CHAPTER 101
SANITARY DISPOSAL PROJECTS

DIVISION II
MUNICIPAL SOLID WASTE LANDFILLS

567—101.101(455B) Purpose. The purpose of this division is to implement Iowa Code Chapter 455B, Division IV "Solid Waste Disposal" and to protect human health and the environment through the implementation of minimum national standards pursuant to the Resource Conservation and Recovery Act ("RCRA" or "the Act") for all municipal solid waste landfill (MSWLF) units and under the Clean Water Act for MSWLFs that are used to dispose of sewage sludge.

This division details the permitting, siting, design, operating, monitoring, corrective action, reporting, record-keeping, closure, and post-closure requirements for sanitary landfills accepting municipal solid waste (MSW).

567—101.102(455B) Applicability and compliance.

101.102(1) Sanitary landfills accepting municipal solid waste must comply with the provisions of this division.

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101.102(3) These rules do not pertain to the management and disposal of special wastes. For rules pertaining to the management and disposal of special wastes, see 567—Chapter 102, Division VI.

101.102(4) These rules do not apply to MSWLF units that did not receive waste after October 9, 1994. The closure permit issued or the rules in effect at the time of closure shall govern post-closure activities for such MSWLF units.

101.102(5) This division does not apply to MSWLF units that ceased receiving waste before October 1, 2007, and are not contiguous with MSWLF units that continued to accept waste after October 1, 2007. For the purpose of this subrule, contiguous MSWLF units are those that adjoin, abut or have a common boundary or edge with one another or that utilize the same groundwater monitoring network system. The permit issued and the rules in effect at the time waste acceptance ceased shall govern post-permit activities for such MSWLF units, except as follows:

a. Financial assurance in accordance with rule 567—101.114(455B) shall be required.

c. Surface water sampling in accordance with subrule 101.110(3) shall be required.

d. MSWLF units shall perform groundwater sampling for the following parameters:

(1) Routine semiannual water sampling parameters:

1. Chloride.
2. Specific conductance (field measurement).
3. pH (field measurement).
4. Ammonia nitrogen.
5. Iron, dissolved.
6. Chemical oxygen demand.
7. Any additional parameters deemed necessary by the department.

(2) Routine annual water sampling parameters:

1. Total organic halogen.
2. Phenols.
3. Any additional parameters deemed necessary by the department.

e. If the analytical results for a downgradient groundwater monitoring point do not fall within the control limits of two standard deviations above (or below for pH) the mean parameters, listed in subparagraphs 101.102(5)*"d"*(1) and (2), in a corresponding upgradient groundwater monitoring point and it cannot be demonstrated that a source other than an MSWLF unit caused the control limit exceedance, then the owner or operator shall comply with the groundwater assessment monitoring program requirements in subrule 101.110(6) and corrective action requirements in subrules 101.110(7),

Commented [RBL1]: SIDEBAR: Source is current Chapter 113.

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Not all changes were tracked. Especially if minor (i.e. spelling) or when rewording of a phrase or sentence occurred.

References to other Chapters/Divisions has not been updated/made. This will occur after receipt of initial workgroup comments.

An asterisk has been added as a prefix (i.e. "*SIDEBAR") to notes that have been added or updated since the last draft.

Commented [RBL3]: SIDEBAR: Added reference to Iowa enabling statue.

Commented [RBL4]: SIDEBAR: Alternative daily cover requirements will be added to this division.

Commented [RBL5]: *SIDEBAR: The C&D regulations have been moved to Division 3 – Industrial Landfills.

Commented [RBL6]: SIDEBAR: Waivers, agreements, permit amendments, etc. previously approved by the department remain in force and are not changed by this rule change (i.e. facilities that were approved by the department to take waste after this date, surface water sampling, etc.).

Commented [RBL7]: SIDEBAR: With additions and deletions, renumbering has not occurred in general.

101.110(8), and 101.110(9), if necessary.

101.102(6) MSWLF units containing sewage sludge and failing to satisfy the requirements of this division violate Sections 309 and 405(e) of the Clean Water Act.

101.102(7) Compliance with amendments to these rules.

a. Owners or operators of existing MSWLF units that have an approved leachate collection system and a composite liner, or a leachate collection system and an alternative liner modeled at an approved point of compliance, shall not be required to redesign or reconstruct the MSWLF units due to amendments to these rules subsequent to such approval unless the department finds that such units are causing pollution or that continued use of such units will result in a vertical expansion on top of or against the side slopes of a previously filled noncompliant MSWLF unit. Prior to waste placement in the vertical expansion area, revised design plans shall be submitted to include construction of a separatory liner and leachate collection system that comply with all the requirements of subrule 101.107(5) to be placed between the area of vertical expansion and the underlying noncompliant MSWLF unit.

b. Except as authorized by subrule 101.102(9) and paragraph 101.102(10)*"a,"* if any new regulation conflicts with a provision of or an operating procedure prescribed in the engineering plans or the MSWLF permit, the facility shall conform to the new regulation.

101.102(8) Equivalency review procedure.

a. In approving a permit application under this division, the department may authorize, in writing, alternatives to the design requirements in this division only if, and only to the extent that, specific rules in this division expressly state that alternatives may be authorized under this division.

b. An owner or operator requesting an alternative design under this division shall submit a request to the department prepared by an Iowa-licensed professional engineer. The request shall:

(1) Identify the specific rule for which an equivalency alternative is being sought.

(2) Demonstrate, through supporting technical documentation, justification and quality control procedures, that the requested alternative to the design requirements in the rules of this division will, for the life of operations at the facility, achieve the performance standards in that rule.

c. No equivalency alternative will be approved unless the application affirmatively demonstrates that the following conditions are met:

(1) The request is complete and accurate and the requirements of this subrule have been met.

(3) The proposed alternative will provide protection equivalent to the design requirements in this division for the air, water or other natural resources of the state of Iowa, and will not harm or endanger the public health, safety or welfare.

567—101.103(455B) Definitions. The definitions in Iowa Code section 455B.301 and 567—Chapter 100 shall apply to this division.

567—101.104(455B) Permits.

101.104(1) For purposes of this division, the permit requirements in 567–Chapter 100, 567 – Chapter 101, division I and the following apply.

101.104(2) *RD&D permits.* The department may issue a research, development, and demonstration (RD&D) permit that overrides the applicable portions of this division, as provided for in 40 CFR 258.4, without issuing a waiver pursuant to 561—Chapter 10. A permit amendment from the department for leachate recirculation only does not require an RD&D permit.

101.104(3) *Notice and public participation in the MSWLF permit issuance and post-permit actions.*

a. For the purposes of this subrule, "post-permit actions" includes permit renewals and requests for facility modifications as defined below:

(1) Change in an MSWLF facility boundary or an MSWLF unit.

(2) Application for an RD&D permit pursuant to subrule 101.104(10).

(3) Installation of a landfill gas collection system.

(4) Application for a closure permit for an MSWLF unit.

(5) Transfer of an MSWLF permit to a new owner.

Commented [RBL8]: SIDEBAR: Definitions moved to Chapter 100 or Division I unless noted. May move Active Life to Division I.

Commented [RBL9]: SIDEBAR: Permit items moved to Chapter 100 or Division I unless noted.

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(6) Waiver from this division under rule 567—101.115(455B).

(7) Change in the post-permit land use of the property.

(8) Other significant permit actions that are determined by the department to require public notice and participation. Such actions may include requests to change any of the requirements set forth as special provisions in the permit.

b. Prior to the issuance of approval or denial for an MSWLF permit or post-permit action, public notice shall be circulated in a manner designed to inform interested and potentially interested persons of the permit or post-permit action request. Procedures for the circulation of public notice shall include at least the following procedures:

(1) Upon receipt of the permit application or post-permit action request, the department shall make a determination of whether public notice is required in accordance with this subrule. If the determination is made that public notice is required, then the department shall prepare the public notice which shall be circulated by the owner or operator within the service area of the MSWLF by posting the public notice near the entrance to the MSWLF; and by publishing the public notice in periodicals or, if appropriate, in a newspaper(s) of general circulation.

(2) The public notice shall be posted on the department's webpage.

c. The department shall provide a period of not less than 30 days following the date of the public notice during which time interested persons may submit their written views with respect to the MWSLF permit application or post-permit action request. All written comments submitted during the 30-day comment period shall be retained by the department and considered by the department in the formulation of the department's final determinations. The period for comment may be extended at the sole discretion of the department.

d. The contents of the public notice shall include at least the following:

(1) The name, address, and telephone number of the department.

(2) The name and address of each applicant.

(3) A brief description of each applicant's activities or operations which result in the submittal of the permit application or post-permit action request.

(4) A statement that any person may submit written and signed comments, or may request a public hearing, or both, on the proposed permit or post-permit action request. A statement of procedures to request a public hearing pursuant to paragraph 101.104(12)*"e"* shall be included.

(5) Locations where copies of the permit application or post-permit action request may be reviewed, including the closest department field office, and the times at which the copies shall be available for public inspection.

e. The applicant, any interested agency, person or group of persons may request or petition for a public hearing with respect to an MSWLF permit application or post-permit action request. Any such request shall clearly state issues and topics to be addressed at the hearing. Any such request or petition for public hearing must be filed with the department within the 30-day period prescribed in paragraph 101.104(12)*"c"* and shall indicate the interest of the party filing such request and the reasons why a hearing is warranted. The department shall hold an informal and noncontested case hearing if there is a significant public interest (including the filing of requests or petitions for such hearing) in holding such a hearing. Frivolous or insubstantial requests for hearing may be denied by the department. Instances of doubt should be resolved in favor of holding the hearing. Any hearing requested pursuant to this subrule shall be held in the service area of the MSWLF, or other appropriate area at the sole discretion of the department.

f. If the department determines that a public hearing is warranted, then the department shall prepare the public notice of the hearing. Public notice of any hearing held shall be circulated at least as widely as was the notice of the permit application or post-permit action request.

g. The contents of public notice of any hearing held pursuant to paragraph 101.104(12)*"e"* shall include at least the following:

(1) The name, address, and telephone number of the department;

(2) The name and address of each applicant whose application will be considered at the hearing;

Commented [RBL11]: SIDEBAR: The department does not intend, as general practice, to require public notices for waivers issued for an MSWLF under Chapter 100 or Division I.

(3) A brief reference to the public notice issued for each permit application and post-permit action request;

(4) Information regarding the time and location for the hearing;

(5) The purpose of the hearing;

(6) A concise statement of the issues raised by the person requesting the hearing;

(7) Locations where copies of the permit application or post-permit action may be reviewed, including the closest department field office, and the times at which the copies shall be available for public inspection; and

(8) A brief description of the nature of the hearing, including the rules and procedures to be followed.

h. The department shall keep a record of the commenters and of the issues raised during the public participation process and shall prepare written responses to all comments received. At the time a final decision is made, the record and copies of the department's responses shall be made available to the public.

567—101.105(455B) Permit applications Unless otherwise authorized by the department, a permit applicant shall submit on a form prescribed by the department, the requirements in 567 – Chapter 100 and division I of this chapter, and the following information:

c. A site exploration and characterization report for the facility that complies with the requirements of subrule 101.106(4).

d. Plans and specifications for the facility, and quality control and assurance (QC&A) plans, that comply with the requirements of subrule 101.107(6).

e. A development and operations (DOPs) plan for the facility.,

f. An environmental monitoring plan that complies with the requirements of rules 567—101.109(455B) and 567—101.110(455B).

g. The project goals and timelines, and other documentation as necessary to comply with subrule 101.104(10) and other requirements of the department if an RD&D permit is being requested or renewed.

i. A closure and post-closure plan that complies with the requirements of rules 567—101.112(455B) and 567—101.113(455B).

567—101.106(455B) Siting and location requirements. This rule applies to new MSWLF units and horizontal expansions of existing MSWLF units. Except for paragraphs 101.106(2) this rule does not apply to permitted MSWLF units which have been approved prior to October 1, 2007. Information required to document compliance with the requirements of rule 567—101.106(455B) shall be consolidated and maintained in a site exploration and characterization report pursuant to subrule 101.106(4).

101.106(1) *Location restrictions.* MSWLFs shall comply with the following location restrictions.

a. Airports.

(1) A prohibition on locating a new MSWLF near certain airports was enacted in Section 503 of the Wendell H. Ford Aviation Investment and Reform Act for the 21st Century (Ford Act), Pub. L. 106-181 (49 U.S.C. 44718 note). Section 503 prohibits the "construction or establishment" of new MSWLFs after April 5, 2000, within six miles of certain smaller public airports. The Federal Aviation Administration (FAA) administers the Ford Act.

(2) Owners or operators of new MSWLF units, existing MSWLF units, and lateral expansions that are located within 10,000 feet (3,048 meters) of any airport runway end used by turbojet aircraft or within 5,000 feet (1,524 meters) of any airport runway end used by piston-type aircraft only must demonstrate to the FAA and obtain their approval that the units are designed and operated so that the MSWLF unit does not pose a bird hazard to aircraft. The owner or operator must place the demonstration of this requirement in the operating record and submit to the department a copy of the demonstration approved by the FAA.

