

**APPENDIX 280.4 - GUIDELINES FOR THE  
PERMANENT CLOSURE OF PETROLEUM  
UNDERGROUND STORAGE TANK SYSTEMS**

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## SECTION 1 - GENERAL

### 1.1 Introduction

The purpose of this document is to provide guidance that explains what the policies of the Underground Storage Tank (UST) Branch are regarding the permanent closure of petroleum UST systems. If you are permanently closing a UST system that has contained a regulated substance other than petroleum, you must contact the UST Branch in order to determine what sampling requirements must be met.

Any tank that was in use on or after December 22, 1988, must be permanently closed if taken out of use for more than a 12-month period unless the tank meets the corrosion protection requirements. If a tank was taken out of use prior to December 22, 1988, and was closed in accordance with acceptable industry standards at that time, it is not required to be permanently closed in accordance with the present UST rules and regulations. Generally, the acceptable industry practice prior to December 22, 1988, was to simply empty the UST of product and in some instances, fill the tank with water. However, if a release is discovered at a tank that was closed prior to December 22, 1988, the release must be reported to the UST Branch and remediated just as if the release had occurred today.

The UST regulations require that when a UST is permanently closed, the site must be sampled for the presence of a release where contamination is most likely to be present. Therefore, the sampling requirements in this guide are only the minimum necessary and are not intended to substitute for the specific conditions that may apply to an individual site. Additional sampling may be justified whenever obvious areas of contamination are found.

No closure report will be accepted as complete without the minimum sampling data that is described herein. However, an allowance will be made where certain circumstances prohibit the collection of the minimum sampling points necessary such as when a tank is to be closed in place but one end of the tank is underneath a building. If it is necessary to deviate from the minimum sampling procedure, the tank owner must submit to the UST Branch an alternative sampling plan thirty (30) days prior to the closure to gain approval.

A Mississippi Department of Environmental Quality (MDEQ) certified contractor must supervise the permanent closure of any UST system that was in use on or after December 22, 1988. The certified contractor must ensure that all UST regulations and industry codes/practices (see Appendix F) relating to the closure are followed. To obtain a current listing of MDEQ certified contractors, contact the UST Branch at (601) 961-5171.

The state Fire Marshall's office and/or local fire department may need to be contacted prior to performing UST closure. You may also be required to obtain city or local demolition permits.

All underground utilities must be identified and clearly marked prior to any excavation or drilling. Contact Mississippi One-Call System, Inc. at 1-601-362-4374 in order to have all underground utilities marked.

Certain terms used in this document are defined in Appendix H for your reference.

## **SECTION 2 - PAPERWORK AND REPORTING REQUIREMENTS**

### **2.1 Tank Registration**

Prior to performing a UST closure, the owner is to verify that the USTs are properly registered with the UST Branch. Any UST system that was in use on or after January 1, 1974, must be registered. If it is determined that a UST system is not registered, the permanent closure will not be approved until the tanks are registered and any applicable annual tank regulatory fees are paid in full. Tanks may be registered by submittal of a "Notification for Underground Storage Tanks" form which may be obtained by contacting the UST Branch or may be downloaded from the Internet at [www.deq.state.ms.us](http://www.deq.state.ms.us).

### **2.2 Notice of Intent to Permanently Close Underground Storage Tank System(s)**

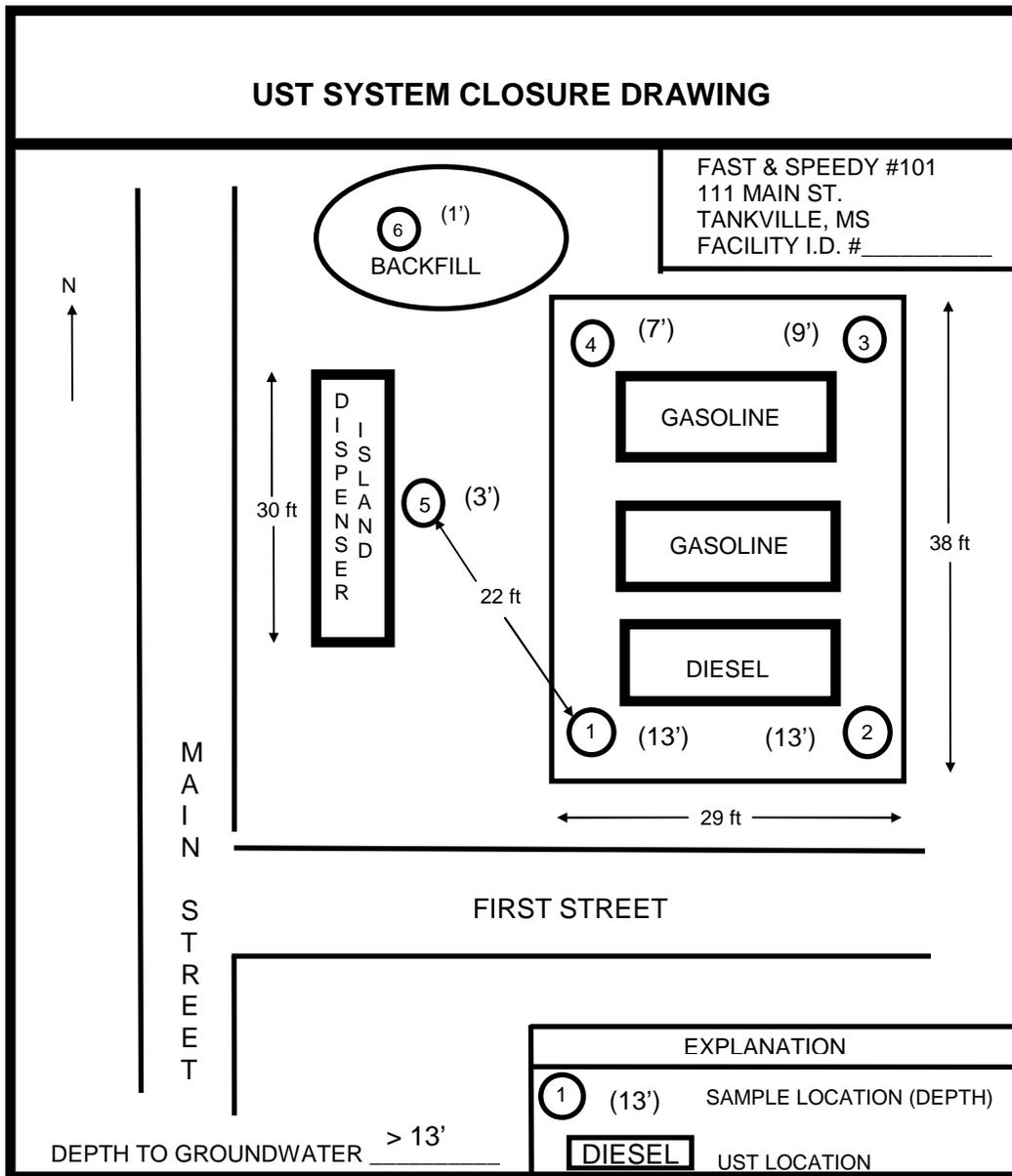
The owner of the UST system or his representative must submit the "Notice of Intent to Permanently Close Underground Storage Tank System(s)" form (Appendix C) at least **30 days** prior to the closure. This form becomes invalid if the closure is not initiated within 120 days after submission. Any form submitted that does not have the owner's signature and the name of the certified contractor is not considered to be valid. Note that an owner may be subject to penalty if a Notice of Intent to Permanently Close UST System(s)" form is not filed with the UST Branch prior to performing a tank closure.

### **2.3 Underground Storage Tank System Closure Report**

The owner of the UST system or his representative must submit the "Underground Storage Tank System Closure Report" form (Appendix D) and all supporting documentation within 60 days of completing the UST closure. The form must be signed by the owner and the certified contractor to be valid. Supporting documentation that must be included with the submittal of the UST Closure Report form includes; a) copies of all analytical results of any and all samples; b) valid sample chain-of-custody; and c) site drawing. In addition, if the closure involves the disposal of contaminated soils and/or groundwater, a copy of the waste manifests must be included in the submittal. Failure to submit all of the documentation necessary to complete the closure will result in the return of the UST Closure Report form to the tank owner.

The site drawing must contain the following:

- general site layout showing tank locations and the substance(s) stored
- dispenser locations
- depth to groundwater (if encountered)
- dimensions of the excavation
- sample locations (sample identification on the drawing must match the labeling on each of the sample containers)
- depth at which each sample was collected.



#### 2.4 Sample Chain-of-Custody

A chain-of-custody record (Appendix E) shall accompany the sample from the time of sample collection to delivery to the lab. The possession or custody of samples must be traceable from the time they are collected until the time the sample is submitted to the laboratory for analysis.

If chain-of-custody procedures are not followed, the integrity of the samples is compromised and the analysis is invalidated. A chain-of-custody record must be completed for all samples that will be analyzed by the laboratory. This record must be completed in the field at the time of sampling. Correct chain-of-custody must continue when the samples are transferred to the laboratory or to the person responsible for the delivery of the samples to the laboratory. Upon transfer of the samples, each person handling the samples must sign, date, and note the time each person received the samples.

