



Guidelines for Closure of Underground Storage Tank Systems

Revised 2/1/2022

Introduction

The following Guidelines for the Closure of Underground Storage Tanks (UST) supersede the original Closure Assessment Guidelines effective July 21, 1992 (revised last in May 2019). These guidelines are intended to assist UST facility owners/operators, contractors, and environmental consultants in complying with the permanent closure requirements for USTs as specified in Rule 1.15(D)(10) of the [*“Rules and Regulations For Underground Storage Facilities Used For Regulated Substances and Hazardous Materials”*](#) (250-RICR-140-25-1) (“UST Regulations”).

Permanent closure of UST systems, including the UST and all associated product and vapor piping, along with all other components, must be conducted in a manner that is consistent with the UST regulations. UST closures require prior approval by and oversight of the DEM UST program. **Permanent closure of most USTs requires the submittal of a permanent closure application and closure fee to DEM, as well as approval and direct oversight by a DEM inspector during the closure process.** The only exceptions to these requirements are:

- Residential Tank: Tanks less than or equal to 1,100 gallons in capacity used for storage of heating oil of any grade and serving a one-, two-, or three-unit dwelling.
- Farm Tank: Tanks less than or equal to 1,100 gallons in capacity used for storing of heating oil of any grade for non-commercial purposes serving a farm.

Permanent Closure Process

DEM may require the permanent closure of any UST system for a variety of reasons, including, but not limited to: tightness test failure; abandonment; failure to maintain corrosion protection; statutory single-wall removal deadlines; damage; evidence of release; or any situation where the Department determines there is an unacceptable risk to the human health or the environment. In addition, an owner may choose to permanently close their UST system at any time.

The permanent closure process for a UST includes the following steps:

- 1) The UST owner selects a qualified environmental consultant (if a closure assessment is being performed) and a contractor to complete the closure;
- 2) The owner or contractor submits a [Permanent Closure Application for USTs](#) and payment of the permanent closure application fee of \$75 per UST;
 - a. If there are any outstanding UST registration or late fees, payment in full must be included with the closure application.
 - b. If the UST being permanently closed was not previously registered with DEM, a one-time UST Registration fee of \$100 per UST must be included with the closure application.
- 3) DEM reviews the application, and if complete, will contact the individual(s) listed on the application to schedule a closure date. A closure approval letter detailing the date of the closure and the name and contact information of the DEM inspector who will be present at the closure will be issued.
- 4) On the morning of the closure, the contractor or another contact will call the DEM inspector to provide an update and estimate of the time that the USTs will be removed. The DEM inspector must be on-site to witness the removal of the UST.
- 5) If a closure assessment must be conducted, the environmental consultant must perform an initial screening of soils and/or peastone surrounding the UST and collect samples for analysis.
- 6) If indications of contamination are present, the DEM inspector must be immediately notified if they are not already on-site. The contractor will be required to excavate and stockpile all accessible contaminated soil and/or peastone. If a release is encountered during a closure, the requirements outlined in [Release Response During a UST Closure](#) must be followed.
- 7) If there is evidence of a release, the property will be designated a Leaking Underground Storage Tank (LUST) project and assigned a DEM project manager who will work with the owners to remediate the property.
- 8) If there is no evidence of a release and all applicable documentation is received, DEM will issue a UST closure certificate which documents that the UST was permanently closed in a manner consistent with DEM requirements.



It is important to remember that this document only covers DEM requirements. Municipalities, as well as local Fire Departments, may have additional requirements or applications. It is important that you check with these entities before you remove a UST.

Closures are scheduled on a first-come, first-serve basis, and preferred dates may not be available due to staffing limitations. Therefore, we highly recommend that you submit the closure application well ahead of your desired closure date to ensure your application is processed and UST program personnel are available for your desired closure date. In general, applications should be submitted no less than 10 business days prior to the preferred closure date.

The permanent closure of a UST system includes removal of all associated product piping, sumps, dispensers, containment basins, vent lines, and all other components of the UST system. These items may be re-used only if they are part of an approved new UST installation, otherwise these components are

required to be removed as part of the closure and may not be abandoned in place unless explicitly approved by the DEM inspector.

