ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
LAND DIVISION - SOLID WASTE PROGRAM
ADMINISTRATIVE CODE

CHAPTER 335-13-4
PERMIT REQUIREMENTS

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335-13-4-.01 Landfill Unit Siting Standards.

New or existing landfill units shall comply with the following standards in order to prevent adverse effects on health or the environment. As part of the application, the owner/operator must submit documentation addressing to the satisfaction of the Department the following siting standards.

(1) Location Standards.

(a) A facility located in a floodplain shall not restrict the flow of the 100-year flood, reduce the temporary water storage capacity of the floodplain, or result in washout of solid waste, so as to pose a hazard to human health and the environment.

(b) A facility shall be located in consideration of the following:

1. A facility shall not jeopardize the continued existence of endangered or threatened species protected under the Endangered Species Act of 1973.

2. The facility shall not result in the destruction or adverse modification of critical habitats protected under the Endangered Species Act of 1973.

(c) A MSWLF unit shall not be sited within 10,000 feet of any airport runway end. Owners or operators proposing to renew existing or site new MSWLF units located within a five-mile radius of any airport runway must notify the affected airport and the Federal Aviation Administration (FAA).

(d) Zones of active faults, seismic impact zones, and unstable areas shall be avoided in locating facilities and practices unless a site specific evaluation as described below, demonstrates minimum potential for adverse effects upon waters of the State.

1. Site specific evaluations for geology and hydrology shall comply with 335-13-4-.11 through 335-13-4-.14.

2. Site specific evaluation shall include minimum design parameters necessary to protect the waters of the State and human health to include minimum requirements of 335-13-4-.15 through 335-13-4-.24.

3. Landfill units shall not be located within 200 feet of a fault that has had displacement within the Holocene epoch unless the owner or operator demonstrates to the Department that an alternative setback distance of less than 200 feet will not result in damage to the structural integrity of the facility and will be protective of human health and the environment.

4. Landfill units 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.

5. Landfill units shall not be located in an unstable area unless engineering measures have been incorporated in the design of the facility to ensure that the integrity of the structural components of the facility will not be disrupted. The following factors, at a minimum, must be considered when determining whether an area is unstable:

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

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

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

(e) Landfill units shall not be located on a site that is archaeologically or historically sensitive as determined by the Alabama Historical Commission. Written certification must be provided from the State Historic Preservation Officer.

(2) Water Quality Standards. A facility shall be located so as to not adversely impact water quality by complying with the following:

(a) A facility shall not cause a discharge of pollutants into waters of the State, including wetlands, that is in violation of the requirements of the National Pollutant Discharge Elimination System (NPDES), Alabama Water Pollution Control Act, Code of Ala. 1975, §§22-22-1 to 22-22-14 and/or section 404 of the Clean Water Act, as amended.

(b) A facility shall not cause non-point source pollution of waters of the State, including wetlands, that violates any requirements of an area wide and statewide water quality management plan that has been approved under the Alabama Water Pollution Control Act.

(c) Landfill units including buffer zones shall not be permissible in wetlands, beaches or dunes.

(d) Landfill units shall not be permissible in any location where the disposal of solid waste would significantly degrade wetlands, beaches or dunes.

(e) Landfill units shall be located outside the boundaries of the coastal area, unless no other reasonable alternative is available. If a site within the coastal area is proposed for development as a landfill unit, it shall be demonstrated to the satisfaction of the Department that siting, design, construction, and operation will ensure that present levels of coastal plants and animals will be maintained.

(3) Other Requirements. Solid Waste Disposal Facilities must comply with any other applicable State or Federal rules, laws, regulations or other requirements.

Author: Russell A. Kelly, S. Scott Story
Statutory Authority: Code of Ala. 1975, §§22-27-3, 22-27-7.
History: November 18, 1981; **Amended:** July 21, 1988; **Amended:** Filed September 28, 1993; effective November 2, 1993. **Amended:** June 21, 1996; effective July 26, 1996. **Amended:** April 24, 2018; effective June 8, 2018.

335-13-4-.02 [Reserved].
Author:
Statutory Authority:
History:

335-13-4-.03 [Reserved].
Author:
Statutory Authority:
History:

335-13-4-.04 [Reserved].
Author:
Statutory Authority:
History:

335-13-4-.05 [Reserved].
Author:
Statutory Authority:
History:

335-13-4-.06 [Reserved].
Author:
Statutory Authority:
History:

335-13-4-.07 [Reserved].
Author:
Statutory Authority:
History:

335-13-4-.08 [Reserved].
Author:
Statutory Authority:
History:

335-13-4-.09 [Reserved].
Author:
Statutory Authority:
History:

335-13-4-.10 [Reserved].
Author:
Statutory Authority:
History:

335-13-4-.11 General Design Standards For Disposal Facilities.

(1) General Standards. 335-13-4-.12 through 335-13-4-.20 provides standards for establishing a landfill unit providing that the siting standards of 335-13-4-.01 have been fully complied with to the satisfaction of the Department. Certain requirements contained in 335-13-4-.01 through 335-13-4-.20 may be enhanced or reduced by

the Department as deemed necessary to comply with the Act and this Division.

(2) Hydrogeology Standards.

