State of Alaska

DEPARTMENT OF ENVIRONMENTAL CONSERVATION

DIVISION OF SPILL PREVENTION AND RESPONSE
CONTAMINATED SITES PROGRAM

Operation Requirements for Soil Treatment Facilities

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OPERATION REQUIREMENTS FOR SOIL TREATMENT FACILITIES

TABLE OF CONTENTS

1.0 Purpose

The Contaminated Sites Program (CSP) regulations require that the owner/operator of an offsite or portable treatment facility obtain approval of an operations plan before accepting or treating contaminated soil. The regulations are located at 18 AAC 75.365, and 18 AAC 78.273.

18 AAC 75.365 and 18 AAC 78.273 require the owner/operator of a soil treatment facility to provide complete containment of the contaminated soil before, during, and after treatment, until the contaminated soil meets the applicable cleanup levels. Proper containment structures for the storage and processing of contaminated soil and water is a crucial portion of any soil treatment facility. The costs associated with providing adequate containment structures at a treatment facility can be significant. The below criteria have been developed in order to provide direction to treatment facility owners/operators in the development of their operations plans and to assist CSP staff in their review of facility operations plans. The criteria are intended to develop and maintain statewide consistency in the regulation of soil treatment facilities by providing appropriate guidance for the containment of contaminated soil before, during, and after treatment.

2.0 Background Information

The nature and scope of soil treatment facility operations plans are varied. Many facilities are designed specifically to remediate soil at the facility or project site where the contaminated soil has been generated (often involves the treatment of a pre-existing stockpile of contaminated soil). Facilities that are set up at the project site where the contaminated soil has been generated are termed 'portable' treatment facilities under 18 AAC 75.365, 18 AAC 78.273, and in this guidance document.

Other operations plans are designed for facilities that will receive contaminated soil from one or more offsite sources, requiring that the contaminated soil be transported to, and managed by, the soil treatment facility. Facilities that are established at a location to receive soils from one (1) or more offsite locations are termed 'offsite' facilities under 18 AAC 75.365, 18 AAC 78.273, and in this guidance document. Offsite operations plans cover the spectrum of operations from those intended to receive soils from a single project site/facility, to those intended to receive and treat soils from multiple project sites/facilities that may be within that area or region. The risk of secondary contamination at these offsite facilities varies due to the type of facility, existing site conditions and surrounding features and environment, and the intensity of use.

Soil containment provisions for portable soil treatment facilities and three (3) categories of offsite soil treatment facilities have been developed, so that appropriate containment provisions can be implemented in response to the relative risk posed by these differing treatment facility operations.

3.0 Soil Treatment Facility Definitions

3.1 Category A) Portable Treatment Facility

Portable treatment facilities are commonly set up at the contaminated site where the soil was generated. Examples of Portable Treatment Facilities include, but are not limited to: thermal desorption rotary kiln units, enhanced-thermal desorption units, hot-air vapor extraction units, and soil washing units. A minimum of 10-mil base liner is required beneath the soil containment, transportation, and treatment areas for operations of less than 180 days duration. A minimum of 20-mil base liner is required in these areas for operations of greater than 180 days duration. Protection of the base liner should include preparation of a firm, smooth, and level base. If the native soil base contains sharp or large aggregate or debris, sand (of appropriate quality to be used as a bedding material) or protective felt fabric must be placed on the native soil prior to laying the base liner down. A sand layer or felt fabric should also be considered for placement on top of the base liner prior to placement of the contaminated soil, if the contaminated soil is frozen or contains large aggregate/debris that would likely damage the base liner. A sand layer of adequate thickness to protect the liner should be placed on top of the liner if equipment is to be repetitively operated in the contaminated soil storage cell.

Post-treated soil stockpiles need to be contained until final verification samples have established that the contaminated soil meets the applicable cleanup levels. Factors which influence the degree of containment required for post-treated soil stockpiles include the level of confidence that the remediation method will meet the cleanup levels, the time delay prior to receiving post-treatment analytical results, and the sensitivity of the surrounding land use and environment.

3.2 Category B) Offsite Treatment Facility Receiving Soil from One Contaminated Site

This category of offsite treatment facility is designed to receive, manage, and remediate soil that has been transported from the site where the contaminated soil was generated to an offsite location for storage and treatment. Examples of Offsite Treatment Facilities include, but are not limited to: thermal desorption rotary kiln units, enhanced-thermal desorption units, hot-air vapor extraction units, and soil washing units.