Closure Assessments

The goal of a closure assessment is to determine if a leak or release from the UST system has occurred. This is done by evaluating the condition of the UST, looking for visual or olfactory evidence of a release, and collecting samples at defined intervals or locations and analyzing them for the presence of petroleum or other hazardous materials. This information is used to generate a Closure Assessment Report which is submitted to DEM for review. While a closure assessment can be beneficial for peace of mind or be necessary to obtain a loan, mortgage, or sell the property, closure assessments are not required for all UST closures. As described in Rule 1.15(A) of the UST Regulations, any UST containing heating oil for on-site use is generally not required to perform a closure assessment. However, DEM may require a closure assessment at any exempted facility, including USTs used for heating oil-on site and residences, if there are conditions which indicate a possible release has occurred.

Closure assessments and soil screening are required to be performed on tanks containing the following:

- Gasoline or Diesel
- Heating Oil when the oil is not consumed entirely on-site (e.g. distribution tanks)
- Hazardous Materials
- Waste Oils
- Jet Fuels & Aviation Gas
- Lubricating and Cutting Oils

Closure assessments must be performed/overseen by an individual who has one of the following certifications: A licensed Professional Engineer (PE), a Certified Professional Geologist (CPG), or a Registered Professional Geologist (RPG). It is expected that the PE, CPG, or RPG be involved in the closure process, be available for communication with field staff and the DEM inspector throughout the closure, and review and approve the final Closure Assessment Report. A phone number to reach the PE/RPG/CPG directly on the day of the closure, either an office line with complete extension or a cell phone number should be provided in the closure application.

The results of the closure assessment must be submitted in both hardcopy and digital form to DEM in a written report format and are due within 30 days of a UST closure. Failure to submit a Closure Assessment consistent with these requirements may delay the issuance of a closure certificate and can result in formal enforcement action, making the facility ineligible for reimbursement from the LUST Financial Responsibility Reimbursement Fund. A complete list of the information that must be included in a closure assessment can be found in Appendix A.

Removal vs. Closure in Place

All USTs and product pipelines are required to be removed from the ground during a UST closure, unless circumstances exist which would prevent their safe removal. In these cases, the UST and product piping may be filled with a flowable fill or high-density sand. This is called a closure in place (CIP). CIP is usually needed when physically removing the UST would impact the structural integrity of a permanent structure or the UST is inaccessible using readily available equipment. Performing a CIP may be more expensive than physically removing the UST. Additionally, opting for CIP may also make selling the property or obtaining financing more difficult. All requests for a closure in place must be submitted in writing with the [Permanent Closure Application for USTs](#), and must include a detailed site plan, pictures, and a thorough explanation of why the UST or product piping cannot be removed.

If a closure in place is approved, the UST and all product piping must either pass a tightness test or a closure assessment must be conducted. Closures in place require the UST interior to be thoroughly cleaned and samples of the soil beneath the UST analyzed. If no contamination is discovered, the UST may be filled.

Who do I need to hire?

All UST closures must be performed by a qualified, properly licensed and insured contractor with equipment adequate to safely remove the UST system components. Please be aware that the UST must be cleaned, made inert, and disposed of in a manner consistent with local, State, and Federal laws.

There are several companies based in Rhode Island and the surrounding area that routinely perform closures and have the experience to respond to any emergencies or challenges that may come up during the closure. DEM cannot recommend any specific contractor, however, we encourage you to get estimates from several companies to better understand both the cost, availability, and experience of the contractor. It is important to remember that the lowest bidder may not be the best deal in the long run, especially if it results in additional costs, fines, penalties, or damage to your property when the closure is performed by contractors with little experience or that do not have the correct equipment. Your petroleum provider, local equipment supplier, 3rd party tester, and regional trade groups are excellent sources of information, and you should seek out recommendations for vendors from these groups.

If you are closing a UST that requires a closure assessment, or you encounter evidence of contamination during the closure, the UST or property owner will also need to hire a qualified environmental consultant. A qualified environmental consultant, at a minimum, must have one of the following: a Professional Engineer (PE) license; be a Registered Professional Geologist (RPG); or a certified professional geologist (CPG).

