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## **PETROLEUM UNDERGROUND STORAGE TANKS: CLOSURE ASSESSMENT SAMPLE COLLECTION AND OVER-EXCAVATION**

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**SECTION 1.0**      **LIST OF ACRONYMS AND CONTACTS**

**1.1 Applicable Acronyms**

AST	Above Ground Storage Tank
BTEX	Benzene, Toluene, Ethylbenzene and Xylenes
CAR	Closure Assessment Report (State Fire Marshal)
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
COCs	Chemicals of Concern
EPA	United States Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
LUST	Leaking Underground Storage Tank
MTBE	Methyl Tertiary-Butyl Ether
NDEQ	Nebraska Department of Environmental Quality
O/O	Owner/Operator
PR Section	Petroleum Remediation Section (NDEQ)
RCRA	Resource Conservation and Recovery Act
RP	Responsible Party
SFM	Nebraska State Fire Marshal
TEH	Total Extractable Hydrocarbons
UST	Underground Storage Tank
VOCs	Volatile Organic Compounds
VRA	Voluntary Remedial Action process

**1.2 Pertinent Contacts**

<u>NDEQ</u>	
Toll Free	(877) 253-2603
Facsimile	(402) 471-2909
Petroleum Remediation Section	(402) 471-2186
Technical issues	
Title 200 reimbursement issues	
Waste Management Compliance Unit	(402) 471-4220
Website: Pertinent regulations and guidance documents	<a href="http://deq.ne.gov">http://deq.ne.gov</a>
<u>SFM</u>	
SFM Flammable Liquid Storage Division	(402) 471-9465
SFM Facsimile	(402) 471-1024
SFM Website: Pertinent regulations	<a href="http://www.sfm.ne.gov">www.sfm.ne.gov</a>

Note: To find guidance on the Department’s web page, go to <http://deq.ne.gov>, click on “Publications & Forms” at the top of the homepage, scroll down and click on “Petroleum Remediation Program,” then click on “Guidance Documents.” For Waste Management guidance documents and forms, click “Publications & Form,” scroll down and click on “Integrated Waste Management.” If a form is needed, click on “Applications & Forms” or click on “Guidance Documents” if a guidance document is needed.

## SECTION 2.0 INTRODUCTION

This guidance pertains to the sampling of media following the removal or replacement of underground storage tanks (USTs) and/or ancillary equipment (e.g., piping, dispensers) as well as management options for those soils contaminated by petroleum hydrocarbons (hereafter referred to as petroleum) that primarily resulted from UST system releases. Its purpose is to provide guidance concerning soil sample collection, laboratory analysis methods, over-excavation of contaminated soil, management of contaminated soil, and reporting. This document integrates the regulations contained within Chapter 10 of the State Fire Marshal's (SFM) Title 159 – Nebraska Administrative Code Rules and Regulations Underground Storage Tanks concerning closure requirements, the Nebraska Department of Environmental Quality's (hereafter referred to as NDEQ or Department) guidance for voluntary over-excavation below leaking USTs (LUSTs) and/or ancillary equipment, and actions considered eligible for reimbursement under NDEQ's Title 200 - Reasonable Rate Schedule and Reimbursement Guidance Manual as established under NDEQ's Title 200-Rules and Regulations for Petroleum Release Remedial Action Reimbursement Fund). Any questions about or requests of variance to the SFM's Title 159 rules and regulations can only be approved by the SFM. Questions concerning over-excavation, sampling methodologies and NDEQ's Title 200 reimbursement should be directed to NDEQ Petroleum Remediation (PR) Section (**402/471-2186** or [NDEQ.moreinfo@Nebraska.gov](mailto:NDEQ.moreinfo@Nebraska.gov)). Other relevant NDEQ regulations include NDEQ's Title 118 – Ground Water Quality Standards and Use Classification, NDEQ's Title 126 – Rules and Regulations Pertaining to the Management of Wastes, and NDEQ's Title 132-Integrated Solid Waste Management Regulations.

Although this guidance makes reference to regulations and may include excerpts from regulations, it is not a regulation itself. Its purpose is to help the public understand the coordination and application of NDEQ and SFM regulations and guidance concerning releases of petroleum from UST systems.

### 2.1 Hazardous Waste Consideration

Prior to removing an UST containing hazardous substances as defined under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) or hazardous wastes under the Resource Conservation and Recovery Act (RCRA), NDEQ's Waste Management Compliance Unit should be contacted at **(402) 471-4210** for assistance concerning analysis methods for hazardous waste determination and soil management options. Soils contaminated by hazardous substances may be regulated as hazardous wastes under NDEQ's Title 128 – Nebraska Hazardous Waste Regulations and therefore, must be handled differently and disposed at specific regulated facilities. For management of petroleum-contaminated soil, please refer to Section 8.0 of this guidance.

### 2.2 Reimbursement Program

**Costs associated with the actual removal and disposal of an UST system or any portion thereof, is not eligible for reimbursement from NDEQ's Title 200 reimbursement fund.** However, those reasonable costs related to the required soil sampling, laboratory analyses, and proper disposal of the petroleum-contaminated backfill and over-excavated native soils performed in accordance with this guidance may be eligible for reimbursement consideration under NDEQ's Title 200 (a deductible and co-payment are required).

In the event of an emergency situation, proposals may be transmitted via telephone or facsimile (**402/471-2909**), and if necessary, may be submitted after the fact. NDEQ's PR Section personnel will evaluate these proposals, and if approved, this work will be considered eligible for reimbursement under NDEQ's Title 200 fund. For any questions concerning NDEQ's Title 200 Program, information can be viewed on the NDEQ web page at <http://deq.ne.gov> or contact the Title 200 staff at **(402) 471-2186**.

## **SECTION 3.0            NOTIFICATION AND GENERAL CLOSURE/REPLACEMENT REQUIREMENTS**

### **3.1 Release Notification**

In accordance with the SFM's Title 159, Chapter 10, Section 004, notification to the SFM and NDEQ shall be made within 24 hours of when contamination is discovered. In addition, it is stated in the NDEQ's Title 126, Chapter 18, Section 002.01, that immediate notification to the NDEQ is required of an oil or hazardous substance release, regardless of the quantity, which occurs beneath the surface of the land, impacts or threatens waters of the state or threatens public health and welfare. Immediate notification is required if a release occurs upon the surface of the land of an oil in a quantity that exceeds 25 gallons, or of a hazardous substance, which equals or exceeds 100 pounds or its reportable quantity under Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) or the Emergency Planning and Community Right-to-Know Act (EPCRA), whichever is less, as outlined in NDEQ's Title 126, Chapter 18, Section 002. Even if a release is less than the reportable quantity, it must be cleaned up; if it is not cleaned up, it becomes reportable to the Department.

In accordance with the SFM's Title 159, Chapter 10, Section 004.03, the owner/operator (O/O) of the UST system is responsible for ensuring that a Closure Assessment Report (CAR) is properly completed and submitted on the appropriate SFM reporting forms. The report is to be submitted to the State Fire Marshal within 45 days of the date of removal/replacement or closure in place.