(a) For purposes of designing the bottom elevation of the proposed cell, the applicant shall measure the groundwater elevation at the location of the proposed cell or liner system. Such determinations shall be based on groundwater measurements taken in the area of the proposed cell or liner system as approved by the Department. At each measuring location, the applicant shall obtain a minimum of two measurements taken during each of the three consecutive months of February, March and April, or as otherwise approved by the Department, with no two measurements taken within any twelve-day period. Having obtained the measurements, the applicant shall design the facility so that the bottom elevation of the proposed cell or liner system shall be a minimum of five feet above the highest measured groundwater level. The applicant shall submit to the Department all data known to exist concerning groundwater elevations at the landfill site and shall submit to the Department a location map showing all monitoring wells or piezometers and drilling logs for all monitoring wells or piezometers used to obtain any groundwater elevation data that is submitted. Nothing herein shall prevent the Department from requiring additional groundwater measurements or from requiring an additional buffer as it may deem appropriate with respect to a particular site.

(b) When the geological and hydrological data so indicate, the Department may specify greater separation distances, a liner(s), or a leachate collection system, or combination of the above to protect the groundwater.

(c) When the geological and hydrological data so indicate, the Department may allow engineering controls to remove, divert, drain, or otherwise modify zones of saturation above the uppermost aquifer.

Author: Russell A. Kelly, S. Scott Story
Statutory Authority: Code of Ala. 1975, §§22-27-3, 22-27-7.
History: November 18, 1981; **Amended:** July 21, 1988. **Amended:** Filed September 28, 1993; effective November 2, 1993. **Amended:** June 21, 1996; effective July 26, 1996. **Amended:** Published October 29, 2021; effective December 13, 2021.

335-13-4-.12 Plans And Operational Reports.

(1) Compliance. Plans and operational reports for construction, operation, maintenance, closure, and post-closure care of landfill

units shall be prepared and kept on site and shall comply with 335-13-5-.02(1) and this chapter.

(2) Plan Requirements. These plans and reports shall include the following as determined necessary by the Department:

(a) Sufficient control points on-site to provide for accurate horizontal and vertical control for facility construction, operation and closure and post-closure.

(b) Detail presentation of geological and hydrogeological units in the disposal site, with typical sections of disposal method and plan and profile sheets on all areas or trenches.

(c) Boundary plat and legal property description prepared, signed, and sealed by a land surveyor of the proposed boundary of the facility and disposal area of the facility.

(d) Initial and final topographical maps at contour intervals of five feet or as otherwise specified by the Department.

(e) Existing and proposed surface drainage pattern to include control structures designed to handle run-on and run-off. Design calculations for sediment control basins, etc. should be provided.

(f) Buffer zones, screening and other aesthetic control measures. Buffer zones around the perimeter of the landfill unit shall be a minimum of 100 feet in width measured in a horizontal plane. No disposal or storage practices for waste shall take place in the buffer zone. Roads, access control measures, earth storage, and buildings may be placed in the buffer zone.

(g) Details of plans for permanent all weather access roads.

(h) A summary of 335-13-4-.01 standards and conclusions of action to be taken and implemented into facility design.

(i) Location of any areas of the facility used for disposal of solid wastes.

(j) Presentation of special engineering features or considerations which must be included or maintained in facility construction, operation, maintenance and closure. Items required in 335-13-4-.12 through 335-13-4-.20 shall be included.

(k) Quality assurance/quality control (QA/QC) plan for all components of the liner, leachate collection, and cap systems.

(l) Location of all explosive gas wells and/or monitoring points.

Author: Russell A. Kelly, S. Scott Story
Statutory Authority: Code of Ala. 1975, §§22-27-3, 22-27-7.
History: November 18, 1981; **Amended:** July 21, 1988. **Amended:** Filed September 28, 1993; effective November 2, 1993. **Amended:** Filed June 21, 1996; effective July 26, 1996. **Amended:** Filed April 24, 2018; effective June 8, 2018. **Amended:** Filed June 25, 2019; effective July 9, 2019.

335-13-4-.13 Site Geology And Hydrology.

(1) Site Hydrogeology. The site hydrogeology shall be established to the upper-most aquifer and subsequent interconnecting aquifers.

(2) Hydrogeological Evaluation. The hydrogeological evaluation for a specific site, as required by the Department, may be provided for as follows:

(a) A hydrogeological evaluation performed by a firm or individual having expertise in hydrogeology. The expense of this evaluation shall be borne wholly by the applicant. The following shall be required on such evaluations made under this rule:

1. The installation of a minimum of three exploration borings to include sampling and geologic logging and completion of these borings as piezometers. Subsequent establishment of the first saturated zone, the uppermost aquifer and subsequent underlying and interconnected aquifers, piezometer measuring point elevations, water table elevations and an estimate of groundwater flow direction and rate will be required.

2. A report shall be submitted to the Department which includes all items, information and analyses contained in 335-13-4-.13(2)(a)1.

3. Resumes and references, as necessary, to establish the qualifications of the firm or individual preparing the evaluation.

(b) A review of the information submitted under 335-13-4-.13(2)(a) shall be conducted by the Department.

(c) The requirement for a hydrogeological evaluation may be waived by the Department based on specific geology, hydrology, or waste types proposed for disposal.

(3) Department Action. The Department will conduct a site background hydrogeological evaluation and review all other related reports, plans or submittals.

(a) Expense for the background hydrogeological evaluation and reviews conducted by the Department shall be borne by the applicant in accordance with established procedures of the Department.