(3) Owners or operators proposing to site new MSWLF units or lateral expansions within a five-

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mile radius of any airport runway end used by turbojet or piston-type aircraft must notify the affected airport and the FAA. A copy of these notifications shall be submitted to the department.

c. Wetlands. New MSWLF units and lateral expansions shall not be located in wetlands, unless the owner or operator can make the demonstrations in 40 CFR 258.12 to the department. For purposes of this lettered paragraph:

~~*"Wetlands"* means those areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.~~

d. Fault areas. For the purposes of this division, the definitions of "Fault," "Displacement," and "Holocene" are as provided in 40 CFR 258.13(b)(1) through (b)(3).

New MSWLF units or lateral expansions shall not be located within 200 feet (60 meters) of a fault that has had displacement in Holocene time unless the owner or operator demonstrates to the department that an alternative setback distance of less than 200 feet (60 meters) will prevent damage to the structural integrity of the MSWLF unit and will be protective of human health and the environment.

e. Seismic impact zones. For the purposes of this division, the definitions of "Seismic impact zone," Maximum horizontal acceleration in lithified earth material," and lithified earth material" are as provide in 40 CFR 258.14(b)(1) through (b)(3).

New MSWLF units and lateral expansions shall not be located in seismic impact zones, unless the owner or operator demonstrates to the department that all containment structures, including liners, leachate collection systems, and surface water control systems, are designed to resist the maximum horizontal acceleration in lithified earth material for the site. The owner or operator must place the demonstration in the operating record and submit a copy of the demonstration to the department.

f. Unstable areas. For purposes of this paragraph, the definitions of "Unstable area," Structural components," Poor foundation conditions," "Areas susceptible to mass movement" and "Karst terranes" are as provided in 40 CFR 258.15(b)(1) through (b)(5).

Owners or operators of new MSWLF units, existing MSWLF units, or lateral expansions located in an unstable area must demonstrate to the department that engineering measures have been incorporated into the MSWLF unit's design to ensure that the integrity of the structural components of the MSWLF unit will not be disrupted. The owner or operator must place the demonstration in the operating record and submit a copy of the demonstration to the department. The owner or operator must consider the following factors, at a minimum, when determining whether an area is unstable:

(1) On-site or local soil conditions that may result in significant differential settling;

(2) On-site or local geologic or geomorphologic features; and

(3) On-site or local human-made features or human-induced events (both surface and subsurface).

k. Property line setback. An MSWLF unit shall be at least 50 feet from the adjacent property line.

l. Housing and sensitive populations. An MSWLF unit shall not be within 500 feet of an occupied residence, recreational area, child care facility, educational facility, or health care facility in existence at the time of receipt of the original permit application or application to laterally expand the permitted MSWLF unit, unless there is a written agreement between the MSWLF owner and such facility. The written agreement shall be filed with the county recorder for abstract of title purposes, and a copy submitted to the department.

101.106(2) *Soil and hydrogeologic investigations.* An MSWLF shall have a qualified groundwater scientist, as defined in paragraph 101.010(1)*"d,"* conduct a soil and hydrogeologic investigation in accordance with this subrule. The purpose of this investigation is to obtain data to determine potential routes of contaminant migration via groundwater. Such information is vital for completion of the site exploration and characterization report, and the hydrologic monitoring system plan and design. This subrule sets forth the minimum requirements for soil and hydrogeologic investigations. An MSWLF shall comply with this subrule unless the department issues written approval due to specific site conditions.

a. Number of borings. A sufficient number of borings shall be made to accurately identify the

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stratigraphic and hydrogeologic conditions at the site.

b. Depth of borings. Unless otherwise approved by the department in writing, the following requirements shall apply to the depth of borings.

(1) All borings shall be a minimum of 25 feet deep and at least 10 feet below the water table.

(2) At a minimum, half of all borings shall extend 20 feet into the uppermost aquifer, 50 feet below the water table, or 10 feet into bedrock.

(3) At a minimum, one boring shall extend 10 feet into bedrock or 100 feet below the lowest ground surface elevation.

(4) All borings shall be of sufficient depth to correlate strata between borings.

c. Boring method and soil samples.

(1) Continuous samples shall be collected for all borings, unless otherwise approved by the department in writing.

(2) Boring logs shall be as detailed as possible in describing each stratum.

(3) Samples shall be clearly marked, preserved and transported in accordance with laboratory procedures.

(4) The permit applicant shall keep and preserve samples until at least 30 days after the permit is issued.

(5) Soil samples from each stratum shall be tested for falling-head hydraulic conductivity and grain size distribution.

Commented [RBL22]: *SIDEBAR: Permeability has been replaced with hydraulic conductivity here and elsewhere in the landfill rules.

d. Conversion of or plugging borings.

(1) Borings may be converted to piezometers or monitoring wells. However, the conversion of such borings does not guarantee that more piezometers or monitoring wells will not be required in the department-approved hydrologic monitoring system plan and design.

(2) Borings not converted to piezometers or monitoring wells shall be plugged and properly sealed so as not to create pathways for subsurface or surface pollution migration. Borings converted to piezometers or monitoring wells may still need to be partially plugged depending on the depth of the boring. Plugging shall be performed pursuant to paragraph 101.110(2)*"d."*

e. Soil and hydrogeologic investigation description and analysis. A soil and hydrogeologic investigation description and analysis shall be completed and maintained and, at a minimum, shall contain the following:

(1) The boring logs pursuant to subparagraph 101.106(3)*"c"*(2).

(2) A description of the properties of each soil and bedrock stratum as appropriate, including:

1. Soil texture and classification.
2. Particle size distribution.
3. Mineral composition, cementation, and soil structure.
4. Permeability, including horizontal and vertical permeability, and porosity.
5. Geologic structure, including strike, dip, folding, faulting and jointing.
6. Previous activities and infrastructure at the site that could affect geology and hydrogeology, such as but not limited to mining, quarry operations, borrow pits, waste disposal, storage tanks, pipelines, utilities and tile lines.
7. Lenses and other discontinuous units, voids, solution openings, layering, fractures, other heterogeneity, and the scale or frequency of the heterogeneity.
8. Correlation and continuity of strata between borings.

(3) Descriptions of the hydrogeologic units within the saturated zone, including:

1. Thickness.
2. Hydraulic properties, including as appropriate, conductivity, transmissivity, storativity, and effective porosity.
3. Concentrations of chemical constituents listed in Appendix I present in the groundwater of hydrogeologic units and the source of those constituents, if known.
4. Role and effect of each hydrogeologic unit as an aquifer, aquitard, or perched saturated zone.
5. The actual or potential use of the aquifers as water supplies.

(4) Plan view maps, and a series of cross sections with two oriented perpendicular and two oriented parallel to the predominant directions of groundwater flow through the MSWLF unit, showing:

1. The extent of soil and bedrock strata.
2. The position of the water table.
3. The position of the uppermost aquifer.
4. Measured values of hydraulic head.
5. Equipotential lines and inferred groundwater streamlines of the water table, and the uppermost aquifer if different from the water table.
6. Location of soil and bedrock borings.
7. Location of piezometers and monitoring points, if any.

(5) A description and evaluation of horizontal and vertical groundwater flow which specifically addresses the following and their significance to the movement of pollutants carried by groundwater:

1. Local, intermediate and regional groundwater systems.
2. Groundwater recharge and discharge areas within and immediately surrounding the facility, including interactions with perennial and intermittent surface waters and how the facility affects recharge rates.
3. Existing and proposed groundwater and surface water withdrawals.
4. The effects of heterogeneity, fractures or directional differences in permeability on groundwater movement.
5. Directions of groundwater movement, including vertical components of flow, specific discharge rates and average linear velocities within the hydrologic strata.
6. Seasonal or other temporal fluctuations in hydraulic head.
7. The effect of existing and proposed MSWLF units.

(6) An analysis of potential impacts on groundwater and surface water quality, and water users, in the event of a theoretical release at the most downgradient portion of each MSWLF unit. The analysis shall at a minimum utilize contaminants and indicator parameters with high mobility in groundwater. This analysis shall include:

1. Assumptions and approximations utilized, and why they were utilized.
2. If a model is utilized, a thorough description of models used and each model's capabilities and limitations, including the reliability and accuracy of the models in actual field tests.
3. Projected paths and rates of movement of contaminants found in leachate.

(7) Recommendations for the location of the proposed MSWLF unit and conceptual design based on hydrogeologic information.

101.106(3) *Site exploration and characterization report.* An MSWLF shall develop and submit to the department for review a site exploration and characterization report. At a minimum, the site exploration and characterization report shall detail compliance with the requirements of rule 567—101.106(455B) and contain the following components:

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a. A title page and index.

b. A legal description of the site.

c. Proof of the applicant's ownership of the site and legal entitlement to use the site as an MSWLF. If the applicant does not own the site, then proof of legal entitlement to the site, such as, a lease, must be submitted. Such legal entitlement must include the following:

(1) Provisions that allow continued disposal operations until closure of the facility.

(2) Provisions for the performance of facility closure operations.

(3) Provisions for post-closure care for at least a 30-year period after facility closure.

d. Proof of the applicant's local siting approval pursuant to Iowa Code section 455B.305A, if applicable.

e. Scaled maps or aerial photographs locating the boundaries of the facility and identifying:

(1) North and other principal compass points.

(2) Section lines and other legal boundaries.

(3) Zoning and land use within 0.5 miles.

(4) Haul routes to and from the facility, including load limits or other restrictions on those routes.
(5) Topography within 0.5 miles.
(6) Applicable setback distances and location requirements pursuant to rule 567—101.106(455B), including:
1. Airports within 6 miles of existing, new and planned MSWLF units.
2. Floodplains within or adjacent to the facility.
3. Wetlands within or adjacent to the facility.
4. Fault areas within 200 feet of existing, new and planned MSWLF units.
5. Seismic impact zones within or adjacent to the facility.
6. Unstable areas within or adjacent to the facility.
9. Water wells within 1,000 feet of upgradient existing, new and planned MSWLF units.
10. Public water wells within 1 mile of upgradient existing, new and planned MSWLF units.
11. Boundaries of the existing, new and planned MSWLF units and the facility property line.
12. Housing and sensitive populations within 500 feet of existing, new and planned MSWLF units.
f. The bird-aircraft hazard demonstration pursuant to paragraph 101.106(2)*"a,"* if applicable.
g. The floodplain demonstration pursuant to paragraph 101.106(2)*"b,"* if applicable.
h. The wetlands demonstration pursuant to paragraph 101.106(2)*"c,"* if applicable.
i. The fault area demonstration pursuant to paragraph 101.106(2)*"d,"* if applicable.
j. The seismic impact zone demonstration pursuant to paragraph 101.106(2)*"e,"* if applicable.
k. The unstable area demonstration pursuant to paragraph 101.106(2)*"f,"* if applicable.
l. Copies of written agreements with surrounding property owners pursuant to paragraph 101.106(2)*"l,"* if applicable.
m. The soil and hydrogeologic investigation description and analysis pursuant to paragraph 101.106(3)*"e."*

567—101.107(455B) MSWLF unit design and construction standards. MSWLF units shall be designed and constructed in accordance with this rule.

101.107(1) *Plans and specifications.*

a. Unless otherwise requested by the department, one copy of plans, specifications, and supporting documents shall be provided to the department for review.

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b. New MSWLF units shall be constructed in compliance with the rules and regulations in effect at the time of construction. Previous department approval of plans and specifications for MSWLF units not yet constructed shall be superseded by the promulgation of new rules and regulations, after which plans and specifications shall be resubmitted to the department for approval prior to construction and operation.

101.107(2) *MSWLF unit subgrade*. The subgrade for a new MSWLF unit shall be constructed as follows:

a. All trees, stumps, roots, boulders, debris, and other material capable of deteriorating in situ material strength or of creating a preferential pathway for contaminants shall be completely removed or sealed off prior to construction of the MSWLF unit.

b. The material beneath the MSWLF unit shall have sufficient strength to support the weight of the unit during all phases of construction and operation. The loads and loading rate shall not cause or contribute to failure of the liner and leachate collection system.

c. The total settlement or swell of the MSWLF unit's subgrade shall not cause or contribute to failure of the liner and leachate collection system.

d. If the in situ material of the MSWLF unit's subgrade cannot meet the requirements of paragraphs 101.107(4)*"b"* and 101.107(4)*"c,"* then such material shall be removed and replaced with material capable of compliance.

e. The subgrade of an MSWLF unit shall be constructed and graded to provide a smooth working surface on which to construct the liner.

f. The subgrade of an MSWLF unit shall not be constructed in or with frozen soil.

101.107(3) *MSWLF unit liners and leachate collection systems.* The liner and leachate collection

system for a new MSWLF unit shall be constructed in accordance with the requirements of this subrule. All active portions must have a composite liner or an alternative liner approved by the department. An MSWLF unit must have a functioning leachate collection system during its active life.

a. Liner systems. An MSWLF unit shall have a liner system that complies with either the composite liner requirements of subparagraph 101.107(5)*"a"*(1) or an alternative liner system that complies with the requirements of subparagraph 101.107(5)*"a"*(2). Liners utilizing compacted soil must place the compacted soil in lifts no thicker than 8 inches after compaction.

(1) Composite liner systems.

1. A composite liner consists of two components, an upper flexible membrane liner (FML) and a lower compacted soil liner.

2. The upper component must consist of a minimum 30-mil flexible membrane liner (FML). FML components consisting of high-density polyethylene (HDPE) shall be at least 60 mil thick. The FML component must be installed in direct and uniform contact with the lower compacted soil component.

3. The lower component must consist of at least a 2-foot layer of compacted soil with a hydraulic conductivity of no more than 1×10^{-7} centimeters per second (cm/sec). The compacted soil must be placed in lifts no thicker than 8 inches after compaction.

