



Disposal of Polluted Soil Guidance

Class I and II Landfills

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Alaska Department of Environmental Conservation
Division of Environmental Health
Solid Waste Program

This guidance document is intended to clarify the regulatory requirements for disposal of polluted soil in 1) Lined Class I landfills and Industrial Waste landfills and 2) Unlined Class I landfills and Class II landfills. Disposal of polluted soil in a landfill requires meeting the criteria outlined in the Solid Waste Regulations, Title 18, Chapter 60, Section 025 of the Alaska Administrative Code (18 AAC 60.025).

While polluted soils can be disposed of in some landfills, no landfill in Alaska is required to accept polluted soil even if all 18 AAC 60.025 regulatory requirements are met. It is important to contact the landfill in the early stages of a project that will generate polluted soil to ensure that the polluted soil will be accepted and to determine what site-specific disposal requirements and costs will apply.



DO NOT assume that landfill disposal is an option without first confirming that a permitted landfill will accept the polluted soil, and **DO NOT** assume that the disposal will be free.

Polluted Soil Disposal Requirements

The requirements for polluted soil disposal differ depending on whether the disposal facility has a liner and a leachate collection system or is unlined.

Lined Class I Landfill or Industrial Waste Landfill

Most Class I landfills and all industrial waste landfills have a geomembrane liner and leachate collection system to ensure that any potential hazardous constituents are contained. Disposal of polluted soil in these landfills is allowed by regulation without prior approval from the Alaska Department of Environmental Conservation (ADEC) Solid Waste Program. However, the landfill operator must approve the acceptance of polluted soil and there may be landfill-specific restrictions (e.g. polluted soil generated outside of the Borough or Municipality is not acceptable), testing requirements, or special conditions. It is essential to check with the landfill operator before beginning a project to determine if the landfill is a disposal option.

Unlined Class I Landfill or Class II Landfill

Currently, all Class II landfills and two Class I landfills in Alaska operate without geomembrane liners. Although polluted soil may be disposed of in an unlined Class I or Class II landfill with prior Solid Waste Program approval, some of those landfills do not accept polluted soil due to their limited disposal capacity and/or concerns about additional monitoring for hazardous constituents that may be required. To obtain approval for the disposal, the soil generator must submit a polluted soil demonstration to the Solid Waste Program in accordance with 18 AAC 60.025(d-e). An approval will then be issued if the demonstration meets the regulatory criteria. Approvals are issued on a case-by-case basis. There are no blanket approvals for polluted soil disposals in unlined Class I and Class II landfills.

Polluted Soil Definition - 18 AAC 60.990 (103):

- (A) *soil that is placed into a landfill, that is not a regulated hazardous waste, that was excavated during spill response or leaking underground storage tank action or to comply with an approved contaminated site cleanup plan under 18 AAC 75 or 18 AAC 78; or*
- (B) *a residue or other material that is placed into a landfill and that is not a regulated hazardous waste but contains a hazardous substance in a concentration exceeding the applicable soil cleanup levels set out in 18 AAC 75.341, Table B1 or Table B2*



Polluted Soil Disposal Demonstration Under 18 AAC 60.025(d-e)

A polluted soil disposal demonstration is necessary to provide assurance that there will be no adverse impacts to nearby surface water or groundwater, to public health, and to the environment from placement of polluted soil in the landfill.

Polluted Soil Disposal Demonstration Procedure

In order to approve the disposal of polluted soil in an unlined landfill, the Solid Waste Program must find that the demonstration satisfies the following criteria listed in 18 AAC 60.025(d):

- The waste in the landfill cannot be washed into nearby surface water, and leachate from the landfill cannot reach nearby surface water.
- The polluted soil disposed of in the landfill will not cause a threat to public health, safety, or welfare, or to the environment.
- A practical potential does not exist for a hazardous constituent from the landfill to migrate to an aquifer during the active life and post-closure care of the landfill.

In addition, the owner/operator of the landfill must agree to implement any institutional controls that the Solid Waste Program determines are necessary to protect public health, safety, and welfare, and the environment.

The factors involved in meeting these criteria are unique to each disposal proposal and each landfill, and therefore it is necessary for the soil generator to work closely with the Solid Waste Program throughout the process.

Since the regulatory criteria listed above require demonstrating that various receptors will not be impacted by the project, it is advisable to develop a Conceptual Site Model (CSM) that considers all potential routes for exposure to occur. This includes consideration of proximity to surface water and groundwater, the potential for exposure of humans or animals to contaminants in the soil, and the potential for disposal of the soil to otherwise adversely affect the environment. The CSM should be based on the available data, regional inferences, and professional judgment. Please refer to the most recent ADEC *Guidance on Developing Conceptual Site Models* available at www.dec.alaska.gov/spar/csp/guidance-forms/ for guidance on developing a complete conceptual site model. A disposal demonstration must ultimately show that the project will not create any unacceptable exposures.