(b) The expense for soil borings, soil tests, piezometers, and other data as needed by the Department shall be borne by the applicant.

Author: Russell A. Kelly, S. Scott Story
Statutory Authority: Code of Ala. 1975, §§22-27-3, 22-27-7.
History: November 18, 1981; **Amended:** July 21, 1988. **Amended:** Filed June 21, 1996; effective July 26, 1996. **Amended:** Filed April 24, 2018; effective June 8, 2018.

335-13-4-.14 Groundwater Resources.

(1) Groundwater. Groundwater resources in the vicinity of the landfill unit shall be determined as a basis for facility design, groundwater protection, and groundwater monitoring required under 335-13-4-.27.

(a) The depth to the groundwater and the direction of flow shall be established during the hydrogeological evaluation.

(b) The groundwater in the first saturated zone below the landfill unit shall be evaluated as follows:

1. A minimum of one hydraulically upgradient monitoring well for background data and two hydraulically downgradient monitoring wells shall be required.

2. The location and design of the monitoring wells shall be approved by the Department prior to installation and the upgradient well shall be located so as not to be affected by the landfill unit.

3. The monitoring wells shall be installed well in advance of projected facility opening so as to provide an undisputed background water quality sample from each well. Background water quality shall be established using the sampling and analysis procedures described in 335-13-4-.27.

4. Additional monitoring wells above the minimum may be required by the Department based on site hydrology, geology, topographical features and waste characteristics.

5. Groundwater monitoring wells shall be designed and constructed as described in 335-13-4-.27.

(c) The groundwater sampling and analysis plan shall be prepared in accordance with 335-13-4-.27.

(2) Soil Permeability. The permeability of on-site soils, specifically those underlying the disposal site, shall be determined by laboratory testing at a qualified soils laboratory and followed up by pump testing or slug testing of monitoring wells.
Author: Russell A. Kelly
Statutory Authority: Code of Ala. 1975, §§22-27-3, 22-27-7.
History: November 18, 1981; **Amended:** July 21, 1988. **Amended:** Filed September 28, 1993; effective November 2, 1993. **Amended:** Filed June 21, 1996; effective July 26, 1996.

335-13-4-.15 Cover.

Daily, weekly, or some other periodic cover shall be required at all landfill units, as determined by the Department.

(1) The suitability and volume of any soils for daily, intermediate and final cover requirements shall be determined by soil borings and analysis.

(2) Any proposal to use alternative cover systems shall be submitted to and approved by the Department prior to implementation.

(3) Alternative cover shall be approved by the Department in compliance with federal law and the USEPA rules for guidance to achieve a level of performance equal to or greater than earthen cover material.
Author: Russell A. Kelly, Heather M. Jones
Statutory Authority: Code of Ala. 1975, §§22-27-3, 22-27-7.
History: November 18, 1981; **Amended:** July 21, 1988. **Amended:** Filed September 28, 1993; effective November 2, 1993. **Amended:** Published October 29, 2021; effective December 13, 2021.

335-13-4-.16 Explosive Gases.

The generation of explosive gases, especially methane (CH4), at a landfill unit which accepts organic waste shall be considered in the design and operation of the facility. Special attention shall be given to control and monitoring of explosive gases as follows:

(1) Control.

(a) Explosive gases shall not exceed the lower explosive limit (LEL) at the facility boundary.

(b) Explosive gases shall not exceed 25 percent of the LEL in facility structures except for gas control or recovery system components.

(c) Facility structures shall be designed and constructed so as not to allow explosive gases to collect in, under or around structures in concentrations exceeding the requirements of this rule.

(2) Monitoring.

(a) Gas monitoring equipment as required by the Department shall be provided at the landfill unit by the operating agency.

(b) The Department upon review of waste type, facility structures, site geology and surrounding land use, may require installation of permanent gas monitoring structures, gas vents, gas control or recovery systems.

(c) An explosive gas monitoring and reporting plan shall be prepared and filed at the facility for all landfill units receiving organic wastes. All sites required to monitor for explosive gases shall submit a plan which indicates permanent monitoring points. The plan shall also include what measures shall be taken by the permittee, landfill supervisor, and any operators present on-site to protect human health and property should explosive gases be detected which exceed the LEL. The plan must be prepared by a registered professional engineer and include seal or signature and registration number in accordance with rule 335-13-5-.02(1)(a)5.(i) of the ADEM Administrative Code.

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

(i) Soil conditions;

(ii) Hydrogeological conditions surrounding the landfill unit;

(iii) Hydraulic conditions surrounding the landfill unit;

(iv) Location of the facility structures and property boundaries;

(v) Location of structures adjacent to facility.

2. The minimum frequency for monitoring shall be quarterly for MSWLF and yearly for C/DLF and ILF.

(i) All monitoring reports shall be submitted to the Department and placed in the operating record of the facility within 30 days of the monitoring event.

(ii) Levels of gas detected shall be expressed in percent LEL and percent volume.

3. If explosive gas levels exceeds the limits specified in this rule, the permittee shall:

(i) Immediately take all necessary steps to ensure protection of human health and property and notify the Department;

(ii) Within 7 days of detection, place in the operating record of the facility the explosive gas levels detected and the immediate steps taken to protect human health and property;

(iii) Within 20 days of detection, submit to the Department for approval a remedial plan for the explosive gas releases. This plan shall describe the nature and extent of the problem and the proposed remedy. The plan shall be implemented upon approval by the Department, but within 60 days of detection. Also, within 60 days of detection, a copy of the plan shall be placed in the operating record of the facility and the Department notified that the plan has been implemented.

