area surrounding the UST site.
  
- b. Attach plan and sectional views of the excavation and include the following:
  - 1. All appropriate excavation dimensions.
  - 2. All soil sample locations and depths using an appropriate method of identification.
  - 3. Location of areas of visible contamination.
  - 4. Former location of tank(s), including depth, with tank Identification Number.
  
- c. Attach groundwater sampling data, if required based on depth to groundwater.  
*Refer to Closure Site Assessment Guidance for further details regarding requirements for groundwater sampling.*
  
- d. Is the groundwater more than 5 feet below the bottom of the tank?  YES  NO

Provide the depth from the ground surface to the groundwater table.

Feet: \_\_\_\_\_

*Refer to Closure Site Assessment Guidance for further details regarding requirements for determining groundwater elevation.*

- e. Was there a notable odor found in the bore holes?  YES  NO

If yes,

(1) The odor strength was (mild) (strong) (other) describe: \_\_\_\_\_

(2) The odor indicates what type of product: (gasoline) (diesel) (waste oil) (kerosene) (other)

Describe: \_\_\_\_\_

- f. Was free product found in the bore holes?  YES  NO

If yes,

(1) How was free product handled? Describe: \_\_\_\_\_

(2) What was the measured thickness of free product? \_\_\_\_\_

g. Describe the soil type and thickness of all layers encountered in the bore holes and provide boring logs:

---

---

---

h. Specify the inert solid material used to fill tanks(s):

---

---

i. Provide the date the tank(s) were filled: \_\_\_\_\_

j. Were the bore holes properly sealed with bentonite/soil?  YES  NO  
If yes, provide the date: \_\_\_\_\_

## 2. DECLARATION

I declare that to the best of my knowledge and belief, the statements and information provided are correct and true. I understand that information in addition to that provided above may be needed in order to obtain final approval by the Department of Planning and Natural Resources –Division of Environmental Protection (DPNR-DEP).

I understand that tests and procedures that may be required by other departments and agencies to demonstrate adequate site safety or suitability for further development (e.g. soil compaction testing) are in addition to the requirements.

I will make contact with an Environmental Specialist (DPNR-DEP) at least two (2) working days to schedule the required inspections. I understand that no work is to commence on the proposed project until a permit has been issued.

I understand that site and worker safety are solely the responsibility of the property owner or his agent and that this responsibility is not shared or assumed by the DPNR-DEP. I further understand that a closure must be submitted to the DPNR-DEP within 30 calendar days of completion of UST closure following the guidelines/format prescribed.

\_\_\_\_\_  
SIGNATURE & TITLE:

\_\_\_\_\_  
PRINT NAME:

TELEPHONE: ( ) \_\_\_\_\_ DATE \_\_\_\_\_

## APPENDIX C

### UST Closure Checklist

- Submit the application for Permit to Close USTR System to DPNR at least 45 days prior to the UST closure or change-in-service.
- Notify any agencies as required such as local fire department, and obtain any local permits as required.
- Notify DPNR- UST Program by fax, email, or telephone at least 30 days prior to the scheduled date and time of the UST closure or change-in-service.
- Call VI WAPA, VI WMA and VI DPW at least 48 hours prior to any excavation activities and arrange for all underground lines and utilities to be located and marked.
- Conduct a site inspection prior to commencement of UST closure or change-in-service activities to observe site for any overhead obstructions or nearby buildings that may interfere with UST closure or change-in-service.
- On the day of and prior to conducting the UST closure or change-in-service activities review the Health and Safety Plan (HASP) and obtain signatures of all workers present.
- Locate UST system and prepare scaled site plan sketch (Note tank and line locations, tank sizes, product types, dispenser islands, buildings, streets, etc.).
- Identify and barricade sufficient work space for workers and equipment (50 feet from edge of excavation).
- Excavate to top of tank, drain and flush piping, cap piping ends if left in place. Remove drop tube, submerged pump if present, and any fittings from UST. Leave vent line in place.
- Leave the tank in the excavation during all cleaning and vapor freeing activities. The tank may be removed from the excavation only after the tank is clean and vapor free.
- Remove all product and residue from tank and lines by vacuum truck or explosion-proof pump.

- Remove vapors from tank by:

### **O** Purging

- Venturi Eductor Method - pulls air into the tank through the vent line, up the drop tube and out the Venturi eductor.
- Diffused Air Blower Method - pushes compressed air into the tank through the opening with drop tube removed, through an air diffuser, and out the vent line.
- Ground the equipment and tank. After purging take CGI readings at several openings and at different levels in tank until the readings are below 10% LEL.

### **O** Inerting

- Dry Ice (CO<sub>2</sub>) – use a minimum of approximately 1½ to 2 pounds per 100 gallons of tank capacity. Distribute evenly over the greatest possible area of the tank. All openings except the vent line are plugged. **Caution:** This is only an estimate amount of dry ice. The only way to determine if enough dry ice was used to make the atmosphere safe from ignition is to have less than 5% oxygen when measuring with an oxygen meter.
- Nitrogen (N<sub>2</sub>) – use approximately one 50 lb. bottle per 2500 gallons of tank capacity. All openings except the vent line are plugged.
- Ground the equipment and tank. Do not apply more than 5 psig to the tank. After inerting take oxygen readings at several openings until the readings are below 6% to 7%.

- A purged or inerted tank can return to flammable status, so readings should be taken regularly during the entire time tanks are on site. Include areas lower than grade and in the immediate vicinity of the tank(s).

- Once the tank is vapor free, remove all purging or inerting equipment, and close all openings with threaded plugs. Disconnect the vent line. Close the vent opening with a threaded

plug that has a 1/8" (API) or 1/4" (NFPA) hole pre-drilled through it to allow tank to breathe in response to temperature changes.

Lift tank from excavation with equipment capable of lifting tank (never drag or roll it). Set tank on trailer for transport.

Properly label tank for transport as recommended by API.

Obtain soil samples as described in the —Underground Storage Tank Closure Document. Place soil samples on ice, complete chain-of-custody, and transport/ship samples to DPNR accredited laboratory for analysis.

Submit the Closure Assessment Report to the DPNR at least 60 days following permanent closure or change-in-service.

**This is intended as a checklist and does not provide instruction on every procedure for proper UST closure or change-in-service. It is the owner/operator responsibility to ensure all applicable rules, regulations, and recommended industry practices are followed during UST closure or change-in-service.**