Contractor Responsibilities and Preparation

Contractors are responsible for cleaning, inerting, removing, and disposing of the UST, associated piping, UST components, and residual product and waste generated during the cleaning process in a manner

consistent with DEM, state, local, and Federal regulations. DEM requires all closures to be conducted in a manner consistent with PEI RP1700: Tank Closure & Removal, API Recommended Practice 1604 "Closure of Underground Petroleum Storage Tanks", and API Standard 2015 "Requirements for Safe Entry and Cleaning of Petroleum Storage Tanks". Contractors should be familiar with these documents and ensure that the measures in them are followed. This includes ensuring personnel are wearing appropriate personal protective equipment, are properly inerting and cleaning the UST, and are securing the excavation using temporary fencing.

Contractors should have the proper equipment available on-site for removal and transportation of the UST, UST components, and generated waste products they are removing. Knowing the construction, capacity, and material stored in the UST will impact what equipment and preparations are needed to safely conduct the closure. Contractors should also become familiar with site characteristics, including location of utility lines and approximate groundwater depth.

Prior to removal, all USTs must be emptied, cleaned, and in some cases, inerted. There are several acceptable ways to empty, clean, and inert a UST, however the method used must comply with API Recommended Practice 1604 and be listed on the closure application. DEM would like to stress that entering any UST is considered confined space entry and is extremely dangerous. Only qualified and trained personnel should perform UST entry. Confined space entry requires special safety equipment, permitting, and in many cases, a properly trained 3rd party rescue team is required. Therefore, it is the responsibility of the property and UST owner, as well as the contractor, to ensure that API Standard 2015 is followed in full and all applicable permits and permissions from the appropriate regulatory authorities are received prior to any confined space entry. Please be aware that DEM does not regulate confined space entry, and DEM does not condone or endorse entry into USTs and recommends alternative methods to clean USTs.

Any UST which contained a substance that is ignitable, flammable, or explosive at ambient temperature must be inerted such that the UST remains below the lower explosive limit (LEL) for the entirety of the UST removal and transport for disposal. Contractors should consult with the local fire department to ensure they are following all appropriate safety procedures. Please note that cleaning a UST does not necessarily mean that these conditions are met, and in most cases inerting with dry ice or a venturi blower and frequent LEL measurement is required. As discussed in API Recommended Practice 1604, the LEL of the tank interior should be measured at a minimum of 3 points on an hourly basis while the UST is open to the atmosphere. Additionally, the UST should be transported in a manner which ensures that the contents remain below the LEL for the entirety of the transport.

UST closures don't always go smoothly. Contractors must plan the closure with contingency plans in case of unexpected issues, including inclement weather, discovery of a release, or other unexpected site conditions. While many UST closures do not result in the discovery of a release, contractors always need to be prepared for contaminated soil to be encountered. If contaminated soil is encountered at a UST closure, efforts must be made to remove and properly dispose of as much of the soil as possible. Excavation of contaminated soil during the closure is substantially less expensive for the property/UST

owner than addressing the issue at a later date, and results in simpler, faster, and less expensive remediation. **Removal of contaminated soil encountered during a UST closure is a requirement of the UST program, and all closures should have a contingency plan to account for this.** It is essential that contractors be prepared with a contingency plan to adjust construction schedules, stockpile contaminated soil on-site, and dewater if needed.

Consultant Responsibilities and Preparation

Consultants are responsible for ensuring applicable environmental and public health regulations are adhered to during the closure, conducting a closure assessment, and, if required, conducting oversight of contaminated soil excavation and disposal. The primary goal of a closure assessment is to determine if a release has occurred at the site. Consultants look for indications of a release based on the condition of the UST system, soil, groundwater, and other media on-site. Consultants are expected to have a basic understanding of the history of the property, especially past releases and significant compliance issues which may have led to the release of product. Where applicable, consultants should perform a DEM file review on the property and review LUST and site remediation files that exist for the property prior to the closure.

Consultants should arrive at the site prepared with a sampling plan and appropriate equipment needed to complete a closure assessment, including, at a minimum:

- Instruments or test kits to perform field screening of soils.
- Sampling jars appropriate for collection, storage, and holding of volatile contaminants.
- Personal protective equipment.
- Field notebook.