4. The composite liner must be adequately sloped toward the leachate collection pipes to provide drainage of leachate. Unless alternative design requirements to this performance standard are approved as part of the permit under subrule 101.102(11) (relating to equivalency review procedure), the leachate collection system shall have a slope greater than or equal to 2 percent and not exceeding 33 percent.

(2) Alternative liner systems.

1. The design must ensure that the concentration values listed in Table I of rule 567—101.107(455B) will not be exceeded in the uppermost aquifer at the relevant point of compliance, as specified pursuant to numbered paragraph 101.107(5)*"a"*(2)"2." Alternative liners utilizing compacted soil must place the compacted soil in lifts no thicker than 8 inches.

2. The relevant point of compliance specified by the department must be within 50 feet of the planned liner or waste boundary, unless site conditions dictate otherwise, downgradient of the facility with respect to the hydrologic unit being monitored in accordance with subparagraph 101.110(2)*"a"*(2), and located on land owned by the owner of the MSWLF unit. The relevant point of compliance specified by the department shall be at least 50 feet from the property line of the facility.

3. When approving an alternative liner design, the department shall consider at least the following factors:

- The hydrogeologic characteristics of the facility and surrounding land.
- The climatic factors of the area.
- The volume and physical and chemical characteristics of the leachate.
- The sensitivities and limitations of the modeling demonstrating the applicable point of compliance.
- Practicable capability of the owner or operator.

4. The alternative liner must be adequately sloped toward the leachate collection pipes to provide drainage of leachate. Unless alternative design requirements to this performance standard are approved as part of the permit under subrule 101.102(11) (relating to equivalency review procedure), the leachate collection system shall have a slope greater than or equal to 2 percent and not exceeding 33 percent.

Table I

Chemical	MCL (mg/l)
Arsenic	0.01
Barium	1.0

Benzene	0.005
Cadmium	0.01
Carbon tetrachloride	0.005
Chromium (hexavalent)	0.05
2,4-Dichlorophenoxy acetic acid	0.1
1,4-Dichlorobenzene	0.075
1,2-Dichloroethane	0.005
1,1-Dichloroethylene	0.007
Endrin	0.0002
Fluoride	4.0
Lindane	0.004
Lead	0.05
Mercury	0.002
Methoxychlor	0.1
Nitrate	10.0
Selenium	0.01
Silver	0.05
Toxaphene	0.005
1,1,1-Trichloroethane	0.2
Trichloroethylene	0.005
2,4,5-Trichlorophenoxy acetic acid	0.01
Vinyl chloride	0.002

Commented [RBL25]: SIDEBAR: It has been brought to EPA's attention that this should be "ethane" and not "methane". This is reinforced by comparing the respective MCLs. It is believed that changing this ahead of the EPA correcting is not substantial.

450 *b. Leachate collection system.* MSWLF units shall have a leachate collection system that complies

with the following requirements:

(1) The leachate collection system shall be designed and constructed to function for the entire active life of the facility and the post-closure period.

(2) The leachate collection system shall be of a structural strength capable of supporting waste and equipment loads throughout the active life of the facility and the post-closure period.

(3) The leachate collection system shall be designed and constructed to minimize leachate head over the liner at all times. An MSWLF unit shall have a leachate collection system that maintains less than a 30-centimeter (i.e., 12-inch) depth of leachate over the liner. The leachate collection system shall have a method for accurately measuring the leachate head on the liner at the system's lowest point(s) within the MSWLF unit (e.g., sumps). Furthermore, an additional measuring device shall be installed to measure leachate directly on the liner in the least conductive drainage material outside of the sump and collection trench. Leachate head measurements from cleanout lines or manholes are not acceptable for the second measurement. All such measurement devices shall be in place before waste is placed in the MSWLF unit.

(4) If the leachate collection system is not designed and constructed factoring in leachate recirculation or bioreactor operations, the department may prohibit such activities within the MSWLF unit.

(5) The collection pipes shall be of a length and cross-sectional area that allow for cleaning and inspection through the entire length of all collection pipes at least once every three years. The collection pipes shall not be designed or constructed with sharp bends that prevent cleaning or inspection along any section of the collection pipe or that may cause the collection pipe to be damaged during cleaning or inspection.

(6) Leachate collection system designs shall attempt to minimize the potential for clogging due to mass loading.

(7) Unless alternative design requirements are approved as part of the permit under subrule 101.102(11) (relating to equivalency review procedure), the following design requirements shall apply:

1. A geotextile cushion over the flexible membrane liner (FML), if the liner utilizes an FML and granular drainage media. A geotextile cushion is not required if the granular drainage media is well rounded and less than 3/8 inch in diameter. The geotextile's mass shall be determined based on the allowable pressure on the geomembrane.

2. Collection pipe(s) at least 4 inches in diameter at the base of the liner slope(s), surrounded by the high hydraulic-conductivity material listed in numbered paragraph 101.107(5)*"b"*(7)"3" below. The collection pipe shall have slots or holes large enough to minimize the potential for clogging from fines conveyed by incoming leachate.

3. One of the following high hydraulic-conductivity materials:

- High hydraulic-conductivity material (e.g., gravel) of uniform size and a fines content of no more than 5 percent by weight passing a #200 sieve. The high hydraulic-conductivity material shall be at least 12 inches in depth and have a hydraulic conductivity of at least 1×10^{-2} cm/sec; or
- A geosynthetic drainage media (e.g., geonet). The transmissivity of geonets shall be tested to demonstrate that the design transmissivity will be maintained for the design period of the facility. The testing for the geonet in the liner system shall be conducted using actual boundary material intended for the geonet at the maximum design normal load for the MSWLF unit, and at the design load expected from one lift of waste. At the maximum design normal load, testing shall be conducted for a minimum period of 100 hours unless data equivalent of the 100-hour period is provided, in which case the test shall be conducted for a minimum period of one hour. In the case of the design load from one lift of waste, the minimum period shall be one hour. For geonets used in final covers, only one test shall be conducted for a minimum period of one hour using the expected maximum design normal load from the cover soils and the actual boundary materials intended for the geonet. A granular layer at least 12 inches thick with a hydraulic conductivity of at least 1×10^{-3} cm/sec shall be placed above the geosynthetic drainage material that readily transmits leachate and provides separation between the waste and liner.

(8) Manholes within the MSWLF unit shall be designed to minimize the potential for stressing or

Commented [RBL26]: SIDEBAR: Industry standards change over time, which would require a rule revision to keep current. Therefore, we are removing specific references to testing standards. Instead, it is up to the discretion of the design engineer.

penetrating the liner due to friction on the manhole exterior from waste settlement.

(9) The leachate drainage and collection system within the MSWLF unit shall not be used for the purpose of storing leachate. If leachate is to be stored, it shall be stored in designated storage structures outside of the MSWLF unit.

(10) All of the facility's leachate storage and management structures outside of the MSWLF unit and operations shall have containment structures or countermeasures adequate to prevent seepage to groundwater or surface water. The containment structures and countermeasures for leachate storage shall be at least as protective of groundwater at the liner of the MSWLF unit on a performance basis.

(11) Unless alternative design requirements are approved as part of the permit under subrule 101.102(11) (relating to equivalency review procedure), the leachate storage structures shall be able to store at least 7 days of accumulated leachate at the maximum generation rate used in designing the leachate collection system. Such minimum storage capacity may be constructed in phases over time so long as the 7-day accumulation capacity is maintained. The storage facility shall also have the ability to load tanker trucks in case sanitary sewer service is unavailable for longer than 7 days.

(12) The leachate collection system shall be equipped with valves or devices similar in effectiveness so that leachate can be controlled during maintenance.

(13) The leachate collection system shall be accessible for maintenance at all times and under all weather conditions.

(14) The permit holder shall annually submit a Leachate Control System Performance Evaluation (LCSPE) Report as a supplement to the facility Annual Water Quality Report, as defined in subrule 101.110(10). The report shall include an evaluation of the effectiveness of the system in controlling the leachate, leachate head levels and elevations, the volume of leachate collected and transported to the treatment works or discharged under any National Pollutant Discharge Elimination System (NPDES) permits, records of leachate contaminants testing required by the treatment works, proposed additional leachate control measures, and an implementation schedule in the event that the constructed system is not performing effectively.

101.107(4) *Quality control and assurance program.* MSWLF units shall be constructed under the supervision of a strict quality control and assurance (QC&A) program to ensure that MSWLF units are constructed in accordance with the requirements of rule 567—101.107(455B) and the approved plans and specifications. At a minimum, such a QC&A program shall consist of the following.

a. The owner or operator shall designate a QC&A officer. The QC&A officer shall be an Iowa-licensed professional engineer. The QC&A officer shall not be an employee of the facility, the construction company or construction contractor. The owner or operator shall notify the department of the designated QC&A officer and provide the department with that person's contact information. The QC&A officer may delegate another person or persons who are not employees of the facility to supervise or implement aspects of the QC&A program.

b. The QC&A officer shall document compliance with rule 567—101.107(455B), and the approved plans and specifications, for the following aspects of construction:

(1) The MSWLF unit's subgrade.

(2) The liner system, as applicable, below:

1. The flexible membrane liner (FML). Destructive testing of the FML shall be kept to side slopes when continuous seams are utilized. Patches over FML destructive testing areas shall be checked with nondestructive methods.

2. The compacted clay component of the liner system. A minimum of five field moisture density tests per 8-inch lift per acre shall be performed to verify that the correct density, as correlated to permeability by a laboratory analysis, has been achieved. Laboratory hydraulic conductivity testing of Shelby tube samples from the constructed soil liner or test pad, or field hydraulic conductivity testing of the constructed soil liner or test pad, or other methods approved by the department, shall be utilized as a QC&A test.

(3) The leachate collection, conveyance and storage systems.

(4) Any other aspect of construction as required by the department.

c. A sampling and testing program shall be implemented by the QC&A officer as part of the QC&A program. The sampling and testing program shall:

(1) Verify full compliance with the requirements of rule 567—101.107(455B), and the approved plans and specifications.

(2) Be approved by the department prior to construction of the MSWLF unit.

(3) Detail how each stage of construction will be verified for full compliance with the requirements of rule 567—101.107(455B), and the approved plans and specifications.

(4) Be based on statistically significant sampling techniques and establish criteria for the acceptance or rejection of materials and constructed components of the MSWLF unit.

(5) Detail what actions will take place to remedy and verify any material or constructed component that is not in compliance with the requirements of rule 567—101.107(455B), and the approved plans and specifications.

d. The QC&A officer shall document the QC&A program. Upon completion of the MSWLF unit construction, the QC&A officer shall submit a final report to the department that verifies compliance with the requirements of rule 567—101.107(455B), and the DNR-approved plans and specifications. A copy of the final report shall also be maintained by the facility in the operating record. At a minimum, the final report shall include the following.

(1) A title page and index.

(2) The name and permit number of the facility.

(3) Contact information for the QC&A officer and persons delegated by the QC&A officer to supervise or implement an aspect of the QC&A program.

(4) Contact information for all construction contractors.

(5) Copies of daily reports containing the following information.

1. The date.
2. Summary of weather conditions.
3. Summary of locations on the facility where construction was occurring.
4. Summary of equipment, materials and personnel utilized in construction.
5. Summary of meetings held regarding the construction of the MSWLF unit.
6. Summary of construction progress.
7. Photographs of the construction progress, with descriptions of the time, subject matter and location of each photograph.
8. Details of sampling and testing program for that day. At a minimum, this report shall include details of where sampling and testing occurred, the methods utilized, personnel involved and test results.
9. Details of how any material or constructed component that was found not to be in compliance via the sampling and testing program was remedied.

(6) A copy of detailed as-built drawings with supporting documentation and photographic evidence. This copy shall also include a narrative explanation of changes from the original department-approved plans and specifications.

(7) A signed and sealed statement by the QC&A officer that the MSWLF unit was constructed in accordance with the requirements of rule 567—101.107(455B), and the approved plans and specifications.

101.107(5) *Vertical and horizontal expansions of MSWLF units.* All vertical and horizontal expansions of disposal airspace over existing and new MSWLF units shall comply with the following:

a. Horizontal expansions shall, at a minimum, comply with the following requirements:

(1) Horizontal expansions are new MSWLF units and, at a minimum, shall be designed and constructed in accordance with subrules 101.107(4), 101.107(5) and 101.107(6).

(2) The slope stability of the horizontal expansion between the existing unit and new MSWLF unit shall be analyzed. The interface between two MSWLF units shall not cause a slope failure of either of the MSWLF units.

(3) A horizontal expansion may include a vertical elevation increase of an existing MSWLF unit, pursuant to paragraph 101.107(7)*"b,"* if approved by the department.

b. Vertical expansions shall, at a minimum, comply with the following:

(1) A vertical expansion of an MSWLF unit shall not be allowed if the MSWLF unit does not have an approved leachate collection system and a composite liner, or a leachate collection system and an alternative liner modeled at an approved point of compliance.

(2) An analysis of the structural impacts of the proposed vertical expansion on the liner and leachate collection system shall be completed. The vertical expansion shall not contribute to the structural failure of the liner and leachate collection system.

(3) An analysis of the impact of the proposed vertical expansion on leachate generation shall be completed. The vertical expansion shall not overload the leachate collection system or contribute to excess head on the liner.

(4) An analysis of the effect of the proposed vertical expansion on run-on, runoff and discharges into waters of the state shall be completed. The vertical expansion shall not cause a violation of subrule 101.107(8).

