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Title 22@ Social Security

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Division 4.5@ Environmental Health Standards for the Management of Hazardous Waste

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Chapter 14@ Standards for Owners and Operators of Hazardous Waste Transfer, Treatment, Storage, and Disposal Facilities

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Article 11@ Surface Impoundments

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Section 66264.221@ Design and Operating Requirements

66264.221 Design and Operating Requirements

(a)

Any surface impoundment that is not covered by subsection (c) of this section or section 66265.221 shall have a liner for all portions of the impoundment (except for existing portions of such impoundments). The liner shall be designed, constructed, and installed to prevent any migration of wastes out of the impoundment to the adjacent subsurface soil or ground water or surface water at any time during the active life (including the closure period) of the impoundment. The liner may be constructed of materials that may allow wastes to migrate into the liner (but not into the adjacent subsurface soil or ground water or surface water) during the active life of the facility, provided that the impoundment is closed in accordance with section 66264.228(a)(1). For impoundments that will be closed in accordance with section 66264.228(a)(2), the liner shall be constructed of materials that can prevent wastes from migrating into the liner during the active life of the facility. The liner shall be: (1) constructed of materials that have appropriate chemical properties and sufficient strength and thickness to prevent failure due to pressure gradients (including static head and external hydrogeologic forces), physical contact with the waste or leachate to which they are exposed, climatic conditions, the stress of installation, and the stress of daily operation; (2) placed upon a foundation or base capable of providing support to the liner and resistance to pressure gradients above and below the liner to

prevent failure of the liner due to settlement, compression, or uplift; and (3) installed to cover all surrounding earth likely to be in contact with the waste or leachate.

(1)

constructed of materials that have appropriate chemical properties and sufficient strength and thickness to prevent failure due to pressure gradients (including static head and external hydrogeologic forces), physical contact with the waste or leachate to which they are exposed, climatic conditions, the stress of installation, and the stress of daily operation;

(2)

placed upon a foundation or base capable of providing support to the liner and resistance to pressure gradients above and below the liner to prevent failure of the liner due to settlement, compression, or uplift; and

(3)

installed to cover all surrounding earth likely to be in contact with the waste or leachate.

(b)

The owner or operator will be exempted from the requirements of subsection (a) of this section if the Department finds, based on a demonstration by the owner or operator, that alternate design and operating practices, together with location characteristics, will prevent the migration of any hazardous constituents into soil outside the impoundment or into the ground water or surface water at any future time. In deciding whether to grant an exemption, the Department will consider: (1) the nature and quantity of the wastes; (2) the proposed alternate design and operation; (3) the hydrogeologic setting of the facility, including the alternative capacity and thickness of the liners and soils present between the impoundment

and ground water or surface water; and (4) all other factors which would influence the quality and mobility of the leachate produced and the potential for it to migrate to ground water or surface water; (5) the potential for lateral migration of hazardous constituents which could present a threat to public health or the environment; (6) recommendations of the State Water Resources Control Board or the appropriate Regional Water Quality Control Board.

(1)

the nature and quantity of the wastes;

(2)

the proposed alternate design and operation;

(3)

the hydrogeologic setting of the facility, including the alternative capacity and thickness of the liners and soils present between the impoundment and ground water or surface water; and

(4)

all other factors which would influence the quality and mobility of the leachate produced and the potential for it to migrate to ground water or surface water;

(5)

the potential for lateral migration of hazardous constituents which could present a threat to public health or the environment;

(6)

recommendations of the State Water Resources Control Board or the appropriate Regional Water Quality Control Board.