4. Monitoring points shall be located every 300 feet along the landfill permit boundaries. In areas where a dwelling is within 1000 feet of the boundaries, the monitoring points shall be 100 feet apart or as otherwise directed by the Department.

(i) Monitoring shall be conducted in structures, culverts, under bridges, drop inlets, and any other place that is conducive to gas accumulation.

(ii) Permanent gas monitoring structures, or use of the bar hole punch method, are required by the Department.

(iii) A minimum depth of six feet must be obtained for permanent monitoring structures and four feet when using the bar hole punch method.

Author: Russell A. Kelly, Eric L. Sanderson, S. Scott Story
Statutory Authority: Code of Ala. 1975, §§22-27-3, 22-27-7.

History: November 18, 1981; **Amended:** July 21, 1988. **Amended:** Filed September 28, 1993; effective November 2, 1993. **Amended:** Filed June 21, 1996; effective July 26, 1996. **Amended:** Filed April 24, 2018; effective June 8, 2018. **Amended:** Published October 29, 2021; effective December 13, 2021.

335-13-4-.17 Drainage.

Owners or operators of all facilities must design, construct and maintain:

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

(2) A run-off control system from the active and/or closed portions of the landfill to collect and control at least the water volume resulting from a 24-hour, 25-year storm.

(3) On-site drainage structures to carry incident precipitation from the disposal site so as to minimize the generation of leachate, erosion and sedimentation. Run-off from the active and/or closed portions of the landfill unit must be handled in accordance with 335-13-4-.01(2)(a), and (b) and shall be routed to a settling basin or other sedimentation control structure to remove sediment prior to release onto adjacent properties or waters.

Author: Russell A. Kelly
Statutory Authority: Code of Ala. 1975, §§22-27-3, 22-27-7.
History: November 18, 1981; **Amended:** July 21, 1988. **Amended:** Filed September 28, 1993; effective November 2, 1993. **Amended:** Filed June 21, 1996; effective July 26, 1996.

335-13-4-.18 Liners And Leachate Collection.

(1) Liners. Where natural hydrogeologic conditions may be determined by the Department to be insufficient to minimize the impact of leachate on waters, the use of an appropriate liner(s) shall be used as approved by the Department. New MSWLF units and lateral expansions, at a minimum, shall be constructed with a composite liner, as defined in 335-13-1-.03, or an alternate design as specified in 335-13-4-.18(3)(h). Multiple liners, including composite liners, may be required if determined necessary by the Department.

(2) Leachate Collection System. A leachate collection system shall be required that is designed and constructed to maintain less than a 30 cm depth of leachate over the liner.

(3) Specifications. The composite liner(s) shall comply with the following minimum standards:

(a) The permeability shall be 1x10-7 cm/sec or less for soil liners.

(b) The synthetic liner(s) shall be resistant to physical and chemical attack by leachate.

(c) The liner system shall be capable of maintaining integrity for the design life which must be determined on a site specific basis.

(d) The minimum allowable thickness of each layer of the composite liner shall be:

1. 40 mil for the flexible membrane liner component unless flexible membrane liner (FML) consists of high density polyethylene (HDPE) which requires 60 mil, and

2. Two feet, measured after compaction, for the natural soil liner component meeting the permeability requirements of 335-13-4-.18(3)(a).

(e) The installation of synthetic liners shall be as recommended by the manufacturer providing that:

1. The installation recommendations of the manufacturer to be used are provided to the Department for review.

2. The Department finds that the recommended installation procedures are consistent with the intent of the Act and this chapter.

3. The installation of the liner shall be under the supervision of an engineer who shall certify to the Department that the liner was installed and maintained in accordance with this Division, QA/QC plans, and approved design plans.

(f) The design and installation of soil liners and the properties of soils used in a soil liner shall meet the following minimum requirements:

1. Design of soil liner(s) shall be by a qualified soils engineer, or geotechnical engineer.

2. The soil liner must be compacted in lifts of 4 to 6 inches within 4 percent of optimum moisture content (or as approved by the Department) to a field density which correlates with a laboratory permeability of 1x10-7 cm/sec or less.

3. The installation of soil liner(s) shall be under the supervision of a soils engineer, geotechnical engineer or geologist who shall certify to the Department that the liner(s) was installed and maintained in accordance with this Division, QA/QC plans, and approved design plans.

4. The soils used in soil liners shall meet the minimum following criteria:

(i) Free of oversize particles, such as rocks, roots, limbs and other foreign substances which would alter the design integrity of the liner;

(ii) Classified under the Unified Soil Classification System as CL, CH or SC (ASTM Standard D2 487-69);

(iii) Allow greater than 30 percent passage through a No. 200 sieve (ASTM Test D-1140);

(iv) Have a liquid limit equal to or greater than 30 units (ASTM Test D-423); and

(v) Have a plasticity greater than or equal to 15 units (ASTM Test D-424).

(g) For a composite liner system, the synthetic liner shall be installed in direct contact with the soil liner.