Completed chain-of-custody records must be submitted for all samples and included with the UST System Closure Report. A sample chain-of-custody form can be found at Appendix E or may be obtained from the laboratory.

## **SECTION 3 - SAMPLING PROCEDURES**

### **3.1 General Sampling Requirements**

Soil and/or groundwater samples must be collected to determine if a release has occurred. The importance of good sampling procedures is critical to the assessment of a site at a UST closure. Since gasoline and some other petroleum products consist largely of volatile organic compounds, special care in collecting samples is required. Special precautions must be taken to be certain that samples collected from each site are representative of the soil and/or groundwater at that location and that the sample is neither altered nor contaminated by the sampling and handling procedure.

When collecting samples for Benzene, Toluene, Ethylbenzene and Xylenes (BTEX) analysis, new disposable latex or nitrile gloves must be worn at each sample collection location. When collecting samples for Polynuclear Aromatic Hydrocarbons (PAH) analysis, new disposable vinyl or nitrile gloves must be worn at each sample collection location. Latex is not a suitable glove material when collecting samples for PAH analysis since PAH's have an affinity for latex.

The minimum number of sample containers (i.e. aliquots) that are stated in this document are only intended to be guidance. Always contact your laboratory to determine the sample size and aliquots that are required for a particular laboratory.

All samples must be placed in proper containers immediately upon collection, properly packaged and labeled with the following minimum information:

1. facility name
2. sample location (e.g. NW corner of tank bed, Sample #1, etc.)
3. date and time samples were collected
4. depth samples were collected
5. person collecting samples
6. analytical test(s) required

All samples must be placed on ice immediately after collection and shipped to the laboratory within 24 hours of collection.

### **3.2 Soil Versus Groundwater Samples**

Soil samples must be collected whenever evidence of soil contamination exists. However, if water is encountered, pump it out in accordance with all regulatory requirements and determine if the water in the tank excavation or borehole returns within 24 hours. If the water returns, assume that the water is true groundwater. If groundwater is present, water sample(s) must be collected. If groundwater is sampled, no soil sampling is required unless soil contamination is evident. If soil contamination is evident at either the tank excavation or the piping trench/dispenser island, soil samples must be collected in accordance with Sections 5-7 of this document in addition to any water samples.

### **3.3 Soil Sample Collection Procedures**

#### **3.3.1 Collecting Soil Samples for Gasoline (BTEX) Analysis**

For BTEX analysis, collect at least one 4-oz sample from each sampling point. The sampling procedure is as follows:

1. Use a stainless steel spoon, spatula or some other appropriate sampling device. NOTE: Sampling device must be decontaminated between each sampling location.
2. Soil samples should be tightly packed into the sample container using the stainless steel spoon or appropriate sampling device.
3. Completely fill sample container (4-oz widemouth amber glass container with a Teflon liner) so that no headspace is present.
4. Immediately store samples on ice and ship to the laboratory within 24 hours of collection.

#### **3.3.2 Collecting Soil Samples for Diesel, Oil, Etc. (PAH) Analysis**

For PAH analysis, collect at least one 8-oz sample from each sampling point. The sampling procedure is as follows:

1. Use a stainless steel spoon, spatula or some other appropriate sampling device. NOTE: Sampling device must be decontaminated between each sampling location.
2. Soil samples should be tightly packed into the sample container using the stainless steel spoon or appropriate sampling device.
3. Completely fill sample container (8-oz widemouth amber glass container with a Teflon liner) so that no headspace is present.
4. Immediately store samples on ice and ship to the laboratory within 24 hours of collection.

### **3.4 Groundwater Sample Collection Procedures**

#### **3.4.1 Collecting Groundwater Samples for Gasoline (BTEX) Analysis**

For BTEX groundwater analysis, collect at least three (3) 40-ml samples from each sampling point.

1. Sampling containers should be pre-labeled before any sample collection begins.
2. Decontaminate bailer and use clean new string/line.  
NOTE: In general, use a disposable bailer and not one that must be decontaminated between borings or wells in order to lessen the chance of cross-contamination.
3. Slowly lower the bailer into the water. Do not allow the bailer to free-fall.
4. Allow the bailer to go into the water as far as possible without touching the bottom of the boring and/or tank hole.
5. Remove the bailer from the water before it is completely immersed under the water.
6. Collect three aliquots:

- a. transfer the sample from the bailer to amber 40-ml glass vials with Teflon-lined septum cap, leaving no head space;
- b. each sample should be carefully poured down the inside of the vial to minimize turbulence;
- c. verify no headspace by inverting the vial and tapping it gently to check for trapped air bubbles. If any are present, a new sample must be collected;
- d. as a rule of thumb, it is best to gently pour the last few drops into the vial so that surface tension holds the water in a “convex meniscus”. The cap is then placed on the vial and some overflow is lost, but air space in the bottle is eliminated;
- e. Immediately store samples on ice and ship to the laboratory within 24 hours of collection.

### 3.4.2 Collecting Groundwater Samples for Diesel, Oil, Etc. (PAH) Analysis

For PAH analysis collect one water sample (1 liter) from each sampling point.

1. Sampling containers should be pre-labeled before any sample collection begins.
2. Transfer the sample from the bailer to a one liter widemouth glass sampling container with a Teflon liner. Completely fill container to the top.
3. Immediately store the samples on ice and ship to the laboratory within 24 hours of collection.

<b>BTEX and PAH Sample Handling Requirements for Soil/Groundwater Samples</b>		
<b>Parameter</b>	<b>Media</b>	<b>Container</b>
BTEX (Gasoline)	Soil	One 4-oz (120-ml) amber glass with Teflon liner
PAH (Diesel, Oil, etc.)	Soil	One 8-oz (250-ml) amber widemouth glass with Teflon liner
BTEX (Gasoline)	Water	Three 40-ml amber vials with septum caps
PAH (Diesel, Oil, etc.)	Water	One 1 liter widemouth glass with Teflon liner

## **SECTION 4 – SAMPLING LOCATIONS FOR TANKS**

### **4.1 General Requirements**

The goal of sampling a tank excavation at closure is to represent the contamination which may exist in a manner that is as accurate as possible while at the same time minimizing the number of samples that are necessary to achieve the stated purpose. Although the sampling locations described in this document are the minimum necessary, they are not intended to substitute for the conditions which may exist at a particular location. Therefore, a certain amount of professional judgement is necessary in order to evaluate and properly assess the site conditions at a tank closure.

When conducting sampling at a tank removal, all backfill materials must be removed from the excavation prior to sampling. Whether sampling the sidewalls or the floor of an excavation, all samples must be collected from a depth of at least one foot into the native soil. Soil samples shall be collected immediately after the removal of all backfill material. When closing tanks in place, the soil borings must be conducted in the native soil immediately surrounding the tank bed excavation. Soil samples shall be collected immediately after completion of the soil boring.

No compositing of samples (including sampling of the backfill) is allowed and each sample that is collected must be analyzed separately.

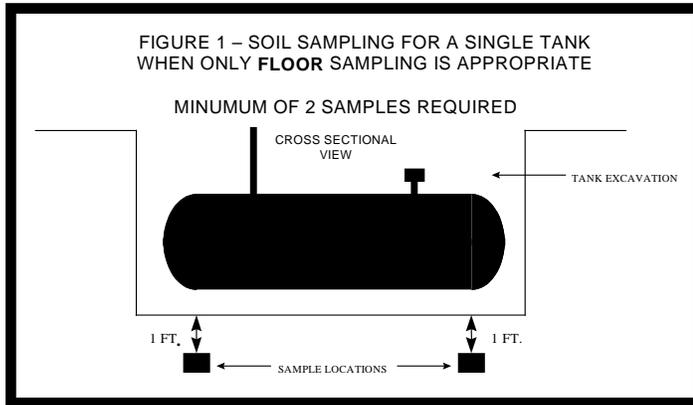
If “true” groundwater (refer to Section 3.2) is encountered during excavation activities, a groundwater sample must be collected from the excavation. No soil sampling is required if a groundwater sample is collected unless soil contamination is evident. Any soils that appear to be contaminated must be sampled in addition to sampling of the groundwater. Follow the soil sampling requirements as described in Sections 5-7 of this document when soil sampling is necessary.

### **4.2 Removal of a Single Tank**

Prior to beginning any sampling activity, all backfill materials must be removed from the excavation. Sampling of the tank excavation may occur from the floor of the excavation only or from both the sidewalls and the floor, depending on the site conditions. A discussion of where to sample the excavation and the minimum number of samples that are necessary to satisfy the requirements of the UST Branch follows:

#### **4.2.1 Removal of a Single Tank - No Sidewall Contamination Apparent**

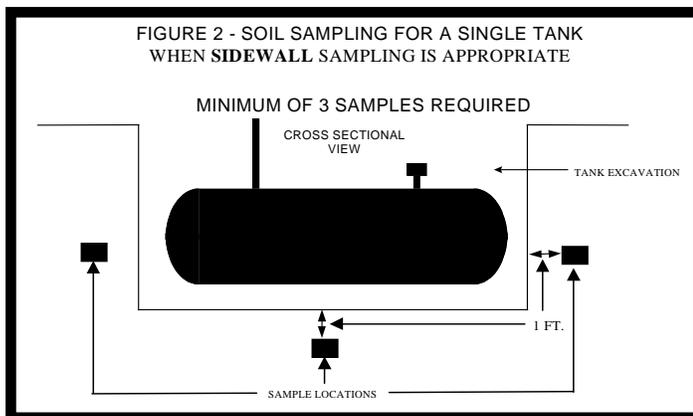
If no contamination is apparent in the sidewalls, only floor sampling is required. Two samples must be collected from the floor of the excavation at a depth of one foot into the native soil. The samples must be collected from the areas of the floor that appear to be the most contaminated. However, you should also take into consideration the entire area of the excavation so that both of the floor samples are not collected from the same general area. If no area of the floor appears to be obviously contaminated, or the floor appears to be uniformly contaminated, the samples must be collected from each end of the excavation as shown in Figure 1.