(c)

The owner or operator of each new surface impoundment unit on which construction commences after January 29, 1992, each lateral expansion of a

surface impoundment unit on which construction commences after July 29, 1992 and each replacement of an existing surface impoundment unit that is to commence reuse after July 29, 1992 shall install two or more liners and a leachate collection and removal system between such liners. "Construction commences" is as defined in section 66260.10 of this chapter under "existing facility". When an existing surface impoundment is expanded after January 29, 1992, the entire surface impoundment will be treated as a surface impoundment constructed after January 29, 1992. The requirements of this subsection shall not apply to surface impoundment units receiving only non-RCRA hazardous waste until February 18, 1996. (1) (A) The liner system shall include: 1. A top liner designed and constructed of materials (e.g., a geomembrane) to prevent the migration of hazardous constituents into such liner during the active life and post-closure care period; and 2. A composite bottom liner, consisting of at least two components. The upper component shall be designed and constructed of materials (e.g., a geomembrane) to prevent the migration of hazardous constituents into this component during the active life and post-closure care period. The lower component shall be designed and constructed of materials to minimize the migration of hazardous constituents if a breach in the upper component were to occur. The lower component shall be constructed of at least 3 feet (91 cm) of compacted soil material with a hydraulic conductivity of no more than 1×10^{-7} cm/sec. (B) The liners shall comply with subsections (a)(1), (2), and (3) of this section. (2) The leachate collection and removal system between the liners, and immediately above the bottom composite liner in the case of multiple leachate collection and removal systems, is also a leak detection system. This leak detection system shall be capable of detecting, collecting, and removing leaks of hazardous constituents at the earliest practicable time through all areas of the top

liner likely to be exposed to waste or leachate during the active life and post-closure care period. The requirements for a leak detection system in this subsection are satisfied by installation of a system that is, at a minimum: (A) Constructed with a bottom slope of one percent or more; (B) Constructed of granular drainage materials with a hydraulic conductivity of 1×10^{-1} cm/sec or more and a thickness of 1 foot (30.5 cm) or more; or constructed of synthetic or geonet drainage materials with a transmissivity of 3×10^{-4} m²/sec or more. In cases where the leak detection system is composed of coarse granular material, there shall be a suitable interface (e.g., geotextile) between the leak detection system and any flexible membrane liner, as needed to prevent the coarse grains from causing a puncture in the flexible membrane liner under the high stress conditions caused by the overlying waste; (C) Constructed of materials that are chemically resistant to the waste managed in the surface impoundment and the leachate expected to be generated, and of sufficient strength and thickness to prevent collapse under the pressures exerted by overlying wastes and any waste cover materials or equipment used at the surface impoundment; (D) Designed and operated to minimize clogging during the active life and post-closure care period; and (E) Constructed with sumps and liquid removal methods (e.g., pumps) of sufficient size to collect and remove liquids from the sump and prevent liquids from backing up into the drainage layer. Each unit shall have its own sump(s). The design of each sump and removal system shall provide a method for measuring and recording the volume of liquids present in the sump and of liquids removed.

(3) The owner or operator shall collect and remove pumpable liquids in the sumps to minimize the head on the bottom liner. (4) The liner system shall be designed, constructed and operated to ensure that leak detection system shall be a minimum of 5 feet above the highest anticipated elevation of groundwater.

(1)

- (A) The liner system shall include: 1. A top liner designed and constructed of materials (e.g., a geomembrane) to prevent the migration of hazardous constituents into such liner during the active life and post-closure care period; and 2. A composite bottom liner, consisting of at least two components. The upper component shall be designed and constructed of materials (e.g., a geomembrane) to prevent the migration of hazardous constituents into this component during the active life and post-closure care period. The lower component shall be designed and constructed of materials to minimize the migration of hazardous constituents if a breach in the upper component were to occur. The lower component shall be constructed of at least 3 feet (91 cm) of compacted soil material with a hydraulic conductivity of no more than 1×10^{-7} cm/sec.
- (B) The liners shall comply with subsections (a)(1), (2), and (3) of this section.

(A)

The liner system shall include: 1. A top liner designed and constructed of materials (e.g., a geomembrane) to prevent the migration of hazardous constituents into such liner during the active life and post-closure care period; and 2. A composite bottom liner, consisting of at least two components. The upper component shall be designed and constructed of materials (e.g., a geomembrane) to prevent the migration of hazardous constituents into this component during the active life and post-closure care period. The lower component shall be designed and constructed of materials to minimize the migration of hazardous constituents if a breach in the upper component were to occur. The lower component shall be constructed of at least 3 feet (91 cm) of compacted soil material with a hydraulic conductivity of no more than 1×10^{-7} cm/sec.