(h) An alternate liner design may be approved by the Department provided that:

1. The owner or operator demonstrates that the alternate design ensures the concentration values listed in Table 1 of this rule will not be exceeded in the first saturated zone at the relevant point of compliance, as specified by the Department under 335-13-4-.27(2)(a)3.

2. When approving a design that complies with subparagraph (a) of this paragraph, the Department shall consider at least the following factors:

(i) The hydrogeologic characteristics of the facility and surrounding land;

(ii) The climatic factors of the area; and

(iii) The volume and physical and chemical characteristics of the leachate.

Chemical	**MCL (mg/L)**
Arsenic	0.05

Chemical	**MCL (mg/L)**
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
Lindane	0.004
Lead	0.015
Mercury	0.002
Methoxychlor	0.1
Nitrate	10
Selenium	0.01
Silver	0.05
Toxaphene	0.005
1,1,1-Trichloromethane	0.2
Trichloroethylene	0.005
2,4,5-Trichlorophenoxy acetic acid	0.01
Vinyl Chloride	0.002

Author: Russell A. Kelly, S. Scott Story
Statutory Authority: Code of Ala. 1975, §§22-27-3, 22-27-7.
History: November 18, 1981; **Amended:** July 21, 1988. **Amended:** Filed September 28, 1993; effective November 2, 1993. **Amended:** Filed June 21, 1996; effective July 26, 1996. **Amended:** Filed April 24, 2018; effective June 8, 2018.

335-13-4-.19 Access.

The owner or operator of the facility must control public access and prevent unauthorized vehicular traffic and illegal dumping of wastes by using artificial barriers, natural barriers, or both, as appropriate to protect human health and the environment.
Author: Russell A. Kelly
Statutory Authority: Code of Ala. 1975, §§22-27-3, 22-27-7.

History: November 18, 1981; **Amended:** July 21, 1988. **Amended:** Filed September 28, 1993; effective November 2, 1993.

335-13-4-.20 Closure And Post-Closure.

(1) Submittal. The owner or operator must submit a closure/post-closure plan to the Department and place in the operating record, no later than the effective date of these regulations or by the initial receipt of waste, whichever is later.

(2) Closure. The requirements for closure of existing and proposed landfill units shall include the following unless otherwise noted.

(a) The owner or operator must prepare a written closure plan that describes the steps necessary to close all existing and proposed landfill units at any point during their active life in accordance with the cover design requirements in 335-13-4-.20(2)(b). The owner or operator must submit the closure plan as part of the permit application to the Department. The closure plan, at a minimum, must include the following information:

1. A description of the final cover, designed in accordance with 335-13-4-.20(2)(b) and the methods and procedures to be used to install the cover;

2. An estimate of the largest area of the landfill unit ever requiring a final cover as required under 335-13-4-.20(2)(b) at any time during the active life;

3. An estimate of the maximum inventory of wastes ever on-site over the active life of the facility; and

4. A schedule for completing all activities necessary to satisfy the closure criteria in this rule.

(b) A final cover system must be installed which is designed to minimize infiltration and erosion. The final cover system must be comprised of an erosion layer(s) underlain by an infiltration layer(s) as follows:

1. The infiltration layer for MSWLF and ILF must be comprised of a minimum of 18 inches of earthen material and/or a synthetic layer that has a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present, or a permeability no greater than 1 x 10-5 cm/sec, whichever is less. The infiltration layer for C/DLF must be comprised of a minimum of 18 inches of compacted earthen material excluding sands, and

2. The erosion layer must consist of a minimum 6 inches of earthen material that is capable of sustaining native plant growth, as specified in 335-13-4-.20(2)(d).

3. The Department may approve an alternative final cover design that includes:

(i) An infiltration layer that achieves an equivalent reduction in infiltration as the infiltration layer specified in 335-13-4-.20(2)(b)1., and

(ii) An erosion layer that provides equivalent protection from wind and water erosion as the erosion layer specified in 335-13-4-.20(2)(b)2.

(c) Final soil cover shall be graded so that:

1. Surface water does not pond over the landfill unit.

2. The maximum final grade of the final cover system shall not exceed 25 percent or as specified by the Department to minimize erosion.

3. Slopes longer than 25 feet shall require horizontal terraces, of sufficient width for equipment operation, for every 20 feet rise in elevation or utilize other erosion control measures approved by the Department.

4. The minimum final grade of the final cover system shall not be less than 5 percent or as specified by the Department to minimize ponding.

5. For a permitted facility utilizing the area fill method or the trench method, final grading of the infiltration layer shall be completed within 90 days after the unit has received the last known receipt of waste.

(d) A vegetative or some other appropriate cover must be established to minimize erosion and, when applicable, maximize evapotranspiration. Within 90 days after completion of final grading requirements on each phase or each trench as specified in 335-13-4-.20(2)(a), the permittee or owner of a permitted landfill unit shall prepare the final cover for the establishment of a vegetative cover or alternative cover. Deep rooted vegetation (roots that may grow below the 6 inch erosion layer) shall be prohibited as vegetative cover. Preparation of a vegetative cover shall include, but not be limited to, the following:

1. Placement of appropriate species of grass seed, fertilizer and mulch; and

2. Watering and maintenance necessary such that germination of grass will occur.

(e) Prior to beginning closure of each landfill unit as specified in this rule, an owner or operator must submit to the Department and place in the operating record a notice of the intent to close the unit.