#### 4.2.2 Removal of a Single Tank - Sidewall Contamination Apparent

If any of the sidewalls appear to be contaminated, sidewall samples must be collected. As shown in Figure 2 below, a minimum of three samples are required to assess the excavation when the sidewalls are contaminated. Two samples must be collected from the sidewalls and one from the floor of the excavation.

The first sidewall sample must be collected from the sidewall of the excavation that appears to be the most contaminated. The second sample must be collected from one of the three remaining sidewalls that appears to have the greatest remaining contamination. If no other sidewall appears to be contaminated, the second sample must be collected from the wall opposite of the sidewall which appears to be the most contaminated. The third sample to be collected must come from the floor of the excavation. The floor sample must be collected from the area of the floor that appears to be the most contaminated. If no area of the floor appears contaminated or if it appears uniformly contaminated the sample must be collected from the center of the excavation.

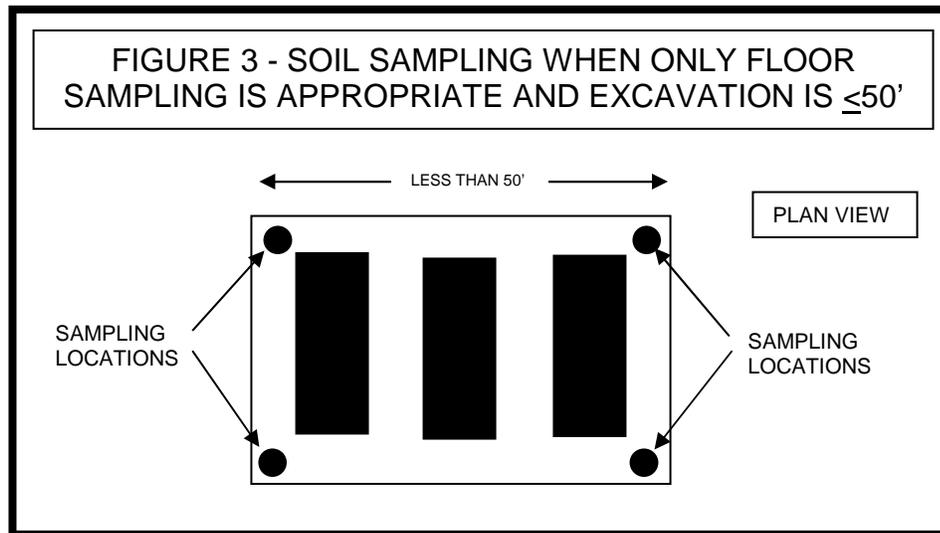


#### 4.3 Removal of Two or More Tanks Within a Common Excavation

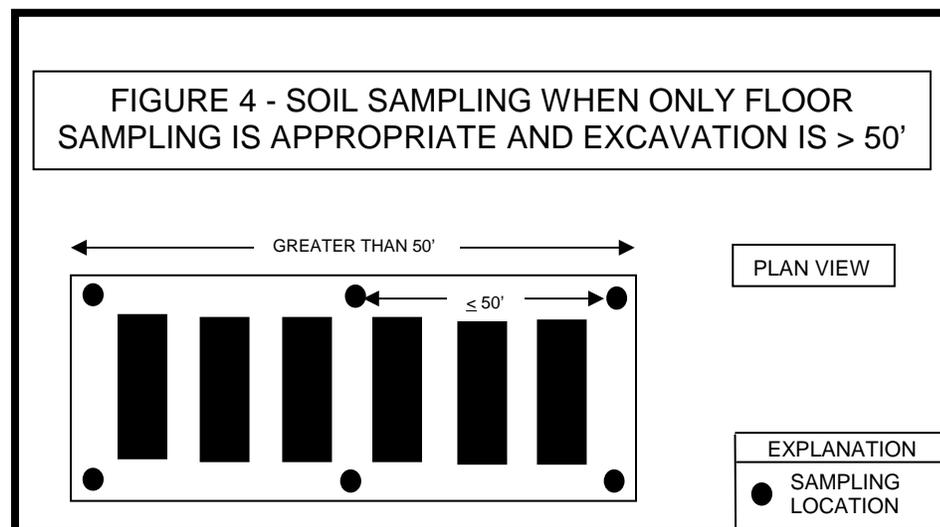
Prior to beginning any sampling activities, all backfill materials must be removed from the tank excavation. As will be discussed, sampling of the tank excavation may occur from the floor of the excavation only or from both the sidewalls and the floor, depending on the site conditions.

### 4.3.1 Removal of Two or More Tanks - No Sidewall Contamination Apparent

If no contamination is apparent in the sidewalls, only floor sampling is required. When the excavation is 50 feet or less in all dimensions, four samples must be collected from the floor of the excavation at a depth of one foot into the native soil. The samples must be collected from the areas of the floor that appear to be the most contaminated. However, you should also take into consideration the entire area of the excavation so that no two of the samples are collected from the same general area. If no area of the floor appears to be obviously contaminated, or the floor appears to be uniformly contaminated, the samples must be collected from each corner of the excavation as shown in Figure 3.



However, if the excavation is greater than 50 feet in any dimension, additional samples must be collected along each dimension of the excavation that is greater than 50 feet in length. The additional sample must be collected from the center of that dimension of the excavation as shown in Figure 4. Soil sampling must also be conducted in such a manner that no more than 50 feet exists between any two sampling points as measured along each dimension (side) of the excavation.

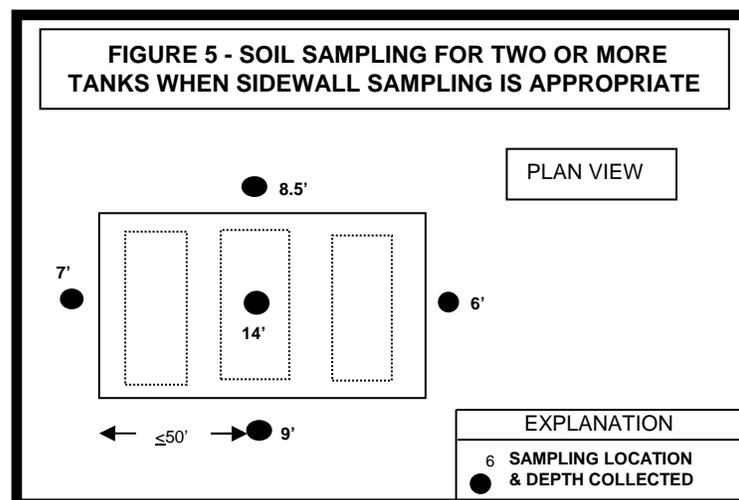


#### 4.3.2 Removal of Two or More Tanks - Sidewall Contamination Apparent

If any of the sidewalls appear to be contaminated, all of the sidewalls must be sampled. As shown in Figure 5 below, a minimum of five samples are required to assess the excavation when the sidewalls are contaminated. One sample must be collected from each of the four sidewalls and one from the floor of the excavation. The sidewall samples must be collected from the area of each sidewall that appears to be the most contaminated. If a wall appears to be clean, the sample for that uncontaminated wall must be collected from the same depth where the highest level of contamination appears in the most contaminated wall of the excavation.

The fifth sample must come from the floor of the excavation. The floor sample must be collected from the area of the floor that appears to be the most contaminated. If no area of the floor appears contaminated or if it appears uniformly contaminated, the sample must be collected from the center of the excavation.

Soil sampling must also be conducted in such a manner that no more than 50 feet exists between any two sampling locations along each wall of the excavation.



#### 4.4 Tank Closure in Place or Change in Service

Since potentially contaminated soils cannot be seen during closure in place activities as when removing tank systems, the sampling requirements for closure in place are more conservative. You must follow the exact guidelines given in this document unless special circumstances do not allow such. Any alternative sampling plan must be submitted to the UST Branch for approval at the same time the "Notice of Intent to Permanently Close UST System(s)" form is submitted.

If "true" groundwater (refer to Section 3.2) is encountered during soil boring activities, groundwater samples must be collected from each boring that contains groundwater and each sample must be analyzed separately. Soil sampling must be conducted from those borings that do not have groundwater. In addition, regardless of whatever soil and/or groundwater sampling that is conducted, one soil sample must be collected from the boring that exhibited the highest level of petroleum contamination during the field screening process (see Section 4.4.4).

