

Petroleum-Contaminated Soils Handling Options

General Information

In the majority of cases when an underground storage tank is removed, soil contamination is discovered. This soil contamination is an environmental concern and may lead to the more serious problem of groundwater contamination. Before removing USTs, you should examine some of the "what ifs". Planning will save you both time and money. The following information outlines some options available for handling petroleum contaminated soils.

When confronted with contamination, you must make some difficult decisions. Should cleanup begin immediately or is further investigation required? Should the contamination be removed or is in-place treatment feasible? Will your business be unduly interrupted if soil treatment occurs on-site? Are there potential business implications, such as long-term liability, insurance requirements, future salability of the property, etc. that should be considered when selecting the cleanup method? Due to the complexity of cleanups and because of the number of remediation options available, the services of a qualified consultant are often useful when developing cleanup strategies other than simple removal of the contaminated soils.

You should be aware that the Department will not be able to complete final review and closure on your cleanup project until treatment and reuse or disposal of all contaminated soils has taken place. Since some options take longer to complete than others, this may also be a factor in the process of determining how to handle the contaminated soil.

In-Place Soil Treatment

Many methods for cleaning up soil contamination in-place, or "in-situ", have been used successfully. Examples of in-situ treatments include vapor extraction and biological treatment. Typically, in-situ treatment can be expensive but becomes more cost effective when large amounts of contamination are present or would be difficult to remove.

In-situ treatment methods are primarily used in conjunction with complex cleanup projects and often require that you submit a Corrective Action Plan. In order to properly prepare a Corrective Action Plan, extensive subsurface investigation

is usually required in order to define the extent of the contamination. Once the full extent of the contamination has been determined, reasonable cleanup options can be developed. If you choose to pursue in-situ soil treatment through a CAP, you should contact the local DEQ Regional Office (see Page 3) that has jurisdiction for your cleanup project in order to discuss the details of what will be required.

Soil Removal

If soil removal appears to be the best method for soil cleanup, a decision must be made concerning how the soils will be managed. Once the soils are removed, they can be independently treated (by you or your consultant) or taken to an authorized facility for treatment or disposal. If the soils are to be independently treated, precautions must be taken to prevent adverse environmental impacts or nuisance conditions.

Stockpiling of contaminated soils can only be conducted on a temporary basis while making arrangements for disposal or treatment. During this time, soils must be placed within a secure (i.e. fenced), lined, and bermed area and kept covered at all times. You have 30 days to either dispose of the soil at an authorized facility or to obtain a solid waste treatment permit from the Department (see section on "Department Approval").

Landfill Disposal

As landfill space becomes restricted, the cost of disposal of contaminated soils may go up. Ideally, no contaminated soils would be disposed of in a landfill since this results in the problem being moved from one location to another. Also, should there be problems with the landfill in the future, or if cleanup of the landfill should be required, persons who disposed of contaminated soil in the landfill may be held partially responsible for cleanup costs. However, until alternative disposal and treatment methods become readily available, landfill disposal may be the most cost effective option for some cleanup projects.

You should be aware that individual landfills may have specific requirements that must be met before disposal is allowed. If landfill disposal is the option chosen, contact them in advance - you may be able to coordinate sampling efforts to



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meet both Landfill and Department requirements at the same time. A list of landfills approved by the DEQ (*Petroleum-Contaminated Soil – Approved Oregon Disposal site List*) to receive PCS is available on our website (see Page 3).

Above Ground Biological Treatment

This treatment method is excellent for gasoline contamination and works relatively well for diesel, waste oil, and other heavy hydrocarbon contamination which does not aerate readily. Since the treatment results in destruction of the contaminants, this method reduces long term liability and is a better environmental solution than soil aeration or landfill disposal. However, unless the amount of soil to be treated is large, bioremediation is a relatively costly method for dealing with contamination. The services of a qualified consultant are usually necessary in the design of an appropriate treatment system. A solid waste permit from the Department is required (see section on "Department Approval"). There are some restrictions on how the treated soil can be reused. Contact the DEQ regional office that has jurisdiction for your cleanup project for more information.

Thermal Treatment

Thermal treatment is preferred over aeration and landfill disposal. This treatment method may reduce your future liability for the contaminated soils (the "cradle to grave" philosophy). Contaminated soil can be treated on-site through the use of a mobile unit or transported to a stationary facility.

Mobile Unit – Thermal Treatment

A mobile unit is especially useful for sites that are remote from a permanent thermal treatment facility or landfill. Costs in hauling the contaminated soil can be saved or reduced. However, you must be careful to ensure that your treatment site is suitable for the treatment equipment. You will need to contact local land use authorities to make sure this activity is allowed for your site. Specific information about the use of the mobile unit must be provided to the Department. A solid waste permit from the Department is required (see section on "Department Approval"). There are some restrictions on how the treated soil can be reused. Contact the DEQ regional office that has jurisdiction for your cleanup project for more information.

Stationary Facility – Thermal Treatment

A stationary facility operates similar to a landfill from a "user" perspective. You must provide the facility with information about where the contaminated soils originated and contamination levels. Once your application has been approved,

the contaminated soils are taken to the facility for processing. Your involvement is then over, unless you make arrangements for reusing the treated soil. Contact the specific facilities for more information on their requirements.

At this time there are no thermal treatment plants approved by the DEQ to receive PCS.