### **3.2 SFM Title 159 Requirements for UST Permanent Closure/Replacement**

Federal UST regulations (40 CFR Part 280) and SFM regulations (Title 159) pertain only to regulated underground storage tank (UST) systems. The SFM's Title 159 requires that the O/O of a regulated UST system conduct a closure assessment at the time of permanent closure (removal/closure in place) and/or replacement. The purpose of performing a closure assessment is to determine if a release of a regulated substance stored within and/or dispensed from an UST and/or ancillary equipment (e.g., piping, dispensers) has occurred. The O/O typically has three options:

- Excavation of UST and/or ancillary equipment: Soil samples must be collected and analyzed for the chemicals of concern (COCs) listed in Table 1. If ground water flows into the excavation, ground water samples must be collected.
- In-place closure of UST and ancillary equipment: Soil **and** ground water samples must be collected and analyzed for the COCs listed in Table 1 using a hollow stem drill rig.
- Closure assessment exception: Soil and/or ground water sampling need not be performed if contamination is identified by any means (e.g. olfactory, visual, field instrument) at the time an UST or any of its ancillary equipment is removed and/or replaced, provided the O/O notifies the NDEQ by the next business day. **Should the UST system O/O select this option, the NDEQ will automatically require the O/O to perform an environmental investigation of the soil and ground water.**

### **3.3 Sample Collection**

According to the SFM's Title 159, Chapter 10, Section 3, samples are to be collected for analysis to detect and quantify the presence of the regulated substances that have been stored in the tank system, using

procedures, instrumentation, and test methodologies approved by NDEQ. Chemicals of concern (COCs) are established in NDEQ’s Title 118, Appendix B, Step 6 (see Table 1 below). All soils and/or ground water samples are to be collected, preserved, transported and analyzed utilizing approved analysis methods and procedures outlined in Appendix A of this guidance for all COCs listed in Table 1.

Please be aware that the use of the wrong laboratory methods (e.g., a laboratory method not listed in this guidance, not previously approved by the NDEQ Petroleum Remediation (PR) Section, or not developed to quantify the substance stored in the UST) will result in re-sampling for proper laboratory analysis.

**Table 1. Chemicals of Concern (See Appendix A for laboratory analysis methods)**

Light Distillate USTs (e.g., gasoline, JP-4)	Middle Distillate USTs (e.g., diesel fuel, kerosene)	Waste Oil
Benzene Toluene Ethylbenzene  Total Xylenes n-Hexane Methyl tertiary-Butyl Ether (MTBE)	Benzene Toluene Ethylbenzene Total Xylenes n-Hexane MTBE Diesel Fuel**	Benzene Toluene Ethylbenzene Total Xylenes n-Hexane MTBE Waste Oil Diesel Fuel
		Additional Chemicals for Waste Oil†
		Chlorinated solvents Ethylene Glycol (antifreeze) Heavy Metals*

\* Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, Silver

\*\* If another petroleum hydrocarbon (e.g., stoddard solvent, motor oil) has been stored within the vessel, then use the appropriate laboratory analysis method and standard for the product as described in Appendix A.

† If the history indicates any of these materials were stored or otherwise held within the storage vessel, samples of the contaminated media are to be collected for the appropriate laboratory analyses.

## **SECTION 4.0      SOIL REMOVAL AND SAMPLE COLLECTION**

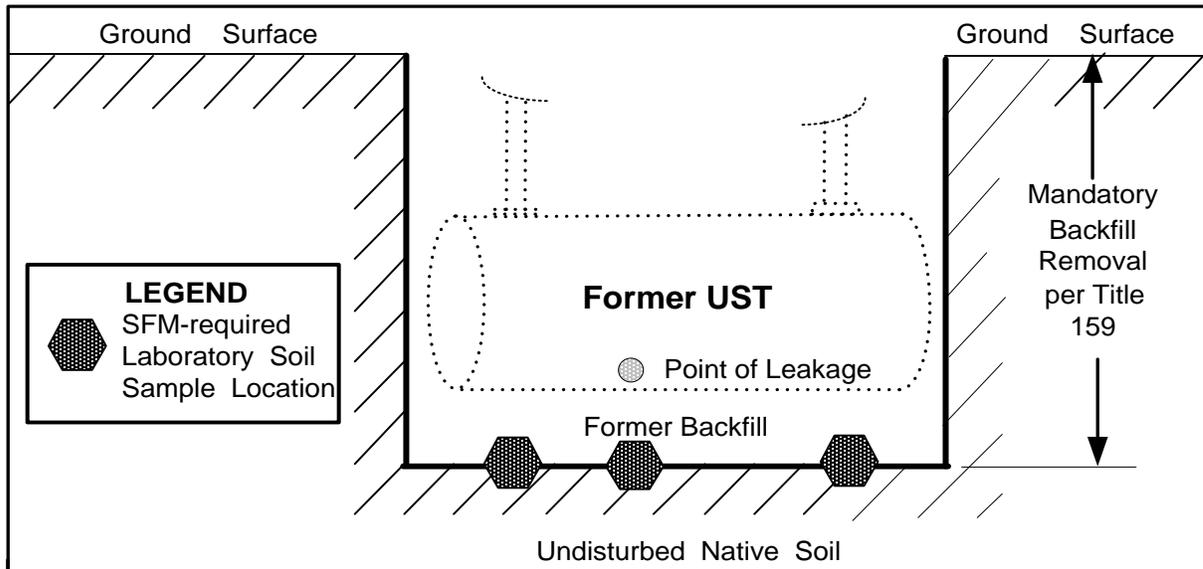
In accordance with the SFM's Title 159, **all backfill material** (hereafter referred to as **mandatory backfill removal**) is to be excavated to the depth where the undisturbed native soil is exposed below the removed/replaced UST(s) and/or ancillary equipment. Soil samples are to be collected as described below per the SFM's Title 159, Chapter 10.

If the contaminated soil is to be taken to a permitted landfill or possibly land applied, please see NDEQ's Environment Guidance Document 06-205, Management of Petroleum-Contaminated Materials on the Department's web page.

### **4.1 UST Assessment**

A minimum of two soil samples per UST are to be collected (Figure 1). Soil samples are to be collected from native soil at each end of the UST. In addition, soil samples must be collected at locations from the native soil that corresponds to visible points of leakage in the UST. If ground water is encountered during the removal, ground water samples are to be collected as described in Section 5.0. See Appendix A for containerizing, labeling, transporting, and maintaining a chain of custody for the soil samples collected.

**Figure 1:** Potential Sampling Locations Following UST Removal



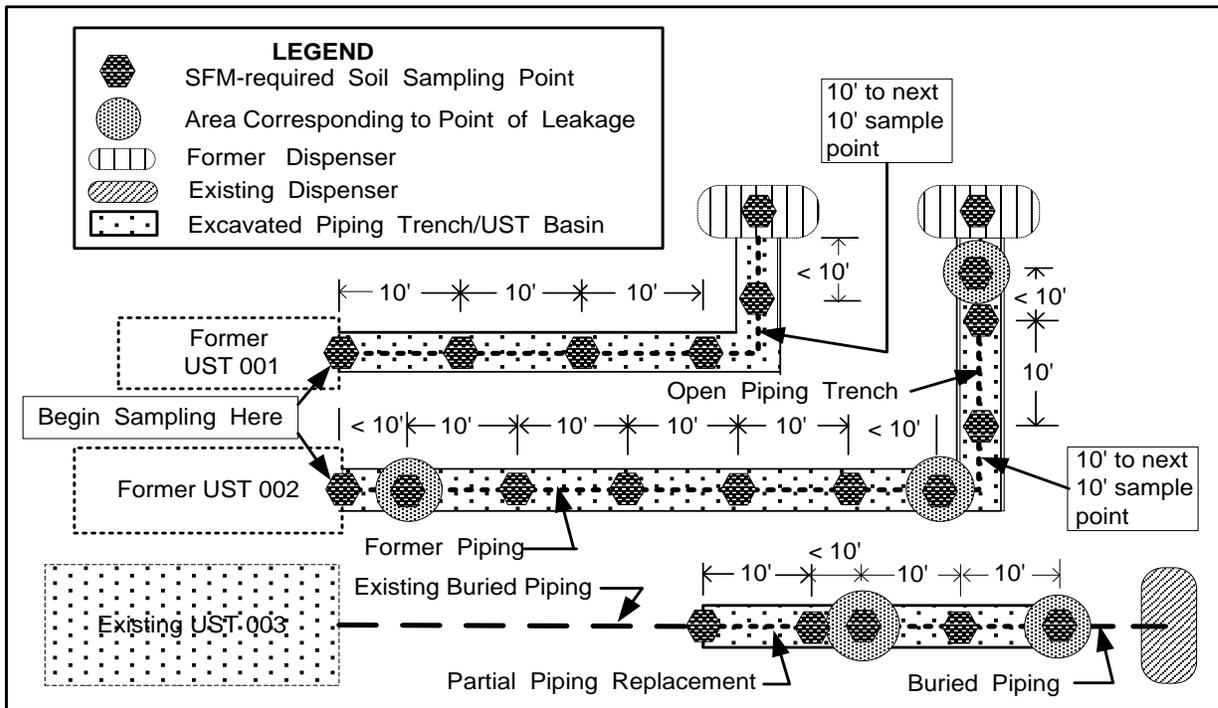
The above figure is an example of a cross-sectional view of sampling locations for laboratory analyses following the mandatory backfill removal. This sampling is required by the SFM's Title 159 when removing an UST.