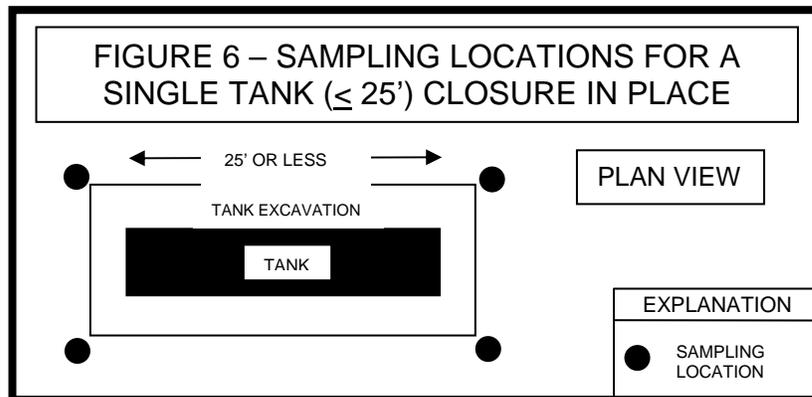
Tanks closed in place must be cleaned and filled with an inert solid material such as sand, concrete, virgin drilling mud or a “foam” material approved for such purposes. If virgin drilling mud is used, the mixture must consist of 25-30 pounds of bentonite per 42 gallon barrel of water and the pH must be between 6.5 and 8. All tank sludges removed during the cleaning process must be properly disposed of in accordance with all regulatory requirements.

#### 4.4.1 Change in Service

A change in service is when the contents of the tank are changed from a regulated substance (e.g. gasoline) to an unregulated substance (e.g. water). In order to accomplish a change in service, the same notification and sampling requirements for the permanent closure of a UST system must be followed. Sampling must be conducted in the same manner as tank closure in place and the interior of the tank properly cleaned. In addition, you must notify the UST Branch of the change in service by submittal of a “Notification for Underground Storage Tanks” form which indicates what unregulated substance is presently stored in the tank.

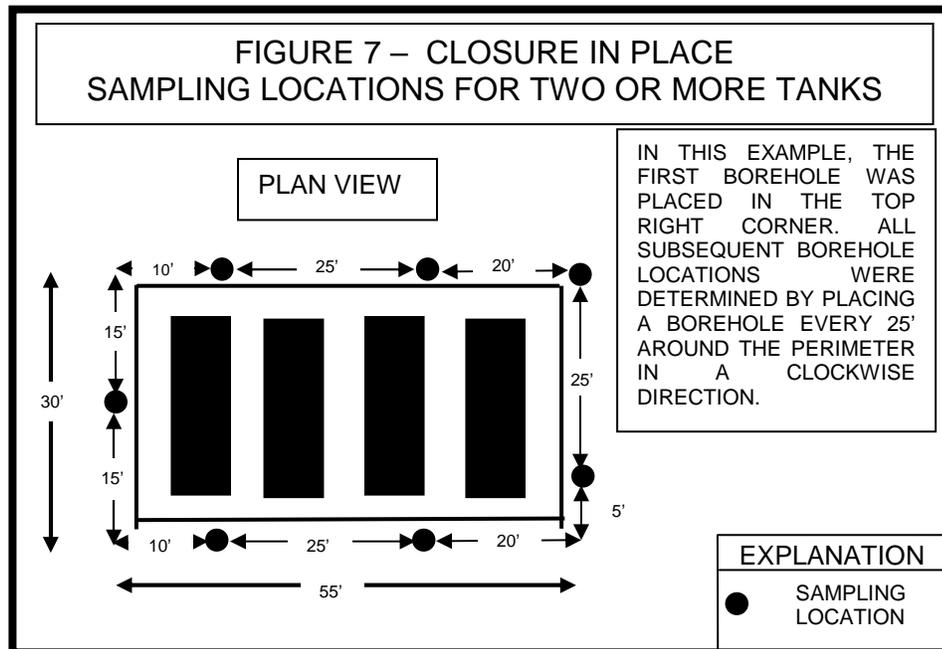
#### 4.4.2 Closure in Place of a Single Tank Less Than or Equal to 25 Feet in Length

Four borings are required when closing in place a single tank less than or equal to 25 feet in length. One borehole at each corner the tank bed must be advanced to a depth of at least one foot below the bottom of the tank and into the native soil as shown in Figure 6. In order to determine the appropriate sampling depth and number of samples to collect, conduct field screening of the soil column following the guidance Section 4.4.4.



#### 4.4.3 Closure in Place of Two or More Tanks Within a Common Tank Bed

For closure in place of two or more tanks within a common tank bed or a single tank that is greater than 25 feet in length, soil borings must be conducted at intervals of every 25 feet along the perimeter of the tank bed as shown in Figure 7. In order to determine the appropriate sampling depth and number of samples to collect, conduct field screening of the soil column following the guidance in Section 4.4.4.



#### 4.4.4 Field Screening of Soils

In order to properly evaluate the appropriate depths to collect soil samples, conduct field screening in two foot intervals of the soil column in each boring. Field screening involves placing the soil in a container (normally a zipper-type plastic bag) and evaluating the headspace with a suitable hydrocarbon meter.

Because soils must be relatively undisturbed to obtain accurate field screening results, any boring that is conducted during sample collection/screening must be accomplished in a manner that will produce a “core” of the soil column. Cuttings produced from rotary drilling equipment are not acceptable for either field screening or sample collection.

In order for the field screening to be evaluated by UST staff, a boring log must be submitted along with the analytical results of sampling. The boring log must show the type of soil encountered throughout the length of the boring. The boring log must also show hydrocarbon vapor levels in parts per million as determined by the field screening process for every two feet of the boring. Please refer to Appendix G for an example of an acceptable boring log.

Soil samples must be conducted at the depth at which the highest levels of hydrocarbon vapors were detected during the field screening process. If no significant variations are found during field screening, samples must be collected from a depth of at least one foot below the bottom of the tanks into the native soil. If the field screening process reveals that all samples should be collected at less than maximum depths, at least one additional sample must be collected from the borehole that had the highest level of vapors found during the field screening process. This additional sample must be collected from a depth of one foot below the bottom of the tanks and into the native soil.

## SECTION 5 - SAMPLING LOCATIONS FOR DISPENSER ISLANDS & PIPING

### 5.1 General Requirements

When performing a UST system closure, all piping must be removed from the ground or properly closed in place. However, if new underground tanks are installed to replace the tanks being closed, the existing piping may be utilized provided it is constructed of non-corrodible materials or coated and cathodically protected steel. If aboveground tanks are being installed, the existing piping may be utilized if it meets the corrosion protection requirements and all soil/groundwater sampling required for a piping closure in place is accomplished.

When closing piping in place, the goal is to render the piping unusable. Therefore, provided the piping is no longer usable, filling of all voids in the piping is not necessary. Pump a concrete slurry or other suitable inert solid material in the piping as full as practical and cap each end of the piping.

Below are several procedure examples to follow when you are only replacing piping or abandoning a dispenser island:

- **I am only abandoning an island – the facility will remain operating as a UST facility.** In this case, you must submit the “Notice of Intent to Permanently Close a UST System” and indicate on the form that only piping is being closed. The section of piping that supplied the abandoned dispenser island must also be closed in accordance with the requirements of this document.
- **I am only replacing the piping – the facility will remain operating as a UST facility and all of the new piping will utilize the existing trenches/dispenser islands.** In this case, you must submit the “Notice of Intent to Permanently Close a UST System” and indicate on the form that only piping is being removed. All dispenser islands/piping trenches must be closed in accordance with the requirements of this document.
- **I am only replacing the tanks – the existing piping will be utilized.** In this case, you must submit the “Notice of Intent to Permanently Close a UST System” and indicate on the form that only tanks are being closed. The tanks must be closed in accordance with the requirements of this document.
- **I am only repairing the piping (please refer to Appendix H for the definition of “repair”).** Repairs of piping are not subject to any of the UST closure requirements. However, if you discover contaminated soils and/or groundwater while conducting the repairs you must collect the appropriate soil and/or groundwater samples for laboratory analysis.