(f) The owner or operator must begin closure activities of each LF unit no later than 30 days after the date of which the LF unit receives the known final receipt of wastes. If the LF unit has remaining capacity and there is reasonable likelihood that the LF unit will receive additional wastes, closure activities of each LF unit must begin no later than one year after the date of known final 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 LF 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 LF unit.

(g) The owner or operator of all LF units must complete closure activities of each LF unit in accordance with the closure plan within 180 days following the last known receipt of waste. 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 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 LF unit. Extensions granted for closure of each LF unit shall not exceed a total of 180 days.

(h) Following closure of each LF unit, the owner or operator must submit to the Department a certification, signed by an independent registered professional engineer verifying that closure has been completed in accordance with the closure plan, and a copy placed in the operating record. C/DLF and/or ILF owner or operator may submit certification signed by a registered professional engineer in lieu of an independent registered professional engineer.

(i) Within 90 days after permit expiration, revocation or when final closure requirements in 335-13-4-.20 are achieved as determined by the Department, the permittee or owner of a facility must provide documentation of compliance with the requirements of the Uniform Environmental Covenants Program in ADEM Admin. Code Division 335-5 and shall record a notation onto the land deed containing the property utilized for disposal, and/or some other legal instrument that is normally examined during a title search, that will in

perpetuity, notify any potential purchaser of the property that:

1. The land has been used as a solid waste disposal facility landfill unit;

2. Its use is restricted by the items contained in 335-13-4-.20(3)(c) and 335-13-4-.20(3)(d);

3. The locations and dimensions of the landfill unit with respect to permanently surveyed benchmarks and surveyed benchmarks and section corners shall be on a plat prepared and sealed by a land surveyor;

4. Contain a note, prominently displayed, which states the name of the permittee or operating agency, the type of landfill unit and the beginning and closure dates of the disposal activity.

5. Certification by and engineer or land surveyor that all closure requirements have been completed as determined necessary by the Department.

(j) For a permitted facility, the permittee or land owner shall submit a certified copy of the recording instrument to the Department and place a copy in the operating record within 120 days after permit expiration, revocation or as otherwise directed by the Department.

(k) Detail design for the closure of existing and proposed LF units shall be shown on a final contour and drainage plan. Items required in 335-13-4-.20(2)(b) through (d), (i), (j), and (3)(a), (d), and (f) shall be included.

(3) Post-closure. The requirements for post-closure of existing and proposed landfill units shall include the following unless otherwise noted.

(a) Following closure of each LF unit, the owner or operator must conduct post-closure care. Post-closure care must be conducted for a minimum of 30 years; or a minimum of 5 years if closed prior to October 9, 1993, or the effective date of §258.1 of 40 CFR 258, Solid Waste Disposal Criteria, whichever is later; except as provided under 335-13-4-.20(3)(b), and consist of at least the following:

1. Eroded areas shall be filled with suitable soil cover, compacted, graded and appropriate cover established as described in 335-13-4-.20(2)(d).

2. Areas which provide for ponding of surface water shall be filled, graded and an appropriate cover established as described in 335-13-4-.20(2)(d).

3. Landfilled areas with extensive surface cracks in soil cover shall be corrected as necessary, or as determined by the Department, to prevent infiltration of surface water.

4. An appropriate cover shall be maintained on the facility at all times as described in 335-13-4-.20(2)(d).

5. Access control structures shall be maintained or erected and signs shall be posted stating that the facility is closed and giving the location of the nearest permitted landfill unit.

6. Any waste dumped at the landfill unit following closure shall be removed to an approved landfill unit by the permittee, operating agency, or owner.

7. Monitoring devices and pollution control equipment such as groundwater monitoring wells, explosive gas monitoring systems, erosion, and surface water control structures, and leachate facilities shall be maintained. Monitoring requirements shall continue in effect throughout the active life and post-closure care period as determined by the Department unless all solid waste is removed and no unpermitted discharge to waters has occurred.

8. Other deficiencies such as vector control, which may be observed by the Department shall be corrected.

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

1. 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

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

(c) The owner or operator of all LF units must submit to the Department and receive approval as part of the permit application, a written post-closure plan. A copy must also be placed in the operating record. The post-closure plan must include, at a minimum, the following information:

1. A description of the monitoring and maintenance activities required in 335-13-4-.20(3)(a) for each LF unit, and the frequency at which these activities will be performed;

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

3. A description of the planned uses of the property during the post-closure period.

(d) Post-closure use of the property used for the disposal operation must never be allowed to disturb the integrity of the final cover, liner(s), or any other component of the containment system, or the function of the monitoring systems necessary to comply with the requirements of these rules. The Department may approve any other disturbance if the owner or operator demonstrates that the disturbance, including any removal of waste, complies with the following:

1. The activities will not increase the potential threat to human health or the environment; or

2. The activities are necessary to reduce a threat to human health or the environment.

(e) Following completion of the post-closure care period for each LF unit, the owner or operator must submit to the Department a certification, signed by an independent registered professional engineer verifying that post-closure care has been completed in accordance with the post-closure plan, and a copy placed in the operating record. A C/DLF owner or operator may submit certification signed by a registered professional engineer in lieu of an independent registered professional engineer.