The environmental professional performing the closure assessment must be on site during all soil excavation, tank cleaning, UST and product piping removal, and if applicable, contaminated soil excavation, stockpiling, and transport. The DEM inspector may stop work if there is no environmental professional on site. The consultant is not required to be present during initial preparatory work such as pavement removal, dispenser and island removal, etc.

Sample Collection and Screening

Soil Screening

The appropriate analytical tool for screening soils at a closure depends on the material stored in the UST. For USTs storing gasoline, aviation fuels, kerosene, diesel or #2 fuel oil, a portable photo-ionization detector (PID) or flame-ionization detector (FID) should be used to screen soils. For USTs storing heavier fuels, including #4 and #6 heating fuels, hydraulic fluid, motor or lubricating oils or other heavier petroleum products, a total petroleum hydrocarbons (TPH) oleophilic dye test with a detection limit of 500 ppm or a portable TPH analyzer should be used. In cases where the UST contains a non-petroleum regulated or hazardous material, check with DEM prior to the closure to discuss the proper screening method.

Soil screening when using a PID/FID must be conducted in accordance with appropriate field sampling and analysis techniques as outlined in Appendix B. FID/PID screening tools rely on volatilization into the headspace, so it's important the sample is sealed and allowed to come to equilibrium at 70°F for a minimum for 10 minutes before being screened. Volatilization is substantially reduced in cold temperatures or wet conditions, and it is critical samples are properly prepared prior to measurement to ensure an accurate value is obtained. When screening soils using another method, soil screening must be conducted according to manufacturer directions.

Consultants must remember that soil screening is not a final determination of a release and a result lower than the screening standard does not necessarily mean a soil is “clean” or meets applicable standards. The purpose of the screening is to aid in the collection of samples for laboratory analytical analysis and to guide excavation of soils. Soil screening should never be used to determine if a property is “clean”, or to determine if soil can be used as backfill.

The DEM inspector has discretion over the location and quantity of samples collected for screening and analysis. However, at a minimum, you should expect soil samples for initial screening to be collected from the following locations:

- UST Sidewalls: Five-foot intervals at elevation equal to tank center;
- Product Piping: Below each dispenser and remote fill and along the line at five-foot intervals; For fiberglass pipe, screening must also be performed beneath each fitting (e.g., elbow, tee, coupling, etc);

- Beneath the fill pipe/spill containment basin at one-foot intervals until the tank is reached
- Tank bottom: along centerline according to length of tank:
 - Up to 20 feet: one soil sample at each end and one at tank center
 - Greater than 20 feet: one soil sample every five feet along centerline

All soil screening results are to be recorded and tabulated in the Closure Assessment Report. If any of the initial screening samples exceed the screening threshold, then a new sample must be collected for laboratory analysis.

Sample Analysis

The number of samples required to be analyzed by a laboratory will vary from site to site and is at the discretion of the DEM inspector, however a minimum of six laboratory samples per UST should be planned: two bottom samples and one UST sidewall sample per side. Once a sample has been collected for soil screening using a PID, it cannot be re-used for laboratory analysis, and a new sample must be collected using proper sampling and storage techniques.

When soil samples are required to be taken for laboratory analysis, the methodology listed in Appendix C of these guidelines should be used, unless otherwise specified by the DEM inspector. All soil and water samples should be collected and handled according to proper chain of custody requirements and accepted

sampling protocols. Samples must be analyzed at laboratories approved by the State of Rhode Island or if located out of state, approved by the appropriate regulatory entity in that jurisdiction. Soil leachability standards for analytical samples can be found in Appendix D. The standards listed in appendix D are to be used in determination of whether a site investigation will be needed after a closure.

Release Determination and Reporting

A release may be indicated by holes/pitting on the UST, soil staining, odor, presence of a visible sheen or LNAPL on groundwater, exceedances of soil screening thresholds, or confirmatory laboratory analysis which shows exceedance of the soil direct exposure threshold or groundwater quality standards. If any of these release indicators are observed, immediate notification of the DEM inspector assigned to the closure is required. *If a release is encountered during a closure, the requirements outlined in the DEM document: [Release Response During a UST Closure](#), must be followed.* The DEM inspector will determine if additional action is needed during the tank closure such as contaminated soil excavation, additional laboratory analysis of soil samples, and other release response actions in accordance with Rule 1.14 of the UST Regulations.