### 5.2 Dispenser Islands

Sampling is required whenever a dispenser island is taken out of service or the piping associated with the island is closed or replaced. However, small changes to the piping

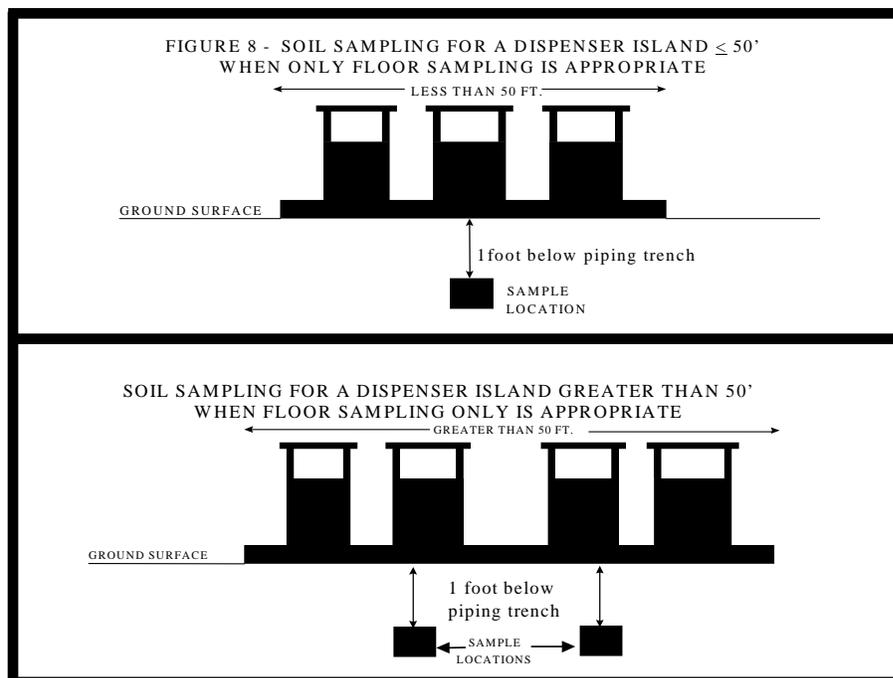
system such as installation of new flex connectors or pipe nipples in order to set new dispensers are not subject to the sampling requirements. An island is considered to be any dispenser or series of dispensers that are oriented in a straight line. Therefore, several different dispense arrangements may exist that could be considered as one island. You should use your professional judgement to determine the most appropriate sampling scheme.

If the dispensers are located directly above the tanks and the tanks are also being permanently closed, no discreet dispenser island samples are necessary provided all of the dispensers are located within the perimeter of the tank bed.

### 5.2.1 Removal of Dispenser Islands – No Sidewall Contamination Apparent

Prior to beginning any sampling activity, all backfill materials must be removed from the excavation. If no contamination of the sidewalls is apparent, one soil sample must be collected from the floor of the excavation. The sample must be collected at a depth of one foot below the piping trench and into the native soil. The sample must be collected from the area of the floor that appears to be the most contaminated. If no area of the floor appears to be contaminated, the sample must be collected from the center of the excavation when the dispenser island is less than or equal to 50 feet in length as shown in Figure 8.

Two soil samples must be taken below each dispenser island if the island is more than 50 feet in length. The samples must be collected from beneath the piping trench at least one foot into the native soil. The samples must be collected from the areas of the floor that appears to be contaminated although no more than 50 feet may exist between any two sample locations. If no area of the floor appears contaminated, the sample locations must be spaced equally along the length of the island and such that no more than 50 feet exists between any two sampling locations as shown in Figure 8.



### 5.2.2 Removal of Dispenser Islands – Sidewall Contamination Apparent

If any of the sidewalls of the excavation appear to be contaminated, the sidewalls must be sampled. At least two samples are required for dispenser islands less than 50 feet in length when sidewall sampling is necessary. One sample must be collected from the area of the sidewall that appears to be the most contaminated. The second sample must be collected from the floor of the excavation where the most contamination appears to be present. The second sample must be collected from the floor of the piping trench and at least one foot into the native soil. If no area of the floor appears contaminated or it appears uniformly contaminated, the sample must be collected as shown in Figure 8.

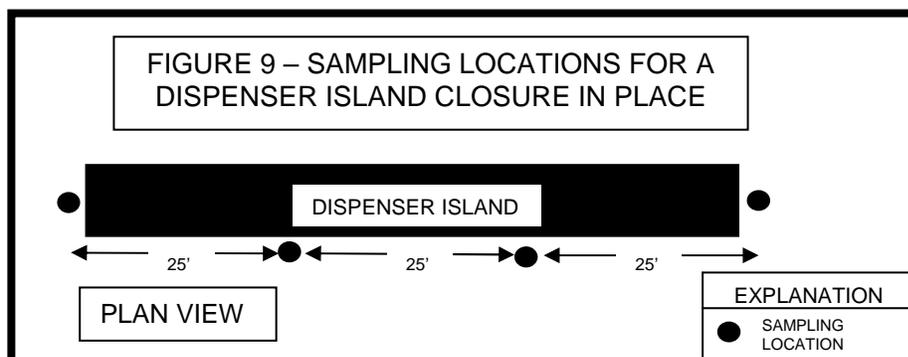
If the dispenser island is greater than 50 feet in length and sidewall sampling is necessary, at least three samples are required. One of the samples must be collected from the area of the sidewall that appears to be the most contaminated. The other two samples must be collected from the floor of the excavation where the most contamination appears to be present. However, you should also take into consideration the entire area of the excavation so that both of the floor samples are not collected from the same general area. If no area of the floor appears contaminated or if it appears uniformly contaminated, collected floor samples as shown in Figure 8.

### 5.2.3 Dispenser Island Closure in Place

Since potentially contaminated soils cannot be seen during closure in place activities as when excavating, the sampling requirements for closure in place are more conservative. You must follow the exact guidelines given in this document unless special circumstances do not allow such. Any alternative sampling plan must be submitted to the UST Branch for approval at the same time the “Notice of Intent to Permanently Close UST System(s)” form is submitted.

Soil borings must be conducted at each end of the dispenser island and along the length of the island such that no more than 25 feet exists between any two borings as shown in Figure 9. The borings must extend to a depth of at least one foot below the bottom of the piping trench and into the native soil. Samples must be collected from each boring following the field screening practices as described in Section 4.4.4.

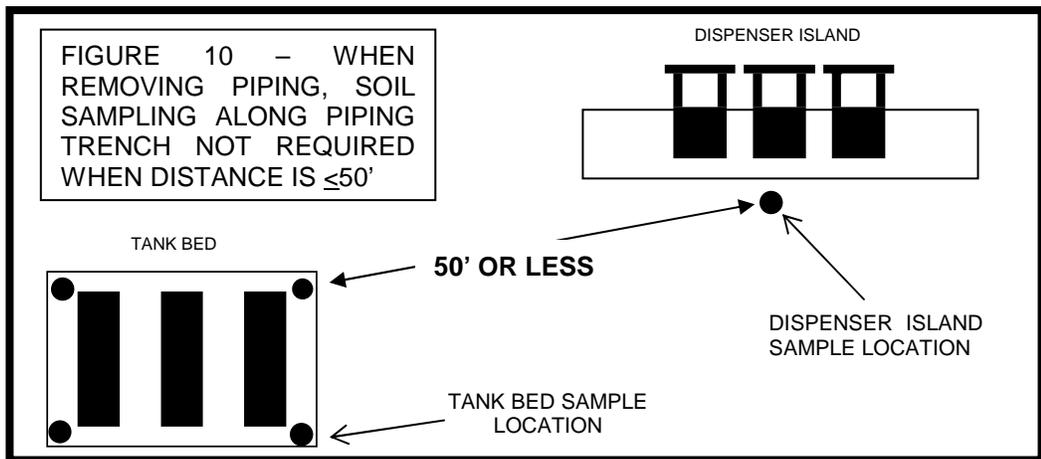
If “true” groundwater (refer to Section 3.2) is encountered during soil boring activities, groundwater samples must be collected from each boring that contains groundwater and each sample must be analyzed separately. Soil sampling must be conducted from those borings that do not have groundwater. In addition, regardless of whatever soil and/or groundwater sampling that is conducted, one soil sample must be collected from the boring that exhibited the highest level of petroleum contamination during the field screening process.



### 5.3 Piping Trenches

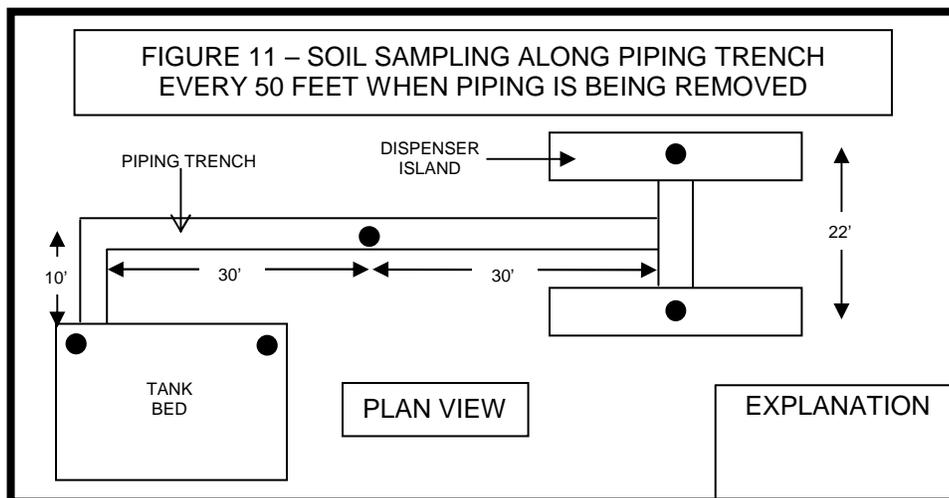
Sampling is required whenever a piping trench is taken out of service or piping is replaced. However, repairs (see definition in Appendix H) or small changes to the piping system such as installation of new flex connectors or unions are not subject to the sampling requirements.

When both the tanks and piping are being removed and 50 feet or less of piping trench exists between the dispenser island sampling point and the nearest tank excavation sampling point, no additional sampling is required along the piping trench unless soil contamination along the piping trench is evident as shown in Figure 10.



