



SC DEPARTMENT *of*
**ENVIRONMENTAL
SERVICES**

Underground Storage Tank Assessment for Permanent UST Closure, Site Check or Change-In-Service

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TABLE OF CONTENTS

I	INTRODUCTION	3
II	BASIC ANALYTICAL/LABORATORY INFORMATION	4
III	RECOMMENDED SAMPLE LOCATIONS	5
IV	UST CLOSURE ACTIVITIES	7
V	SOIL/GROUNDWATER LABORATORY ANALYSIS	9
VI	REPORTING	10
VII	QUESTIONS	10
VIII	AVOID THESE COMMON MISTAKES	10

I. INTRODUCTION

- The Underground Storage Tank (UST) Management Division of the South Carolina Department of Environmental Services (Department) has developed this technical guidance at the request of the regulated community to help UST owners and operators complete assessments of suspected releases during UST closures, change in service, or site checks. In all of the events listed previously, South Carolina UST Control Regulations (Regulations) R.61-92, Part 280, Section 52 states that owners and operators must measure for the presence of a release where contamination is most likely present at the UST site. In selecting sample types, sample locations, and measurement methods, owners and operators must consider the nature of the stored substance, the cause for suspicion, the type of backfill, the depth to groundwater, and other factors appropriate for identifying the presence and source of the release.
- To provide better service and response times, a standardized assessment report format has been developed. All assessment reports are required by the Regulations to include the standardized format. Assessment reports must be submitted to the Department within 60 days of permanent closure or change-in-service. The use of this format will provide the Department with the information needed to complete the assessment report without additional requests. The assessment report can be submitted as a stand-alone document or included as an appendix in a more comprehensive report.
- If you have any questions regarding this document or would like a copy of the South Carolina UST Control Regulations or other UST related documents, please contact the UST Division at (803) 898-0589, Fax (803) 898-0673.
- The Department does not license or certify contractors who perform UST installation, upgrade, or closure activities. The Regulations reference industry and manufacturer standards that must be followed to ensure compliance with the standards. UST owners and operators are solely responsible for ensuring that these activities are performed in accordance with referenced standards.
- To permanently close an UST, it must be emptied and cleaned of all liquids and accumulated sludges. Product lines must be purged of all liquids. The UST must also be removed from the ground or filled in place with an inert solid material such as sand, foam, or concrete. Water is not an inert solid material and cannot be used for in place closure. The physical closure of the UST (either by removal or filling in place) must conform to the established industry standards listed below:
 - American Petroleum Institute Recommended Practice 1604, "Removal and Disposal of Used Underground Petroleum Storage Tanks";
 - American Petroleum Institute Publication 2015, "Cleaning Petroleum Storage Tanks."

CAUTION: USTs can contain large quantities of explosive vapors that may ignite if handled improperly. Individuals closing UST systems should follow the industry standards referenced above to reduce the risk of accidents.

- Owners or operators must notify the Department at least 30 days prior to permanent closure or change-in-service. Continued use of an UST system to store a non-regulated substance is considered a change-in-service. Before a change-in-service, owners and operators must empty and clean the tank by removing all liquid and accumulated sludge and conduct a site assessment in accordance with section 72 of the Regulations. A change-in-service also includes switching from a non-regulated substance to a regulated substance.
- When evaluating potential contractors or consultants, UST owners and operators can take several steps to ensure a quality job. One key action is to request references and obtain a list of the most recent projects the contractor has completed. This helps verify their experience, reliability, and familiarity with the type of work required.
- All analytical data collected during the assessment should be reported in the assessment report. For analytical parameters (for specific petroleum products), analytical methods, and reporting limits, please refer to Part V of this document, SOIL/GROUNDWATER LABORATORY ANALYSIS. Sample quality is important to a successful assessment report. Therefore, selecting a South Carolina certified lab is required.
- If free product is discovered at a site, the UST owner or operator must report to the Department within 24 hours of discovery.
- Even if a full-service firm is hired to handle all aspects of the project, the UST owner and operator are responsible for satisfying all regulatory requirements. If the work is not done properly, the owner and operator will be held responsible for correcting any problems.

II. BASIC ANALYTICAL/LABORATORY INFORMATION

- Samples for laboratory analysis must be collected and stored using proper methods. Groundwater and soil samples MUST be placed on wet ice immediately upon sampling and maintained at 6 degrees Celsius/ 39 degrees Fahrenheit until relinquished at the laboratory. See REFERENCES FOR SAMPLING PROTOCOL below. Please note: Most refrigerators will not maintain samples at the required temperature.
- An Organic Vapor Analyzer (OVA) may be used to assist in the selection of samples for laboratory analysis. Please note that OVAs are not as effective with higher boiling point products such as diesel fuel, kerosene, or waste oil.
- Chemicals of concern (COC) are specific constituents that are identified for evaluation in the assessment process. Reporting limits for COCs in soil and water samples are provided in Part V, SOIL/GROUNDWATER LABORATORY ANALYSIS. If detection limits must be elevated for highly contaminated samples, the dilution must be documented with the analytical results.
- Appropriate chain of custody forms must be maintained for the laboratory reports to be considered valid.