(f) If the permittee or owner, or any subsequent owner of the land upon which a landfill unit is located wishes to remove waste, waste residues, the liner, if any, or any contaminated soils, the owner must request approval from the Department. The owner may also ask permission to remove the notation from the recording instrument if all waste and contaminated soils are removed from the property and no unpermitted discharges to waters have occurred.

Author: Russell A. Kelly, S. Scott Story, Heather M. Jones
Statutory Authority: Code of Ala. 1975, §§22-27-3, 22-27-4, 22-27-7.
History: November 18, 1981; **Amended:** July 21, 1988. **Amended:** Filed September 28, 1993; effective November 2, 1993. **Amended:** Filed June 21, 1996; effective July 26, 1996. **Amended:** Filed April 24, 2018; effective June 8, 2018. **Amended:** Published October 29, 2021; effective December 13, 2021.

335-13-4-.21 General Operational Standards For Landfill Units.

Any person or agency operating or planning to operate a landfill unit shall operate and maintain the facility consistent with this Division. General requirements for operating and maintaining an acceptable landfill unit shall be:

(1) General Operation.

(a) The operation and use of the landfill unit shall be as stipulated in the permit.

(b) Waste accepted at the facility shall be strictly controlled so as to allow only waste stipulated in the permit or otherwise as may be approved by the Department. The permittee of any facility permitted under these rules must have in the operating record a plan describing procedures the permittee will implement for detecting and preventing the disposal of free liquids, regulated hazardous wastes, regulated medical wastes, and regulated PCB wastes at the facility. This plan must include at a minimum:

1. Random inspections of incoming loads to ensure that incoming loads do not contain free liquids, regulated hazardous wastes, regulated medical wastes, or regulated PCB wastes.

2. Inspection of suspicious loads.

3. Records of all inspections to include the origin of waste suspected to be regulated hazardous, regulated medical, or regulated PCB waste if known; transporters, to include transfer stations and all handlers of the waste en route to the disposal site; and any certifications from generators provided to the permittee or facility personnel. These records must be maintained on file in the operating record of the facility.

4. Training of facility personnel to recognize free liquids, regulated hazardous wastes, regulated medical wastes, and regulated PCB wastes.

5. Procedures for notifying the proper authorities if free liquids, regulated hazardous wastes, regulated medical wastes, or regulated PCB wastes are discovered at the facility.

6. Methods to identify all industrial users of the facility, producers of special wastes, and transporters of these wastes.

(c) Prior to disposal of industrial waste and/or medical waste, the permittee shall obtain from each generator a written certification that the material to be disposed does not contain free liquids, regulated hazardous wastes, regulated medical wastes, or regulated PCB wastes.

1. This certification may be based on laboratory analysis of the waste on a case-by-case basis, or documentation supporting the generator's knowledge of the wastestreams(s), or as may be required by the Department.

2. Copies of the certification shall be submitted to the Department for disposal approval and for any specific requirements prior to disposal. After submittal of the required certification, the Department shall have five (5) working days to respond. If no response is given, the permittee may dispose of the material as proposed.

3. In the case of one-time emergency disposal requests, the permittee shall submit the required certification no later than five (5) days after the disposal of waste.

4. Certification shall be renewed or revised biennially (every two years) or at such time that operational changes at the point of generation could render the waste hazardous, whichever is more frequent and submitted to the Department for approval.

5. Copies of these certifications and approvals shall be maintained on file in the operating record of the facility and shall be made available for the Department upon request.

6. The above requirements notwithstanding and, as may otherwise be required, pursuant to Division 13 rules, generators will not be required to submit certification to the Department provided that:

(i) The waste will be disposed of at a non-commercial industrial waste landfill which has been permitted by the Department, and is owned either exclusively or mutually by the generator(s) of the waste, and which disposes of waste generated only by the owner(s);

(ii) The wastestream(s) to be disposed of are specifically described in the Solid Waste Landfill Permit issued by the Department or in the final application as referenced by the permit for the site designated to receive the waste;

(iii) The required certification, as described above, is maintained on-site by the owner(s) of the landfill; and

(iv) The required certification, as described above, is made available for inspection by the Department upon request.

(d) The landfill unit shall be operated in such a manner that there will be no water pollution or unauthorized discharge.

1. Any discharge resulting from a landfill unit or practice may require:

(i) A National Pollutant Discharge Elimination System (NPDES) permit under the Alabama Water Pollution Control Act as issued by the Department.

(ii) A dredge or fill permit from the Army Corps of Engineers as required under Section 404 of the Clean Water Act, as amended; or

(iii) That a non-point source of surface waters does not violate an area wide or statewide water quality management plan that has been approved under the Alabama Water Pollution Control Act.

2. The groundwater shall not be contaminated as specified by this Division.

(e) The historic and certified disposal areas shall be identified with a sufficient number of permanent markers which are at least visible from one marker to the next.

(f) Measuring or weighing devices shall be required for all municipal solid waste landfill units accepting solid waste. All solid waste shall be properly measured or weighed prior to disposal unless otherwise approved by the Department.

(g) Deep rooted vegetation (with roots that may grow below the six inch erosion layer) shall be prohibited as vegetative cover.

(h) With the exception of very small quantity generator waste disposed of in municipal solid waste landfills, regulated hazardous waste, as defined by Division 14 of the ADEM Administrative Code, is prohibited from disposal in a non-hazardous landfill unit.