#### 5.3.1 Removal of Piping – No Sidewall Contamination Apparent

Prior to beginning any sampling activity, all backfill materials must be removed from the piping trench excavation. If no contamination of the sidewalls is apparent, soil samples must be collected from the floor of the excavation. The samples must be collected from the floor of the piping trench at least one foot into the native soil. The samples must be collected from the areas of the floor that appears to be the most contaminated although no more than 50 feet may exist between any two sampling locations. If no area of the floor appears contaminated or if it is uniformly contaminated, the samples must be collected along the length of the piping trench such that no more than 50 feet exists between any two sampling locations as shown in Figure 11.



### 5.3.2 Removal of Piping – Sidewall Contamination Apparent

If any of the sidewalls of the piping trench excavation appear to be contaminated, the sidewalls must be sampled. Samples must be collected from the areas of the sidewalls that appear to be the most contaminated. However, sampling must be conducted so that no more than 50 feet exists between any two sampling points.

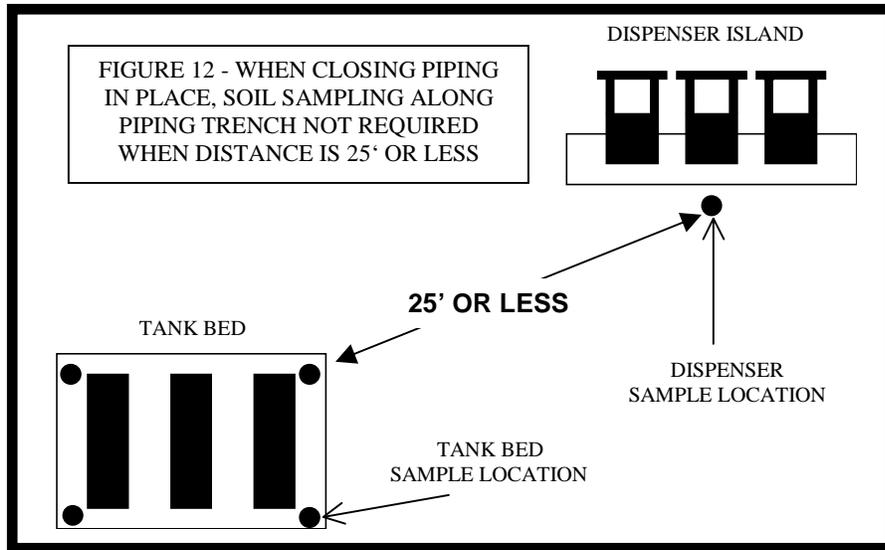
If the site conditions are such that the sidewalls are the appropriate locations for all samples, at least one of the samples must be collected from the floor of the piping trench excavation where the most contamination appears to be present. The sample must be collected at a depth of at least one foot below the piping trench and into the native soil. If no area of the floor appears contaminated or it appears uniformly contaminated, the sample must be collected at the midpoint of the piping trench.

### 5.3.3 Closure in Place of Piping

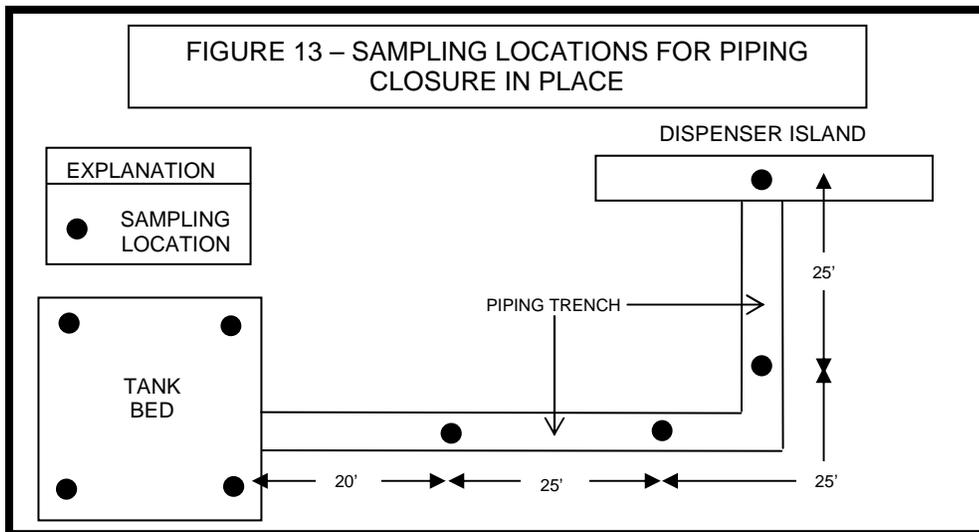
Since potentially contaminated soils cannot be seen during closure in place activities as when excavating, the sampling requirements for closure in place are more conservative. All sampling schemes must follow the exact guidelines given in this document unless special circumstances do not allow such. Any alternative sampling plan must be submitted to the UST Branch for approval.

When piping is to be closed in place, sampling along the piping trench is not required if the location of the dispenser island sample is within 25 feet of the nearest tank excavation sample. The 25 foot distance is measured in a straight line as depicted in Figure 12.

If you are conducting a piping closure in place but the tanks are remaining active, the 25 foot distance referenced above has no significance. Under these circumstances, a sample must be collected from the dispenser island and from the end of the piping trench where it enters the tank bed. If there is more than 25 feet of piping trench located between these two sampling points, additional samples must be collected such that no more than 25 feet exists between any two sample points.



If the distance between the dispenser island sample and the nearest tank bed sample is greater than 25 feet, soil samples must be collected along the piping trench such that no more than 25 feet of piping exists between any two sampling points as shown in Figure 13. This means that some excavation is required in order to locate the piping trench since sampling must occur underneath or immediately adjacent to the trench. All soil borings must extend to a depth of at least one foot below the bottom of the piping trench and into the native soil. Samples must be collected from each boring following the field screening practices as described in Section 4.4.4.



If “true” groundwater (refer to Section 3.2) is encountered during soil boring activities, groundwater samples must be collected from each boring that contains groundwater and each sample must be analyzed separately. Soil sampling must be conducted from those borings that do not have groundwater. In addition, regardless of whatever soil and/or groundwater sampling that is conducted, one soil sample must be collected from the boring that exhibited the highest level of petroleum contamination during the field screening process.

## SECTION 6 – BACKFILL SAMPLING

### 6.1 General Requirements

All excavated backfill material must be sampled unless it is disposed of in an approved sanitary landfill. This is because the soil samples collected from the native soil of the tank excavation may not be representative of the contamination levels of the backfill materials.

A minimum of one soil sample is required to be collected for each 100 cubic yards of material. Sample the backfill material as soon as possible after stockpiling. The samples must be collected at a point at least one foot into the stockpile following the same sample collection procedures as for any other soil sampling. The backfill samples must be analyzed for the same constituents as the tank excavation samples.

### 6.2 Backfill Handling Options

Typically, all backfill material is contaminated and should be handled as such until laboratory analysis proves otherwise. The following are the options allowed for handling the backfill material:

- a. Dispose of in an approved landfill (Appendix B).

Conduct any sampling that may be required by the landfill and receive permission from the landfill you wish to utilize.

- b. Stockpile on site and await the lab results of sampling.

All backfill material should be placed on and covered with an impervious material (plastic sheeting). If the analytical results of the backfill material are below the action levels of the UST Branch, the backfill material may be placed back into the excavation. If the results are above our limits, your options are as described in paragraphs a, d or e of this section.

- c. Sample the backfill material and return it to the excavation.

The backfill material may be returned to the excavation before the analytical results are obtained with the understanding that the backfill material may have to be re-excavated if the analytical results are above the action levels of the UST Branch. If the results are above the action levels of the UST Branch, your options are as described in paragraphs a, d or e of this section.

- d. Aerate the backfill material on site.

If the analytical results indicate concentrations above the action levels of the UST Branch and the owner does not want to dispose of the backfill material in an approved sanitary landfill, the backfill material may be aerated on site. To aerate the backfill material, place the backfill material on an impervious material (plastic sheeting), spread the backfill material approximately one foot thick. Build a berm around the soil that will retain any rainwater and prevent any

contamination from spreading. Cover the soil on rainy days; uncover the soil on sunny days. Disc or till the soil weekly. Contact a UST Branch Project Manager for instructions before initiating the aeration process.

- e. Stockpile the backfill material at a different location.

Before this is done, approval must be obtained from the MDEQ Groundwater Division-Special Waste Section.

## **SECTION 7 – DEVIATIONS FROM MINIMUM SAMPLING REQUIREMENTS**

### **7.1 Hazards or Obstructions**

When circumstances do not allow the collection of samples from the locations required in this document, the owner must contact the UST Branch and receive prior approval of any alternative sampling plan. Draw a sketch of the facility that shows the tank system in relation to any obstacles and show the proposed sampling locations.

### **7.2 Waiver of Sampling Requirements**

While not generally a recommended practice, sampling requirements may be waived if the facility has monitoring wells as the method of leak detection and no evidence of a release has been noted. The UST Branch generally will only consider groundwater monitoring to grant a waiver. In order to request a waiver, submit the previous twelve months of monitoring well records at the same time the “Notice of Intent to Permanently Close UST System(s)” form is submitted and indicate you wish to have the sampling requirements waived.