1.

A top liner designed and constructed of materials (e.g., a geomembrane) to prevent the migration of hazardous constituents into such liner during the active life and post-closure care period; and

2.

A composite bottom liner, consisting of at least two components. The upper component shall be designed and constructed of materials (e.g., a geomembrane) to prevent the migration of hazardous constituents into this component during the active life and post-closure care period. The lower component shall be designed and constructed of materials to minimize the migration of hazardous constituents if a breach in the upper component were to occur. The lower component shall be constructed of at least 3 feet (91 cm) of compacted soil material with a hydraulic conductivity of no more than 1×10^{-7} cm/sec.

(B)

The liners shall comply with subsections (a)(1), (2), and (3) of this section.

(2)

The leachate collection and removal system between the liners, and immediately above the bottom composite liner in the case of multiple leachate collection and removal systems, is also a leak detection system. This leak detection system shall be capable of detecting, collecting, and removing leaks of hazardous constituents at the earliest practicable time through all areas of the top liner likely to be exposed to waste or leachate during the active life and post-closure care period. The requirements for a leak detection system in this subsection are satisfied by installation of a system that is, at a minimum: (A) Constructed with a bottom slope of one percent or more; (B) Constructed of granular drainage materials with a hydraulic conductivity of 1×10^{-1} cm/sec or more and a thickness of 1 foot (30.5 cm) or more; or constructed of synthetic or geonet drainage materials with a transmissivity of 3×10^{-4} m²/sec or more. In cases where the leak detection system is composed of coarse granular material, there shall be a suitable interface (e.g., geotextile) between the leak detection system and any flexible membrane liner, as needed to prevent the coarse grains from causing a puncture in the flexible membrane liner under the high stress conditions caused by the

overlying waste; (C) Constructed of materials that are chemically resistant to the waste managed in the surface impoundment and the leachate expected to be generated, and of sufficient strength and thickness to prevent collapse under the pressures exerted by overlying wastes and any waste cover materials or equipment used at the surface impoundment; (D) Designed and operated to minimize clogging during the active life and post-closure care period; and (E) Constructed with sumps and liquid removal methods (e.g., pumps) of sufficient size to collect and remove liquids from the sump and prevent liquids from backing up into the drainage layer. Each unit shall have its own sump(s). The design of each sump and removal system shall provide a method for measuring and recording the volume of liquids present in the sump and of liquids removed.

(A)

Constructed with a bottom slope of one percent or more;

(B)

Constructed of granular drainage materials with a hydraulic conductivity of 1×10^{-1} cm/sec or more and a thickness of 1 foot (30.5 cm) or more; or constructed of synthetic or geonet drainage materials with a transmissivity of 3×10^{-4} m²/sec or more. In cases where the leak detection system is composed of coarse granular material, there shall be a suitable interface (e.g., geotextile) between the leak detection system and any flexible membrane liner, as needed to prevent the coarse grains from causing a puncture in the flexible membrane liner under the high stress conditions caused by the overlying waste;

(C)

Constructed of materials that are chemically resistant to the waste managed in the surface impoundment and the leachate expected to be generated, and of sufficient strength and thickness to prevent collapse under the pressures exerted by overlying wastes and any waste cover materials or equipment used at the surface impoundment;

(D)

Designed and operated to minimize clogging during the active life and post-closure care period; and

(E)

Constructed with sumps and liquid removal methods (e.g., pumps) of sufficient size to collect and remove liquids from the sump and prevent liquids from backing up into the drainage layer. Each unit shall have its own sump(s). The design of each sump and removal system shall provide a method for measuring and recording the volume of liquids present in the sump and of liquids removed.

(3)

The owner or operator shall collect and remove pumpable liquids in the sumps to minimize the head on the bottom liner.

(4)

The liner system shall be designed, constructed and operated to ensure that leak detection system shall be a minimum of 5 feet above the highest anticipated elevation of groundwater.

