



Polluted Soil: Beneficial Use in Class III Landfills

Guidance

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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 the beneficial use of polluted soil in a Class III landfill. In general, this applies to any polluted soil that does not meet the requirements for disposal in a Class III landfill as discussed in the *Disposal of Low-Level Petroleum Polluted Soil: Class III* guidance document (www.dec.alaska.gov/eh/solid-waste/how-do-i-dispose-of/).



DO NOT assume that beneficial use is an option without first confirming that the soil will be accepted at a permitted landfill, and **DO NOT** assume that it will be accepted for free.

Class III Landfill Polluted Soil Limitations

Class III landfills serve the most remote communities in Alaska. They are unlined facilities with very limited capacity and generally no environmental monitoring except for visual monitoring. Therefore, beneficially using polluted soil in a Class III landfill must be carefully considered to weigh the relative risk and benefit to the community. As such, prior approval by the landfill permittee and the Alaska Department of Environmental Conservation (ADEC) Solid Waste Program under Title 18, Chapter 60, Section 025(c) [18 AAC 60.025(c)] is required.

Sampling

If beneficial use in a Class III landfill is proposed as an option for soil excavated from a contaminated site, the soil that is proposed for beneficial use must first be characterized with regard to the total volume of soil, the contaminant levels in the soil, and any other data (e.g. leaching potential, permeability, hydraulic conductivity, etc.) needed to support a beneficial use proposal. The analytical methods used are critical in generating the data necessary to support the beneficial use proposal, so it is necessary to develop a Sampling and Analysis Plan that is specific to characterizing the soil for this purpose. 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 Sampling and Analysis Plan 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. It is advisable to consult with the Solid Waste Program after results are received to determine whether the results support moving forward with the development of the beneficial use demonstration.

Beneficial Use of Polluted Soil in a Permitted Class III Landfill under 18 AAC 60.025(c)

The beneficial use of polluted soil in a Class III landfill is allowed under 18 AAC 60.025(c), and approval will be granted on a case-by-case basis if both of the following are demonstrated to the satisfaction of the Solid Waste Program:

- 1) There is a legitimate beneficial use for the polluted soil at the landfill. This means the proposed use
 - a. will provide a direct benefit at the landfill other than providing payment for the acceptance of the polluted soil; and
 - b. can be accommodated within the established operational practices at the landfill, or within the existing maintenance, closure, or expansion plans for the landfill.

- 2) The applicant completes a polluted soil demonstration in compliance with the conditions and requirements of 18 AAC 60.025(d-e).

Beneficial Use Legitimacy Justification Procedure

The factors involved in meeting the legitimacy criteria are unique to each beneficial use proposal and each landfill. Therefore, it is necessary for the polluted soil generator to work closely with the Solid Waste Program and the community throughout the process.

The polluted soil generator must demonstrate that the polluted soil will provide a direct benefit to the community that is both reasonable and realistic. The beneficial use proposal should describe and show there is a need for the polluted soil material at the landfill. The amount of polluted soil being proposed for beneficial use also needs to be discussed in relation to the size of the landfill and the proposed use. If soil for cover, construction, or closure is available within the community, then the polluted soil generator must explain what materials are being replaced by the polluted soil and why using this soil is a benefit to the community. They must also demonstrate that the polluted soil is as well-suited for the proposed use as the materials it will replace.

The beneficial use of polluted soil at a Class III landfill must also consider the current and future landfill operations and designs. The polluted soil generator needs to demonstrate that the beneficial use of polluted soil at the landfill will not negatively impact operations or future expansion/closure plans. The plan must include a narrative describing how, when, and where the polluted soil will be used within the landfill. If the proposed beneficial use requires stockpiling prior to actually being used, then the polluted soil generator must outline where and how the material will be stockpiled so that it will not hinder daily operations. The polluted soil generator must also provide documentation that the landfill permittee or operator has the personnel and equipment to manage and place the polluted soil or that the polluted soil generator agrees to fully manage placement of the polluted soil in the landfill.

The beneficial use proposal must conform to the community's needs for the material. The community must be fully informed about the proposed use of the soil and the contaminants contained within the soil, and must be willing to accept responsibility for the soil once placed in the landfill. If the Solid Waste Program determines that the community does not have a clear understanding of all of the intricacies involved with accepting the polluted soil for the proposed beneficial use, the request will be denied.

Polluted Soil Demonstration Procedure

To approve the beneficial use of polluted soil in a Class III 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 beneficially-used polluted soil 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.

If the beneficial use 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. Although the implementation of institutional controls can be

assigned to the polluted soil generator as part of the disposal contract, unless this is clearly defined in the contract, responsibility for implementing institutional controls defaults to the landfill owner/operator.

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

Since the regulatory criteria listed above require demonstrating that various receptors will not be impacted by the polluted soil, it is advisable to develop a Conceptual Site Model (CSM) that considers all potential routes through which exposure could occur. This includes: consideration of the proximity to surface water and groundwater; the potential for exposure of humans or animals to contaminants in the soil; and the potential for beneficial use of the soil to otherwise adversely affect the environment. The CSM should be based on available data, regional inferences, and professional judgment. Few Class III landfills have any documented geo-technical information available so it may be pertinent to collect information about the local area from traditional and local knowledge sources. 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 CSM. A demonstration must ultimately show that the project will not create any unacceptable exposures.

Generally, polluted soil beneficial use demonstrations consist of leachability analyses and/or fate and transport modeling. These processes are each described in greater detail below.

Leaching Tests

Leaching tests are one option for evaluating potential impact of the polluted soil. Options for leaching tests 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 methods are currently only approved for inorganic constituents. 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 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* for guidance, which is available at www.dec.alaska.gov/spar/csp/guidance-forms/.

Fate and transport predictions must estimate the maximum potential migration for each of 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; 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.

Summary

If the decision is made to continue with the demonstration, the polluted soil 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 the following:

- A site-specific fate and transport prediction, based on either modeling or leachability assessment results that anticipate the maximum likely migration of that contaminant.
- The potential effects on public health, safety, and welfare, and the environment.

Once the demonstration is completed, the polluted soil generator must ensure the following:

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

The Solid Waste Program will approve or deny the request based on review of both the Beneficial Use Legitimacy Justification and the Polluted Soil Demonstration.

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



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.