However, if evidence of petroleum contaminated soil and/or groundwater is found during closure activities, samples must then be collected from the appropriate locations and analyzed as described in this guidance document.

## **SECTION 8 -SAMPLE ANALYSIS**

### **8.1 Tanks**

The samples must be analyzed for the product last stored in the UST (refer to the table below). However, if evidence of a leak from a previously stored product is found or it is known that the tank stored a different substance at one time, the samples must be analyzed for that substance also. For example, all of the tanks have stored gasoline for the past several years but it is known that one of the tanks was once used to store diesel fuel. Therefore, all samples collected from the tank excavation would have to be analyzed for both PAH and BTEX.

In addition, if an excavation contained tanks that stored substances that require both BTEX and PAH analysis (i.e. gasoline and diesel fuel), all samples collected from the excavation must be analyzed for both BTEX and PAH.

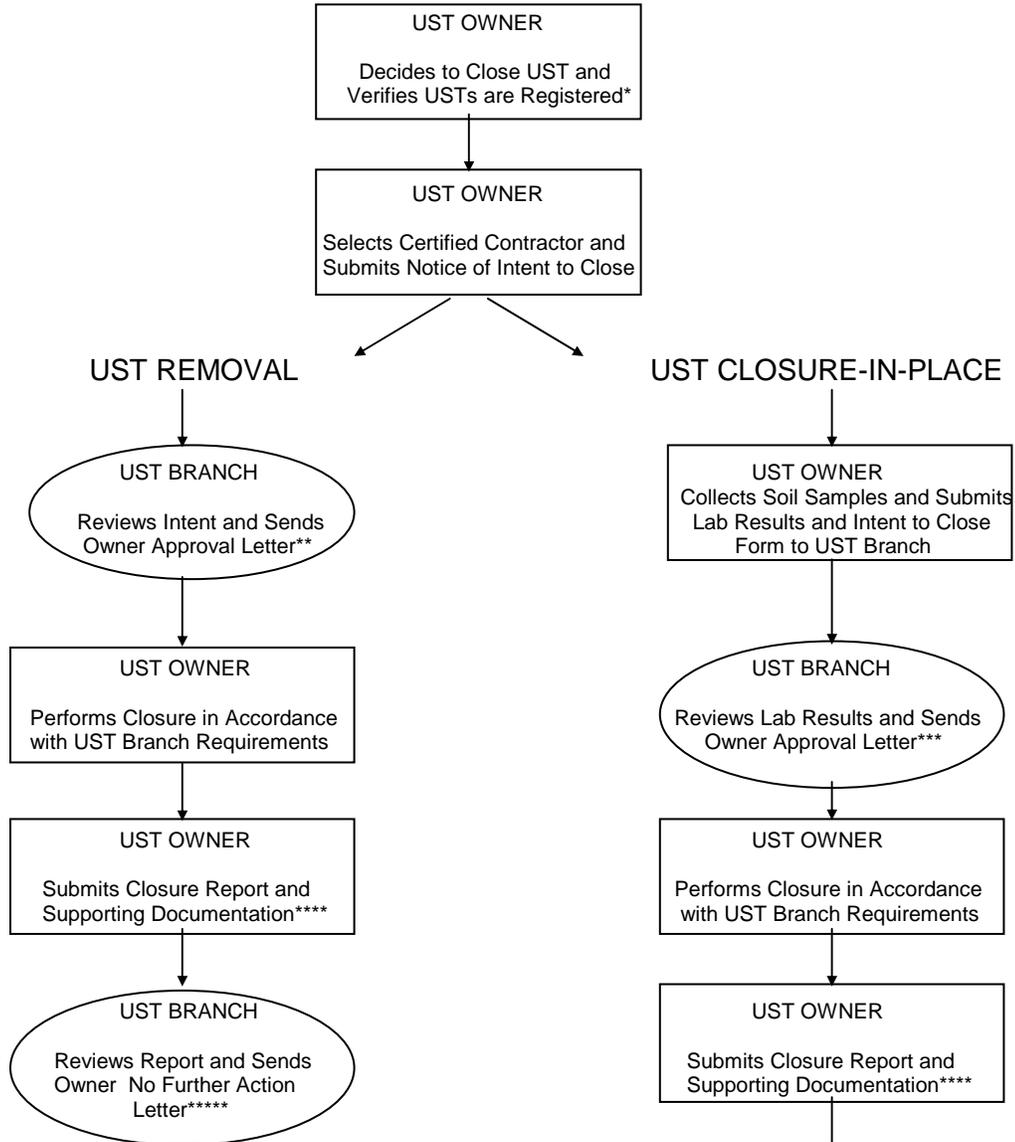
## 8.2 Dispenser Islands and Piping

Samples must be analyzed for the products last transferred in the piping. However, if evidence of a leak from a previously stored product is found or it is known that the piping transferred a different substance at one time, the samples must be analyzed for that substance also.

In addition, if both diesel fuel and gasoline piping are in the same trench/dispenser island, all samples collected from the piping trench/dispenser island must be analyzed for both BTEX and PAH.

REQUIRED SAMPLE ANALYSIS (TANKS & PIPING)		
Product Stored	Sample Media	Analysis
Gasoline	Soil/Water	BTEX*
Diesel Fuel, Used Oil Kerosene, Jet Fuel	Soil/Water	PAH**
Hazardous or Other Substances	Soil/Water	***
*	BTEX = The analysis for Benzene, Toluene, Ethylbenzene and Xylenes. EPA Methods 8021B, 8260B	
**	PAH = The analysis for polynuclear aromatic hydrocarbons (EPA Methods 8100, 8270C or 8310)	
***	Analyze by approved method for the substance stored or contact the UST Branch for required analysis	

## APPENDIX A "The Closure Cycle"



\* If the tanks are not registered, the Owner must submit a Notification for Underground Storage Tanks.

\*\* If the Notice of Intent to Permanently Close form is not completed satisfactorily, the form will not be accepted.

\*\*\* The lab results must normally be below the limits established by the UST Branch in order for the Closure-in-Place to be approved.

\*\*\*\* Supporting documentation: a) lab results of any sampling; b) chain-of-custody; c) manifests for the disposal of any contaminated soils, waters, or tank sludges; d) site drawing.

\*\*\*\*\* If lab results are above UST Branch limits, Owner is notified of contamination and works with UST Branch to clean up site.

## APPENDIX B

### Permitted Solid Waste Landfills

#### **Adams County**

Plantation Oaks Landfill  
Operator – Waste Management, Inc.  
(601) 445-8459

#### **Chickasaw County**

Prairie Bluff Landfill  
Operator – Waste Management, Inc.  
(662) 456-9560

#### **Clay County**

Golden Triangle Regional Landfill  
Operator – Golden Triangle SW Mgt. Auth.  
(662) 324-7566

#### **Harrison County**

Pecan Grove Landfill  
Operator – Waste Management, Inc.  
(228) 255-5553

#### **Jefferson County**

Jefferson County Landfill  
Operator – Southern Landfill Mgt., Inc.  
(601) 786-9997

#### **Kemper County**

Kemper County Landfill  
Operator - Kemper Co. Landfill  
Company, L.L.C.  
(601) 656-5411

#### **Lauderdale County**

Pine Ridge Landfill  
Operator – Waste Management, Inc.  
(601) 483-0715

#### **Leflore County**

Leflore County Sanitary Landfill  
Operator – County & Santek Envir. of MS  
(601) 453-8550

#### **Madison County**

City of Canton Sanitary Landfill  
Operator – City of Canton  
(601) 859-3245

#### **Madison County**

Little Dixie Landfill  
Operator – BFI Waste Systems  
(601) 982-9488

#### **Pearl River County**

Central Landfill  
Operator – Transamerican Waste  
(601) 795-2500

#### **Perry County**

Pine Belt Regional Landfill  
Operator – Pine Belt SW Auth.  
(601) 545-6676

#### **Pontotoc County**

Three Rivers Regional Landfill  
Operator – Three Rivers SW Authority/  
Santek Envir. of MS  
(662) 488-0444

#### **Scott County**

Clearview Environmental Control  
Operator – Chambers/USA Waste  
(800) 832-2937

#### **Tippah County**

Northeast Mississippi Regional Landfill  
Operator – Northeast Authority/  
Waste Services, Inc.  
(662)223-5445

#### **Tunica County**

Tunica County Landfill  
Operator – Trashhunters, Inc.  
(662) 363-2282

#### **Washington County**

Big River Landfill  
Operator – BFI Waste Systems  
(662) 335-1014

#### **Winston County**

City of Louisville Landfill  
Operator – City of Louisville  
(662) 773-9201

**APPENDIX C**

**Notice of Intent to Permanently Close Underground Storage Tank System(s)**

Return Completed Form To	Mississippi Department of Environmental Quality Office of Pollution Control P. O. Box 10385 Jackson, MS 39289-0385	Facility I. D. Number: _____ Date Received by MDEQ: _____
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Complete and return this form within thirty (30) days prior to permanently closing tank system

I. Location of Tank System	II. Ownership of Tank System
Name: _____ Address: _____ City: _____ County: _____	Name: _____ Address: _____ City: _____ State: _____ ZIP: _____

**III. Date of Scheduled Tank System Closure**

Month: \_\_\_\_\_ Day: \_\_\_\_\_ Year: \_\_\_\_\_

**IV. Type of Permanent Closure**

Tank & Piping Removal _____	Tank & Piping Closure in Place _____	<b>Type of fill material to be used for Closure in Place</b>
Tank Removal Only _____	Tank Closure in Place Only _____	
Piping Removal Only _____	Piping Closure in Place Only _____	
Will any new underground Tanks _____ Piping _____ be installed at this facility?		
		Sand _____ Concrete _____ Virgin Drilling Mud _____ Approved "foam" _____

**V. Underground Storage Tank System Information**

Tank	1	2	3	4	5	6	7	8
Date of Installation								
Tank Capacity								
Substance stored throughout history of tank (check all that apply)	gasoline							
	diesel							
	used oil							
	kerosene							
	other							

**VI. Contractor Information**

Name of Company Performing Closure: \_\_\_\_\_

Name of Individual Certified by MDEQ to Permanently Close USTs: \_\_\_\_\_

Mississippi DEQ UST Certification Number: \_\_\_\_\_ Expiration Date: \_\_\_\_\_

**VII. Sampling Requirements**

All sampling must be performed in accordance with the Mississippi Department of Environmental Quality's Underground Storage Tank Guidelines for the Permanent Closure of Petroleum Underground Storage Tanks.