- Analyses must be performed by a laboratory certified by the Department (per South Carolina UST Control Regulation 61-92) using Environmental Protection Agency (EPA) analytical methods. The laboratory report of analyses results must include the SC Laboratory Identification number of the laboratory which performed the actual analysis. Contact the Department's Laboratory Certification Section at (803) 896-0970 to confirm a laboratory's certification.
- References for sampling protocol:
 1. EPA Publication #600/2-85/104, September 1985, "**Practical Guidance for Ground-Water Sampling.**"
 2. EPA Publication #OSWER-9950.1, September 1986, "**RCRA Groundwater Monitoring Technical Enforcement Guidance Document.**"
 3. EPA Publication SW-846, Third Edition, 1986, Updates I, II, IIA, IIB, and III, "**Test Methods for Evaluating Solid Waste, Physical/Chemical Methods.**"
 4. EPA Publication #530/UST-90-003, September 1990, "**Field Measurements, Dependable Data When You Need It.**"

III. RECOMMENDED SAMPLING LOCATIONS

It is important that assessment information be representative of site conditions. The type of sampling used should consider the method of closure. The two UST closure methods (in-place vs. removal) are treated differently, since USTs that are removed from the ground enable the bottom of the excavation to be visually inspected. In this case, the visual inspection of the exterior of the UST and excavation is an important component of the closure activity and can provide information to determine if a release has occurred. Holes in the UST and/or areas of stained soils should be noted in the assessment report. Using this information, sampling locations can be tailored to make an initial determination concerning the presence of contamination.

The exterior of USTs that are closed in place cannot be visually inspected. Consequently, the presence or size of releases may not be determined, and a more comprehensive assessment is necessary.

In addition to the USTs, the product piping and dispenser islands must be assessed. Regardless of the method of closure, it is imperative that the assessment include information for all components of the system, including product piping and dispenser islands.

A) FOR UST CLOSURE BY REMOVAL

- The recommended minimum number of soil samples to be collected from a single UST excavation is equal to the number of USTs, plus one. The samples should be collected from areas of the excavation judged most likely to be contaminated. The most likely sampling areas would include UST ends, the area directly beneath the UST, and in those areas of noted UST failure. After excavating only enough soil to remove the UST from the ground, soil samples should be taken from the undisturbed (native) soils at the bottom of the excavation. If the excavation walls appear contaminated, additional soil samples should be collected from these areas.

- If groundwater is encountered in any excavation, at least one groundwater sample should be collected for analysis. Document the presence or absence of a petroleum (iridescent) sheen or free product on the water in the excavation.

B) FOR UST CLOSURE IN PLACE OR CHANGE-IN-SERVICE

- The recommended minimum number of soil samples collected from each area where the USTs are located is equal to **twice** the number of USTs. Borings should be placed at or near each end of every UST. Samples should be taken at least two feet below the base of the UST.
- If groundwater is encountered in any boring, at least ONE sample should be collected for analysis. If groundwater is expected to be encountered at a site, a monitoring well request should be submitted to the Department prior to beginning an assessment.

C) PRODUCT PIPING

- Samples should be taken at every junction and change in direction, as well as every twenty (20) feet along straight runs of piping which are thirty (30) feet or longer. Straight runs of piping less than thirty (30) feet in length should be sampled at the midpoint. Samples should be collected approximately two feet below the bottom of the piping from each location.

D) DISPENSER ISLANDS

- All dispenser islands should be sampled. If the dispenser island is located above or immediately adjacent (**less than five feet**) to the UST, the sample for the island can be incorporated into the sample for that UST. Otherwise, dispenser islands should be individually sampled. Samples should be collected approximately two feet below the bottom of the associated piping.

E) SPILL BUCKETS/SUBMERSIBLE TURBINE PUMP SUMP (Typically associated with site checks)

- Collect a soil or groundwater sample using approved sampling techniques. Be sure to dispose of any contaminated soil or water properly. If spill bucket removal occurs, a soil sample should be collected directly below the spill bucket before the bucket is replaced. If the bucket is repaired but not removed, then the soil sample should be collected as close as possible to the repaired spill bucket. Owners and operators must measure for the presence of a release where contamination is most likely to be present at the UST site. Therefore, if collecting a sample is not possible directly beneath the spill bucket, due to pea gravel being encountered, a groundwater sample must be collected as close as possible in a downgradient location.
- What information should a site check contain?
 - The UST permit number and site address.

