

# Treatment and disposal of petroleum-contaminated soil

## Petroleum Remediation Program

Described below are the available options and process for treating or disposing of petroleum-contaminated soil (PCS) generated during tank system replacement or removal, surface soil excavations, and other investigation activities conducted at Minnesota Pollution Control Agency (MPCA) Petroleum Remediation Program leak sites:

- I. Stockpiling petroleum-contaminated soil prior to treatment or disposal
- II. Managing petroleum-contaminated soils less than 100 mg/kg, diesel range organics or gasoline range organics
- III. Thin spreading small quantities of petroleum-contaminated soil (10 cubic yards or less)
- IV. Land treatment of petroleum-contaminated soil
- V. Composting petroleum-contaminated soil
- VI. Landfilling petroleum contaminated soil

### I. Stockpiling petroleum-contaminated soil prior to treatment or disposal

- A. For stockpiling petroleum-contaminated soil (PCS) at approved storage area, refer to [Excavation of petroleum-contaminated soil](#) section I.G.
- B. Certain conditions must be met for stockpiling PCS at a land treatment site. Stockpiling of PCS may be done prior to soil batch approval if required run-off controls are implemented and a [Request to land treat petroleum-contaminated soil](#) form is submitted within 30 days of initial soil storage. If approval of the batch of soil is denied, the stockpiled soil must be removed within 30 days.

#### Stockpiling at land treatment site run-off control requirements:

**Less than 10 days:** none required

**10 days or more:** cover stockpiles with a tarp, reinforced plastic at least 6-mils thick, or unreinforced plastic at least 10-mils thick **OR** place straw bales or silt dams (geotextile materials) secured with stakes around the perimeter.

## II. Managing petroleum-contaminated soils with less than 100 mg/kg, diesel range organics or gasoline range organics

For soils excavated in accordance with [Excavation of petroleum-contaminated soil](#), and soil analytical results below 100 milligrams per kilogram (mg/kg) gasoline range organics or diesel range organics, soils may be managed in one of the following ways:

- Return soil to excavated area.
- Reuse soil on site, within the parcel boundary.
- Thin spread soil (any volume) on or off-site according to the requirements in [Section III](#) below.
- Reuse soil off site as unregulated fill in accordance with [Best management practices for the off-site reuse of unregulated fill](#).
- Dispose at a sanitary landfill in accordance with [Section VI](#) below.
- Proceed with land treatment in accordance with [Section IV](#). However, the typical follow-up monitoring necessary for land treatment is not required.

## III. Thin spreading small quantities of petroleum-contaminated soil

Thin spreading is for petroleum-contaminated soil (PCS) totaling less than 10 cubic yards, or any quantity of soil with gasoline range organics (GRO) or diesel range organics (DRO) concentrations less than 100 milligrams per kilogram (mg/kg) (see [Section II](#)). To request approval please contact the MPCA's Petroleum Remediation project manager.

The following conditions need to be met to thin spread PCS:

- **Storage:** Store PCS in accordance with [Excavation of petroleum-contaminated soil and tank removal sampling](#) section I.G.
- **Permission from landowner:** The property owner must give permission to thin spread PCS on their property.
- **Local and county ordinances:** Contact local units of government prior to thin spreading PCS to learn and observe any ordinances or local requirements that pertain to thin spreading.
- **County or township notifications and approvals:** If the PCS will be thin spread within a different township than where it originated, notification must be made to the receiving township. If the PCS will be thin spread in an unorganized township, notification must be made to the receiving county. The township or county if an unorganized township has 60 days to review the request and notify the MPCA if the request is denied.
- **Site conditions:** The application site must be in a relatively isolated area with setback distances of 200 feet from surface waters, drinking water wells, sewers, and places of habitation. Do not choose an area prone to ponding. The native soil must be a loamy soil; avoid sand and gravel-type soils. Also, the land slope, as defined in the [Natural Resources Conservation Service \(NRCS\) soil survey](#), must be less than 6%.
- **Timing:** Thin spreading application of PCS is only allowed between April 1<sup>st</sup> and November 1<sup>st</sup>. Weather conditions must be amenable to immediate incorporation.
- **Application:** Apply the PCS at a maximum thickness of two inches. After application, incorporate the PCS into the native soil by disking, raking, blading, or equivalent methods. The application site must be observed for visual contamination for a minimum of one year.

- **Samples and analysis:** Sampling is required if the soil is a potentially hazardous waste as described in [Soil sample collection and analysis procedures](#). Analyze soils contaminated with used oil for Resource Conservation and Recovery Act (RCRA) metals and polychlorinated biphenyls (PCBs), in accordance with [Soil sample collection and analysis procedures](#). If the soil is considered a hazardous waste, it cannot be thin spread, and must be managed in accordance with [Minn. R. ch. 7045](#).