Product Stored in Tank	Media	Analysis to be Performed
Gasoline	Soil or Groundwater	BTEX (EPA Methods 8021B, 8260B)
Waste Oil, Diesel, Kerosene	Soil or Groundwater	PAH (EPA Methods 8100, 8270C, 8310)
Other than above	Soil or Groundwater	Contact Office of Pollution Control

**VIII. Owner Agreement**

Oath: I certify that the information listed above is true and correct to the best of my belief and knowledge.

Owner's Name _____	Owner's Signature _____	Date Signed _____
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Produced by the Mississippi Department of Environmental Quality, Office of Pollution Control, UST Branch  
P. O. Box 2261, Jackson, MS 39225 601.961.5171 /fax 601.961.5093 / www.deq.state.ms.us 7/08

**APPENDIX D**

**UNDERGROUND STORAGE TANK SYSTEM CLOSURE REPORT**

Return Department of Environmental Quality  
 Completed Office of Pollution Control  
 Form PO Box 10385  
 To Jackson MS 39289-0385

Facility I.D. No. \_\_\_\_\_  
 Date Received by MDEQ \_\_\_\_\_

**Location of Tank System**

**Ownership of Tank System**

Name \_\_\_\_\_  
 Address \_\_\_\_\_  
 City \_\_\_\_\_ County \_\_\_\_\_

Name \_\_\_\_\_  
 Address \_\_\_\_\_  
 City \_\_\_\_\_ State \_\_\_\_\_ ZIP \_\_\_\_\_

**TYPE OF UNDERGROUND STORAGE TANK SYSTEM CLOSURE**

Tank and piping removal \_\_\_\_\_ Tank and piping closure in place \_\_\_\_\_ Were any new tanks installed? \_\_\_\_\_  
 Tank removal only \_\_\_\_\_ Tank closure in place only \_\_\_\_\_ Was any new piping installed? \_\_\_\_\_  
 Piping removal only \_\_\_\_\_ Piping closure in place only \_\_\_\_\_ Number of active tanks remaining \_\_\_\_\_

**Description of Underground Storage Tanks (Complete for each closed tank at this location.)**

I. Tank Information	Tank No.					
Estimated age of tank in years.						
Estimated total capacity in gallons.						
Substance stored in tank.						
II. Tank Closure Information						
Date product was removed from tank/piping (mm/dd/yy).						
Date tank/piping was permanently closed (mm/dd/yy).						
If closed in place, list the inert material used (sand, concrete, drilling mud approved foam material).						

**Disposition of excavated backfill material**

**Note:** All backfill materials must be handled in accordance with the Mississippi Department of Environmental Quality's (MDEQ) Guidelines for the Permanent Closure of UST Systems.

Disposed of in landfill \_\_\_\_\_  
 Returned to excavation \_\_\_\_\_  
 Stockpiled on site \_\_\_\_\_  
 Aerating on site \_\_\_\_\_  
 Aerating off site \_\_\_\_\_

**Submit the following supporting documentation with this Closure Report:**

1. Lab analytical results of sampling
2. Sample Chain-of-Custody
3. Site Drawing
4. Waste manifests if tank sludges, water or backfill materials are disposed.

**III. Site Assessment Information**

Date samples were collected. (mm/dd/yy) \_\_\_\_\_ Was groundwater encountered (yes/no) \_\_\_\_\_  
 Was there any soil staining apparent? \_\_\_\_\_ Depth to groundwater (feet) \_\_\_\_\_  
 Was there any free product noted? \_\_\_\_\_ Were visible holes in tanks/piping? \_\_\_\_\_

**To be completed by the tank owner:** (Please print or type all but signature)

**Date:** \_\_\_\_\_

**Oath:** I certify that the information concerning closure is true to the best of my belief and knowledge.

Owner's Name: \_\_\_\_\_

Owner's Signature: \_\_\_\_\_

**To be completed by person certified by MDEQ to Permanently Close:**

**Date:** \_\_\_\_\_

Name of person certified by MDEQ to close/remove: \_\_\_\_\_

MDEQ Certified Contractor's Signature: \_\_\_\_\_

MDEQ Certified Contractor's Company: \_\_\_\_\_

MDEQ Certification No.: \_\_\_\_\_



## **APPENDIX F**

### **Industry Codes and Standards for Underground Storage Tank Closure or Change in Service**

“Removal and Disposal of Used Underground Storage Tanks”, American Petroleum Institute Recommended Practice 1604, 1220 L St., NW, Washington, DC 20005 (202) 682-8000.

“Cleaning Petroleum Storage Tanks”, American Petroleum Institute Publication 2015.

“Interior Lining of Underground Storage Tanks”, American Petroleum Institute Publication 1631.

“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, DC 20402.

“Tank Closure Without Tears: An Inspector’s Safety Guide”, New England Interstate Environmental Training Center, 2 Fort Road, South Portland, ME 04106 (207) 767-2539.

“Excavation & Trenching Operations”, Occupational Safety & Health Administration Publication 2226.

**APPENDIX G**

**BORING LOG FOR UST SYSTEM CLOSURE IN PLACE**

BORE HOLE NUMBER 1\*

DEPTH (FEET)	SOIL TYPE	HYDROCARBON VAPORS (PPM)
0	TOP SOIL	70
2	CLAY	110
4		100
6	SAND	850 (SAMPLE COLLECTED FOR ANALYSIS)
8		410
10	CLAY	220
12		370
14	SAND	

\* INDICATE LOCATION OF EACH BORING ON CLOSURE DRAWING AND NUMBER ACCORDINGLY.

Type of Instrument utilized for field screening \_\_\_\_\_

Manufacturer of instrument \_\_\_\_\_

Date last calibrated (mm/dd/yy) \_\_\_\_\_

**NOTE: Boring Logs for each borehole and the laboratory analytical results of all sampling must be submitted at the same time the "Notice of Intent to Permanently Close Underground Storage Tank(s)" form is submitted in order for the closure in place to be approved by the UST Branch.**

## APPENDIX H - DEFINITIONS

**Aliquot**- Part of the whole. One sampling location may require two or more discreet containers in order to qualify as an adequate sample. Each sample container is an aliquot.

**Aquifer** - Underground bodies of sand or gravel which contains groundwater.

**Backfill** – All of the soil which was placed in the excavation when the tank system was installed. In UST systems installed after 1988, the backfill is normally easy to determine since tank systems were required to be backfilled with clean sand or gravel and these materials are easily differentiated from the native soil.

**BTEX** - Benzene, Toluene, Ethylbenzene, and Xylenes, the four major components of gasoline.

**Convex Meniscus** - Curved or rounded like the outside of a circle.

**Decontamination** - A process in which to clean and remove contaminants from sample equipment and devices with detergent wash following a series of rinses with distilled water.

**Groundwater** - For the purposes of UST closures, it is the naturally occurring water that seeps into the tank excavation from the aquifer.

**Headspace** - The air space between the sample and the top of the closed container.

**Holding time** - The length of time allowed between sample collection and analysis by the laboratory.

**Native soil** - Soil which has been undisturbed by activities of man.

**PAH** - Polynuclear Aromatic Hydrocarbons.

**Preservative** - A chemical added to a water and/or soil samples to prevent deterioration or to maintain the original characteristics.

**Repair** – To restore a piping system. Repair as utilized in this document means that some minor component, such as a flex connector or a coupling/union, of the piping system has been replaced or simply tightened.

**Septum cap** - A sample container cap that has a membrane for extracting water with a syringe.

**Stockpiling** - Storing excavated materials on site. Correct stockpiling requires putting the excavated material on plastic at a height not greater than 3 feet. A berm should surround the stockpiled material in order to prevent rainwater run-off.

**Teflon lined** - A synthetic liner used to line the sides and caps of sample containers to prevent samples from sticking.

**VOC** - Volatile Organic Compounds - chemicals which readily vaporize under normal atmospheric conditions.