When using a PID or FID, the following criteria is to be used as the threshold for release reporting:

Soil Screening Thresholds when using a PID/FID	
Gasoline, All Grades	20 ppm
Diesel, #2 Fuel Oil, Waste Oil	10 ppm
Kerosene, Aviation Fuels	20 ppm
#4 and #6 Fuel Oil	PID Screening not applicable

When using a portable TPH analyzer or an oleophilic dye test, the screening threshold is 500 ppm as TPH. Any exceedance of this threshold will require collection and analytical analysis of confirmatory samples for laboratory analysis.

Closure Inspections

A DEM UST Program staff member will be assigned to be an inspector for the closure. This individual’s name and contact information will be included on the closure approval letter the individual listed as the primary contact receives when the closure is approved and scheduled. The primary role of the DEM inspector at a UST closure is to observe the condition of the UST, soil, and if present, groundwater. The DEM inspector will also oversee the collection and screening of soil samples by the consultant. The DEM inspector has sole discretion on determination of whether a release has occurred from a UST. The consultant or contractor should contact the DEM UST inspector the morning of the closure to provide an update on the status of the removal and schedule a time for the DEM inspector to arrive on-site to witness the UST removal and perform an inspection of the USTs and tank grave.

The contractor is expected to ensure that all USTs remain on-site until they are inspected by a DEM inspector. The removal of any regulated UST from a site before it has been inspected is prohibited.

As the bottom of the tank is frequently the location of damage and corrosion, tanks should be positioned in such a way the bottom of the UST can be safely examined by the DEM inspector after their removal. Contractors are expected to remove any sediment and debris that may adhere to the tank in order to aid in the inspection, and proper safety practices, including blocking the tank on both sides to prevent rolling, must be used.

If a release has occurred, it is the responsibility of the consultant to notify the DEM inspector. In cases where a closure assessment was not initially required and there is not a consultant involved, the contractor is responsible for notifying the DEM inspector and the UST owner is required to hire an environmental consultant to conduct a closure assessment. If a release is encountered during a closure, the requirements outlined in [Release Response During a UST Closure](#) must be followed.

Closure Completion and Closure Certificates

A closure is not considered complete until all required documentation and closure-related release investigation and remediation has been completed. If a closure assessment is not required and no release is observed or suspected, the DEM UST inspector may issue a UST closure certificate immediately. However, if the closure of the UST system does require a Closure Assessment Report then the closure certificate will not be issued until the Closure Assessment Report and all associated documentation has been received and reviewed.

In situations where there are indications or confirmation of a release, the DEM LUST Project Manager has sole discretion in issuing the closure certificate. Completion of all closure-related initial investigation and soil removal, as well as submittal of all data and the Closure Assessment Report, is required before a closure certificate will be issued.

Closure Assessment Reports must be complete and contain all items required in Appendix A. The DEM Project manager may reject any report which contains deficiencies which may delay the issuance of a closure certificate.

Closure certificates are sent to the UST owner after they are issued. While copies of the closure certificates may be available by performing a file review with the DEM UST program, the owner should maintain the certificate in a safe place as it is a legal document showing that the UST system has been removed in accordance with DEM requirements, and is frequently required to sell the property, or obtain a loan or mortgage.

Soil Disposal and Backfill

The disposal and re-use of soils generated from the closure of underground storage tanks is strictly regulated by the Federal Resource Conservation and Recovery Act (RCRA), Rhode Island State Law, and DEM regulations.

This guidance is only for soils to be reused onsite or transported and disposed of at an appropriate disposal facility. Transportation of any soils generated during a UST closure to other locations is generally not permitted.

Soils excavated during a UST closure can be divided into two categories:

- Soils that screened below the screening threshold with no indication of a release.
- Soils that exceed the screening threshold and/or there is evidence of a release.

