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PROCEDURES AND SOIL SAMPLING REQUIREMENTS for the OVEREXCAVATION of PETROLEUM CONTAMINATED SOILS DURING UST REMOVAL ACTIVITIES

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The Department of Natural Resources and Environmental Control, Tank Management Section (DNREC-TMS) has developed this guidance to assist tank owners, operators and contractors in complying with DE Admin. Code 1351, State of Delaware *Regulations Governing Underground Storage Tank Systems* (the UST Regulations). This is guidance only, the DNREC-TMS may impose additional requirements when deemed necessary.

Overexcavation is the technique for the expedited corrective action of a **limited release** from an underground storage tank (UST) system. Specifically, if a release is identified during the removal of a tank, the owner/operator may decide to overexcavate the tank pit area to remove the contaminated materials. Although this method of remediation is acceptable, the owner/operator should be aware that the procedure can be quite expensive if the release is more extensive than originally anticipated. Discretion should be used especially when considering to overexcavate a tank area where a large release has occurred, and/or where the lateral and vertical extent of the contamination is unknown. Importantly, careful consideration will help safeguard the tank owner/operator from large unforeseen costs for the disposal/remediation of the excavated materials. In addition, the owner/operator should be aware that if post-excavation confirmatory samples show that contamination is still present on-site above action levels, a hydrogeologic investigation of the release will still be required.

OVEREXCAVATION PROCEDURES

1. Remove tank(s) and collect the required number of soil samples. Refer to UST Removal Guidance for specific sample requirements.
2. If a release is identified, the tank area may be overexcavated, but no more than five (5) feet farther than any one side of the original tank excavation. Additional excavation is permissible, following notification and approval from the DNREC-TMS (see "Potential Outcomes," Step 3, below).
3. If the water table or bedrock is encountered during excavation (or anticipated to be encountered), contact the DNREC-TMS project officer to discuss your options.

4. Following the excavation procedures, collect confirmatory soil samples from each wall and the bottom of the excavation (see the “Soil Sampling Requirements for UST Overexcavation” section below).
5. Remediate/dispose of the contaminated soils.
6. Submit a closure report to the DNREC-TMS including:
 - a. Site Map depicting the location and dimensions of the excavation and sample locations.
 - b. Results of the soil sample analyses with chain-of-custody.
 - c. Custody seal chain-of-custody, if applicable.
 - d. Photo documentation of the excavation.
 - e. All appropriate disposal documentation. (e.g., disposal of piping, product, sludge, soil, etc.)
 - f. If sampling deviation is approved in the field the name of the DNREC-TMS project officer who approved the deviation must be clearly indicated and the sampling locations must be noted on the site map.

POTENTIAL OUTCOMES

1. If the analytical results show that the contaminated soils have been removed from the tank area, and documentation showing that the excavated materials have been remediated and/or disposed, the DNREC-TMS will make a decision to inactivate the site (ie: a No Further Action (NFA) letter will be issued to the tank owner/operator).
2. If the analytical results show that contaminated materials remain in the tank area, the DNREC-TMS will issue notification requiring the tank owner/operator to take further action to investigate or remediate the release.
3. If the owner/operator decides that further overexcavation of the tank area is the best appropriate means to remediate the release, then a work plan outlining the proposed procedure must be submitted to the DNREC-TMS for review. The work plan must address the following:
 - a. Method(s) for determining the lateral and vertical extent of the contamination.
 - b. Estimated amount of material to be excavated.
 - c. Screening method to be used to identify the contamination during the excavation process.
 - d. Sampling protocol for the area of overexcavation, and the excavated soils.
 - e. Proposed method for the remediation/disposal of the excavated soils.
 - f. Method, location, and estimated length of time contaminated soils are to be stockpiled onsite.
 - g. If remediated onsite, the ultimate disposal options for the treated materials.

SOIL SAMPLING REQUIREMENTS for UST OVEREXCAVATION

You must receive approval **in advance**, from the DNREC-TMS, for **any** deviation from these requirements. Requests for deviation must be written, including reason for deviation and a sketch showing proposed sampling locations.