## IV. Land treatment of petroleum-contaminated soil

Land treatment is an effective method of treating petroleum-contaminated soil (PCS). Contaminated soils excavated from a petroleum release can be land applied on MPCA-approved land treatment sites. The PCS is spread over an approved area and tilled into the soil surface, where soil microorganisms break down the petroleum compounds into carbon dioxide, water, and fatty acids. If needed, nutrients are added to the soil to provide an optimal environment for rapid microbial growth. Typically, it takes one to two years of biodegradation for the petroleum concentrations at the land treatment site to be considered treated, and the site allowed to return to regular use.

An average gasoline range organics or diesel range organics concentration of 1,000 mg/kg equals four cups of petroleum product in 1 cubic yard of soil.

See the documents referenced below for details on treatment site approval, individual soil batch approval, notification of soil spreading, and follow up monitoring.

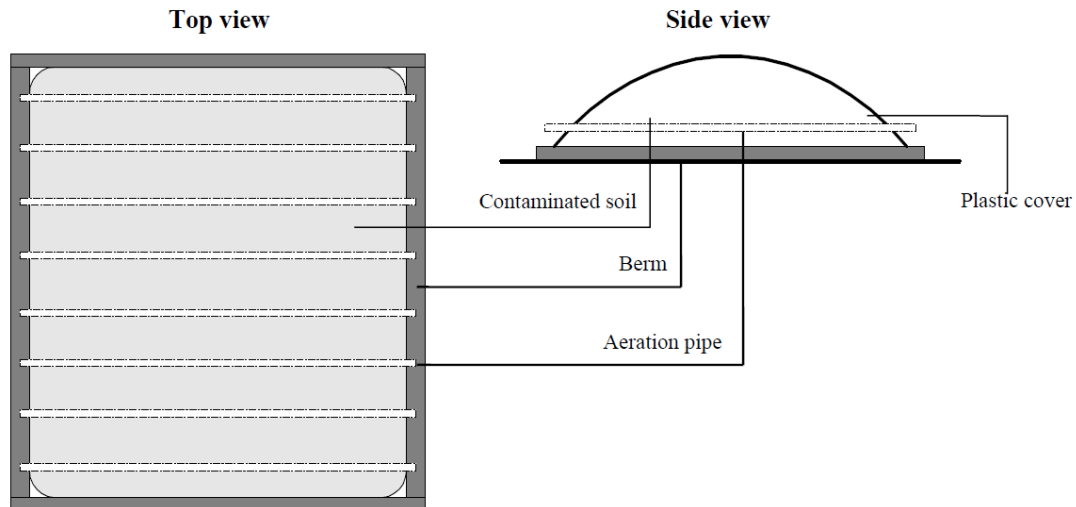
- To apply for land treatment site approval, complete an [Application for petroleum-contaminated soil land treatment site](#).
- To request to land apply soils on an approved land treatment site, complete [Request to land treat petroleum-contaminated soils](#).
- To provide notification soils have been spread, complete [Notification of spreading petroleum-contaminated soil](#).
- To submit follow up monitoring results, complete [Soil monitoring results for land treated petroleum-contaminated soil](#).

See the list of [Current pre-approved petroleum contaminated land treatment sites](#) that can receive PCS.

## V. Composting petroleum-contaminated soil

Composting is the controlled microbial degradation of petroleum in contaminated soils and the MPCA has established a general permit to allow composting of petroleum-contaminated soil (PCS). This is done by building a compost pile, also sometimes referred to as a bio-pile, which is a pile of PCS that is constructed in such a way that provides optimum conditions for microbial growth through the addition of oxygen, water, and nutrients. Pipes distribute oxygen through the pile. Bulking agents such as wood chips, sawdust or straw can also be added to the pile to facilitate the movement of air through the pile. Nutrients in the form of fertilizers or manure may also be added. The pile is watered or kept moist and is covered to keep moisture loss to a minimum, keep the pile warm, and to prevent volatilization. Under these conditions, microorganisms such as bacteria and fungi flourish, and break down the petroleum compounds. Typically, it takes one to two years of composting to be considered treated.

## Typical Soil-Composting Pile Construction



- To apply for permit coverage to operate a compost site, complete an [Application for the construction and operation of a petroleum-contaminated soil composting site](#).
- To request to compost soils on an approved compost site, complete [Request to compost petroleum-contaminated soil](#).
- To submit follow up monitoring results, complete [Soil monitoring results for composted petroleum-contaminated soil](#).

## VI. Landfilling petroleum-contaminated soil

Petroleum-contaminated soil (PCS) can be disposed of at an in-state or out of state permitted landfill that accepts PCS. Soil disposal at an in-state permitted landfill is regulated by MPCA's [Solid Waste program](#).

Landfills may have varying sampling requirements. Follow the landfill's stockpile sampling and analytical requirements if they differ from those described in [Soil sample collection and analysis procedures](#). If not, conform to [Soil sample collection and analysis procedures](#), Section B, by collecting and analyzing the appropriate number of soil samples from representative portions of the stockpile. Ensure copies of waste manifests or disposal receipts are included in reports submitted to the MPCA.

For a list of existing Minnesota landfills, see the [MPCA's Landfills](#) webpage.