- A detailed map showing the suspected release location, labeled sample location(s), north arrow, building locations, road names, tank and dispenser locations and extent of excavation.
- A complete description of soils sampled.
- A detailed description of the methods used to collect and store samples.
- A laboratory analysis report (must include the chain of custody).
- The laboratory analysis report must meet the criteria detailed in the UST Quality Assurance Program Plan (QAPP) and/or the Analytical Methodology for Groundwater and Soil Assessment Guidelines. For example, if the results indicate that the reporting limits exceed the RBSL, or the sample temperature is too high, additional sampling will be required.

IV. UST CLOSURE ACTIVITIES

A) BEFORE CLOSURE

- Notify the Department in writing **30 days** before UST system closure. Written approval will be issued. To allow the Department's staff an opportunity to attend the UST closure, please call at least 48 hours before the actual closure date. Other local agencies (fire marshal, etc.) may also need notification of closure activity. Contact the local governing agency for information.
- All USTs must be emptied and cleaned by removing all liquids and accumulated sludge prior to a permanent closure. The cleaning methods, quantity of materials removed, and the disposal location must be attached (manifests, etc.) to the assessment report.
- Contact the Department **prior** to any de-watering activities. De-watering activities are actions necessary for removing water from the excavation for permanent closure of USTs.

B) CLOSURE BY REMOVAL

- Waste products, sludges, contaminated water, and paving material must be disposed of at a Department- permitted treatment or disposal facility. For information, contact the Underground Storage Tank Management Division at (803) 898-0589 or (803) 898- 2544.
- After a UST system removal, inspect and document all USTs and piping for indications of failure. Noticeable failures should influence soil/water sampling locations.
- Conduct a closure assessment where contamination is most likely to be found. (See Part III; RECOMMENDED SAMPLING LOCATIONS).
- Excavate only enough soil to remove the tanks and piping. All excavated soils are to be returned to the excavation except where authorized by a Department representative in writing.
- Paving material cannot be placed back into the excavation and must be disposed of at a facility permitted by DES.

- Follow all applicable transportation regulations if moving USTs off site. Please contact the local office of the Department of Transportation for additional information.

C) CLOSURE IN PLACE

- Waste products, sludges, and contaminated water must be disposed of at a Department-permitted treatment or disposal facility. For information, contact the Underground Storage Tank Management Division at (803) 898-0589 or (803) 898-2544.
- Conduct a closure assessment where contamination is most likely to be found. (See Part IV; RECOMMENDED SAMPLING LOCATIONS)
- Fill the empty and cleaned UST with an inert solid material.

D) RECEPTOR SURVEY

- The location and type of receptors that are, or may be, affected by a release must be identified. This includes any receptors that could experience direct or indirect impact from contamination. Receptors such as underground structures, utilities, surface water bodies, sensitive habitats, and water supply wells should be thoroughly documented. Identifying these receptors early helps ensure appropriate response actions, prevent further migration of contaminants, and protect human health and the environment.

E) AFTER CLOSURE

- Upon confirmation of a release in accordance with Section 280.52 or after a release from the UST system is identified in any other manner, owners and operators must perform the following initial response actions within 24 hours of a release: (a) Report the release to the Department (e.g., by telephone or electronic mail); (b) Take immediate action to prevent any further release of the regulated substance into the environment; and (c) Identify and mitigate fire, explosion, and vapor hazards.

V. SOIL/GROUNDWATER LABORATORY ANALYSIS

A) FOR UST SYSTEMS THAT CONTAIN PETROLEUM PRODUCTS ANALYZE SAMPLES FOR EACH OF THE FOLLOWING:

PRODUCT: USED OIL					
SOIL SAMPLES			WATER SAMPLES		
Analyte	Method	RL*	Analyte	Method	RL*
BTEX	5035/8260B	5 µg/kg	BTEX	5030B/8260B	5 µg/L
Naphthalene	5035/8260B	5 µg/kg	Naphthalene	5030B/8260B	5 µg/L