To characterize the soils in the tank area, the DNREC-TMS requires tank owners/operators to collect composite and grab soil samples for each tank that is overexcavated. Specifically these samples include:

Composite Samples

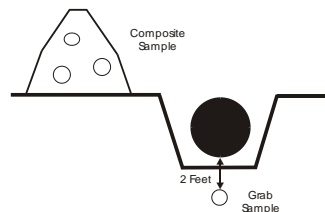
Composite soil samples should be collected by sampling the soils along the pit wall that are representative of subsurface conditions. If visible staining or vapors/odors are exhibited at any area along the wall, soils from that impacted area must be incorporated in the composite sample. To prevent volatilization of any contamination, composite samples should be collected as soon as the sample locations become accessible. The number of required composite soil samples per tank is described in *Table 1*.

Grab Samples

Grab soil samples should be collected from areas showing visible staining, or wherever vapors are detected by the screening instrument(s). If no contamination is apparent, grab samples should be collected from the center of each pit wall. To prevent volatilization of any contamination, grab samples should be collected as soon as the sample locations become accessible. The number of required grab soil samples per tank is described in *Table 1*.

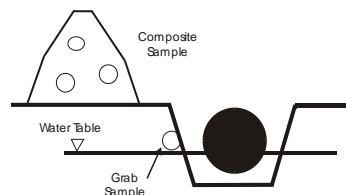
Tanks Above the Water Table

If groundwater is not present in the tank pit, soil borings/test pits must be installed to a total depth equal in elevation to two (2) feet below the bottom of the tank. Grab samples must be collected from two (2) feet below the bottom of the tank.



Tanks Below the Water Table

If the tank is submerged, soil borings/test pits must be drilled to the top of the water table. Grab soil samples must be collected from the soils directly above the soil/groundwater interface.



If overexcavation is chosen as the method to remediate a release during an UST removal, the DNREC-TMS requires that the area of excavation be sampled in the following manner to verify that the contaminated materials have been removed:

**REQUIRED NUMBER OF SOIL SAMPLES BY TANK CAPACITY
for 1 TANK in a PIT***

UST Capacity (gallons)	# of Samples per Tank
0 – 1,100	Composite Samples (5 samples) – 1 from each sidewall and 1 pit bottom
1,101 – 20,000	Composite Samples (5 samples) - 1 from each sidewall and 1 pit bottom Grab Samples (5 samples) – 1 from each sidewall and 1 pit bottom
20,000-above	Composite Samples – 1 per 20 running feet each wall or bottom being overexcavated Grab Samples – 1 per 20 running feet each wall or bottom being overexcavated

***For sites with more than one tank deviation from the above requirements may be requested via a written request to the DNREC-TMS. See #3 under Notification above.**

UST Systems Less Than 1,100 Gallons in Capacity – 5 total samples

One (1) composite sample must be collected from each of the four (4) sidewalls and pit bottom of the excavation. A map or diagram showing where the samples were collected must accompany the analytical results submitted to the DNREC-TMS for review.

UST Systems Greater Than 1,100 Gallons in Capacity or Dispenser Overexcavation(s) – 10 total samples

One (1) composite and one (1) grab sample must be collected from the four (4) sidewalls and pit bottom of the excavation. A map or diagram showing where the samples were collected must accompany the analytical results submitted to the DNREC-TMS for review.

UST Systems Greater Than 20,000 Gallons in Capacity

In larger tank fields, one (1) composite and one (1) grab sample must be collected per twenty (20) running feet, along each side (walls and floor) that is overexcavated. A map or diagram showing where the samples were collected must accompany the analytical results submitted to the DNREC-TMS for review.

QA/QC PROTOCOL

All samples must be submitted in clean sealed containers provided by the analytical laboratory and kept at $\leq 6^{\circ}\text{C}$ until delivered to the laboratory for analysis. The laboratory must receive samples within twenty-four (24) hours of collection. If sample delivery within twenty-four (24) hours is not possible (for example, samples are collected late on a Friday after the laboratory is closed) proper storage of the samples must be documented on the chain of custody form. A chain of custody form must be maintained at all times for all samples and submitted to the DNREC-TMS.

For sampling events where volatile organic compounds (BTEX, GRO, EDB, EDC, MTBE, etc.) are to be analyzed, a trip blank must accompany the cooler from pickup to delivery. The trip blank must be analyzed for the same volatile organic compounds as the collected soil samples.