Typically, when a contaminated site is cleaned up, data are generated that identify the contaminant(s) of concern. If a landfill is proposed as an option for disposal of the excavated soil, the stockpiled soil must first be characterized to give an accurate representation of the volume of soil, the contaminant levels in the soil, and any other data needed to make the demonstration. The analytical methods used are critical in generating the data necessary to support disposal in a landfill, so it is necessary to develop a Sampling and Analysis Plan (SAP) that is specific to characterizing the waste for disposal. This may include performing leaching tests, or may involve generating data to support a fate and transport model. Please refer to the most recent ADEC *Field Sampling Guidance* available at www.dec.alaska.gov/spar/csp/guidance-forms/ for guidance on proper field screening, sample collection, preservation, and analytical methods.

Once a SAP is developed and approved by the Solid Waste Program, sampling and analysis should occur. If the Solid Waste Program is contacted early enough in the contaminated site clean up process, the required sampling could be conducted at the close of the excavation effort. The results of the sampling will help inform choices concerning disposal. It is advisable to consult with the Solid Waste Program after results are generated to determine whether the results support moving forward with the development of a polluted soil disposal demonstration. Generally, polluted soil disposal demonstrations consist of leachability analyses and/or fate and transport modeling.

If the decision is made to continue with the polluted soil disposal demonstration, the generator should ensure that the demonstration addresses all potential receptors. The demonstration may also include proposed institutional controls that will be included to ensure that receptors are protected. For each contaminant of concern, the demonstration must include a site-specific fate and transport prediction, based on either modeling or leachability assessment results, that anticipates the maximum likely migration of that contaminant, and must consider the potential effects on public health, safety, and welfare, and the environment.

Once a disposal demonstration is completed, it must be:

- signed by both the generator of the polluted soil and the landfill permittee,
- certified by a qualified groundwater scientist, and
- submitted to the Solid Waste Program for review with the required fee.

The Solid Waste Program will approve or deny the request based on the completed disposal demonstration.

Aspects Involved in a Demonstration

Leaching Tests

Leaching tests are one option that may be used for demonstrating whether contaminants may leach from the disposed soil. Options for leaching testing include the following:

- Toxicity Characteristic Leaching Procedure (TCLP) (SW-846 Method 1311)
- Synthetic Precipitation Leaching Procedure (SPLP) (SW-846, Method 1312)
- Alternative Procedures (e.g. Leaching Environmental Assessment Framework [LEAF] (SW-846, Method 1313, 1314, 1315, and 1316)

These leaching tests evaluate the concentration of contaminants in the liquid produced by the leaching test. Note that these tests are not appropriate for all constituents; for instance, the LEAF method is only approved for inorganic constituents at this time, and therefore close coordination with the Solid Waste Program is essential.

The results of the leaching test are compared to the Solid Waste Program's *Surface Water Standards Table* available at www.dec.alaska.gov/eh/solid-waste/monitoring (the standards listed in the *Surface Water Standards Table* also apply to those constituents in groundwater for nearly all analytes). The Solid Waste Program should be consulted in interpreting the results of the leaching tests to determine the path forward for the disposal demonstration.

Fate and Transport Modeling

Contaminant fate and transport can be demonstrated using fate and transport modeling software. Please refer to the most recent ADEC *Fate and Transport Modeling Guidance* available at www.dec.alaska.gov/spar/csp/guidance-forms/ for guidance on the application of fate and transport models.



Qualified Groundwater Scientist Definition – 18 AAC 60.990 (111):

A scientist or engineer who has received a baccalaureate or post-graduate degree in the natural sciences or engineering and has sufficient training and experience in groundwater hydrology and related fields as may be demonstrated by professional certification or completion of accredited university programs that enable that scientist or engineer to make sound professional judgments regarding groundwater monitoring, contaminant fate and transport, and corrective action.

Fate and transport predictions must estimate the maximum potential migration for the identified contaminants of concern in the polluted soil. To be approved, the demonstration must show that the contaminants of concern will not migrate to surface water or groundwater, or otherwise pose a threat to public health, safety, or welfare, or to the environment. This requires entering into the model the analytical data from the samples of the polluted soil and the physical, biological, and chemical parameters of the polluted soil and the landfill that affect the fate and transport of these contaminants. These site-specific parameters may include, but are not limited to, precipitation, temperature, soil type, hydraulic conductivity, permeability, depth to groundwater, and surface water locations.

Institutional Controls

When a landfill accepts polluted soil, the owner/operator accepts the responsibility and liability for any impacts it might cause. If the disposal is approved, the landfill permittee/operator must agree to implement any institutional controls that the Solid Waste Program determines are necessary to provide long-term protection of public health, safety, and welfare, and the environment.

Additional Sources

Washington State Department of Ecology. 2003. An Assessment of Laboratory Leaching Tests for Predicting the Impacts of Fill Material on Ground Water and Surface Water Quality – A Report to the Legislature. Publication No. 03-09-107. December 2003.

www.fortress.wa.gov/ecy/publications/documents/0309107.pdf



Institutional Controls (IC)

IC are administrative and legal controls that help minimize the potential for human exposure to any contamination on a property, or to protect the integrity of any environmental remedy already completed (e.g. assess restrictions, cover requirements).

Additional IC information can be found at:

www.dec.alaska.gov/spar/csp/institutional-control-info#examples