Category B facilities are restricted to treatment of soil from only one contaminated project site (i.e., soil generated from a single contaminated site or by a single facility). A minimum of 10-mil base liner is required beneath the soil containment, transportation, and treatment areas for operations of less than 180 days duration. A minimum of 20-mil base liner is required in these areas for operations of greater than 180 days duration. Protection for the base liner in contaminated soil containment, transportation, and treatment areas should include preparation of a firm, smooth, and level base. If the native soil base contains sharp or large aggregate or debris, a sand (of appropriate quality to be used as a bedding material) or protective felt fabric must be placed on the native soil prior to laying the base liner down. A sand layer or felt fabric should also be considered for placement on top of the base liner prior to placement of the contaminated soil, if the contaminated soil is frozen or contains large aggregate/debris that would likely damage the base liner. A sand layer

of adequate thickness to protect the liner should be considered for placement on top of the liner if equipment is to be repetitively operated in the contaminated soil storage cell.

Post-treated soil stockpiles need to be contained until final verification samples have established that the contaminated soil meets the applicable cleanup levels. Factors which influence the degree of containment required for post-treated soil stockpiles include the level of confidence that the remediation method will meet the cleanup levels, the time delay prior to receiving post-treatment analytical results, and the sensitivity of the surrounding land use and environment.

3.3 Category C) Offsite Treatment Facility Receiving Soil from Multiple Projects/Facilities: Up to three years of operations

The minimum soil containment provision for Category C offsite treatment facilities shall consist of the engineered design, construction inspection, and record drawings of the **lined** contaminated soil storage, transportation, and treatment areas. It is recommended that the facility be designed such that the input or load hopper to the treatment equipment is contiguous to the soil containment cell, when practical. An Alaska registered engineer shall submit construction design drawings (plan and cross sectional), details, and specifications for the installation of the lined contaminated soil containment areas prior to construction or use of the facility. These engineering plans must be sealed and signed by a registered engineer. Within 45 days after the completion of construction of the facility, a registered engineer must also provide sealed and signed record drawings, verifying that all lined containment areas were installed in accordance with the DEC approved plan. This means that the engineer or the engineer's assistant, must inspect and document the installation process. Examples of lined, engineered containment designs and specifications are available from DEC from prior-approved soil treatment facility operations plans.

Lined, engineered containment areas are limited to no more than three years of use (from the date that contaminated soil was first placed within the containment area), at which time the removal and closure assessment of that portion of the treatment facility is required. DEC approval of continued operations for a period of time that exceeds three years would require submittal of another engineered soil containment plan, construction of new soil containment structures, and construction inspection and record drawings by a registered engineer.

Post-treated soil stockpiles at Category C facilities are to be contained until final verification samples have established that the contaminated soil meets the applicable cleanup levels. Structures for post-treated soil containment shall be included in the engineered plans.

See **Attachment A** for additional engineering plan guidance for Category C facilities.

3.4 Category D) Offsite Treatment Facility Receiving Soil from Multiple Projects/Facilities: More than three years of operations

The minimum soil containment provision for Category D Offsite Treatment Facilities shall consist of the engineered design, construction inspection, and record drawings of concrete, steel, or other **hard-surface**, petroleum-resistant contaminated soil storage, transportation, and treatment areas. Soil containment areas for Category D facilities shall include a hard, petroleum-resistant surface that is resistant to structural damage by bulldozers, backhoe buckets, and front-end loader buckets. It is recommended that the facility be designed such that the input or load hopper to the treatment equipment is contiguous to the soil containment cell, when practical. An Alaska registered engineer shall submit construction design drawings (plan and cross sectional), details, and specifications for the installation of the hard surface contaminated soil containment areas, prior to construction or use of the facility. These engineering plans must be sealed and signed by a registered engineer. Within 45 days after the completion of construction of the facility, a registered engineer shall also provide sealed and signed record drawings, verifying that all hard surface containment areas were installed in accordance with the DEC approved plan. This means that the engineer or the engineer's assistant, must inspect and document the installation process. Examples of hard-surface, engineered containment designs and specifications are available from DEC from prior-approved soil treatment facility operations plans.