### **4.2. Piping/Dispenser Assessment**

Soil samples for piping are to be collected from native soil every 10 feet from where the piping leaves the UST excavation and extending to and including the dispenser (Figure 2) if the dispensers

are to be removed or replaced. Additionally, soil samples are to be collected from native soil locations that correspond to visible points of leakage in the piping. If only partial replacement of a product line is being performed, then sample collection is to begin at the end nearest the UST with samples being collected every 10 feet thereafter between the UST and dispenser. If ground water enters the trench during the piping/dispenser removal, a ground water sample must be collected as described in Section 5.0.

**Figure 2:** Potential Sampling Locations Following UST Piping and/or Dispenser Removal

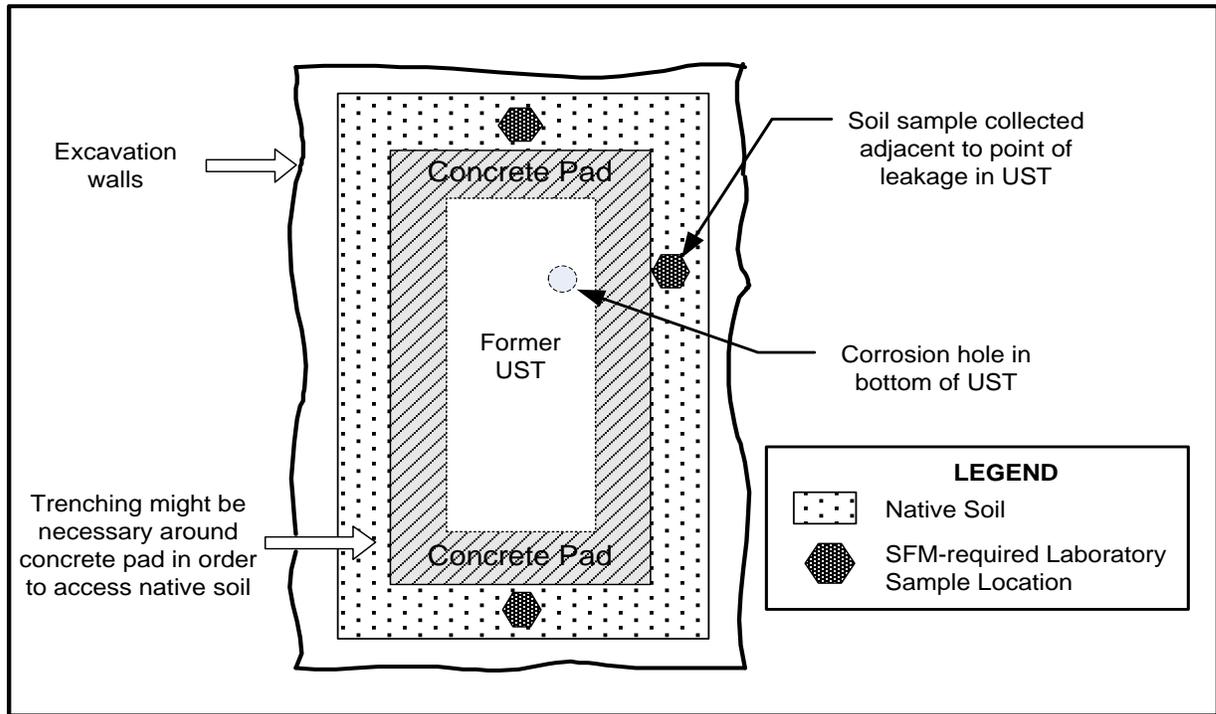


The above figure is an example depicting a plan view of sampling locations for laboratory analyses in piping trenches and beneath dispensers following the mandatory removal of backfill required by the SFM's Title 159.

### 4.3 Concrete Pads

Should a concrete pad be encountered beneath the USTs while excavating, two soil samples must be collected from native soils at each end of the pad for each UST (Figure 3). This might require excavating the backfill at the ends of the pad to expose native soil. If visible points of leakage are observed in the UST, then soil samples are also to be collected along the edge of the pad corresponding to the observed points of leakage. The O/O also has the option of removing and disposing of the concrete pad in order to perform over-excavation. If the concrete pad is removed, then the soil samples can be collected as typically performed for excavations without pads (Section 4.1) since the areas of contamination can be fully viewed. Removal of the pad is considered a remedial action and is therefore eligible for reimbursement consideration from the NDEQ's Title 200 fund.

**Figure 3:** Potential Sampling Locations When Concrete Pads Are Present

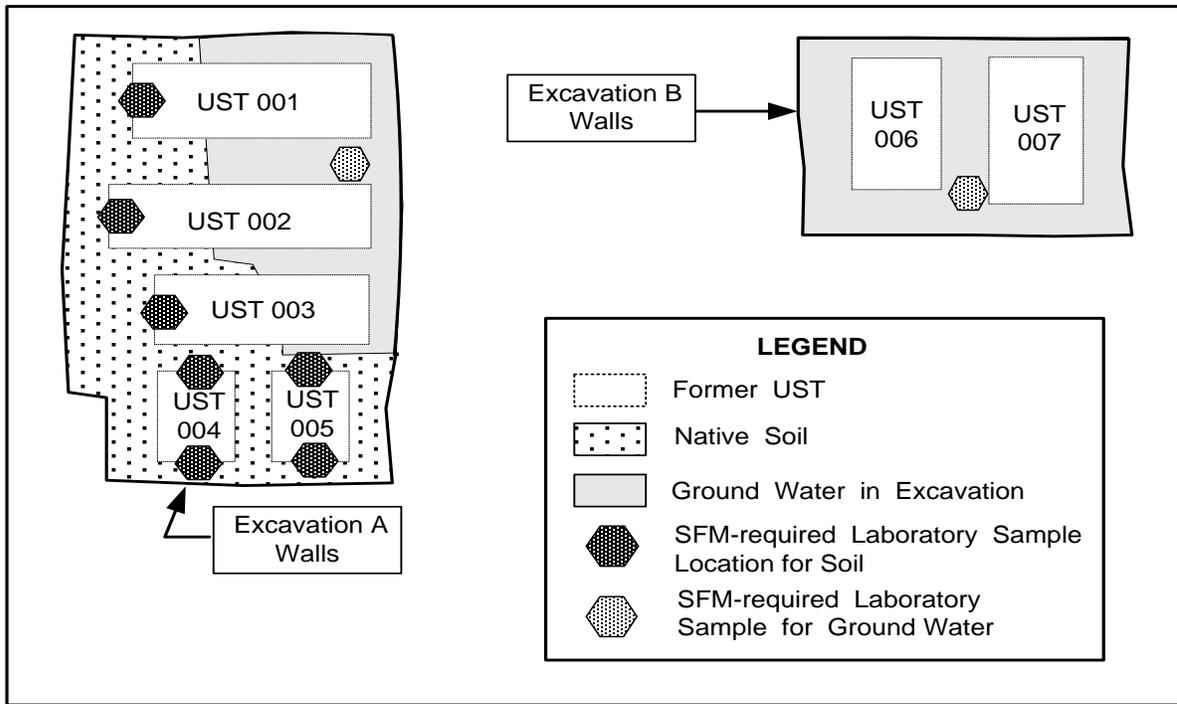


The above figure is an example depicting a plan view of sampling locations for mandatory laboratory analyses around a concrete pad following mandatory soil removal. This sampling is required by the SFM's Title 159.