(d)

The liners shall be designed and constructed to contain the waste and leachate fluids when subjected to the maximum anticipated hydraulic head which will be imposed during disposal operations and the post-closure maintenance period.

(e)

The leachate collection and removal system shall:(1) be designed, constructed, maintained and operated to collect leachate from the area, and to ensure that there is no buildup of hydraulic head on the liner. The depth of fluid in the collection sump shall be kept at a minimum needed to ensure sufficient pump operation;

(1)

be designed, constructed, maintained and operated to collect leachate from the area, and to ensure that there is no buildup of hydraulic head on the liner. The depth of fluid in the collection sump shall be kept at a minimum needed to ensure sufficient pump operation;

(f)

The Department may approve alternative design or operating practices to those specified in subsection (c) of this section if the owner or operator demonstrates to the Department that such design and operating practices, together with location characteristics: (1) Will prevent the migration of any hazardous constituent into the groundwater or surface water at least as effectively as the liners and leachate collection and removal system specified in subsection (c) of this section; and (2) Will allow detection of leaks of hazardous constituents through the top liner at least as effectively.

(1)

Will prevent the migration of any hazardous constituent into the groundwater or surface water at least as effectively as the liners and leachate collection and removal system specified in subsection (c) of this section; and

(2)

Will allow detection of leaks of hazardous constituents through the top liner at least as effectively.

(g)

The double liner requirement set forth in subsection (c) of this section shall be waived by the Department for any monofill, if: (1) the monofill contains only hazardous wastes from foundry furnace emission controls or metal casting molding sand, and such wastes do not contain constituents which would render

the wastes hazardous for reasons other than exceeding the soluble threshold limit concentration as described in section 66261.24; and (2) (A) 1. the monofill has at least one liner for which there is no evidence that such liner is leaking. For the purposes of this subsection, the term "liner" means a liner designed, constructed, installed, and operated to prevent hazardous waste from passing into the liner at any time during the active life of the facility, or a liner designed, constructed, installed, and operated to prevent hazardous waste from migrating beyond the liner to adjacent subsurface soil, ground water, or surface water at any time during the active life of the facility. In the case of any surface impoundment which has been exempted from the requirements of subsection (c) of this section on the basis of a liner designed, constructed, installed, and operated to prevent hazardous waste from passing beyond the liner, at the closure of such impoundment, the owner or operator shall remove or decontaminate all waste residues, all contaminated liner material, and contaminated soil to the extent practicable. If all contaminated soil is not removed or decontaminated, the owner or operator of such impoundment will comply with appropriate post-closure requirements, including but not limited to groundwater monitoring and corrective action; 2. the monofill is located more than one-quarter mile from an underground source of drinking water as defined in section 66260.10 of this chapter; and 3. the monofill is in compliance with generally applicable groundwater monitoring requirements for facilities with permits; or the owner or operator demonstrates that the monofill is located, designed and operated so as to assure that there will be no migration of any hazardous constituent into ground water or surface water at any future time.

(1)

the monofill contains only hazardous wastes from foundry furnace emission controls or

metal casting molding sand, and such wastes do not contain constituents which would render the wastes hazardous for reasons other than exceeding the soluble threshold limit concentration as described in section 66261.24; and

(2)

(A) 1. the monofill has at least one liner for which there is no evidence that such liner is leaking. For the purposes of this subsection, the term "liner" means a liner designed, constructed, installed, and operated to prevent hazardous waste from passing into the liner at any time during the active life of the facility, or a liner designed, constructed, installed, and operated to prevent hazardous waste from migrating beyond the liner to adjacent subsurface soil, ground water, or surface water at any time during the active life of the facility. In the case of any surface impoundment which has been exempted from the requirements of subsection (c) of this section on the basis of a liner designed, constructed, installed, and operated to prevent hazardous waste from passing beyond the liner, at the closure of such impoundment, the owner or operator shall remove or decontaminate all waste residues, all contaminated liner material, and contaminated soil to the extent practicable. If all contaminated soil is not removed or decontaminated, the owner or operator of such impoundment will comply with appropriate post-closure requirements, including but not limited to groundwater monitoring and corrective action; 2. the monofill is located more than one-quarter mile from an underground source of drinking water as defined in section 66260.10 of this chapter; and 3. the monofill is in compliance with generally applicable groundwater monitoring requirements for facilities with permits; or the owner or operator demonstrates that the monofill is located, designed and operated so as to assure that there will be no migration of any hazardous constituent into ground water or surface water at any future time.