(5) The proposed vertical expansion shall be in compliance with the final slopes required at closure pursuant to paragraph 101.112(1)*"e."*

101.107(6) *Run-on and runoff control systems.*

a. Owners or operators of MSWLF units must design, construct, and maintain the following:

(1) A run-on control system to prevent flow onto the active portion of the landfill during the peak discharge from a 25-year storm;

(2) A runoff control system from the active portion of the landfill to collect and control at least the water volume resulting from a 24-hour, 25-year storm.

b. Runoff from the active portion of the MSWLF unit must be handled in accordance with paragraph 101.110(1)*"a."*

567—101.108(455B) Operating requirements. The requirements of this rule shall be consolidated in a development and operations plan (DOPs) pursuant to subrule 101.108(4).

101.108(1) *Prohibited operations and activities.* For the purposes of this subrule, "regulated hazardous waste" means a solid waste that is a hazardous waste, as defined in Iowa Code section 455B.411.

a. Waste screening for prohibited materials. Owners or operators of MSWLF units must implement a program at the facility for detecting and preventing the disposal of regulated hazardous wastes, polychlorinated biphenyls (PCB) wastes, and other prohibited wastes listed in paragraph 101.108(1)*"b."* This program must include, at a minimum:

(1) Random inspections of incoming loads unless the owner or operator takes other steps to ensure that incoming loads do not contain regulated hazardous wastes, PCB wastes or other prohibited wastes listed in paragraph 101.108(1)*"b"*;

(2) Records of any inspections;

(3) Training of facility personnel to recognize regulated hazardous wastes, PCB wastes and other prohibited wastes listed in paragraph 101.108(1)*"b"*; and

(4) Notification of the EPA regional administrator if regulated hazardous wastes or PCB wastes are discovered at the facility.

b. Materials prohibited from disposal. The following wastes shall not be accepted for disposal by an MSWLF.

(1) Hazardous waste, whether it is a chemical compound specifically listed by U.S. Environmental Protection Agency (EPA) as a regulated hazardous waste or a characteristic hazardous waste pursuant to the characteristics below:

1. Ignitable in that the waste has a flash point of less than 140 degrees Fahrenheit.
2. Corrosive in that the waste has a pH less than 2 or greater than 12.5.
3. Reactive in that the waste is normally unstable; reacts violently with water; forms an explosive mixture with water; contains quantities of cyanide or sulfur that could be released into the air in sufficient quantity to be a danger to human health; or can easily be detonated or exploded.
4. Toxicity characteristic leaching procedure (TCLP) (EPA Method 1311) toxic, in that a TCLP

Commented [RBL27]: SIDEBAR: It should be noted that stormwater storm event requirements are for active conditions and do not include closed conditions. This is the same in the CFR.

Commented [RBL28]: SIDEBAR: ERRAP requirements have been moved to Chapter 100 and Division I, so no need to include here.

listed chemical constituent exceeds the EPA assigned concentration standard in 40 CFR Part 261 or the department assigned concentration standard in Table I of rule 567—101.107(455B). Waste from a residential building that is contaminated by lead-based paint (i.e., the waste fails the TCLP test for lead only) may be disposed of in an MSWLF unit. The purpose of this exclusion is to help prevent the exposure of children to lead-based paint. Therefore, the meaning of "residential building" in regard to this TCLP exclusion shall be interpreted broadly and include any building which children or parents may utilize as a residence (temporarily or permanently). Such residential buildings include, but are not limited to, single-family homes, apartment buildings, townhomes, condominiums, public housing, military barracks, nursing homes, hotels, motels, bunkhouses, and campground cabins.

(2) Polychlorinated biphenyl (PCB) wastes with a concentration equal to or greater than 50 parts per million (ppm).

(3) Free liquids, liquid waste and containerized liquids. However, free liquids and containerized liquids may be placed in MSWLF units if:

1. The containerized liquid is household waste other than septic waste. The container must be a small container similar in size to that normally found in household waste;

2. The waste is leachate or gas condensate derived from the MSWLF unit, whether it is a new or existing MSWLF unit or lateral expansion, and is designed with a composite liner and leachate collection system as described in paragraph 101.107(5)*"a."* The owner or operator must demonstrate compliance with this subparagraph and place the demonstration in the operating record; or

3. The MSWLF unit is a RD&D project in which the department has authorized the addition of liquids and meets the applicable requirements of subrule 101.104(10).

(4) Septage, which is the raw material, liquids and pumpings from a septic system, unless treated pursuant to 567—Chapter 68.

(5) Appliances as defined pursuant to 567—Chapter 102, division VII, unless there is documentation that the appliance has been demanufactured pursuant to 567—Chapter 102, division VII.

(6) Radioactive waste, excluding luminous timepieces and other items using very small amounts of tritium.

(7) Infectious waste, unless managed and disposed of pursuant to 567—Chapter 102, division VI.

(8) Hot loads, meaning solid waste that is smoking, smoldering, emitting flames or hot gases, or otherwise indicating that the solid waste is in the process of combustion or close to igniting. Ash that has not been fully quenched or cooled is considered a hot load. Such wastes may be accepted at the gate, but shall be segregated and completely extinguished and cooled in a manner as safe and responsible as practical before disposal.

(9) Asbestos-containing material (ACM) waste with greater than 1 percent asbestos, unless managed and disposed of pursuant to 567—Chapter 102, division VI.

(11) Grit and bar screenings, grease skimmings, and sewage sludge unless managed and disposed of pursuant to 567—Chapter 102, division VI.

(12) Waste tires, unless each tire is processed into pieces no longer than 18 inches on any side.

(13) Yard waste, except in the circumstances given in Iowa code 455D.9.1

(14) Lead-acid batteries.

(15) Waste oil and materials containing free-flowing waste oil. Materials contaminated with waste oil may be disposed of if no free-flowing oil is retained in the material, and the material is not a hazardous waste.

(16) Baled solid waste, unless the waste is baled on site after the waste has been visually inspected for prohibited materials.

c. Open burning and fire hazards. No open burning of any type shall be allowed within the permitted boundary of an MSWLF facility. The fueling of vehicles and equipment, and any other activity that may produce sparks or flame, shall be conducted at least 50 feet away from the working face.

d. Scavenging and salvaging. Scavenging shall not be allowed at the MSWLF facility. However, salvaging by MSWLF operators may be allowed.

Commented [RBL29]: *SIDEBAR: PCS has been removed from here and under alternative daily cover, so non-hazardous PCS can be directly buried.

Commented [RBL30]: *SIDEBAR: The Chapter 102 reference allows disposal of all sewage sludges, including Class III as long as it is stabilized.

e. Animal feeding and grazing. Feeding animals MSW shall not be allowed at an MSWLF facility. The grazing of domestic animals on fully vegetated areas of the MSWLF facility not used for disposal, including closed MSWLF units, may be allowed by the department so long as the animals do not cause damage or interfere with operations, inspections, environmental monitoring and other required activities Hoofed animals shall not be allowed on closed MSWLF units.

101.108(2) *Disposal operations and activities.* MSWLFs shall comply with the following requirements:

a. Survey controls and monuments. Survey controls and monuments shall be maintained as follows.

(1) The property boundary, the permitted boundary and the boundaries of MSWLF units shall be surveyed and marked by a professional land surveyor at least once prior to closure.

(2) Prior to waste placement, all new MSWLF unit boundaries shall be surveyed and staked by an Iowa-licensed professional engineer or land surveyor.

(3) Survey monuments shall be established and maintained by an Iowa-licensed professional land surveyor to provide vertical and horizontal control.

(4) An Iowa-licensed professional engineer or land surveyor shall check vertical elevations and the progression of fill sequencing.

(5) All survey stakes and monuments shall be clearly marked.

(6) An Iowa-licensed professional engineer or land surveyor shall biennially inspect all survey monuments. Any missing or damaged survey monuments shall be replaced by a professional land surveyor.

b. First lift. The first lift and initial placement of MSW over a new MSWLF unit liner and leachate collection system shall comply with the following requirements.

(1) Waste shall not be placed in the new MSWLF unit until the QC&A officer has submitted a signed and sealed final report to the department pursuant to paragraph 101.107(6)*"d"* and that report has been approved by the department.

(2) Construction and earth-moving equipment shall not operate directly on the liner and leachate management system. Waste disposal operations shall begin at the edge of the new MSWLF unit by pushing MSW out over the liner and leachate collection system. Compactors and other similarly heavy equipment shall not operate directly on the leachate collection system until a minimum of 4 feet of waste has been mounded over the top of the leachate collection system.

(3) C&D waste and materials clearly capable of spearing through the leachate collection system and liner shall not be placed in the first 4 feet of waste over the top of the leachate collection system. The first 4 feet of waste shall consist of select waste that is unlikely to damage the liner and performance of the leachate collection system.

(4) The owner or operator must place documentation in the operating record and submit a copy to the department that adequate cover material was placed over the top of the leachate collection system in the MSWLF unit or that freeze/thaw effects had no adverse impact on the compacted clay component of the liner.

c. Fill sequencing. The rate and phasing of disposal operations shall comply with the following requirements.

(1) The fill sequencing shall be planned and conducted in a manner and at a rate that does not cause a slope failure, lead to extreme differential settlement, or damage the liner and leachate collection system.

(2) The fill sequencing shall be planned and conducted in a manner compliant with the run-on and runoff requirements of subrule 101.107(8) and surface water requirements of rule 567—101.110(455B).

d. Working face. The working face shall comply with the following requirements.

(1) The working face shall be no larger than necessary to accommodate the rate of disposal in a safe and efficient manner.

(2) The working face shall not be so steep as to cause heavy equipment and solid waste collection vehicles to roll over or otherwise lose control.

Commented [RBL31]: SIDEBAR: This subrule was edited to clarify expectations for what is needed and who can do the work.

(3) Litter control devices of sufficient size to help prevent blowing litter shall be utilized at the working face. The operation of the working face shall attempt to minimize blowing litter.

(4) The operation of the working face shall prevent the harborage of vectors and attempt to minimize the attraction of vectors.

(5) Employees at the working face shall be trained to visually recognize universal symbols, markings and indications of prohibited wastes pursuant to paragraph 101.108(1)*"b."*

e. Special wastes. Special wastes shall be managed and disposed of pursuant to 567—Chapter 102 Division VI.

f. Cover material and alternative cover material. Alternative cover material of an alternative thickness (e.g., tarps, spray covers) may be authorized if the owner or operator demonstrates to the department that the alternative material and thickness control vectors, fires, odors, blowing litter, and scavenging without presenting a threat to human health and the environment. Cover material or alternative cover material shall be available for use during all seasons in all types of weather. Cover material and alternative cover material shall be utilized as follows:

(1) Daily cover. Six inches of cover material or an approved depth or application of alternative cover material shall be placed and maintained over waste at the end of each operating day, or at more frequent intervals if necessary, to control vectors, fires, odors, blowing litter, and scavenging.

(2) Intermediate cover. At least 1 foot of compacted cover material or an approved depth or application of alternative cover material shall be placed and maintained over waste in the active portion that has not or will not receive more waste for at least 30 days. At least 2 feet of compacted cover material or alternative cover material shall be placed and maintained over waste that has not or will not receive waste for at least 180 days. Such active portions shall be seeded if they will not receive waste for a full growing season.

(3) Scarification of cover. To help prevent leachate seeps by aiding the downward flow of leachate, cover material or alternative cover material, which prevents the downward flow of leachate and is at least 5 feet from the outer edge of the MSWLF unit, shall be scarified prior to use of that area as a working face. Cover material or alternative cover material that does not impede the downward flow of leachate, as approved by the department, does not require scarification. Scarification may be as simple as the spearing or breaking up of a small area of the cover. Areas of intermediate cover may require removal of some of the cover material or alternative cover material to aid the downward flow of leachate.

(4) Final cover. Final cover over an MSWLF unit that is to be closed shall be constructed and maintained according to the closure and post-closure requirements of rules 567—101.112(455B) and 567—101.113(455B).

g. Leachate seeps. Leachate seeps shall be contained and plugged upon being identified. Leachate seeps shall not be allowed to reach waters of the state. Soils outside of the MSWLF unit that are contaminated by a leachate seep shall be excavated and then disposed of within the MSWLF unit. Such soils may be used for daily cover material.

h. Leachate recirculation. The department must approve an MSWLF unit for leachate recirculation. The primary goal of the leachate recirculation system is to help stabilize the waste in a more rapid, but controlled, manner. The leachate recirculation system shall not contaminate waters of the state, contribute to erosion, damage cover material, harm vegetation, or spray persons at the MSWLF facility. Leachate recirculation shall be limited to MSWLF units constructed with a composite liner.

i. Differential settlement. Areas of differential settlement sufficient to interfere with runoff and run-on shall be brought back up to the contours of the surrounding active portion. Differential settlement shall not be allowed to cause ponding of water on the active portion.

101.108(3) *Universally approved beneficial use determinations for alternative cover material.* The following alternative cover materials may be beneficially used as daily cover material at sanitary landfills in the manner and volume specified by sanitary landfill rules. However, sanitary landfills shall amend their sanitary landfill permits by notifying the department, and the department field office with jurisdiction over the facility, of their intent to utilize solid by-products pursuant to this rule at least 30 days prior to actual utilization of the by-products as alternative cover material.

Commented [BLR32]: *SIDEBAR: Alternative daily cover was added here since only applies to MSWLFs.