TPH	9071B	10 mg/kg	TPH	9070A	40 mg/L
PAH	3550C/8270D	660 µg/kg	PAH	3510C/8270D	10 µg/L
Metals			Metals		
Arsenic	3050 B w/ 6020A or 7010	250 µg/kg	Arsenic	3005A, 3010A	50 µg/L
Barium	3050B w/ 6010C or 6020A	250 µg/kg	Barium	3005A, 3010A	5 µg/L
Cadmium	3050B w/ 6010C, 6020A or 7010	250 µg/kg	Cadmium	3005A, 3010A	5 µg/L
Chromium	3050B w/ 6010C, 6020A or 7010	250 µg/kg	Chromium	3005A, 3010A	1 µg/L
Lead	3050B w/ 6010C or 6020A	250 µg/kg	Lead	3005A, 3010A	5 µg/L
Mercury	7471A	10 µg/kg	Mercury	7470A	0.2 µg/L
Selenium	3050 B w/ 6020A or 7010	250 µg/kg	Selenium	3005A, 3010A	5 µg/L
Silver	3050B w/ 6010C, 6020A or 7010	250 µg/kg	Silver	3005A, 3010A	5 µg/L

PRODUCT: GASOLINE, DIESEL, FUEL OIL, KEROSENE					
SOIL SAMPLES			WATER SAMPLES		
Analyte	Method	RL*	Analyte	Method	RL*
BTEX	5035/8260B	5 µg/kg	BTEX	5030B/8260B	5 µg/L
Naphthalene	5035/8260B	5 µg/kg	Naphthalene	5030B/8260B	5 µg/L
PAH	3550C/8270D	660 µg/kg	PAH	3510C/8270D	5 µg/L
MTBE	5035/8260B	5 µg/kg	MTBE	5035/8260B	5 µg/kg
Ethanol	5035/8260B	5 µg/kg	Ethanol	5030/8260B	5 µg/kg
			EDB	8011	.05 µg/L
			1,2-DCA	5030B/8260B	5 µg/L
PRODUCT: OTHER PETROLEUM			Sample for Representative Parameters		

BTEX = Benzene, Toluene, Ethyl-benzene, Xylene
PAH = Polynuclear Aromatic Hydrocarbons (Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Chrysene, Dibenz(a,h)anthracene)
MTBE = Methyl Tertiary Butyl Ether
TPH = Total Petroleum Hydrocarbon
METALS = Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, Silver
AA or ICP = Atomic Absorption or Inductively Coupled Plasma
***** = Reporting Limit (RL)
EDB = Ethylene Dibromide
DCA = Dichloroethane

B) FOR UST SYSTEMS THAT CONTAIN HAZARDOUS SUBSTANCES

When assessing an UST system that has contained a hazardous substance listed in the Comprehensive Environmental Response, Compensation, and Liability Act, all analyses must be performed by a laboratory certified by the Department. Analytical methods should be for representative parameters. Questions concerning appropriate analytical methods should be directed to the UST Division.

VI. REPORTING

Please do not submit assessment reports for multiple facilities bound under one cover. Incomplete assessment reports may not be reviewed until all necessary information is submitted.

VII. QUESTIONS

On correspondence related to the facility, please reference the Facility Permit ID Number. Questions should be addressed to the Underground Storage Tank Management Division at (803) 898-0589 or (803) 898- 2544.

VIII. AVOID THESE COMMON MISTAKES...

Some assessment reports are incomplete or submitted with deficiencies. These reports delay the entire reviewing process, and you may be asked to provide additional sampling which means spending more money. To avoid being asked to resubmit work, please review the following list before starting your site assessment.

- Incorrect reporting limits - The reporting limit for benzene, toluene, ethyl benzene, xylene, (BTEX) and naphthalene is 5 ug/kg. The reporting limit for polynuclear aromatic hydrocarbons (PAHs) is 660 ug/kg. You should inform the laboratory performing the analysis of the required reporting limits. If the result of analysis (BTEX, naphthalene, or PAHs) for the sample is below the detection limit for that analyte, then the required reporting limit must still be met. Otherwise, you may be required to resample.
- Failure to collect the correct number of samples - The assessment guidelines provide sampling requirements for USTs closed by removal or filling in place. For closure by removal, the number of samples is equal to the number of tanks plus one sample. When filling in place, the number of samples is twice the number of tanks. Requirements for piping are the same for both closure methods.
- Failure to submit sampling methodology and sample depths - A brief description of how the samples were taken, precautions that were taken to prevent cross contamination, and the method by which the samples were stored prior to being taken to the laboratory is required. Note: Ensure that samples are packed in ice. Blue ice packs or refrigerators are usually not adequate to maintain samples at the required temperature of 6 degrees Celsius.
- Failure to sample the dispenser islands and piping runs - If the distance between the dispenser and UST is greater than 5 feet, a sample is required at a depth of 2 feet under the dispenser. Piping samples should be taken every 20 feet along straight runs exceeding 30 feet. Piping runs under 30 feet should be sampled at midpoint.
- Standardized report format- Use the standardized report format to avoid delays in processing your report.