(i) Except as provided in paragraph 1. below, a landfill shall not dispose of whole tires after December 31, 2027. Whole tires shall at a minimum be shredded or cut into thirds or smaller pieces prior to disposal.

1. Incidental whole tires received in loads of solid waste may be disposed, provided the whole tires

constitute a de minimis portion of the overall load of waste.

2. "De minimis" refers to a small amount of material or number of items, as applicable, commingled and incidentally disposed of with other solid waste.

(2) Open Burning.

(a) Open burning of solid waste at any landfill unit is prohibited unless approved by the Department as follows:

1. Clearing debris at the landfill unit such as trees and stumps may be burned if prior approval is received from the Department and the Alabama Forestry Commission.

2. Emergency clean-up debris resulting from catastrophic incidents may be burned at a permitted landfill unit if consistent with the intent of this Division and air pollution control requirements. Prior approval must be received from this Department and other appropriate agencies.

3. If approved, the burning shall not occur over previously filled areas or within 200 feet of existing disposal operations unless otherwise specified by the Department and such burning shall not cause a public nuisance or pose a threat to public health.

(b) The person or agency requesting permission to burn solid waste shall apply in writing to the Department, outlining why a burn request should be granted. This request should include, but not be limited to, specifically what areas will be utilized, types of waste to be burned, the projected starting and completion dates for the project, and the projected days and hours of operation.

Author: Russell A. Kelly, S. Scott Story, Heather M. Jones, Jason Wilson

Statutory Authority: Code of Ala. 1975, §§22-22A-5, 22-27-3, 22-27-4, 22-27-7, 22-27-47, 22-27-48.

History: November 18, 1981; **Amended:** March 31, 1988 (Emergency Regulations); July 21, 1988; October 2, 1990. **Amended:** Filed September 28, 1993; effective November 2, 1993. **Amended:** Filed June 21, 1996; effective July 26, 1996. **Amended:** Filed April 24, 2018; effective June 8, 2018. **Amended:** Filed June 25, 2019; effective July 9, 2019. **Amended:** Published October 29, 2021; effective December 13, 2021. **Amended:** Published October 31, 2024; effective December 15, 2024.

335-13-4-.22 Specific Requirements For Municipal Solid Waste Landfills.

The following requirements in conjunction with 335-13-4-.21 shall be for operating and maintaining an acceptable MSWLF:

(1) Daily Operation.

(a) All waste shall be covered as follows:

1. A minimum of six inches of compacted earth or other alternative cover material that is approved by the Department shall be added at the conclusion of each day's operation or as otherwise approved by the Department to control disease vectors, fires, odors, blowing litter, and scavenging.

2. In the event that erosion develops on previously covered disposal areas, or when covered waste otherwise becomes exposed, cover must be re-applied to comply with the minimum cover requirements of subparagraph (1)(a)1. of this section.

3. Final closure shall be carried out in accordance with rule 335-13-4-.20 of this Division.

(b) All waste shall be confined to as small an area as possible within a single working face and spread to a depth not exceeding two feet prior to compaction, and such compaction shall be accomplished on a face slope not to exceed 4 to 1 (25%) or as otherwise approved by the Department.

(c) All waste shall be thoroughly compacted with adequate landfill equipment before the daily cover is applied. A completed daily cell shall not exceed eight feet in vertical thickness measured perpendicular to the slope of the preceding cell.

(d) The site shall be operated in accordance with approved plans and permits.

(e) Adequate personnel shall be provided to ensure continued and smooth operation of the facility.

(f) Adequate equipment shall be provided to ensure continued operation in accordance with the permit and regulations.

(g) Provisions shall be made for disposal activities in adverse weather conditions.

(h) The site shall be adequately secured using artificial barriers, natural barriers, or both to prevent entry of unauthorized vehicular traffic.

(i) A sign outlining instructions for use of the site shall be posted at the entrance and shall include: name of facility, name of permittee and/or operating agency or person, days and hours of operation, disposal fees, and types of waste accepted if the site is available to the general public or commercial haulers.

1. Name of facility,

2. Name of permittee and/or operating agency or person,

3. Days and hours of operation,

4. Disposal fees, and

5. Types of waste accepted if the site is available to the general public or commercial haulers.

(j) Special provisions shall be made for handling large dead animals or highly putrescible waste. Immediately covering the waste with a minimum of 12 inches of cover in a designated area of the facility shall be included in these provisions.

(k) Bulk or noncontainerized liquid waste, or containers capable of holding liquids, shall not be accepted at a landfill unit unless:

1. The liquid is household waste other than septic waste;

2. The liquid is leachate or gas condensate derived from the MSWLF unit, and the MSWLF unit is designed with a minimum composite liner and leachate collection system or approved equivalent liner and leachate collection system; or

3. The containers:

(i) Are similar in size to that normally found in household waste;

(ii) Are designed to hold liquids for use other than storage; or

(iii) Contain household wastes.

(l) Empty containers larger in size than normally found in household waste must be rendered unsuitable for holding liquids prior to disposal in the landfill unit unless otherwise approved by the Department.

(m) Unless otherwise provided by 335-13-4-.22(1)(k), free liquids are prohibited from disposal in the landfill unit.

(n) MSWLF units containing sewage sludge and failing to satisfy the criteria in this Division violate Sections 309 and 405(e) of the Clean Water Act.

(2) Routine Maintenance.

(a) