REMEDIATION DIVISION
Petroleum Cleanup Section

Over-Excavation of Contaminated Soil and Landfarming Technical Guidance Document

This guidance was developed to assist with remediation and cleanup actions at petroleum releases overseen by the Petroleum Tank Cleanup section.

A common practice among many Underground Storage Tank (UST) removal contractors and consultants is to over-excavate soil from the tank pit at nearly every tank removal site where contaminated soil is encountered. In many cases, this over-excavation results in the removal of a large volume of contaminated soil that ultimately has to be landfarmed off site. If the landfarm location is not suitable for treating the contaminated soil, the contaminants may spread and pollute groundwater or nearby streams or rivers, significantly increasing environmental and public health impacts, and the cost of cleanup.

There is no question that over-excavating and landfarming soils is an economical method for addressing some minor petroleum contamination problems; however, it is not always the most cost effective nor environmentally sound method for dealing with wide-spread soil contamination.

To address our concern with this problem, Department of Environmental Quality (DEQ) requires that the consultant obtains approval before landfarming large quantities of contaminated soil. DEQ has developed the following guidelines for making decisions about over-excavation:

1. Try to anticipate the need for a landfarm site before beginning a tank removal project, and evaluate possible sites before removing any soil. Consideration should be given to a licensed soil treatment facility (STF).
2. At a known release site, try to determine the extent of contamination and estimate the volume of soil that is contaminated, before selecting over-excavation and landfarming as the corrective action method. If soil volume estimates are greater than 100 cubic yards, groundwater is encountered, or a suitable landfarm site is not available, don't continue to excavate soil at the site. Contact DEQ immediately if any of these situations arise. A thorough site investigation may be required to determine the best cleanup alternative.
3. If over-excavation and landfarming is the corrective action selected for a site, determine if there is a licensed STF of a suitable landfarm location available before beginning soil removal. DEQ may contact local officials to assist in approving one-time small quantity landfarm sites. Written approval from DEQ

will be required (see box below) and must be obtained before beginning over-excavation. This will eliminate the need to stockpile large volumes of contaminated soil. (A form to be completed for obtaining DEQ approval of a one-time landfarm site is enclosed for your use.)

4. If contaminated soil is stockpiled at an UST site or other temporary storage site, it must be in a location that will not cause water pollution (Water Quality Act, 75.5.605 MCA), further soil contamination, create nuisance odors to nearby communities, or present a fire or safety hazard. Local county health and/or fire officials should be contacted prior to temporarily storing contaminated soil. If required by DEQ, stockpiles of contaminated soil must be covered with plastic and/or bermed, to prevent runoff of contaminated water or release of nuisance odors.

   REMINDER: The Montana UST regulations require that a petroleum release be reported to DEQ within 24 hours of discovery. (refer to Technical Guidance Document #3)

Requirements For Landfarming Based on Soil Volumes

Volume of Soil to be Landfarmed	Requirements
1 to 100 cubic yards for one-time landfarm application on property belonging to owner of contaminated soil.	Written approval from DEQ. DEQ may require initial sampling and/or follow-up monitoring.
1 to 100 cubic yards for one-time landfarm application on property not belonging to owner of contaminated soil.	Written approval from DEQ DEQ may require initial sampling and/or follow-up monitoring. Written permission from property owner.
Between 100 and 1,600 cubic yards for one-time landfarm application at any site.	Written approval from DEQ. DEQ will require background soil sampling and initial and follow-up soil monitoring. Groundwater monitoring may be required.
Application of contaminated soils from more than one site or where the total volume exceeds 1,600 cubic yards, or the establishment of a permanent landfarm site.	Landfarm License from the DEQ Community Services Division (406) 444-5345.

What To Look For When Selecting a One-Time Landfarm Site

Landfarming uses a combination of sunlight, wind and naturally occurring soil microorganisms to break down contaminants. The best landfarm sites are isolated flat areas on high ground where wind can blow over the soils, where standing water cannot accumulate and where there are no surface water drainages. Sites where soils have high silt and clay contents are preferred over sites where soils consist of sand and gravel.

Generally, depending on soil type, the site should be at least 500 feet from any wells, and greater than 25 feet from the seasonally high groundwater level. The location of nearby wells and the depth to groundwater must be evaluated through a review of well logs or other available information. Information on soils at the site should be obtained from the Soil Conservation Service (SCS). No landfarming activity shall occur where petroleum wastes are likely to cause pollution of any state waters (75-5-604 MCA).

PROPER LANDFARMING PROCEDURES

1. As required by DEQ, collect background or baseline samples from native soil at the approved landfarm site before spreading the contaminated soil. These samples can be combined into one or two samples for laboratory analysis. The samples should be analyzed for Volatile Petroleum Hydrocarbons (VPH) and Extractable Petroleum Hydrocarbons screen (EPH). Representative samples of the contaminated soil must also be collected and analyzed for benzene, toluene, ethyl benzene and xylene (BTEX) and for VPH and/or EPH screen depending on the source of contamination. Generally, analysis of two samples of the contaminated soil will be required.
2. Spread the contaminated soil in a thin layer (less than 6 inches) at the landfarm site. Construct a berm around the site, or otherwise prevent runoff from occurring. Mark the corners of the landfarm with stakes or flags so it can be identified at a later date. Mechanically till or turn over the soil periodically (approximately monthly) during the warm months (May to October) to promote soil exposure to the air and sunlight.
3. DEQ will establish the necessary number and frequency of soil samples to be collected at each site. Collect soil samples within the treatment area on a periodic schedule to determine when contaminant concentrations are low enough to stop treatment activities. Send all sampling and monitoring results to the DEQ project manager. DEQ will determine when treatment can be halted. Usually the requirement will be to collect two samples twice per year.

In most cases, soil contaminated with gasoline should be relatively clean after a summer season of proper landfarming. Soil contaminated with diesel fuel, waste oil, or a mixture of petroleum products may require longer treatment time.

Some landfarming technologies recommend the addition of mixtures of commercially sold bacteria, fertilizer or other products to the soil to increase degradation of petroleum products. Before applying any such soil additives at a landfarm site, approval must first be obtained from DEQ. Landfarming soils contaminated with other materials, such as sewage, antifreeze, or solvents is prohibited.

For additional information, please contact the DEQ (406) 444-6444.