During the closure and subsequent “chasing” of contamination, these soils should be segregated into two separate piles. Soils that screened below the screening threshold with no evidence of a release may be re-used on-site and no further analytical analysis is required.

For soils which exceeded the screening threshold, and/or there was evidence of a release, additional analytical analysis and a RCRA Hazardous Waste Characterization is required to determine if the soil must be disposed of, or can be re-used on site. These soils must be sampled immediately after excavation and analyzed using an appropriate method as outlined in Appendix C, and a qualified individual must perform a RCRA Hazardous Waste Characterization to determine if the soil is regulated as hazardous waste.

If the soil meets the following requirements, it may be re-used on-site as backfill:

- Analytical results demonstrate that the soil meets both the Rhode Island Direct Exposure Criteria and Leachability standards.
- A qualified individual has performed a RCRA hazardous waste assessment and determined that the soil does not meet the definition of hazardous waste.

RCRA requires that the property owner maintain all documents related to the hazardous waste determination for the life of the property.

If the soil analytical results exceed the Rhode Island direct exposure or leachability criteria, or a qualified individual determines that the soil is regulated hazardous waste, the soil is required to be disposed of at a properly licensed facility and cannot be re-used. Soils excavated as a result of a UST removal or removal of contamination may not be sold or transported to another site for use as fill under any circumstances.

Please remember that soil stockpiles must be stored on polyethylene (poly) sheeting and covered at all times. Soil must be disposed of within 30 days of excavation, therefore it is imperative that all analytical samples be analyzed as soon as possible in order to arrange disposal and transport, if required.

Appendix A

Contents of the Closure Assessment Report:

1. A background description of the site including location, use of the facility, and a summary of any available tank and line leak detection results;
2. A locus map using the U.S. Geological Survey 7.5 minute quadrangle map;
3. A detailed site plan showing the location of all former or existing USTs, product and vapor line pipelines, dispensers, buildings, utilities, monitoring wells, drinking water wells, soil screening locations, soil sampling locations and any other pertinent site features;
4. Descriptions of all USTs and product pipelines closed including size, construction type, depth to tank bottom, age and stored material;
5. A description of the condition of the USTs and product pipelines including extent of corrosion, identification of any holes and any other indication of leakage;
6. Photographic documentation of the condition of each UST and/or product pipeline removed;
7. A description of the soil conditions in the excavation zone such as soil classification, gradation, extent of compaction and any other notable physical characteristics;
8. A description of soil contamination, including visual and olfactory observations, field screening and laboratory analytical methods used and all results;
9. A description of groundwater encountered in the excavation zone including depth to water and appearance with respect to the presence of any sheen or free product;
10. A description of groundwater obtained from monitoring or observation wells, where present, including any gauging results;
11. Identification of the DEM groundwater classification at the site and surrounding areas, the availability of public water and presence of private or public wells;
12. Any potential receptors such as, but not limited to, surface waters, basements, storm drains, sewer lines or other utilities where contamination is identified;
13. Description of the management of all excavated contaminated soil, including proper cover while stockpiled on-site and documentation of proper disposal;
14. Documentation of proper disposal of the tank(s) and the residual sludge material;
15. Any other information or documentation required to complete the closure assessment; and
16. **Conclusions as to whether a release has occurred and recommendations for further investigation and/or remediation;**
17. A statement signed by the registered professional engineer, or the certified professional geologist, or the registered professional geologist, who prepared the report or who directly supervised preparation of the report, certifying the accuracy of the information contained in the report; and
18. A statement signed by the facility owner that the report is complete and accurate.
19. A completed [UST Closure Assessment Report Checklist](#).