For soil sampling events where volatile organic compounds are to be analyzed, methanol preservation or Encore™[®] sampling must be conducted. Note: Encore™[®] Samplers **should not** be used when sampling pea gravel. When sampling pea gravel, methanol preservation of the sample in the field is required. Coordinate with your laboratory in advance to determine best sample volume and appropriate bottleware size for representative samples and ease of sample collection.

To minimize the risk of cross-contamination the use of disposable/dedicated sampling equipment is highly recommended when collecting samples. If reusable sampling equipment is preferred, proper decontamination procedures must be employed. The collection of an equipment blank is recommended, not required, when reusable/non-dedicated sampling equipment is used.

To maintain sample integrity, a DNREC-TMS Representative on-site may apply a custody seal to the sample container at the time of sample collection. If the seals are applied a separate chain-of-custody will be provided. This chain of custody must accompany the sample to the laboratory and a copy must be returned to the DNREC-TMS along with the sample results. If a sample is received by the laboratory with a damaged custody seal the DNREC-TMS may not accept the sample results and will request additional samples be collected.

Call the DNREC-TMS for more specific information about sampling methods, including proper procedures to assure QA/QC of samples and decontamination of tools.

REPORTING REQUIREMENTS

1. Site Map showing sample locations.
2. Results of the soil sample analyses with chain-of-custody.
3. Custody seal chain-of-custody if applicable.
4. All appropriate disposal documentation. (e.g., disposal of piping, product, sludge, soil, etc.)
5. If sampling deviation is approved in the field the name of the DNREC-TMS project officer who approved the deviation must be clearly indicated and the sampling locations must be noted on the site map.

The UST owner, operator or contractor must forward the required documentation to the DNREC-TMS within sixty (60) days of the tank overexcavation activity. The sample results must be labeled with the full site name, address, and date of the overexcavation. It is the responsibility of the UST owner, operator or contractor to provide all necessary information to the DNREC-TMS.

ANALYTICAL PARAMETERS

All soil samples from petroleum tank Overexcavation activities must be analyzed according to the following **DERBCAP Tier 0** table below:

Analyte	Tier 0 Action Level	Gasoline	Kerosene/ Jet Fuels	Diesel/ Heating Fuels	Used Oil ^{1,2}	Aviation Gas	New Oil	Heavy Oils	Other
BTEX ^{5,7}	Benzene 230 ppb, Total BTEX 10 ppm	X	X		X	X			
GRO ⁷	100 ppm	X	X		X	X			
DRO	1000 ppm		X	X	X		X		
HRO	Site by Site				X		X	X	
Lead, EDB ⁷ , EDC ⁷	400 ppm, 10 ppb, 400 ppb	X ⁴			X	X			
MTBE ^{3,7}	130 ppb	X	X		X	X			
Ethanol ^{7,8}	None	X							
Other ⁶	Site by Site								X ⁶

Footnotes:

1. Used oil as defined in the Delaware *Regulations Governing Underground Storage Tank Systems*, Part A, Section 2. and the Delaware *Regulations Governing Hazardous Waste*.
2. Used oil USTs may also be required to analyze for metals, volatiles, semi-volatiles or any other analyte as required on a site specific basis depending on the tank contents. Contact the DNREC-TMS for determination.
3. MTBE analysis is required, unless conclusive documentation is submitted and pre-approved by the DNREC-TMS that no portion of the tank system was in service after January 1, 1978.
4. For gasoline USTs only, Lead, EDB and EDC analysis is required, unless conclusive documentation is submitted and pre-approved by the DNREC-TMS that all portions of the tank system were installed after January 1, 1996.
5. In addition to total BTEX, benzene must be reported separately.
6. If the tank contained anything other than petroleum products or if the tank system contained Racing Fuel, contact the DNREC-TMS for information on sampling procedures and analytical requirements prior to any on site activities.
7. Samples collected for the analysis of volatile organic compounds must be preserved with methanol. Encore TM® samplers are acceptable provided the preservative is methanol. Note: EncoreTM® Samplers **should not** be used when sampling pea gravel. When sampling pea gravel, methanol preservation of the sample in the field is required.
8. Ethanol analysis is required, unless conclusive documentation is submitted and pre-approved by the DNREC-TMS that no portion of the tank system was in service after April 1, 2006.