**SECTION 5.0      GROUND WATER SAMPLING**

This section pertains to the mandatory soil removal process as well as over-excavation. Soil removal should cease if ground water has entered the excavation and covered the entire excavation floor. If ground water covers the entire excavation floor, then, in accordance with the SFM’s Title 159, one ground water sample is to be collected for laboratory analysis. If digging ceases before ground water covers the entire excavation floor, soil samples are to be collected for laboratory analysis from the locations on the basin floor as previously discussed in Section 3.0 in addition to the ground water samples (Figure 4). See Appendix A for containerizing, labeling, transporting, and maintaining a chain of custody for the ground water samples collected.

**Figure 4:** Potential Sampling Locations When Ground Water Enters the Excavation Following the Removal of Backfill



If ground water enters the excavation following soil removal, the figure above shows two examples depicting plan views of sampling locations for laboratory analyses required by the SFM’s Title 159.

## **SECTION 6.0      IN-PLACE CLOSURE SAMPLE COLLECTION**

The SFM's Title 159 allows USTs and piping to be closed in-place. If this option is selected, a soil boring must be drilled at each end of each UST and along the piping runs in order to provide the data necessary to document site conditions. As stated in Title 159, Chapter 10, Section 003.03A, soil borings shall be a minimum of two inches in diameter and be completed using a hollow stem auger. Drilling to and sampling of ground water shall be performed in accordance with the Nebraska Department of Health and Human Services' Title 178, NAC 12.

Samples are to be submitted for laboratory analyses for the Chemicals of Concern (COCs) indicated in Table 1. When collecting soil samples using an auger, it is to be done in such a manner as to minimize disturbance of the soil structure, which can be achieved by using a coring barrel, split spoon, or Shelby Tube. The predominant soil type of each sample (e.g., clay, silt, sand, gravel) shall be recorded separately and submitted on a boring log as an addendum to the SFM's Closure Assessment Report (CAR). See Appendix A for containerizing, labeling, transporting, and maintaining chain of custody for each soil and ground water sample collected.

In some cases, the locations of the UST and/or product piping or the depth to ground water prevent conducting an in-place closure assessment in accordance with the SFM's Title 159. In such cases, contact the SFM Flammable Liquid Storage Division to discuss a possible variance.

NOTE: When performing an in-place UST system closure assessment, the soils generated by the drilling must be properly managed. Please review NDEQ's Environmental Guidance Document 05-161, Investigation-Derived Waste (IDW) & Remediation Waste Considerations prior to drilling in order to prepare for the management of investigation-derived wastes.

### **6.1 Sampling Locations**

#### **6.1.1 USTs**

One boring is to be drilled through the UST basin backfill at each end of each UST to be closed in-place. If the distance between any of the borings exceeds 25 feet, as measured along the UST basin perimeter, a boring is to be drilled midway between the two ends and sampled as described above.

#### **6.1.2 Piping**

Borings are to be placed on what is best estimated to be the down-gradient side with respect to the ground water flow direction. One boring is to be drilled at the location where the product line leaves the UST basin. If the running length of the product line between the boring at the UST basin and its corresponding dispenser exceeds 25 feet, additional borings are to be drilled such that the borings along the piping run are equally spaced and the distance between each boring does not exceed 25 feet between.

#### **6.1.3 Dispensers**

One boring is to be drilled within 3 feet of each dispenser island. Again, the borings are to be placed on the side that is best estimated to be the down-gradient direction of ground water flow.

## **6.2 Sample Collection Depths**

In accordance with the SFM's Title 159, Chapter 10, Section 003, a sample is to be collected from each boring when contamination is first encountered, be it in the soil or ground water. If contaminated soil is detected before encountering ground water, then one soil sample is to be collected at the depth it is first encountered. As the auger is advanced, soil samples are to be collected every 10 feet ahead of the drill string with a coring barrel, split spoon, or Shelby Tube soil sampler until ground water is reached, at which point a ground water sample is collected.

## **6.3 Ground Water Sample Collection**

It should be noted that when collecting a ground water sample, the sample needs to be taken within the top 5 feet or less of the saturated zone. This may require that some research be conducted prior to drilling at a facility in order to estimate the depth to ground water. It is important to know the depth to ground water because in those areas of the state where fine-grained soils (i.e., clays and silts) are prevalent, ground water may be very slow to enter the boring. As a result, drilling a well below the upper 5 feet of the saturated zone may occur.

It is strongly recommended that a temporary casing and screen be carefully placed in the boring and the ground water level allowed to equilibrate when collecting a ground water sample. Ensure that the screened interval extends above the water table in order to allow any petroleum product that might be present to enter the casing. The ground water sample can then be collected by slowly lowering a bailer down the temporary well casing. If petroleum product is present on the ground water, then measure the product thickness in the bailer. Otherwise, collect a ground water sample for laboratory analyses.

A ground water sample can be collected through the hollow stem auger, but this method is not recommended as it can result in cross-contaminating the water sample. However, if sampling through a hollow stem auger, pull up the auger above the water table and allow time for any free product that might be present to enter the boring before for collecting the ground water sample.

## **SECTION 7.0      UST OVER-EXCAVATION GUIDANCE**

If soil contamination is still apparent following the mandatory backfill removal, the Owner/Operator (O/O) has the option to **voluntarily** dig below (over-excavate) the backfill/native soil interface in an attempt to remove all of the petroleum-contaminated soil or at least reduce the amount remaining. Should this option be selected, the sampling requirements of the SFM's Title 159, Chapter 10 must still be followed. The Department, however, considers voluntary over-excavation to be a remedial action. As such, those reasonable costs associated with the actual physical excavation (for the over-excavated portion only) in addition to disposal/land application and sample analyses are eligible for reimbursement consideration in accordance with NDEQ's Title 200, provided this guidance is followed. Reimbursement for the mandatory backfill removal (SFM's Title 159 requirement) is only allowed for those costs associated with the sample analyses and disposal/land application.

The purpose of over-excavating at the time of UST system closure is to reduce or eliminate the amount of contaminated soil in the source area, thereby reducing impacts or potential impacts to points of exposure (e.g., contamination of drinking water wells, intrusion of vapors into subsurface structures) caused by the petroleum contamination leaching downward and/or migrating from the source area. Over-excavation assists in the prevention or reduction of future ground water contamination, explosion potential, vapor intrusion or other potential risks to public health and safety. It is important to note, however, that over-excavation beneath any portion or all of the UST system may not eliminate the need for further investigation and/or remediation of soil and/or ground water.

If the over-excavation option is being considered, it is strongly recommended that it is performed immediately following the removal of the UST(s) and/or other parts of system. If immediate over-excavation is not conducted at the time of closure, but is performed at a later time after the excavation has been backfilled, then the O/O may be allowed to submit a work plan at a later date for the purpose of over-excavating. The costs for only the required sampling and contaminated soil disposal will be considered eligible for reimbursement from NDEQ's Title 200 fund whereas the cost associated with re-excavating to expose the contaminated soils is not considered eligible for reimbursement (see Section 2.2).

It should be noted that if the O/O intends to install a new UST and/or ancillary equipment (e.g., piping, dispensers) in the over-excavated UST basin(s) and/or trenches that have been backfilled, **the SFM must be notified prior to installation** (SFM's Title 159, Chapter 2, Section 003 and Chapter 4, Section 004.05). It must be demonstrated to the SFM that the backfill material has been compacted such that it will facilitate installation of the new equipment (contact the SFM for compaction guidance of unstable soils for UST system installation).