(A)

1. the monofill has at least one liner for which there is no evidence that such liner is leaking. For the purposes of this subsection, the term "liner" means a liner designed, constructed, installed, and operated to prevent hazardous waste from passing into the liner at any time during the active life of the facility, or a liner designed, constructed, installed, and operated to prevent hazardous waste from migrating beyond the liner to adjacent subsurface soil, ground water, or surface water at any time during the active life of the facility. In the case of any surface impoundment which has been exempted from the requirements of subsection (c) of this section on the basis of a liner designed, constructed, installed, and operated to prevent hazardous waste from passing beyond the liner, at the closure of such impoundment, the owner or operator shall remove or decontaminate all waste residues, all contaminated liner material, and contaminated soil to the extent practicable. If all contaminated soil is not removed or decontaminated, the owner or operator of such impoundment will comply with appropriate post-closure requirements, including but not limited to groundwater monitoring and corrective action; 2. the monofill is located more than one-quarter mile from an underground source of drinking water as defined in section 66260.10 of this chapter; and 3. the monofill is in compliance with generally applicable groundwater monitoring requirements for facilities with permits; or the owner or operator demonstrates that the monofill is located, designed and operated so as to assure that there will be no migration of any hazardous constituent into ground water or surface water at any future time.

1.

the monofill has at least one liner for which there is no evidence that such liner is leaking. For the purposes of this subsection, the term "liner" means a liner designed, constructed, installed, and operated to prevent hazardous waste from passing into the liner at any time during the active life of the facility, or a liner designed, constructed, installed, and operated to prevent hazardous waste from migrating beyond the liner to adjacent subsurface soil, ground water, or surface water at any time during the active life of the facility. In the case of any surface impoundment which has been

exempted from the requirements of subsection (c) of this section on the basis of a liner designed, constructed, installed, and operated to prevent hazardous waste from passing beyond the liner, at the closure of such impoundment, the owner or operator shall remove or decontaminate all waste residues, all contaminated liner material, and contaminated soil to the extent practicable. If all contaminated soil is not removed or decontaminated, the owner or operator of such impoundment will comply with appropriate post-closure requirements, including but not limited to groundwater monitoring and corrective action;

2.

the monofill is located more than one-quarter mile from an underground source of drinking water as defined in section 66260.10 of this chapter; and

3.

the monofill is in compliance with generally applicable groundwater monitoring requirements for facilities with permits; or the owner or operator demonstrates that the monofill is located, designed and operated so as to assure that there will be no migration of any hazardous constituent into ground water or surface water at any future time.

(h)

A surface impoundment shall be designed, constructed, maintained, and operated to prevent overtopping resulting from normal or abnormal operations; overfilling; wind and wave action; rainfall; run-on; malfunctions of level controllers, alarms, and other equipment; and human error.

(i)

A surface impoundment shall have dikes that are designed, constructed, and maintained with sufficient structural integrity to prevent massive failure of the dikes. In ensuring structural integrity, it must not be presumed that the liner system will function without leakage during the active life of the unit.

(j)

The Department will specify in the permit all design and operating practices that are necessary to ensure that the requirements of this section are satisfied.

(k)

The owner or operator of any replacement surface impoundment unit is exempt from subsection (c) of this section if: (1) The existing unit was constructed in compliance with the design standards of 42 USC section 6924(o)(1)(A)(i) and 42 USC section 6924(o)(5); and (2) There is reason to believe that the liner is functioning as designed.

(1)

The existing unit was constructed in compliance with the design standards of 42 USC section 6924(o)(1)(A)(i) and 42 USC section 6924(o)(5); and

(2)

There is reason to believe that the liner is functioning as designed.