**Section 724.401 Design and Operating Requirements**

a) Any landfill that is not covered by subsection (c) or 35 Ill. Adm. Code 725.401(a) must have a liner system for all portions of the landfill (except for existing portions of such landfill). The liner system must have the following:

1) A liner that is designed, constructed, and installed to prevent any migration of wastes out of the landfill to the adjacent subsurface soil or groundwater or surface water at any time during the active life (including the closure period) of the landfill. The liner must be constructed of materials that prevent wastes from passing into the liner during the active life of the facility. The liner must fulfill the following:

A) It must be 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;

B) It must be 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

C) It must be installed to cover all surrounding earth likely to be in contact with the waste or leachate; and

2) A leachate collection and removal system immediately above the liner that is designed, constructed, maintained, and operated to collect and remove leachate from the landfill. The Agency must specify design and operating conditions in the permit to ensure that the leachate depth over the liner does not exceed 30 cm (one foot). The leachate collection and removal system must fulfill the following:

A) Constructed of materials that fulfill the following:

i) Chemically resistant to the waste managed in the landfill and the leachate expected to be generated; and

ii) Of sufficient strength and thickness to prevent collapse under the pressures exerted by overlying wastes, waste cover materials, and any equipment used at the landfill; and

B) Designed and operated to function without clogging through the scheduled closure of the landfill.

b) The owner or operator will be exempted from the requirements of subsection (a) if the Board grants an adjusted standard pursuant to Section 28.1 of the Act and 35 Ill. Adm. Code 101 and 104. The level of justification is a demonstration by the owner or operator that alternative design or operating practices, together with location characteristics, will prevent the migration of any hazardous constituents (see Section 724.193) into the groundwater or surface water at any future time. In deciding whether to grant an adjusted standard, the Board will consider the following:

1) The nature and quantity of the wastes;

2) The proposed alternative design and operation;

3) The hydrogeologic setting of the facility, including the attenuative capacity and thickness of the liners and soils present between the landfill and groundwater or surface water; and

4) All other factors that influence the quality and mobility of the leachate produced and the potential for it to migrate to groundwater or surface water.

c) The owner or operator of each new landfill unit on which construction commences after January 29, 1992, each lateral expansion of a landfill unit on which construction commenced after July 29, 1992, and each replacement of an existing landfill unit that was to commence reuse after July 29, 1992, must install two or more liners and a leachate collection and removal system above and between such liners. "Construction commenced" is as defined in 35 Ill. Adm. Code 720.110 under "existing facility".

1) Liner requirements.

A) The liner system must include the following:

i) 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

ii) A composite bottom liner, consisting of at least two components. The upper component must 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 must 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 must be constructed of at least 3 feet (91 cm) of compacted soil material with a hydraulic conductivity of no more than 1x10-7 cm/sec.

B) The liners must comply with subsections (a)(1)(A), (a)(1)(B), and (a)(1)(C).

2) The leachate collection and removal system immediately above the top liner must be designed, constructed, operated, and maintained to collect and remove leachate from the landfill during the active life and post-closure care period. The Agency must specify design and operating conditions in the permit to ensure that the leachate depth over the liner does not exceed 30 cm (one foot). The leachate collection and removal system must comply with subsections (c)(3)(C) and (c)(3)(D).

3) 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 (LDS). This LDS must 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 LDS in this subsection (c) are satisfied by installation of a system that, at a minimum, fulfills the following:

A) It is constructed with a bottom slope of one percent or more;

B) It is constructed of granular drainage materials with a hydraulic conductivity of 1x10-2  cm/sec or more and a thickness of 12 inches (30.5 cm) or more; or constructed of synthetic or geonet drainage materials with a transmissivity of 3x10-5 m2/sec or more;

C) It is constructed of materials that are chemically resistant to the waste managed in the landfill and the leachate expected to be generated, and of sufficient strength and thickness to prevent collapse under the pressures exerted by overlying wastes, waste cover materials, and equipment used at the landfill;

D) It is designed and operated to minimize clogging during the active life and post-closure care period; and

E) It is 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 must have its own sumps. The design of each sump and removal system must provide a method for measuring and recording the volume of liquids present in the sump and of liquids removed.

4) The owner or operator must collect and remove pumpable liquids in the LDS sumps to minimize the head on the bottom liner.

5) The owner or operator of a LDS that is not located completely above the seasonal high water table must demonstrate that the operation of the LDS will not be adversely affected by the presence of ground water.

d) Subsection (c) will not apply if the owner or operator demonstrates to the Agency, and the Agency finds for such landfill, that alternative design or operating practices, together with location characteristics, will do the following:

1) It 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 systems, specified in subsection (c); and

2) It will allow detection of leaks of hazardous constituents through the top liner at least as effectively.

e) The Agency must not require a double liner as set forth in subsection (c) for any monofill, if the following is true:

1) The monofill contains only hazardous wastes from foundry furnace emission controls or metal casting molding sand, and such wastes do not contain constituents that render the wastes hazardous for reasons other than the toxicity characteristics in 35 Ill. Adm. Code 721.124, with USEPA hazardous waste numbers D004 through D017; and

2) No Migration Demonstration

A) Design and Location Requirements

i) The monofill has at least one liner for which there is no evidence that such liner is leaking;

ii) The monofill is located more than one-quarter mile from an underground source of drinking water (as that term is defined in 35 Ill. Adm. Code 702.110; and

iii) The monofill is in compliance with generally applicable groundwater monitoring requirements for facilities with RCRA permits; or

B) The owner or operator demonstrates to the Board that the monofill is located, designed, and operated so as to assure that there will be no migration of any hazardous constituent into groundwater or surface water at any future time.

f) The owner or operator of any replacement landfill unit is exempt from subsection (c) if the following is true:

1) The existing unit was constructed in compliance with the design standards of 35 Ill. Adm. Code 724.401(c), (d), and (e); and

BOARD NOTE: The cited subsections implemented the design standards of sections 3004(o)(1)(A)(i) and (o)(5) of the Resource Conservation and Recovery Act (42 USC 6924(o)(1)(A)(i) and (o)(5)).

2) There is no reason to believe that the liner is not functioning as designed.

g) The owner or operator must design, construct, operate, and maintain a run-on control system capable of preventing flow onto the active portion of the landfill during peak discharge from at least a 25-year storm.

h) The owner or operator must design, construct, operate, and maintain a run-off management system to collect and control at least the water volume resulting from a 24-hour, 25-year storm.

i) Collection and holding facilities (e.g., tanks or basins) associated with run-on and run-off control systems must be emptied or otherwise managed expeditiously after storms to maintain design capacity of the system.

j) If the landfill contains any particulate matter that may be subject to wind dispersal, the owner or operator must cover or otherwise manage the landfill to control wind dispersal.

k) The Agency must specify in the permit all design and operating practices that are necessary to ensure that the requirements of this Section are satisfied.

(Source: Amended at 42 Ill. Reg. 22614, effective November 19, 2018)