**Please circle on the site map submitted with the Closure Assessment Report (CAR) the general areas where over-excavation was performed.**

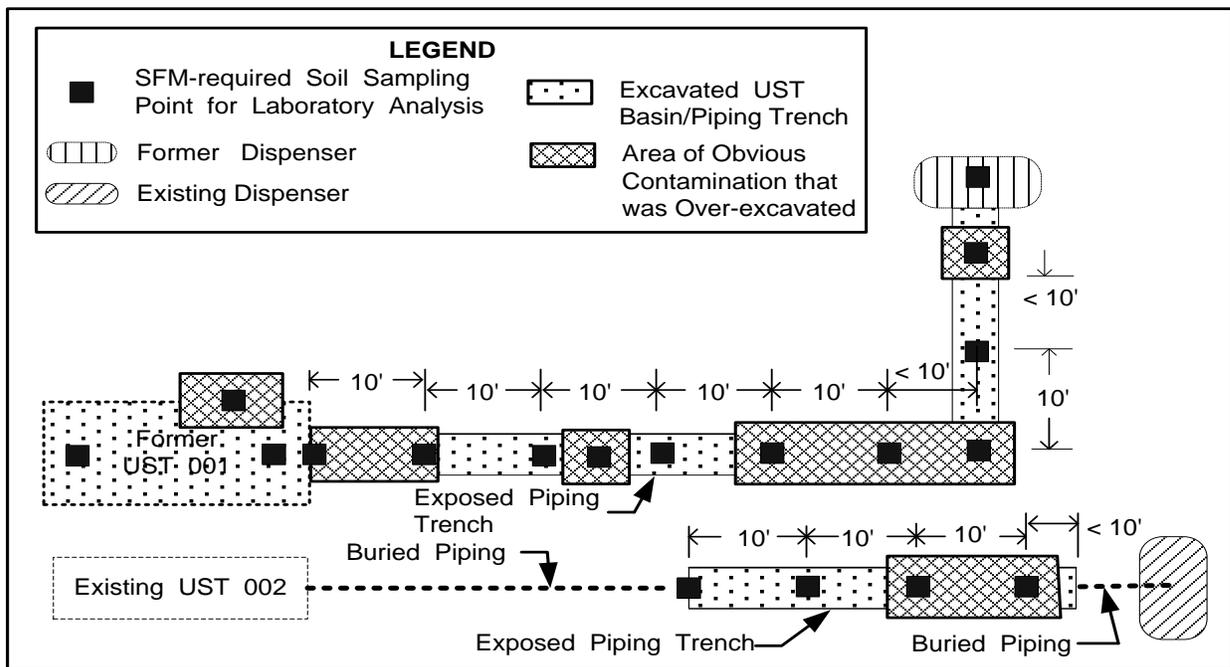
### **7.1 Over-excavation Process**

Voluntary over-excavation of contaminated soils below the backfill-native soil interface as well as that soil removed and disposed in order to provide safe working conditions (i.e. sloping or benching of side walls) is considered part of the remedial action. Please be aware that the Department will not consider the disposal of non-contaminated soil eligible for reimbursement, so it is best to separate the contaminated soil from non-contaminated soil as it is being excavated. See Figures 5 and 6 for examples indicating sampling locations required by Title 159 following soil removal per Title 159 as well as those required

following voluntary over-excavation. If ground water enters when over-excavating, please refer to Section 5.0 of this guidance for sampling requirements.

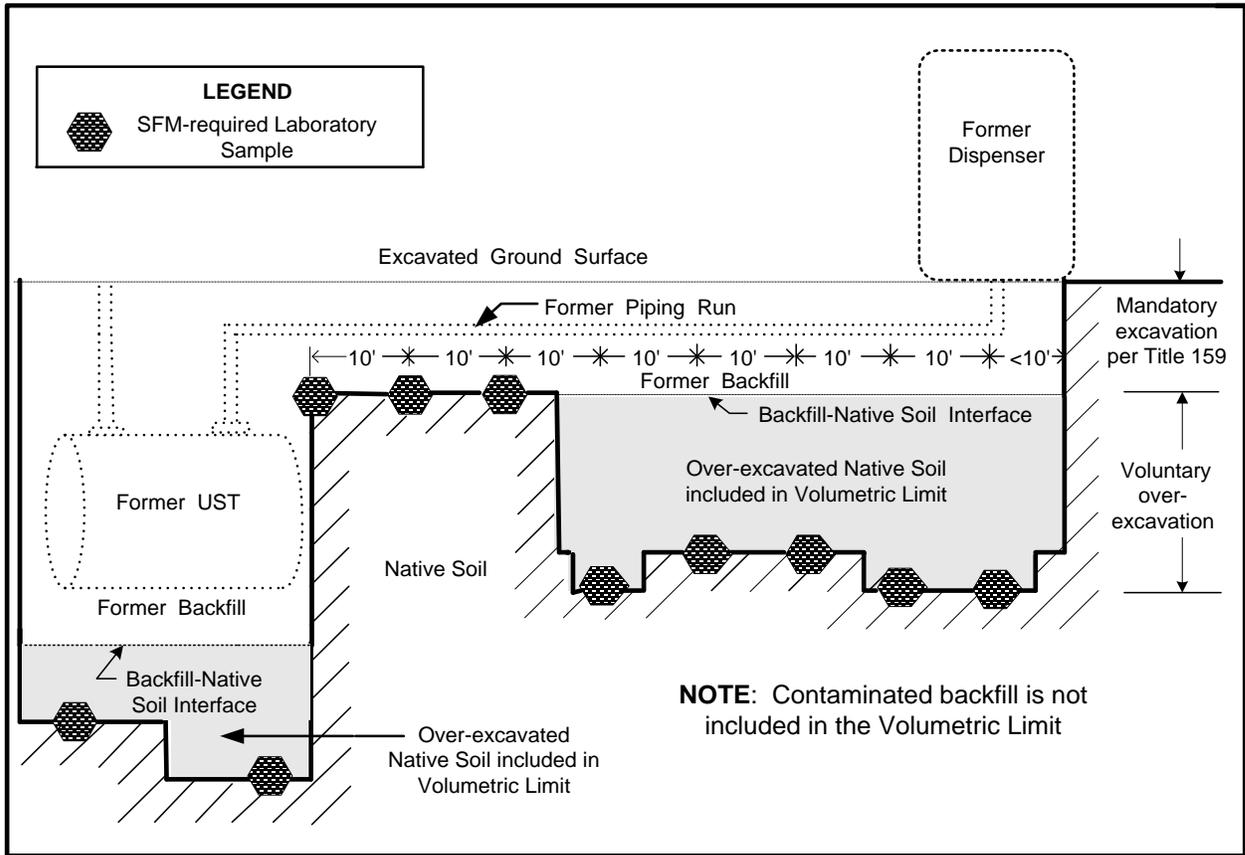
The petroleum-contaminated soil removed **must be** properly managed (see NDEQ’s Environment Guidance Document 06-205-Management of Petroleum-Contaminated Materials). This work is eligible for reimbursement consideration under NDEQ’s Title 200 and as such, the NDEQ Petroleum Remediation (PR) Section has established limits (Table 2) for specified volumes of soil that can be taken to the landfill without prior approval from the NDEQ PR Section and yet remain eligible for Title 200 reimbursement consideration. See Section 8.0 of this guidance for contaminated soil management and coordination with permitted landfills.

**Figure 5:** Plan-View Depiction of Potential Sampling Locations for Over-Excavated Sites



The figure above portrays a plan view of potential sampling locations following voluntary over-excavated soil removal. The SFM’s Title 159 requires that samples be collected from the backfill-native soil interface; however, when an area is over-excavated, then the sample is collected from the base of the excavation.