Commented [RBL33]: SIDEBAR: The definition for "active portion" is more applicable to closure/capping, so we removed it from here.

Commented [RBL34]: SIDEBAR: As noted above, the definition for "active portion" is more applicable to closure/capping, so we removed it from here.

Commented [RBL35]: SIDEBAR: This statement is redundant with the run-on and runoff rules, so it has been removed.

Commented [RBL36]: SIDEBAR: Alternative cover requirements were moved in from current Chapter 108.

a. Asphalt Shingles. Asphalt shingles that are certified, consistent with federal regulations (Reference: Appendix E, Subpart E, 40 CFR Part 763, Section 1, Polarized Light Microscopy), as not containing more than 1 percent asbestos and are ground to an average size of 3 inches or less in any dimension may be mixed with soil in a 50/50 volume

b. Compost. One hundred percent cured or finished compost, including compost overs, may be used.

c. Diatomaceous earth. Diatomaceous earth may be mixed with soil in a 50/50 volume.

d. Foundry sand. Foundry sand may be mixed with soil in a 50/50 volume.

e. Glass. Glass that has been ground to an average size of ½ inch or less in any dimension may be mixed with soil in a 10 percent glass and 90 percent soil by volume mixture.

f. Gypsum and gypsum wallboard. Gypsum and gypsum wallboard that have been ground to an average size of 3 inches or less in any dimension may be mixed with soil in a 50/50 volume.

g. Paper mill sludge. Uncontaminated, dewatered paper mill sludge may be mixed with soil in a 50/50 volume.

h. Sandblasting abrasive. Sandblasting abrasive and residuals may be mixed with soil in a 50/50 volume.

j. Tire chips. Tire chips that are an average size of 3 inches or less in any dimension may be mixed with soil in a 50/50 volume.

101.108(4) *Beneficial use determination application requirements for alternative cover material.* Unless the alternative cover material beneficial use is approved pursuant to 101.108(3), the applicant shall submit the following application information to the department to amend the sanitary landfill permit. The department may request that additional information be submitted in order to make a beneficial use determination. The department may also require specific beneficial use determination conditions and issue a temporary beneficial use determination on a trial basis.

If the department finds the application information to be incomplete, then it shall notify the applicant in writing of that fact and of the specific deficiencies and return the application materials to the applicant within 30 days of such notification. The applicant may reapply without prejudice.

a. The name, address, and telephone number of:

(1) Owner of the site where the project will be located.

(2) Applicant for the beneficial use determination.

(3) Official responsible for the operation of the project.

(4) Professional engineer (P.E.) licensed by the state of Iowa and retained for the project, if any. The department may, at its sole discretion, require the applicant to retain a professional engineer for the project or specific parts thereof.

(5) Agency to be served by the project, if any.

(6) Responsible official of agency to be served.

b. A description of the proposed alternative cover material and whether it is to be used as daily, intermediate, or final cover.

c. The chemical and physical characteristics of the alternative cover material.

d. The proposed volume ratio of the alternative cover material(s) to soil or other alternative cover material(s).

e. A demonstration that there is a known or reasonably probable suitability of the alternative cover material as cover material by providing previous case studies of the alternative cover material being utilized as cover material or information on the ability of the alternative cover material to do the following:

(1) Reduce or maintain current odor levels.

(1) Reduce or deter vectors.

(2) Reduce or maintain the current risk of fire.

(3) Control litter and dust.

(4) Impede the infiltration of liquids and precipitation.

(5) Control landfill gas migration.

(6) Provide a safe and effective working surface.

(7) Provide effective growing media.

(8) Other documentation that the alternative cover material is suitable for cover material.

(9) A demonstration that the proposed use of the alternative cover material will not adversely affect human health or the environment. The demonstration may include, but is not limited to, a toxicity characteristics leaching procedure (TCLP, EPA Method 1311) analysis of a representative sample of the alternative cover material.

101.108(5) *Beneficial use of alternative cover material and state goal progress.* Alternative cover material placed at no more than the thickness required by sanitary landfill rules shall be exempt from landfill tonnage measurements used for state goal progress and waste diversion calculations.

101.108(6) *Development and operations plan (DOPs).* An MSWLF unit shall maintain a development and operations plan (DOPs). At a minimum, the DOPs shall detail how the facility will operate and how compliance with the requirements of this rule will be maintained. The DOPs shall contain at least the following components:

a. A title page and table of contents.

b. Telephone number and email address of the official responsible for the operation of the facility and an emergency contact person if different.

c. Service area of the facility and political jurisdictions included in that area.

d. Days and hours of operation of the facility.

e. Details of how the site will comply with the prohibited operations and activity requirements of subrule 101.108(1) and any related permit conditions.

f. Details of how the site will comply with the disposal operation and activity requirements of subrule 101.108(2) and any related permit conditions.

g. Details of how the site will comply with the facility operations and activity requirements of subrule 101.108(3), any related permit conditions, and any leachate and wastewater treatment requirements.

567—101.109(455B) Environmental monitoring and corrective action requirements for air quality and landfill gas. MSWLFs shall comply with the following environmental monitoring and corrective action requirements for air quality and landfill gas.

101.109(1) *Air criteria.* Owners or operators of MSWLFs must ensure that the units do not violate any applicable requirements developed under a state implementation plan (SIP) approved or promulgated by the department pursuant to Section 110 of the Clean Air Act.

101.109(2) *Landfill gas.* MSWLFs shall comply with the following requirements for landfill gas. For purposes of this subrule, "lower explosive limit" means the lowest percent by volume of a mixture of explosive gases in air that will propagate a flame at 25°C and atmospheric pressure.

a. Owners or operators of MSWLF units must ensure that:

(1) The concentration of methane gas generated by the facility does not exceed 25 percent of the lower explosive limit for methane in facility structures (excluding gas pipeline, control or recovery system components);

(2) The concentration of methane gas does not exceed the lower explosive limit for methane at the facility property boundary; and

b. Owners or operators of MSWLF units must implement a routine methane-monitoring program to ensure that the standards of paragraph 101.109(2)*"a"* are met. Such a program shall include routine subsurface methane monitoring (e.g., at select groundwater wells, at gas monitoring wells).

(1) The type and frequency of monitoring must be determined based on the following factors:

1. Soil conditions;
2. The hydrogeologic conditions surrounding the facility;
3. The hydraulic conditions surrounding the facility;
4. The location of facility structures (including potential subsurface preferential pathways such as, but not limited to, pipes, utility conduits, drain tiles and sewers) and property boundaries; and
5. The locations of structures near the outside of the facility to which or along which subsurface

migration of methane gas may occur. Examples of such structures include, but are not limited to, houses, buildings, basements, crawl spaces, pipes, utility conduits, drain tiles and sewers.

(2) The minimum frequency of monitoring shall be quarterly.

c. If methane gas levels exceeding the limits specified in paragraph 101.109(2)*"a"* are detected, the owner or operator must:

(1) Immediately take all necessary steps to ensure protection of human health and notify the department and department field office with jurisdiction over the MSWLF;

(2) Within 7 days of detection, place in the operating record and notify the department and department field office with jurisdiction over the MSWLF of the methane gas levels detected and a description of the steps taken to protect human health; and

(3) Within 60 days of detection, implement a remediation plan for the methane gas releases, place a copy of the plan in the operating record, and notify the department and department field office with jurisdiction over the MSWLF that the plan has been implemented. The plan shall describe the nature and extent of the problem and the proposed remedy.

d. The owner or operator shall submit an annual report to the department detailing the gas monitoring sampling locations and results, any action taken, and the results of steps taken to address gas levels exceeding the limits of paragraph 101.109(2)*"a"* during the previous year. This report shall include a site map that delineates all structures, perimeter boundary locations, and other monitoring points where gas readings were taken. The site map shall also delineate areas of landfill gas migration outside the MSWLF units, if any. The report shall contain a narrative explaining and interpreting all of the data collected during the previous year. The report shall be due each year at a date specified by the department in the facility's permit.

567—101.110(455B) Environmental monitoring and corrective action requirements for groundwater and surface water. MSWLFs shall comply with the following environmental monitoring and corrective action requirements for groundwater and surface water.

101.110(1) *General requirements for environmental monitoring and corrective action for groundwater and surface water.*

a. MSWLF units shall not:

(1) Cause a discharge of pollutants into waters of the United States, including wetlands, that violates any requirements of the Clean Water Act, including, but not limited to, NPDES requirements, pursuant to Section 402 of the Clean Water Act.

(2) Cause the discharge of a nonpoint source of pollution into waters of the United States, including wetlands, that violates any requirement of an areawide or statewide water quality management plan that has been approved under Section 208 or 319 of the Clean Water Act.

b. A new MSWLF unit must be in compliance with the groundwater monitoring requirements specified in subrules 101.110(2), 101.110(4), 101.110(5) and 101.110(6) before waste can be placed in the unit.

c. Once established at an MSWLF unit, groundwater monitoring shall be conducted throughout the active life and post-closure care period of that MSWLF unit as specified in rule 567—101.113(455B).

e. The department may establish alternative schedules for demonstrating compliance with:

(1) Subparagraph 101.110(2)*"e"*(3), pertaining to notification of placement of certification in operating record;

(2) Subparagraph 101.110(5)*"c"*(1), pertaining to notification that statistically significant increase (SSI) notice is in operating record;

(3) Subparagraphs 101.110(5)*"c"*(2) and (3), pertaining to an assessment monitoring program;

(4) Paragraph 101.110(6)"b," pertaining to sampling and analyzing Appendix II constituents;

(5) Subparagraph 101.110(6)*"d"*(1), pertaining to placement of notice (Appendix II constituents detected) in record and notification of placement of notice in record;

(6) Subparagraph 101.110(6)*"d"*(2), pertaining to sampling for Appendices I and II;

(7) Paragraph 101.110(6)*"g,"* pertaining to notification (and placement of notice in record) of SSI above groundwater protection standard;

(8) Numbered paragraph 101.110(6)*"g"*(1)"4" and paragraph 101.110(7)*"a,"* pertaining to assessment of corrective measures;

(9) Paragraph 101.110(8)*"a,"* pertaining to selection of remedy and notification of placement in record;

(10) Paragraph 101.110(9)*"f,"* pertaining to notification of placement in record (certification of remedy completed).

101.110(2) *Groundwater monitoring systems.* MSWLFs shall have a groundwater monitoring system that complies with the following requirements:

a. A groundwater monitoring system must be installed that meets the following objectives:

(1) Yields groundwater samples from the uppermost aquifer that represent the quality of background groundwater that has not been affected by leakage from a unit. A determination of background quality may include sampling of wells that are not hydraulically upgradient of the waste management area where either:

1. Hydrogeologic conditions do not allow the owner or operator to determine which wells are hydraulically upgradient; or

2. Sampling at other wells will provide an indication of background groundwater quality that is as representative as or more representative than that provided by the upgradient wells.

(2) Yields groundwater samples from the uppermost aquifer that represent the quality of groundwater passing the relevant point of compliance specified by the department under numbered paragraph 101.107(5)*"a"*(2)"2." The downgradient monitoring system must be installed at the relevant point of compliance specified by the department under numbered paragraph 101.107(5)*"a"*(2)"2" that ensures detection of groundwater contamination in the uppermost aquifer. When physical obstacles preclude installation of groundwater monitoring wells at the relevant point of compliance at existing units, the downgradient monitoring system may be installed at the closest practicable distance, hydraulically downgradient from the relevant point of compliance specified by the department under numbered paragraph 101.107(5)*"a"*(2)"2," that ensures detection of groundwater contamination in the uppermost aquifer.

(3) Provides a high level of certainty that releases of contaminants from the site can be promptly detected. Downgradient monitoring wells shall be placed along the site perimeter, within 50 feet of the planned liner or waste boundary unless site conditions dictate otherwise, downgradient of the facility with respect to the hydrologic unit being monitored. Each groundwater underdrain system shall be included in the groundwater detection monitoring program under subrule 101.110(5). The maximum drainage area routed through each outfall shall not exceed 10 acres unless it can be demonstrated that site-specific factors such as drain flow capacity or site development sequencing require an alternative drainage area. If contamination is identified in the groundwater underdrain system pursuant to subrule 101.110(5), the owner or operator shall manage the underdrain discharge as leachate in lieu of assessment monitoring and corrective action.