Soil Aeration

While treatment processes that result in the destruction of the hydrocarbons are preferred, soil aeration may be a somewhat less expensive means for dealing with soil contamination. Aeration works best for gasoline contaminated soils and has limited success with diesel or heavier hydrocarbons. This method involves the volatilization of hydrocarbons into the atmosphere. Some states prohibit this type of treatment because the hydrocarbons help to form photochemical smog (ozone). Also, gasoline contains benzene, which is a carcinogen.

While soil aeration may be a lower cost treatment option, it is by no means a "no cost" procedure. Soil aeration involves more than just spreading or piling the soil and letting it sit. The process requires the use of specific controls to prevent the creation of other problems and considerable work is needed to ensure that treatment is effective in reducing contaminant concentrations to an acceptable level. Soil aeration must include active treatment measures such as tilling or using piping and pumps to push/pull air through the soil. The Department will not approve of projects that involve the use of "passive aeration". A solid waste permit from the Department is required (see section on "Department Approval"). There are some restrictions on how the treated soil can be reused. Contact the DEQ regional office that has jurisdiction for your cleanup project for more information. More complete details on how to conduct soil aeration is contained in the guidance document *Treatment of Petroleum-Contaminated Soil*.

Department Approval

If your proposal for handling the petroleum contaminated soil includes on-site or off-site bioremediation, soil aeration, or thermal treatment with a mobile unit, a solid waste permit for treatment is required. This type of permit is called a *Solid Waste Letter Authorization* and requires the payment of a \$500.00 permit fee. The Department may waive the permit fee if you are otherwise reimbursing the Department for oversight costs. You will need to obtain approval for the treatment site from the local land use authorities before you proceed. The application for a solid waste

treatment permit requires that a written Treatment Plan be prepared that demonstrates that you will be able to effectively treat the contaminated soil. The owners of the properties where the treatment will occur, and where the treated soil will be reused, must sign statements to document that they understand what the restrictions are with these activities. Permits are good for six months from the date issued. Generally, if treatment has not been successful within one treatment "season", you must find alternatives (disposal at an approved facility) for handling the soil (although there may be some exceptions, as in the case of true bioremediation projects). If you propose to treat soil from more than one cleanup project at a single location, a more comprehensive solid waste permit will be required. The Letter of Authorization contains specific permit conditions which must be met throughout the treatment period. Violations of permit conditions could result in enforcement actions that include civil penalties or revocation of the permit.

In addition to the permit requirements for treating soil, some cleanup projects may also require a Water Quality permit to discharge water from an excavation or discharge treated water from a groundwater treatment system. Prior notice must be given to the Department if there will be air emissions from pollution control equipment (such as air strippers or vapor extraction systems). Contact the DEQ regional office that has jurisdiction for your cleanup project if either situation might be applicable to your project.

Representative soil samples must be collected quarterly to measure the reduction of concentrations and progress reports submitted to the Department. Soil treatment activities must be coordinated with the Department throughout the project and approval received before moving any contaminated or treated soils off-site. Regardless of the treatment methods, there are some restrictions on how the treated soil can be reused. Contact the DEQ regional office that has jurisdiction for your cleanup project for more information.

Summary

To minimize treatment costs, careful advance planning is required. Although several options are presented, some are more desirable than others. From an environmental perspective, the Department strongly encourages selection of a treatment method that actually destroys contamination rather than transferring it from one media to another (e.g. from soil to air). In addition, effective treatment of soils - if done correctly - results in the ability to reuse the soil

for other purposes (with some restrictions). Therefore, you may be required to submit information to "justify" the selection of other, less environmentally preferred methods for handling petroleum contaminated soil. However, the Department does recognize that these preferred treatment methods may not be equally available throughout the state at this time. Because treatment conditions for each site are unique, the specific requirements listed in this document may be more or less stringent than what is actually needed for your site. Careful coordination and prior approval from your DEQ regional office at specific junctures in the treatment process is extremely important. A final determination that "no further action is required" for the entire cleanup project will not be made by the Department until all details regarding the treated soils have been satisfactorily addressed and documented.

Publications Available on Tanks Website

Publications mentioned in this Fact Sheet may be downloaded from the Tanks Website at: www.deq.state.or.us/lq/tanks/

Contacting DEQ Regional Tank Staff

Tank Staff are available at the following offices:

In Northwest Oregon (Clatsop, Clackamas, Columbia, Multnomah, Tillamook and Washington counties):

- Portland, 2020 SW Fourth Ave., Suite 400, 503-229-5263

In Western Oregon (Benton, Coos, Curry, Douglas, Jackson, Josephine, Lane, Lincoln, Linn, Marion, Polk and Yamhill counties):

- Salem office: 750 Front St. NE, Suite 120, 503-378-8240
- Eugene office: 165 E. 7th Avenue, Suite 100, 541-686-7838
- Coos Bay office: 381 N. Second Street., 541-269-2721

In Eastern Oregon (Baker, Crook, Deschutes, Gilliam, Grant, Harney, Hood River, Jefferson, Klamath, Lake, Malheur, Morrow, Sherman, Umatilla, Union, Wallowa, Wasco and Wheeler counties):

- The Dalles office: Columbia Gorge Community College, 400 E. Scenic Drive, Building 2, 541-298-7255

Alternative formats

Alternative formats (Braille, large type) of this document can be made available. Contact DEQ's Office of Communications & Outreach, Portland, at 503-229-5696, or toll-free in Oregon at 1-800-452-4011, ext. 5696.