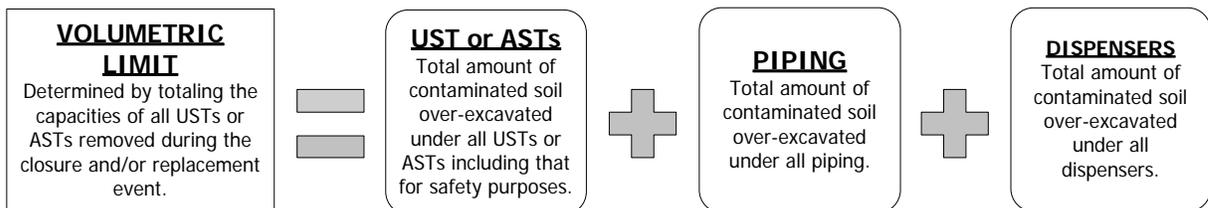
**Figure 6:** Cross-Sectional Depiction of Potential Sampling Locations for Over-Excavated Sites



The figure above portrays a cross-sectional view of potential sampling locations following voluntary over-excavated soil removal. The SFM’s Title 159 requires that samples be collected from the backfill-native soil interface; however, when an area is over-excavated, then the sample is collected from the base of the excavation.

**7.2 Volumetric Limits**

The volumetric limits (Table 2) have been established for the aggregate quantity of contaminated native soils when over-excavating beneath the UST basin, piping trenches, and dispensers during a single removal/replacement event. Please note that volumetric limits **can also be applied** when over-excavating petroleum-contaminated soil associated with leaking above ground storage tank (AST) systems. However, soil contaminated by petroleum released from ASTs must be managed differently than that released from USTs (see Section 8).



**Table 2: Over-excavation Volumetric Limits**

Total Tank Capacities of the Tanks Removed (in gallons)	Pre-approved Maximum Reimbursable Amount of Soil Removed as Part of the <u>Over-excavation</u> Aggregate Total for all Tanks, Piping, and Dispensers (in cubic yards)*
< 1,100	35
1101-3100	65
3101-5100	100
5101-7100	135
7101-9100	170
9101-11,100	195
11,101-12,000	220
12,001-13,000	245
13,001-14,000	270
14,001-15,000	295
15,001-16,000	320
16,001-17,000	345
17,001-18,000	370
18,001-19,000	395
19,001-20,000	420
20,001-21,000	445
21,001-22,000	470
22,001-23,000	495
23,001-24,000	520
24,001-25,000	545
25,001-26,000	570
>26,000	Call the NDEQ PR Section for approval at (402) 471-2186

Note: The capacities for all tanks removed are to be totaled and compared to the numbers in the left column. The corresponding number in the right column is the volumetric limit.

\* When only over-excavating beneath any or all of the dispensers and/or piping (no USTs or ASTs involved), the pre-approved maximum reimbursable amount is 20 percent of the volumetric limit applicable to the total tank capacities.

The volumetric limits apply only to those contaminated soils removed as part of the over-excavation. Although disposal/land application of these soils (see Section 8 for management of contaminated soils) is still eligible for reimbursement consideration under NDEQ’s Title 200, the volumetric limits do not apply to any contaminated backfill removed during the SFM mandatory soil removal process. If the O/O chooses to continue to excavate beyond the volumetric limits for the their associated tank capacities, PR Section personnel **must** be contacted for approval in order for the work effort to be considered eligible for Title 200 reimbursement consideration. If the amount of over-excavated soil is anticipated to exceed 570 cubic yards for the total tank capacities of greater 26,000 gallons, NDEQ PR Section personnel **must** be notified before proceeding with over-excavation and a work plan may be requested for evaluation. If a concrete pad is removed, its volume is not counted toward the volumetric limit, but its disposal is considered eligible for reimbursement from NDEQ’s Title 200 fund.

How to use Table 2 to calculate the volumetric limits when removing USTs, and possibly lines and/or dispensers, are shown in the following two examples.

1. Two USTs are removed as well as the dispensers and lines. The two USTs have capacities of 5,100 gallons and 10,000 gallons. The total UST capacity equals 15,100 gallons (see Column 1).

According to Table 2, the total amount of soil that can be over-excavated and disposed without prior approval from the PR Section and remain eligible for Title 200 reimbursement consideration is 320 cubic yards (see Column 2).

2. Three USTs are removed with capacities of 10,000 gallons, 15,000 gallons, and 20,000 gallons as well as some dispensers and lines. The total UST capacity equals 45,000 gallons (see Column 1). According to Table 2, the total amount of soil that can be over-excavated and disposed without prior approval from the PR Section and remain eligible for Title 200 reimbursement consideration is 570 cubic yards (see Column 2). Any amount over-excavated for disposal exceeding 570 cubic yards must be approved by the PR Section in order to remain eligible for Title 200 reimbursement consideration.

It is not uncommon to replace or remove only the dispensers and/or piping. When doing so, the total amount of contaminated soil that may be over-excavated for those dispensers and/or piping without prior approval by the NDEQ PR Section and remain eligible for Title 200 reimbursement consideration is 20 percent of the volume applicable to the total tank capacities listed in Table 2. Examples of calculating the volumetric limits that are pre-approved when removing lines and/or dispensers are as follows.

1. One dispenser is removed, which is connected to an UST with a capacity of 5,000 gallons (see Column 1). The pre-approved amount that can be over-excavated for disposal is 20 cubic yards [ $0.20 \times 100$  cubic yards (see Column 2) = 20 cubic yards].
2. Piping between a dispenser and an UST with a capacity of 15,000 gallons is removed (see Column 1). The amount of soil pre-approved for over-excavation is 59 cubic yards [ $0.20 \times 295$  cubic yards (see Column 2) = 59 cubic yards].
3. Eight dispensers and associated piping are removed, which are connected to a 10,100-gallon UST and an 8,000-gallon UST. The two USTs have a total capacity of 18,100 gallons (see Column 1). The amount of soil pre-approved for over-excavation is 79 cubic yards [ $0.20 \times 395$  cubic yards (see Column 2) = 79 cubic yards].
4. Eight dispensers and associated piping are removed. The dispensers are connected to one UST with a capacity of 5,100 gallons and three with capacities of 10,000 gallons each. The four USTs have a total capacity of 35,100 gallons (see Column 1). The amount of soil pre-approved for over-excavation is 114 cubic yards [ $0.20 \times 570$  cubic yards (see Column 2) = 114 cubic yards]. Any amount over-excavated for disposal exceeding 114 cubic yards must be approved by the NDEQ PR Section in order to remain eligible for Title 200 reimbursement consideration.

## **SECTION 8.0**      **CONTAMINATED SOIL MANAGEMENT**

Soil excavated as part of the SFM's Title 159 mandatory backfill removal process as well as concrete pad rubble, if present, may be managed in one of three ways. Those options include:

1. **Dispose of contaminated soils and rubble as a special waste at a permitted (Subtitle D) Municipal Solid Waste Landfill.** It is strongly suggested that the landfill be contacted prior to trucking the soil in order to determine if it will accept petroleum contaminated soil and what sampling analyses the landfill may want to review before accepting the soil. In addition, inform the landfill whether the soil is generated by a petroleum release from an UST or an AST, because it might make a difference as to what sample analyses are required. For additional details, please see NDEQ's Environmental Guidance Document 06-205-Management of Petroleum-Contaminated Materials on the Department's web page. The Waste Management Compliance Unit can also be contacted at either (402) 471-4210 or at toll free (877) 253-2603, and the web site address is <http://deq.ne.gov>.
2. **Seek the Department's approval to conduct a one-time land application of the contaminated soils (no rubble allowed).** Please note that land application is generally **not** allowed between November 30 and March 1. In order for the Department's Waste Management Compliance Unit to consider land application, NDEQ's Special Waste Characterization Request Form must be completed and submitted for review. This form is also available on the Department's web page at <http://deq.ne.gov>.
3. Contaminated soils and rubble excavated for the SFM's Title 159 **mandatory backfill removal process** are part of a **construction activity** and may be pushed back into the excavation. **The Department, however, does not recommend this action.** It is during the UST system removal/replacement process that some, if not all, impacted soil can be easily removed and properly disposed or land applied, thus reducing or eliminating the threat of continued contaminant migration to the underlying ground water and/or the migration of petroleum vapors into buildings and subsurface structures. The Department reviews each of the SFM's Closure Assessment Reports (CARs) submitted to determine if any remaining contamination warrants an environmental investigation due to potential risks to human health and safety and the environment. It is possible an environmental investigation might not be needed at a later date if the impacted soil, even marginally contaminated, is managed in some other manner than pushing it back in the excavation.