(4) Be designed and constructed with the theoretical release evaluation pursuant to subparagraph 101.106(3)*"e"*(6) taken into consideration.

b. For those facilities which are long-term, multiphase operations, the department may establish temporary waste boundaries in order to define locations for monitoring wells. The convergence of groundwater paths to minimize the overall length of the downgradient dimension may be taken into consideration in the placement of downgradient monitoring wells provided that the multiphase unit groundwater monitoring system meets the requirements of paragraphs 101.110(2)*"a,"* 101.110(2)*"c,"* 101.110(2)*"d"* and 101.110(2)*"e"* and will be as protective of human health and the environment as the individual monitoring systems for each MSWLF unit, based on the following factors:

(1) Number, spacing, and orientation of the MSWLF units;

(2) Hydrogeologic setting;

(3) Site history;

(4) Engineering design of the MSWLF units; and

(5) Type of waste accepted at the MSWLF units.

e. Hydrologic monitoring system plan (HMSP). Unless otherwise approved by the department in writing, the number, spacing, and depth of groundwater monitoring points shall be:

(1) Determined based upon site-specific technical information, including but not limited to the soil and hydrogeologic investigation pursuant to subrule 101.106(3) and the site exploration and characterization report pursuant to subrule 101.106(4), that must include thorough characterization of:

1. Aquifer thickness, groundwater flow rate, and groundwater flow direction including seasonal and temporal fluctuations in groundwater flow; and

2. Saturated and unsaturated geologic units and fill materials overlying the uppermost aquifer, materials comprising the uppermost aquifer, and materials comprising the confining unit defining the lower boundary of the uppermost aquifer, including, but not limited to: thicknesses, stratigraphy, lithology, hydraulic conductivities, porosities and effective porosities; and

3. Projected paths and rates of movement of contaminants found in leachate pursuant to subparagraph 101.106(3)*"e"*(6).

(2) Designed and constructed with a maximum of 300 feet between downgradient groundwater monitoring wells, unless it is demonstrated by site-specific analysis or modeling that an alternative well spacing is justified. The convergence of groundwater paths to minimize the overall length of the downgradient dimension may be taken into consideration in the placement of downgradient monitoring wells provided that the groundwater monitoring system meets the requirements of paragraphs 101.110(2)"a," 101.110(2)"c," 101.110(2)"d," and 101.110(2)"e."

(3) Certified by a qualified groundwater scientist and approved by the department. Within 14 days of this certification and approval by the department, the owner or operator must notify the department that the certification has been placed in the operating record.

f. Monitoring well maintenance and performance reevaluation plan. A monitoring well maintenance and performance reevaluation plan shall be included as part of the HMSP. The plan shall ensure that all monitoring points remain reliable. The plan shall provide for the following:

(1) A biennial examination of high and low water levels accompanied by a discussion of the acceptability of well location (vertically and horizontally) and exposure of the screened interval to the atmosphere.

(2) A biennial evaluation of water level conditions in the monitoring wells to ensure that the effects of waste disposal or well operation have not resulted in changes in the hydrologic setting and resultant flow paths.

(3) Measurements of well depths to ensure that wells are physically intact and not filling with sediment. Measurements shall be taken annually in wells which do not contain dedicated sampling pumps and every five years in wells containing dedicated sampling pumps.

(4) A biennial evaluation of well recharge rates and chemistry to determine if well deterioration is occurring.

101.110(3) *Surface water monitoring systems.* The department may require an MSWLF facility to implement a surface water monitoring program if there is reason to believe that a surface water of the state has been impacted as a result of facility operations (i.e., leachate seeps, sediment pond discharge) or a groundwater SSI over background has occurred.

a. A surface water monitoring program must be developed that consists of a sufficient number of monitoring points, designated at appropriate locations, to yield surface water samples that:

(1) Provide a representative sample of the upstream quality of a surface water of the state if the surface water being monitored is a flowing body of water.

(2) Provide a representative sample of the downstream quality of a surface water of the state if the surface water being monitored is a flowing body of water.

b. Surface water levels must be measured at a frequency specified in the facility's permit, within 1/10 of a foot at each surface water monitoring point immediately prior to sampling, each time surface

water is sampled. The owner or operator must determine the rate and direction of surface water flow, if any, each time surface water is sampled. Surface water level and flow measurements for the same surface water of the state must be measured on the same day to avoid temporal variations that could preclude accurate determination of surface water flow and direction.

c. The owner or operator must notify and receive approval from the department for the designation or decommission of any surface water monitoring point, and must place that approval in the operating record.

d. The surface water monitoring points shall be designated to maintain sampling at that monitoring point throughout the life of the surface water monitoring program.

e. Each surface water monitoring point must have a unique and permanent number, and that number must never change or be used again at the MSWLF. Surface water monitoring points shall be identified by "SW# (Insert unique and permanent number)".

f. The number, spacing, and location of the surface water monitoring points shall be determined based upon site-specific technical information, including:

(1) Water level, including seasonal and temporal fluctuations in water level; and

(2) Flow rate and flow direction, including seasonal and temporal fluctuations in flow.

g. The MSWLF may discontinue the surface water monitoring program if monitoring data indicates that facility operations are not impacting surface water.

101.110(4) *Groundwater sampling and analysis requirements.*

a. The groundwater monitoring program must include consistent sampling and analysis procedures that are designed to ensure monitoring results that provide an accurate representation of groundwater quality at the background and downgradient wells installed in compliance with subrule 101.110(2). The owner or operator must notify the department that the sampling and analysis program documentation has been placed in the operating record, and the program must include procedures and techniques for:

(1) Sample collection;

(2) Sample preservation and shipment;

(3) Analytical procedures;

(4) Chain of custody control; and

(5) Quality assurance and quality control.

b. The groundwater monitoring programs must include sampling and analytical methods that are appropriate for groundwater sampling and that accurately measure hazardous constituents and other monitoring parameters in groundwater samples. Groundwater samples shall not be field-filtered prior to laboratory analysis.

c. The sampling procedures and frequency must be protective of human health and the environment, and consistent with subrule 101.110(5).

d. Groundwater elevations must be measured at a frequency specified in the facility's permit, within 1/100 of a foot in each well immediately prior to purging, each time groundwater is sampled. The owner or operator must determine the rate and direction of groundwater flow each time groundwater is sampled. Groundwater elevations in wells which monitor the same waste management area must be measured within a period of time short enough to avoid temporal variations in groundwater flow which could preclude accurate determination of groundwater flow rate and direction.

e. The owner or operator must establish background groundwater quality in a hydraulically upgradient or background well(s) for each of the monitoring parameters or constituents required in the particular groundwater monitoring program that applies to the MSWLF unit, as determined under paragraph 101.110(5)*"a"* or 101.110(6)*"a."* Background groundwater quality may be established at wells that are not located hydraulically upgradient from the MSWLF unit if the wells meet the requirements of subparagraph 101.110(2)*"a"*(1).

f. The number of samples collected to establish groundwater quality data must be consistent with the appropriate statistical procedures determined pursuant to paragraph 101.110(4)*"g."* The sampling procedures shall be those specified under paragraphs 101.110(5)*"b"* for detection monitoring,

101.110(6)*"b"* and 101.110(6)*"d"* for assessment monitoring, and 101.110(7)*"b"* for corrective action.

g. The owner or operator must specify in the operating record which of the following statistical methods will be used in evaluating groundwater monitoring data for each hazardous constituent. The statistical test chosen shall be conducted separately for each hazardous constituent in each well.

(1) A parametric analysis of variance (ANOVA) followed by multiple comparisons procedures to identify statistically significant evidence of contamination. The method must include estimation and testing of the contrasts between each compliance well's mean and the background mean levels for each constituent.

(2) An analysis of variance (ANOVA) based on ranks followed by multiple comparisons procedures to identify statistically significant evidence of contamination. The method must include estimation and testing of the contrasts between each compliance well's median and the background median levels for each constituent.

(3) A tolerance or prediction interval procedure in which an interval for each constituent is established from the distribution of the background data, and the level of each constituent in each compliance well is compared to the upper tolerance or prediction limit.

(4) A control chart approach that gives control limits for each constituent.

(5) Another statistical test method that meets the performance standards of paragraph 101.110(4)*"h."* The owner or operator must place a justification for this alternative in the operating record and notify the department of the use of this alternative test. The justification must demonstrate that the alternative method meets the performance standards of paragraph 101.110(4)*"h."*

h. The statistical method required pursuant to paragraph 101.110(4)*"g"* shall comply with the following performance standards:

(1) The statistical method used to evaluate groundwater monitoring data shall be appropriate for the distribution of chemical parameters or hazardous constituents. If the distribution of the chemical parameters or hazardous constituents is shown by the owner or operator to be inappropriate for a normal theory test, then the data shall be transformed or a distribution-free theory test shall be used. If the distributions for the constituents differ, more than one statistical method may be needed.

(2) If an individual well comparison procedure is used to compare an individual compliance well constituent concentration with background constituent concentrations or a groundwater protection standard, the test shall be done at a Type I error level not less than 0.01 for each testing period. If a multiple comparisons procedure is used, the Type I experiment-wise error rate for each testing period shall be not less than 0.05; however, the Type I error level of not less than 0.01 for individual well comparisons must be maintained.

(3) If a control chart approach is used to evaluate groundwater monitoring data, the specific type of control chart and its associated parameter values shall be protective of human health and the environment. The parameters shall be determined after the number of samples in the background database, the data distribution, and the range of the concentration values for each constituent of concern have been considered.

(4) If a tolerance interval or a prediction interval is used to evaluate groundwater monitoring data, the levels of confidence and, for tolerance intervals, the percentage of the population that the interval must contain, shall be protective of human health and the environment. These parameters shall be determined after the number of samples in the background database, the data distribution, and the range of the concentration values for each constituent of concern have been considered.

(5) The statistical method shall account for data below the limit of detection (LD) by recording such data at one-half the limit of detection (i.e., LD/2) or as prescribed by the statistical method. Any practical quantitation limit (pql) that is used in the statistical method shall be the lowest concentration level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions that are available to the facility.

(6) If necessary, the statistical method shall include procedures to control or correct for seasonal and spatial variability as well as temporal correlation in the data.

i. The owner or operator must determine whether or not there is an SSI over background values

for each parameter or constituent required in the particular groundwater monitoring program that applies to the MSWLF unit, as determined under paragraph 101.110(5)*"a"* or 101.110(6)*"a."*

(1) In determining whether an SSI has occurred, the owner or operator must compare the groundwater quality of each parameter or constituent at each monitoring well designated pursuant to subrule 101.110(2) to the background value of that constituent, according to the statistical procedures and performance standards specified under paragraphs 101.110(4)*"g"* and 101.110(4)*"h."*

(2) Within 45 days after completing sampling and analysis, the owner or operator must determine whether there has been an SSI over background at each monitoring well.

101.110(5) *Detection monitoring program.*

a. Detection monitoring is required at MSWLF units at all groundwater monitoring wells defined under subrule 101.110(2). At a minimum, a detection monitoring program must include the monitoring for the constituents listed in Appendix I and any additional parameters required by the department on a site-specific basis. An alternative list of constituents may be used if it can be demonstrated that the constituents removed are not reasonably expected to be in or derived from the waste contained in the unit and if the alternative list of constituents is expected to provide a reliable indication of leachate leakage or gas impact from the MSWLF unit.

The department may establish an alternative list of inorganic indicator parameters for an MSWLF unit within Appendix I, in lieu of some or all of the heavy metals (constituents 1 to 15 in Appendix I), if the alternative parameters provide a reliable indication of inorganic releases from the MSWLF unit to the groundwater. In determining alternative parameters, the department shall consider the following factors:

(1(The types, quantities and concentrations of constituents in wastes managed at the MSWLF unit;

(2) The mobility, stability and persistence of waste constituents or their reaction products in the unsaturated zone beneath the MSWLF unit;

(3) The detectability of indicator parameters, waste constituents and reaction products in the groundwater; and

(4) The concentration or values and coefficients of variation of monitoring parameters or constituents in the groundwater background.

b. The monitoring frequency for all constituents listed in Appendix I or in the alternative list approved in accordance with subparagraph 101.110(5)*"a"*(1) shall be at least semiannual (i.e., every six months) during the active life of the facility (including closure) and the post-closure period. Where insufficient background data exist, a minimum of five independent samples from each well, collected at intervals to account for seasonal and temporal variation, must be analyzed for the constituents in Appendix I or in the alternative list approved in accordance with subparagraph 101.110(5)*"a"*(1) during the first year. At least one sample from each well must be collected and analyzed during subsequent semiannual sampling events. The department may specify an appropriate alternative frequency for repeated sampling and analysis for constituents in Appendix I or in the alternative list approved in accordance with subparagraph 101.110(5)*"a"*(1) during the active life (including closure) and the post-closure care period. The alternative frequency during the active life (including closure) shall be not less than annually. The alternative frequency shall be based on consideration of the following factors:

(1) Lithology of the aquifer and unsaturated zone;

(2) Hydraulic conductivity of the aquifer and unsaturated zone;

(3) Groundwater flow rates;

(4) Minimum distance between upgradient edge of the MSWLF unit and downgradient monitoring well screen (minimum distance of travel); and

(5) Resource value of the aquifer.

c. If the owner or operator determines, pursuant to paragraph 101.110(4)*"i,"* that there is an SSI over background for one or more of the constituents listed in Appendix I or in the alternative list approved in accordance with subparagraph 101.110(5)*"a"*(1) at any monitoring well specified under subrule 101.110(2), then the owner or operator:

(1) Must, within 14 days of this finding, place a notice in the operating record indicating which

constituents have shown statistically significant changes from background levels, and notify the department that this notice was placed in the operating record.

(2) Must establish within 90 days an assessment monitoring program meeting the requirements of subrule 101.110(6) except as provided in subparagraph 101.110(5)*"c"*(3).

(3) The owner or operator may demonstrate that a source other than an MSWLF unit caused the contamination or that the SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. A report documenting this demonstration must be certified by a qualified groundwater scientist, approved by the department, and placed in the operating record. If resampling is a part of the demonstration, resampling procedures shall be specified prior to initial sampling. If a successful demonstration to the department is made and documented, the owner or operator may continue detection monitoring as specified in subrule 101.110(5). If, after 90 days, a successful demonstration is not made, the owner or operator must initiate an assessment monitoring program as required in subrule 101.110(6).