Post-treated soil stockpiles at Category D facilities are to be contained until final verification samples have established that the contaminated soil meets the applicable cleanup levels. Structures for post-treated soil containment shall be included in the engineered plans.

See **Attachment A** for additional engineering plan guidance for Category D facilities.

4.0 Discretionary Category Designation

The above four (4) categories of soil treatment facilities are expected to address the majority of soil treatment facility operations within the state. Under certain circumstances, DEC staff may need to exercise discretionary authority in determining the most appropriate categorical requirements to apply to a soil treatment facility, which could increase or decrease the level of soil containment criteria required. DEC project managers should coordinate any discretionary category designation with supervision and the program staff responsible for reviewing Category C/D facility operations plans in order to maintain statewide consistency. The two most likely examples of such circumstances are discussed below:

4.1 Large quantity of soil from one project

Soils from a single project totaling more than approximately 4000 cubic yards (~6000 tons) are proposed for treatment either on or offsite.

Concern would normally be greater for offsite treatment. Under this circumstance, DEC may exercise discretion to increase the soil containment criteria from Category A or B, and reclassify the facility to the more protective Category C. Factors that DEC will examine and consider include, but are not limited to:

a) the sensitivity of the environment and current environmental conditions at the proposed soil treatment site;

b) soil contaminant concentrations;

c) soil treatment processing rate and the total span of time projected to complete soil treatment;

d) whether soil treatment will occur during winter or freeze-thaw weather conditions;

e) whether contaminated soil stockpiles will have to over-winter during the soil treatment process;

f) whether the soil storage cell will be repetitively loaded and unloaded during the soil processing operation, thereby threatening the integrity of the base liner, compared to the strictly one time unloading of contaminated soil from a soil storage cell to the treatment equipment; and

g) other project-specific considerations that relate to the risk of secondary contamination of the soil treatment site.

4.2 Minimal quantity of soil from multiple projects

Soils from more than one project (generating site), totaling less than approximately 500 cubic yards (~750 tons) are proposed for treatment at a single processing location. Under this circumstance, DEC may exercise discretion to relax the soil containment criteria from Category C and reclassify the facility down to Category B. Factors that DEC will examine and consider include, but are not limited to:

a) the remoteness of the soil treatment project from existing Category C or D soil treatment facilities;

b) all of the factors identified in the preceding example – '*Large quantity of soil from one project.*'

5.0 The Operations Plan Review Process

5.1 Projected Processing Times

Category **A** and **B** soil treatment facilities requesting department approval of an operations plan should allow for a minimum 30 (Category A) or 45 (Category B) -day review and processing period from the date of submittal of the operations plan. A public participation process may be required for facilities in these categories, involving a three-day publication of a Soil Treatment Facility Operations Plan Notice in local newspaper(s) and a two-week public comment period following the

last date of publication. The department must approve the wording of the public notice prior to publication. Comments in response to the notice will be directed to the department.

Category **C** and **D** soil treatment facilities requesting department approval of an operations plan should allow for a minimum 60-day review and processing period from the date of submittal of the operations plan. A public participation process is required for these facilities, involving a three-day publication of a Soil Treatment Facility Operations Plan Notice in local newspaper(s) and a two-week public comment period following the last date of publication. The department must approve the wording of the public notice prior to publication. Comments in response to the notice shall be directed to the department. *It would not be uncommon for the operations plan review and public notification process for category **C** and **D** facilities to run longer than 60 days.*

ATTACHMENT A

Engineering Design Criteria for Soil Containment Structures Using Synthetic Liners. (Maximum Approved Life of Three (3) Years)

Base liners must be a minimum of 20 mil nominal thickness and comply with the Long Term Liner Specifications in 18 AAC 78.274(a), Table B.

Liners should be factory seam sealed by the manufacturer whenever possible. Field seeming of liners is only allowed when conducted in accordance with the liner manufacturer's recommended procedures, to include any certification, training, and experience requirements placed on field seaming workers. Field seaming methods must be clearly specified in the engineering plans for DEC review.