Petroleum-contaminated soil **generated during over-excavation** is considered a **remedial action** and as such, **must be either properly disposed or land applied, it cannot be placed back in the excavated basin and/or trench.** Again, please refer to NDEQ's Environmental Guidance 06-205-Management of Petroleum-Contaminated Materials for disposal and land application directions.

Please note that soil contaminated with petroleum released **from an AST or during a transportation incident (e.g., pipeline, vehicle accident)** must undergo a hazardous waste determination prior to disposal or land application. This is further discussed in NDEQ's Environmental Guidance 06-205-Management of Petroleum-Contaminated Materials.

**SECTION 9.0**            **REPORT REQUIREMENTS AND SUBMITTAL**

In accordance with the SFM's Title 159, a completed Closure Assessment Report (CAR), containing all information required in Chapter 10, Section 004.03, must be submitted to the SFM within 45 days of the removal/replacement or closure-in-place of a regulated UST and/or ancillary equipment. Please circle on the site map submitted with the CAR the general areas where over-excavation was performed.

The CAR is to be submitted to:

Nebraska State Fire Marshal  
Fuels Safety Division  
246 South 14<sup>th</sup> Street  
Lincoln, NE 68509

After the CAR has been reviewed by the SFM, it is forwarded to the NDEQ for determining if additional environmental actions are warranted. The Department will then send a letter to the UST owner stating either the site file has been closed or that a subsurface investigation (Tier 1 investigation) is warranted; instructions will be provided should the latter determination be made.

## **SECTION 10.0      GLOSSARY**

**above ground storage tank system (AST)** – any tank or combination of tanks, including pipes, and ancillary equipment connected to such tank or tanks, which is used to contain an accumulation of petroleum (in the case of this guidance) and volume of which is more than ninety percent or more above the surface of the ground.

**ancillary equipment** – any system devices including, but not limited to, piping, fittings, flanges, valves, and pumps used to distribute, meter, or control the flow of regulated substances to and from an UST.

**backfill** – that material placed around the USTs and ancillary equipment (e.g., piping) when the system was installed such as sand, gravel, disturbed native soil, and so on.

**chemicals of concern (COCs)** – those specific constituents of petroleum (listed in Table 1) for which laboratory analyses are required as part of the SFM's Closure Assessment Report (CAR).

**grab sample** – a discrete portion representative of a specific location at a given point in time. The sample is collected all at once and at one particular point from the sampled medium. The representativeness of such samples is defined by the nature of the materials being sampled.

**ground water** – water occurring beneath the surface of the ground that fills available openings in the rock or soil materials such that they may be considered saturated.

**hazardous substance** – two separate meanings depending on use:

**storage** – per the SFM's Title 159, "Hazardous substance UST system" means an underground storage tank system that contains a hazardous substance defined in section 101(14) of Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) (but not including any substance regulated as a hazardous waste under subtitle C) or any mixture of such substances and petroleum, and which is not a petroleum UST system.

**release reporting** – per NDEQ's Title 126-Rules and Regulations Pertaining to the Management of Wastes, "Hazardous Substance" means:

- any substance or mixture of substances other than oil and petroleum-related products or radioactive substances which, when released into the environment, presents an imminent and substantial hazard to the public health or welfare, including but not limited to, fish, shellfish or other wildlife, and, any substance designated pursuant to Chapters 2 and 4 of NDEQ's Title 128-Nebraska Hazardous Waste Regulations, and
- any substance designated by the United States Environmental Protection Agency pursuant to Section 101(14) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980 or Section 329(3) of the Emergency Planning and Community Right-to Know Act (EPCRA) of 1986 (40 CFR Part 355).

**hydrocarbon** – any organic compound, gaseous, liquid, or solid, consisting primarily of carbon and hydrogen.

**meniscus** – the curved upper surface of a non-turbulent liquid in a container. As it pertains to collecting a ground water sample, the meniscus must curve upward to prevent the incorporation of air (identified as bubbles) into the vial.

**operator** – any person in control of, or having responsibility for, the daily operation of a tank but shall not include a person described in subdivision (2)(b) of Neb. Rev. Stat. §81-15,119.

**over-excavation** – the total amount of contaminated native soil removed beyond the base of the backfill underlying an UST or any of the ancillary equipment in accordance with the SFM’s Title 159.

**owner** – per the Petroleum Products and Hazardous Substances Storage and Handling Act, §81-15, 119, in the case of a tank [UST] in use on July 17, 1986, or brought into use after such date, any person who owns a tank used for the storage of dispensing of regulated substances; and in the case of any tank in use before July 17, 1986, but no longer in use on such date, any person who owned such tank immediately before the discontinuation of its use.

**petroleum** – is defined under several statutes and regulations.

For purposes of Title 200 reimbursement (Petroleum Release Remediation Action Act, §66-1510):

1. Motor vehicle fuel as defined in section Neb. Rev. Stat. §66-482, except natural gasoline used as a denaturant by an ethanol facility as defined in Neb. Rev. Stat. §66-1333; and
2. Diesel fuel as defined section Neb. Rev. Stat. §66-482, including kerosene which has been blended for use as a motor fuel; and
3. A fraction of crude oil that is liquid at a temperature of sixty degrees Fahrenheit and a pressure of fourteen and seven-tenths pounds per square inch absolute, except any such fraction which is regulated as a hazardous substance under section 101(14) of the federal Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.C. 9601(14), as such act existed on January 1, 2005.

For purposes of reporting a release in accordance with NDEQ’s Title 126-Rules and Regulations Pertaining to the Management of Wastes (Chapter 1, Section 030), the term “oil” is used. “Oil” means oil of any kind or in any form, including, but not limited to:

1. Petroleum, fuel oil, oil refuse, and oil mixed with wastes other than dredged spoil (Section 311(a)(1) of the Federal Clean Water Act) and;
2. Fats and oils from animal and vegetable sources.

**release** – per NDEQ’s Title 126-Rules and Regulations Pertaining to the Management of Wastes, “release” means, but is not limited to, any discharging, spilling, leaking, pumping, emitting, emptying or dumping of an oil or hazardous substances upon land, beneath the surface of the land, or in waters of the State, either by accident or otherwise.

**responsible person (party)** – per NDEQ’s Title 126-Rules and Regulations Pertaining to the Management of Wastes, any person producing, handling, storing, transporting, refining, or disposing of an oil or hazardous substance when a release occurs, either by accident or otherwise. This includes carriers and any other person in control of an oil or hazardous substance when a release occurs, whether they own the oil or hazardous substances or are operating under a lease, contract, or other agreement with the legal owner thereof.

**soil** – the collection of natural earthy unconsolidated materials (i.e., sediments) on the earth’s surface, including those modified by humans and all unconsolidated material below the earth’s surface, which comprises the unsaturated zone.

**tank** – as it applies to the SFM’s Title 159, an underground storage tank (UST), as defined below. For the purpose of over-excavation, the term “tank” may also apply to an above ground storage tank (AST).

**tank excavation** – those soils excavated in order to only remove all or any portion of the underground storage tank system to meet the State Fire Marshal’s regulations (Title 159).