101.110(6) *Assessment monitoring program.*

a. Assessment monitoring is required whenever an SSI over background has been confirmed pursuant to paragraph 101.110(5)*"c"* to be the result of a release from the facility.

b. Within 90 days of triggering an assessment monitoring program, and annually thereafter, the owner or operator must sample and analyze the groundwater for all constituents identified in Appendix II. A minimum of one sample from each downgradient well shall be collected and analyzed during each sampling event. For any constituent detected in the downgradient wells as a result of the complete Appendix II analysis, a minimum of four independent samples from each well must be collected and analyzed to establish background for the constituents. The department may specify an appropriate subset of wells to be sampled and analyzed for Appendix II constituents during assessment monitoring. The department may delete any of the Appendix II monitoring parameters for an MSWLF unit if it can be shown that the removed constituents are not reasonably expected to be in or derived from the waste contained in the unit.

c. The department may specify an appropriate alternate frequency for repeated sampling and analysis for the full set of Appendix II constituents required by paragraph 101.110(6)*"b"* during the active life (including closure) and post-closure care period of the unit. The following factors shall be considered:

(1) Lithology of the aquifer and unsaturated zone;

(2) Hydraulic conductivity of the aquifer and unsaturated zone;

(3) Groundwater flow rates;

(4) Minimum distance between upgradient edge of the MSWLF unit and downgradient monitoring well screen (minimum distance of travel);

(5) Resource value of the aquifer; and

(6) Nature (fate and transport) of any constituents detected in response to this paragraph.

d. After obtaining the results from the initial or subsequent sampling events required in paragraph 101.110(6)*"b,"* the owner or operator must:

(1) Within 14 days, place a notice in the operating record identifying the Appendix II constituents that have been detected and notify the department that this notice has been placed in the operating record;

(2) Within 90 days, and on at least a semiannual basis thereafter, resample all wells specified by subrule 101.110(2) and conduct analyses for all constituents in Appendix I or in the alternative list approved in accordance with subparagraph 101.110(5)*"a"*(1), and for those constituents in Appendix II that are detected in response to the requirements of paragraph 101.110(6)*"b."* Concentrations shall be recorded in the facility operating record. At least one sample from each well must be collected and analyzed during these sampling events. The department may specify an alternative monitoring frequency during the active life and the post-closure period for the constituents referred to in this subparagraph. The alternative frequency for constituents in Appendix I or in the alternative list approved in accordance with subparagraph 101.110(5)*"a"*(1) during the active life shall be no less than annual.

Commented [BLR37]: *SIDEBAR: Reference to closure was removed as it is included in the definition of active life.

The alternative frequency shall be based on consideration of the factors specified in paragraph 101.110(6)*"c"*;

(3) Establish background concentrations for any constituents detected pursuant to paragraph 101.110(6)*"b"* or subparagraph 101.110(6)*"d"*(2); and

(4) Establish groundwater protection standards for all constituents detected pursuant to paragraph 101.110(6)*"b"* or 101.110(6)*"d."* The groundwater protection standards shall be established in accordance with paragraph 101.110(6)*"h"* or 101.110(6)*"i."*

e. If the concentrations of all Appendix II constituents are shown to be at or below background values, using the statistical procedures in paragraph 101.110(4)*"g"* for two consecutive sampling events, the owner or operator must notify the department of this finding and may return to detection monitoring.

f. If the concentrations of any Appendix II constituents are above background values, but all concentrations are below the groundwater protection standard established under paragraph 101.110(6)*"h"* or 101.110(6)*"i,"* using the statistical procedures in paragraph 101.110(4)*"g,"* the owner or operator must continue assessment monitoring in accordance with this subrule.

g. If one or more Appendix II constituents are detected at statistically significant levels above the groundwater protection standard established under paragraph 101.110(6)*"h"* or 101.110(6)*"i"* in any sampling event, the owner or operator must, within 14 days of this finding, place a notice in the operating record identifying the Appendix II constituents that have exceeded the groundwater protection standard and notify the department and all other appropriate local government officials that the notice has been placed in the operating record. The owner or operator also:

(1) Must, within 90 days of this finding, comply with the following requirements or the requirements in subparagraph 101.110(6)*"g"*(2):

1. Characterize the nature and extent of the release by installing additional monitoring wells as necessary until the horizontal and vertical dimensions of the plume have been defined to background concentrations;

2. Install at least one additional monitoring well at the facility boundary in the direction of contaminant migration and sample this well in accordance with subparagraph 101.110(6)*"g"*(2);

3. Notify all persons who own the land or reside on the land that directly overlies any part of the plume of contamination if contaminants have migrated off site when indicated by sampling of wells in accordance with subparagraph 101.110(6)*"g"*(1); and

4. Initiate an assessment of corrective measures as required by subrule 101.110(7).

(2) May demonstrate that a source other than an MSWLF unit caused the contamination, or that the SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. A report documenting this demonstration must be certified by a qualified groundwater scientist, approved by the department, and placed in the operating record. If a successful demonstration is made, the owner or operator must continue monitoring in accordance with the assessment monitoring program pursuant to subrule 101.110(6), and may return to detection monitoring if the Appendix II constituents are at or below background as specified in paragraph 101.110(6)*"e."* Until a successful demonstration is made, the owner or operator must comply with paragraph 101.110(6)*"g"* including initiating an assessment of corrective measures.

h. The owner or operator must establish a groundwater protection standard for each Appendix II constituent detected in the groundwater. The groundwater protection standard shall be:

(1) For constituents for which a maximum contaminant level (MCL) has been promulgated under Section 1412 of the Safe Drinking Water Act (codified) under 40 CFR Part 141, the MCL for that constituent;

(2) For constituents for which MCLs have not been promulgated, the background concentration for the constituent established from wells in accordance with subrule 101.110(2); or

(3) For constituents for which the background concentration is higher than the MCL identified under subparagraph 101.110(6)*"h"*(1) or health-based concentrations identified under paragraph 101.110(6)*"i,"* the background concentration.

i. The department may establish an alternative groundwater protection standard for constituents for which MCLs have not been established. These groundwater protection standards shall be appropriate health-based concentrations that comply with the statewide standards for groundwater established pursuant to 567—Chapter 137.

j. In establishing alternative groundwater protection standards under paragraph 101.110(6)*"i,"* the department may consider the following:

(1) The policies set forth by the Groundwater Protection Act;

(2) Multiple contaminants in the groundwater with the assumption that the effects are additive regarding detrimental effects to human health and the environment;

(3) Exposure threats to sensitive environmental receptors; and

(4) Other site-specific exposure or potential exposure to groundwater.

101.110(7) *Assessment of corrective measures.*

a. Within 90 days of finding that any of the constituents listed in Appendix II have been detected at a statistically significant level exceeding the groundwater protection standards defined under paragraph 101.110(6)*"h"* or 101.110(6)*"i,"* the owner or operator must initiate an assessment of corrective measures. Such an assessment must be completed and submitted to the department for review and approval within 180 days of the initial finding unless otherwise authorized or required by the department.

b. The owner or operator must continue to monitor in accordance with the assessment monitoring program as specified in subrule 101.110(6).

c. The assessment shall include an analysis of the effectiveness of potential corrective measures in meeting all of the requirements and objectives of the remedy as described under subrule 101.110(8), addressing at least the following:

(1) The performance, reliability, ease of implementation, and potential impacts of appropriate potential remedies, including safety impacts, cross-media impacts, and control of exposure to any residual contamination;

(2) The time required to begin and complete the remedy;

(3) The costs of remedy implementation; and

(4) The institutional requirements such as state or local permit requirements or other environmental or public health requirements that may substantially affect implementation of the remedy(ies).

d. Within 60 days of approval from the department of the assessment of corrective measures, the owner or operator must discuss the results of the corrective measures assessment, prior to the selection of a remedy, in a public meeting with interested and affected parties. The department may establish an alternative schedule for completing the public meeting requirement. Notice of public meeting shall be sent to all owners and occupiers of property adjacent to the permitted boundary of the facility, the department, and the department field office with jurisdiction over the facility. A copy of the minutes of this public meeting and the list of community concerns must be placed in the operating record and submitted to the department.

101.110(8) *Selection of remedy.*

a. Based on the results of the corrective measures assessment conducted under subrule 101.110(7), the owner or operator must select a remedy within 60 days of holding the public meeting that, at a minimum, meets the standards listed in paragraph 101.110(8)*"b."* The department may establish an alternative schedule for selecting a remedy after holding the public meeting. The owner or operator must submit a report to the department, within 14 days of selecting a remedy, describing the selected remedy, stating that the report has been placed in the operating record, and explaining how the selected remedy meets the standards in paragraph 101.110(8)*"b."*

b. Remedies must:

(1) Be protective of human health and the environment;

(2) Attain the groundwater protection standards specified pursuant to paragraph 101.110(6)*"h"* or 101.110(6)*"i"*;

(3) Control the source(s) of releases so as to reduce or eliminate, to the maximum extent practicable,

further releases of Appendix II constituents into the environment that may pose a threat to human health or the environment; and

(4) Comply with standards for management of wastes as specified in paragraph 101.110(9)*"d."*

c. In selecting a remedy that meets the standards of paragraph 101.110(8)*"b,"* the owner or operator shall consider the following evaluation factors:

(1) The long-term and short-term effectiveness and protectiveness of the potential remedy(ies), along with the degree of certainty that the remedy will prove successful based on consideration of the following:

1. Magnitude of reduction of existing risks;

2. Magnitude of residual risks in terms of likelihood of further releases due to waste remaining following implementation of a remedy;

3. The type and degree of long-term management required, including monitoring, operation, and maintenance;

4. Short-term risks that might be posed to the community, workers, or the environment during implementation of such a remedy, including potential threats to human health and the environment associated with excavation, transportation, redisposal, or containment;

5. Time period until full protection is achieved;

6. Potential for exposure of humans and environmental receptors to remaining wastes, considering the potential threat to human health and the environment associated with excavation, transportation, redisposal, or containment;

7. Long-term reliability of the engineering and institutional controls; and

8. Potential need for replacement of the remedy.

(2) The effectiveness of the remedy in controlling the source to reduce further releases based on consideration of the following factors:

1. The extent to which containment practices will reduce further releases; and

2. The extent to which treatment technologies may be used.

(3) The ease or difficulty of implementing a potential remedy(ies) based on consideration of the following factors:

1. Degree of difficulty associated with constructing the technology;

2. Expected operational reliability of the technology;

3. Need to coordinate with and obtain necessary approvals and permits from other agencies;

4. Availability of necessary equipment and specialists; and

5. Available capacity and location of needed treatment, storage, and disposal services.

(4) Practicable capability of the owner or operator, including a consideration of technical and economic capabilities.

(5) The degree to which community concerns, including but not limited to the concerns identified at the public meeting required pursuant to paragraph 101.110(7)*"d,"* are addressed by a potential remedy or remedies.

d. The owner or operator shall specify as part of the selected remedy a schedule(s) for initiating and completing remedial activities. Such a schedule must require the initiation of remedial activities within a reasonable period of time taking into consideration the factors set forth in subparagraphs 101.110(8)*"d"*(1) to (8). The owner or operator must consider the following factors in determining the schedule of remedial activities:

(1) Extent and nature of contamination;

(2) Practical capabilities of remedial technologies in achieving compliance with groundwater protection standards established under paragraph 101.110(6)*"h"* or 101.110(6)*"i"* and other objectives of the remedy;

(3) Availability of treatment or disposal capacity for wastes managed during implementation of the remedy;

(4) Desirability of utilizing alternative or experimental technologies that are not widely available, but which may offer significant advantages over already available technologies in terms of

effectiveness, reliability, safety, or ability to achieve remedial objectives;

(5) Potential risks to human health and the environment from exposure to contamination prior to completion of the remedy;

(6) Resource value of the aquifer including:

1. Current and future uses;

2. Proximity and withdrawal rate of users;

3. Groundwater quantity and quality;

4. The potential damage to wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents;

5. The hydrogeologic characteristics of the facility and surrounding land;

6. Groundwater removal and treatment costs; and

7. The cost and availability of alternative water supplies;

(7) Practicable capability of the owner or operator; and

(8) Other relevant factors.

101.110(9) *Implementation of the corrective action plan.*

a. Based on the schedule established under paragraph 101.110(8)*"d"* for initiation and completion of remedial activities, the owner or operator must:

(1) Establish and implement a corrective action groundwater monitoring program that:

1. At a minimum, meets the requirements of an assessment monitoring program under subrule 101.110(6);

2. Indicates the effectiveness of the corrective action remedy; and

3. Demonstrates compliance with groundwater protection standards pursuant to paragraph 101.110(9)*"e"*;

(2) Implement the corrective action remedy selected under subrule 101.110(8); and

(3) Take any interim measures necessary to ensure the protection of human health and the environment. Interim measures should, to the greatest extent practicable, be consistent with the objectives of and contribute to the performance of any remedy that may be required pursuant to subrule 101.110(8). The following factors must be considered by an owner or operator in determining whether interim measures are necessary:

1. Time period required to develop and implement a final remedy;

2. Actual or potential exposure of nearby populations or environmental receptors to hazardous constituents;

3. Actual or potential contamination of drinking water supplies or sensitive ecosystems;

4. Further degradation of the groundwater that may occur if remedial action is not initiated expeditiously;

5. Weather conditions that may cause hazardous constituents to migrate or be released;

6. Risk of fire or explosion, or potential for exposure to hazardous constituents as a result of an accident or the failure of a container or handling system; and

7. Other factors that may pose threats to human health and the environment.

b. An owner or operator may determine, based on information developed after implementation of the remedy has begun or other information, that compliance with the requirements of paragraph 101.110(8)*"b"* is not being achieved through the remedy selected. In such cases, the owner or operator must notify the department and implement other methods or techniques that could practicably achieve compliance with the requirements, unless the owner or operator makes the determination under paragraph 101.110(9)*"c."* The notification shall explain how the proposed alternative methods or techniques will meet the standards in paragraph 101.110(8)*"b,"* or the notification shall indicate that the determination was made pursuant to paragraph 101.110(9)*"c."* The notification shall also specify a schedule(s) for implementing and completing the remedial activities to comply with paragraph 101.110(8)*"b"* or the alternative measures to comply with paragraph 101.110(9)*"c."* Within 90 days of approval by the department for the proposed alternative methods or techniques or the determination of impracticability, the owner or operator shall implement the proposed alternative methods or

techniques meeting the standards of paragraph 101.110(8)*"b"* or implement alternative measures meeting the requirements of subparagraphs 101.110(9)*"c"*(2) and (3).

c. If the owner or operator determines that compliance with requirements under paragraph 101.110(8)*"b"* cannot be practicably achieved with any currently available methods, the owner or operator must:

(1) Obtain certification of a qualified groundwater scientist and approval by the department that compliance with requirements under paragraph 101.110(8)*"b"* cannot be practicably achieved with any currently available methods.