Base soil specification for soils beneath and in contact with the liner are 100% passing the ¾" US sieve, without sharp fracture surfaces on the aggregate. A minimum of three (3) inches of soil meeting this specification is required immediately beneath the base liner at all locations. If the base specification soil is not available or not used, an appropriate thickness protective felt fabric may be employed to offset the use of out-of-specification material to some extent, depending on the quality of the specific bedding materials proposed for use. The design engineer will need to research and support the use of the appropriate felt fabric in conjunction with any out-of-specification base soil.

Base soils must be smooth with no sharp or irregular projections and sufficiently compacted to prevent settlement under the soil and vehicle loading that will occur over the lined containment area. The base soils should, at the minimum, be proof-rolled under the observation of the engineer. The engineer is required to inspect and approve the prepared soil base prior to placement of the synthetic liner (or protective felt fabric if used).

Cover soil specification for soils above and in contact with the base liner are 100% passing the 3/8" US standard sieve, sandy, free-draining soil. A minimum of 18" of cover soil must be maintained above the base liner at all times, prior to heavy equipment and vehicle travel over the base liner. This will require special soil cover placement techniques, which must be described and specified within the engineering plans. The 18" minimum applies to entry and exit ramp areas also. If the cover specification soil is not available or not used, protective felt fabrics may be employed to allow the use of some out-of-specification cover soil. In this situation, the design engineer will need to research and support the use of an appropriate felt fabric for use with out-of-spec cover soil. The engineer is required to be present during the cover soil placement process in order to certify that proper soil placement techniques have been employed.

Whenever protective felt fabrics are used, a minimum 12" overlap is required at all felt joints. The perimeter of the liner shall be bermed a minimum of 6" above the surrounding soil surface to prevent surface water intrusion of the containment cell.

A minimum of 18" of cover soil must be maintained over the synthetic liner at all times throughout the life of the soil containment cell. The design should include provisions that will help to ensure that the owner/operator will maintain the minimum of 18" of cover soil during operations. An Alaska registered engineer or registered land surveyor shall provide survey control and documentation during the construction process, and provide certified contour drawings of the

facility and soil containment cells and structures. These survey drawings must include a permanent benchmark for purposes of future reference.

Soil containment cells must be designed and contoured such that nondomestic wastewater collecting within the cell(s) can drain to a monitoring and de-watering sump. This sump, in combination with the free-draining cover soil within the cell, will provide a means for both monitoring the accumulation of wastewater and evacuating excess wastewater to prevent cell flooding. The free-draining soil must remain structurally stable and support vehicle loading when saturated.

A provision for the handling, storage, processing, and ultimate disposal of nondomestic wastewater must be provided in the plans. The plans must include a provision for the operation and maintenance of the monitoring and de-watering sump.

The requirement for engineered record drawings means that the engineer must provide adequate construction inspection and oversight, so as to be able to certify that the structures were constructed as intended and in compliance with DEC approved plans.

The general format for the engineering plans should follow the engineering plan requirements found in 18 AAC 72.600(c) (Nondomestic Wastewater System Plan Review, Application for Department Approval).

Engineering Design Criteria for Hard-Surface (i.e. Concrete, Steel) Soil Containment Structures.

Hard-surface soil containment cells require the following:

Engineering plans, details, drawings, and specifications must be signed and sealed by a registered engineer demonstrating proper base soil materials selection, placement, and preparation in order to support the multi-season and long-term use of the concrete or other hard-surface, petroleum resistant containment cells.

An Alaska registered engineer or registered land surveyor must provide survey control and documentation during the construction process and provide certified contour drawings of the facility and soil containment cells and structures. These survey drawings must include a permanent benchmark for purposes of future reference. Engineering design plans and specifications for the concrete slabs or other hard, petroleum resistant surface, identifying the loading design parameters, must be signed and sealed by a registered engineer.

A roof covering the soil containment cells is preferred. For plans lacking a roof, contours and provisions must be included to control, contain, handle, process, and dispose of nondomestic wastewater that accumulates within the soil containment cells.

The engineering plans must include a long-term inspection and maintenance program to ensure the structural and watertight integrity of the concrete pad or other hard, petroleum resistant surface. The requirement for engineered record drawings means that the engineer must provide adequate construction inspection and oversight, so as to be able to certify that the structures were constructed as intended, and in compliance with the DEC approved plans.

The general format for the engineering plans should follow the engineering plan requirements found in 18 AAC 72.600(c) (Nondomestic Wastewater System Plan Review, Application for Department Approval).