**underground storage tank system (UST)** – per the Petroleum Products and Hazardous Substances Storage and Handling Act, §81-15, 119, any tank or combination of tanks, including underground pipes connected to such tank or tanks, which is used to contain an accumulation of regulated substance and volume of which is ten percent or more beneath the surface of the ground. See the SFM’s Title 159 for underground storage tanks that are exempt from the required sampling.

**APPENDIX A**  
**COLLECTION OF SOIL AND GROUND WATER SAMPLES FOR LABORATORY  
ANALYSIS OF PETROLEUM CHEMICALS OF CONCERN**

**SAMPLING PROCEDURES:**

The following procedures are to be followed when collecting samples for laboratory analysis.

- Only laboratory-cleaned, laboratory-approved containers are to be used.
- For volatiles such as benzene, toluene, ethylbenzene, and xylenes (BTEX), methyl tertiary-butyl ether (MTBE), and n-hexane, all containers must have air-tight, Teflon-lined, screw-on lids.
- All samples must be immediately placed in appropriate containers and the containers properly sealed.
- All sample containers must be properly labeled with the following information:
  - Sample number and location,
  - Facility name,
  - Type of analysis to be conducted
  - Date of sampling,
  - Time of sampling,
  - Sampler's signature.
- After collection, samples must be kept cool (4° C) until delivered to laboratory.
- All applicable chain-of-custody documents must be completed and accompany the laboratory analysis data.
- All preservation and holding time requirements must be followed.

**LABORATORY ANALYSIS METHODS FOR SOIL AND WATER:**

- Method OA-2 Total Extractable Hydrocarbons (TEH) (most current version):
  - Container type: wide-mouth, glass sample jar
  - Container size:
    - § **Soil samples:** one liter or one quart
    - § **Water samples:** one liter or one quart
  - Sample amount necessary to complete analysis:
    - § **Soil samples:** at least 200 grams (about one-half quart)
    - § **Water samples:** one liter or one quart
  - Preservation: soil and water samples: cool to 4° C (39° F)
  - Holding time:
    - § **Soil samples:** must be delivered to the laboratory and extracted within 14 days and analyzed within 40 days.
    - § **Water samples:** must be delivered to the laboratory and extracted within 7 days and analyzed within 40 days.
  - Specific sampling procedures:

- § **Soil samples:** quickly place as much soil as possible in the container and immediately secure lid. **Do not pack soil in jar by tamping.**
  - § **Water samples:** slowly introduce water with as little agitation as possible until the container is completely full, then immediately secure the lid.
- Method OA-1 or EPA Method 8260 (most current versions), Volatile Organic Analysis: for BTEX, MTBE, and n-hexane:
    - Sample numbers needed: two vials from each sample location
    - Container type:
      - § **Soil samples:** 40 ml vials or 4 oz. glass jars
      - § **Water samples:** 40 ml vials. The size may differ depending on the minimum sample amount required by the laboratory conducting the analysis.
    - Sample amount necessary to complete the analysis:
      - § **Soil samples:** quickly and completely fill 40 ml vials or 4 oz jars (no head space).
      - § **Water samples:** 40 ml vials. The size may differ depending on the minimum sample amount required by the laboratory conducting the analysis.
    - Preservation:
      - § **Soil Samples:** cool to 4° C (39° F)
      - § **Water samples:** for OA-1 and EPA Method 8260, use 1:1 HCL to pH <2 and cool to 4° C (39° F)
    - Holding Time:
      - § **Soil samples:** analyze sample within a maximum of 14 days from sample collection
      - § **Water samples:** analyze preserved samples within a maximum of 14 days of sample collection, and within a maximum of 7 days of sample collection for analysis of unpreserved samples
    - Specific sampling procedures:
      - § **Soil samples:** sample containers must be completely filled, leaving no headspace
      - § **Water samples:** The necessary amount of hydrochloric acid (HCL) is first placed in the vial before introducing the water sample. The vial is then tilted at an angle between 25-35 degrees while being filled to minimize agitation; no air is to be passed into the container. The vial is filled until a meniscus is formed on top of the bottle. Immediately seal container with cap, then invert the container and lightly tap with a finger to ensure that no air bubbles are present in the sample. If air bubbles are present, the sample must be discarded and the above procedure repeated. Once an air-free sample is obtained, the sealed vial is to be vigorously shaken for one minute and placed on ice.

**CHEMICALS OF CONCERN:**

The latest version of either Method OA-1 or EPA Method 8260 is to be used when analyzing for Volatile Organics. These chemicals include: Benzene, Toluene, Ethylbenzene, Xylenes, Methyl Tertiary-butyl Ether, and n-Hexane (BTEX, MTBE, n-Hexane, respectively).

Method OA-2 is used when analyzing middle and heavy distillates such as diesel fuels, fuel oils, motor oil, waste oil, stoddard solvent, and others. Method OA-2 measures Total Extractable Hydrocarbons (TEH) using a standard for the substance(s) stored in the UST.

**NDEQ Approved Laboratory Sample Procedures for COCs\***

MATRIX/ SAMPLING TYPE	SOIL/GRAB*		WATER/GRAB*	
	VOCs <sup>♠</sup> (BTEX, MTBE, n-HEXANE)	TEH <sup>♠†</sup> (DIESEL, MOTOR OIL, WASTE OIL, KEROSENE, ETC.)	VOCs <sup>♠</sup> (BTEX, MTBE, n-HEXANE)	TEH <sup>♠†</sup> (DIESEL, MOTOR OIL, WASTE OIL, KEROSENE, ETC.)
APPROVED LABORATORY ANALYSIS METHOD**	METHOD OA-1 or EPA METHOD 8260B	METHOD OA-2	METHOD OA-1 or EPA METHOD 8260B	METHOD OA-2
PRESERVATIVE	COOL TO 4° C (39° F)	COOL TO 4° C (39° F)	1:1 HCL TO pH <2. COOL ALL SAMPLES TO 4° C (39° F)	COOL TO 4° C (39° F)
CONTAINER TYPE	TWO 4 oz GLASS JARS OR 40 ml VIALS ALL LIDS SHALL BE AIRTIGHT AND TEFLON LINED	ONE LITER OR QUART WIDE-MOUTH JAR. ALL LIDS SHALL BE AIRTIGHT AND TEFLON LINED	TWO 40 ml VIALS. ALL LIDS SHALL BE AIRTIGHT AND TEFLON LINED.	ONE LITER OR QUART WIDE-MOUTH JAR. ALL LIDS SHALL BE AIRTIGHT AND TEFLON LINED
AMOUNT NEEDED	FILL TWO 40 ml VIALS or TWO 4 oz GLASS JARS (NO HEADSPACE)	200 GRAMS (ABOUT 1/2 QUART)	TWO 20 ml VIALS (NO BUBBLES)	FILL ONE LITER OR QUART JAR
HOLDING TIME	14 DAYS TO ANALYZE	14 DAYS TO EXTRACT, 40 DAYS TO ANALYZE	14 DAYS TO ANALYZE	14 DAYS TO EXTRACT, 40 DAYS TO ANALYZE

\* Please refer to Table 1 for the COCs to be collected for the type of petroleum.

♠ The most current version of the laboratory analytical method must be used.

† The middle and heavy distillates are to be analyzed using Total Extractable Hydrocarbons (TEH). Laboratory standards are available for the middle and heavy distillates such as:

TEH as Diesel

TEH as Motor Oil (unused motor oil)

TEH as Waste Oil

- If Chlorinated Solvents are suspected in the Waste Oil: complete Method OA-1 or 8260B scan.

- If Ethylene Glycol (Antifreeze) is suspected in the Waste Oil: use EPA Method 8430.

- If Heavy Metals (i.e., RCRA eight metals: Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, Silver) are suspected in Waste Oil: use EPA Method 6010B.

TEH as Kerosene

TEH as Stoddard Solvent