(2) Implement alternate measures to control exposure of humans or the environment to residual contamination, as necessary to protect human health and the environment.

(3) Implement alternate measures for control of the sources of contamination, or for removal or decontamination of equipment, units, devices, or structures that are:

1. Technically practicable; and
2. Consistent with the overall objective of the remedy.

(4) Notify the department within 14 days that a report justifying the alternate measures prior to implementation has been placed in the operating record.

d. All solid wastes that are managed pursuant to a remedy required under subrule 101.110(8), or an interim measure required under subparagraph 101.110(9)*"a"*(3), shall be managed in a manner:

(1) That is protective of human health and the environment; and

(2) That complies with applicable RCRA, state and local requirements.

e. Remedies selected pursuant to subrule 101.110(8) shall be considered complete when:

(1) The owner or operator complies with the groundwater protection standards established under paragraph 101.110(6)*"h"* or 101.110(6)*"i"* at all points within the plume of contamination that lie beyond the groundwater monitoring well system established under subrule 101.110(2).

(2) Compliance with the groundwater protection standards established under paragraph 101.110(6)*"h"* or 101.110(6)*"i"* has been achieved by demonstrating that concentrations of Appendix II constituents have not exceeded the groundwater protection standard(s) for a period of three consecutive years using the statistical procedures and performance standards in paragraphs 101.110(4)*"g"* and 101.110(4)*"h."* The department may specify an alternative length of time during which the owner or operator must demonstrate that concentrations of Appendix II constituents have not exceeded the groundwater protection standard(s), taking into consideration:

1. The extent and concentration of the release(s);
2. The behavior characteristics of the hazardous constituents in the groundwater;
3. The accuracy of monitoring or modeling techniques, including any seasonal, meteorological, or other environmental variables that may affect accuracy; and
4. The characteristics of the groundwater.

(3) All actions required by the department to complete the remedy have been satisfied.

f. Upon completion of the remedy, the owner or operator must notify the department within 14 days that a certification has been placed in the operating record verifying that the remedy has been completed in compliance with the requirements of paragraph 101.110(9)*"e."* The certification must be signed by the owner or operator and by a qualified groundwater scientist and approved by the department.

g. When, upon completion of the certification, the owner or operator determines that the corrective action remedy has been completed in accordance with the requirements under paragraph 101.110(9)*"e,"* the owner or operator shall be released from the requirements for financial assurance for corrective action pursuant to subrule 101.114(5).

101.110(10) *Annual water quality reports (AWQR).* The owner or operator shall submit an annual report to the department detailing the water quality monitoring sampling locations and results, assessments, selection of remedies, implementation of corrective action, and the results of corrective action remedies to address SSIs, if any, during the previous year. This report shall include a site map that delineates all monitoring points where water quality samples were taken, and plumes of

contamination, if any. The report shall contain a narrative explaining and interpreting all of the data collected during the previous year. The report shall be due each year on a date set by the department in the facility's permit.

567—101.111(455B,455D) Record-keeping and reporting requirements. The purpose of the record-keeping and reporting activities is to verify compliance with this division and to document the construction and operations of the facility. The department can set alternative schedules for record-keeping and notification requirements as specified in subrules 101.111(1) and 101.111(2), except for the notification requirements in paragraph 101.106(2)*"a"* and numbered paragraph 101.110(6)*"g"*(1)"3." MSWLFs shall comply with the following record-keeping and reporting requirements.

101.111(1) *Record keeping.* The owner or operator of an MSWLF unit must record and retain near the facility in an operating record or in an alternative location approved by the department the following information as it becomes available:

a. Permit application, permit renewal and permit modification application materials pursuant to rule 567—101.105(455B);

b. The site exploration and characterization reports pursuant to subrule 101.106(4);

c. Design and construction plans and specifications, and related analyses and documents, pursuant to rule 567—101.107(455B). The QC&A final reports, and related analyses and documents, pursuant to paragraph 101.107(6)*"d"*;

d. Inspection records, training procedures, and notification procedures required in rule 567—101.108(455B);

e. Any MSWLF unit design documentation for placement of leachate or gas condensate in an MSWLF unit as required under numbered paragraphs 101.108(1)*"b"*(3)"2" and "3";

f. Gas monitoring results from monitoring and any remediation plans required by rule 567—101.109(455B);

g. Any demonstration, certification, finding, monitoring, testing, or analytical data required by rule 567—101.110(455B);

h. Closure and post-closure care plans and any monitoring, testing, or analytical data as required by rules 567—101.112(455B) and 567—101.113(455B); and

i. Any cost estimates and financial assurance documentation required by this chapter.

101.111(2) *Reporting requirements.* The owner or operator must notify the department when the documents required in subrule 101.111(1) have been placed in the operating record. All information contained in the operating record must be furnished upon request to the department for inspection.

567—101.112(455B) Closure criteria. MSWLFs shall comply with the following closure requirements.

101.112(1) Owners or operators of MSWLF units must install a final cover system that is designed to minimize infiltration and erosion. The final cover system must be designed and constructed to:

a. Have a permeability less than or equal to the permeability of any bottom liner system (for MSWLFs with some type of liner) or have a permeability no greater than 1×10^{-7} cm/sec, whichever is less;

b. Minimize infiltration through the closed MSWLF by the use of an infiltration layer that contains a minimum of 18 inches of compacted earthen material;

c. Minimize erosion of the final cover by the use of an erosion layer that contains a minimum of 24 inches of earthen material that is capable of sustaining native plant growth;

d. Have an infiltration layer and erosion layer that are a combined minimum of 42 inches of earthen material at all locations over the closed MSWLF unit; and

e. Have a slope between 5 percent and 25 percent. Steeper slopes may be used if it is demonstrated that a steeper slope is unlikely to adversely affect final cover system integrity.

101.112(2) The department may approve an alternative final cover design that includes:

a. An infiltration layer that achieves reduction in infiltration equivalent to the infiltration layer

specified in paragraphs 101.112(1)*"a"* and 101.112(1)*"b"*; and

b. An erosion layer that provides protection from wind and water erosion equivalent to the erosion layer specified in paragraphs 101.112(1)*"c"* and 101.112(1)*"d."*

101.112(3) The owner or operator must prepare a written closure plan that describes the steps necessary to close all MSWLF units at any point during the active life in accordance with the cover design requirements in subrule 101.112(1) or 101.112(2), as applicable. The closure plan, at a minimum, must include the following information:

a. A description of the final cover including source, volume, and characteristics of cover material, designed in accordance with subrule 101.112(1) or 101.112(2) and the methods and procedures to be used to install the cover;

b. An estimate of the largest area of the MSWLF unit requiring a final cover, as required under subrule 101.112(1) or 101.112(2), at any time during the active life;

c. An estimate of the maximum inventory of wastes on site over the active life of the landfill facility; and

d. A schedule for completing all activities necessary to satisfy the closure criteria in rule 567—101.112(455B).

101.112(4) The owner or operator must notify the department that the closure plan has been placed in the operating record no later than the initial receipt of waste in a new MSWLF unit.

101.112(5) At least 180 days prior to beginning closure of each MSWLF unit as specified in subrule 101.112(6), an owner or operator must notify the department of the intent to close the MSWLF unit, and that a notice of the intent to close the unit has been placed in the operating record. If the MSWLF facility will no longer be accepting MSW for disposal, then the owner or operator must also notify all local governments utilizing the facility and post a public notice of the intent to close and no longer to accept MSW.

101.112(6) The owner or operator must begin closure activities of each MSWLF unit:

a. No later than 30 days after the date on which the MSWLF unit receives the known final receipt of wastes; or

b. If the MSWLF unit has remaining capacity and there is a reasonable likelihood that the MSWLF unit will receive additional wastes, no later than one year after the most recent receipt of wastes. Extensions beyond the one-year deadline for beginning closure may be granted by the department if the owner or operator demonstrates that the MSWLF unit has the capacity to receive additional wastes and the owner or operator has taken and will continue to take all steps necessary to prevent threats to human health and the environment from the unclosed MSWLF unit.

101.112(7) The owner or operator must complete closure activities of each MSWLF unit in accordance with the closure plan within 180 days following the beginning of closure as specified in subrule 101.112(6). Extensions of the closure period may be granted by the department if the owner or operator demonstrates that closure will, of necessity, take longer than 180 days and that the owner or operator has taken and will continue to take all steps to prevent threats to human health and the environment from the unclosed MSWLF unit.

101.112(8) Following closure of each MSWLF unit, the owner or operator must submit to the department certification, signed by an independent professional engineer (P.E.) registered in Iowa, verifying that closure has been completed in accordance with the closure plan. Upon approval by the department, the certification shall be placed in the operating record.

101.112(9) Following closure of all MSWLF units, the owner or operator must record a notation on the deed to the landfill facility property, or some other instrument that is normally examined during title search in lieu of a deed notification, and notify the department that the notation has been recorded and a copy has been placed in the operating record. The notation on the deed must in perpetuity notify any potential purchaser of the property that:

a. The land has been used as a landfill facility; and

b. Its use is restricted under paragraph 101.113(3)*"c."*

101.112(10) The owner or operator may request permission from the department to remove the

notation from the deed if all wastes are removed from the facility.

567—101.113(455B) Post-closure care requirements. MSWLFs shall comply with the following post-closure care requirements.

101.113(1) Following closure of each MSWLF unit, the owner or operator must conduct post-closure care. Post-closure care must be conducted for 30 years, except as provided under subrule 101.113(2), and consist of at least the following:

a. Maintaining the integrity and effectiveness of any final cover, including making repairs to the cover as necessary to correct the effects of settlement, subsidence, erosion, or other events, and preventing run-on and runoff from eroding or otherwise damaging the final cover;

b. Maintaining and operating the leachate collection system in accordance with the requirements in paragraphs 101.107(5)*"b"* and 101.108(3)*"i,"* if applicable. The department may allow the owner or operator to stop managing leachate if the owner or operator demonstrates that leachate no longer poses a threat to human health and the environment;

c. Monitoring the groundwater in accordance with the requirements of rule 567—101.110(455B) and maintaining the groundwater monitoring system; and

d. Maintaining and operating the gas monitoring system in accordance with the requirements of rule 567—101.109(455B).

101.113(2) The length of the post-closure care period may be:

a. Decreased by the department if the owner or operator demonstrates that the reduced period is sufficient to protect human health and the environment and this demonstration is approved by the department; or

b. Increased by the department if the department determines that the lengthened period is necessary to protect human health and the environment.

101.113(3) The owner or operator of all MSWLF units must prepare a written post-closure plan that includes, at a minimum, the following information:

a. A description of the monitoring and maintenance activities required in subrule 101.113(1) for each MSWLF unit, and the frequency at which these activities will be performed;

b. Name, address, email, and telephone number of the person or office to contact about the facility during the post-closure period; and

c. A description of the planned uses of the property during the post-closure period. Post-closure use of the property shall not disturb the integrity of the final cover, liner(s), or any other components of the containment system, or the function of the monitoring systems unless necessary to comply with the requirements in this division. The department may approve any other disturbance if the owner or operator demonstrates that disturbance of the final cover, liner or other component of the containment system, including any removal of waste, will not increase the potential threat to human health or the environment.

101.113(4) The owner or operator must notify the department that a post-closure plan has been prepared and placed in the operating record by the date of initial receipt of waste.

101.113(5) Following completion of the post-closure care period for each MSWLF unit, the owner or operator must submit to the department a certification, signed by an independent Iowa-licensed professional engineer, verifying that post-closure care has been completed in accordance with the post-closure plan. Upon department approval, the certification shall be placed in the operating record.

567—101.114(455B) Financial assurance requirements. The owner or operator of an MSWLF must establish financial assurance for closure, post-closure care and corrective action, if applicable, in accordance with 567 – Chapter 101, division VIII.

567—101.115 Waivers. Some provisions of this division are minimum standards required by federal law (see 40 CFR 258), and waivers to such provisions shall not be granted unless they are as protective as the applicable minimum federal standards.

These rules are intended to implement Iowa Code section 455B.304.

567—101.116 to 101.199 Reserved.