Appendix B

Adapted from Maine Department of Environmental Protection, Field Screening of Soil Samples Utilizing Photoionization and Flame-ionization Detectors, SOP No. RWM-DR-011:

- 1) Warm up and calibrate the PID and FID instrument to be used according to the manufacturers recommended procedure. The PID and/or FID should be ready for use prior to collection of the first sample.
- 2) Collect the soil sample utilizing appropriate soil sampling equipment.
- 3) Place approximately 200 grams of the soil sample into an approved container. The same type of container should be consistently used at the site for comparison purposes; do not mix or reuse headspace containers (unless the approved container is reusable and cleaned appropriately between uses). In so far as possible, samples should be mineral soil free of vegetation and stones larger than ½ inches in diameter. If soil samples are of different type (loam, sand, silt), this should be identified in the field log book. If a duplicate sample is to be submitted to the laboratory for analysis, this sample should be containerized and preserved as appropriate immediately. Care should be taken to co-locate field screening and laboratory samples from the same soils. Laboratory VOC samples should not be taken from the field screening sample after it is screened, unless approved in the SAP and documented in the field notes and subsequent report. If using jars, the jars should be immediately sealed by placing a square of foil over the mouth and screwing on the lid. If using a metalized bag, the gusset at the bottom should be opened to allow development of the headspace within the entire bag.
- 4) Knead and break-up soil clods and shake the container for 30 seconds to thoroughly mix the contents.
- 5) Let Sample equilibrate for 10-minutes and shake again. Allow at least 20 minutes but not more than 60-minutes for VOCs to reach equilibrium with the headspace. An attempt should be made to allow the same amount of equilibration time for each sample. When ambient temperatures are greater than 70-degrees, samples should be stored in the shade. When temperatures are below 70 degrees, samples should be warmed in the sunlight or in a running vehicle.
- 6) Measure and record the samples headspace concentration with the instrument by recording the highest PID/FID response. Collect a sample of the headspace by inserting the PID/FID probe into the appropriate opening for the container you are using. It is important to insert the probe as quickly as possible after the seal to the container has been broken. If the highest reading is related to a spike in the instrument response, then both the spike response and the highest response should be recorded and noted.

Appendix C

TANK CONTENT	METHOD:
Gasoline	EPA 8260 VOCs and EPA TPH-8015(M)
Mineral Spirits	EPA 8260 VOCs and EPA TPH-8015(M)
Jet A	EPA 8260 VOCs and EPA TPH-8015(M)
JP-4	EPA 8260 VOCs and EPA TPH-8015(M)
JP-5	EPA TPH-8015(M)
Kerosene	EPA TPH-8015(M)
Diesel	MA VPH
#2 Fuel Oil	MA VPH
#4 Fuel Oil	MA EPH
#5 Fuel Oil	MA EPH
#6 Fuel Oil	MA EPH
Lubricating Oil	MA EPH
Waste Oil	EPA TPH-8015(M)
Unknown Contents	EPA 8260 VOCs, TPH 8015 (M) and MA EPH VPH

Appendix D

Soil Analytical Action Levels for RIDEM Supervised UST Projects

Contaminant	GA Leachability (mg/kg)	GB Leachability (mg/kg)
VOCs		
Benzene	0.2	4.3
Carbon tetrachloride	0.4	5
Chlorobenzene	3.2	100
1,2-Dichloroethane	0.1	2.3
1,1-Dichloroethene	0.7	0.7
cis-1,2-Dichloroethene	1.7	60
Trans-1,2-Dichloroethene	3.3	92
1,2-Dichloropropane	0.1	70
Ethylbenzene	27	62
Ethylene dibromide (EDB)	0.0005	
Methyl-tertiary-butyl-ether (MTBE)	0.9	100
Styrene	2.9	64
Tetrachloroethene	0.1	4.2
Toluene	32	54
1,1,1-Trichloroethane	11	160
1,1,2-Trichloroethane	0.1	
Trichloroethene	0.2	20
Vinyl chloride	0.3	
Xylenes	540	
SVOCs		
Benzo(a)pyrene	240	
Dichlorobenzene (all isomers)	41	
Diethylhexyl phthalate	120	
Naphthalene	0.8	
Pentachlorophenol	7.1	
1,2,4-Trichlorobenzene	140	
TPH	500	2500
VPH		
aliphatic C5 - C8 *	100	100
aliphatic C9 - C12 *	1,000	1,000
aromatic C9 - C10*	100	100
EPH		
aliphatic C9 - C18*	1,000	1,000
aliphatic C19 - C36*	3,000	3,000
aromatic C11 - C22*	1,000	1,000

*Values adopted from Massachusetts MCP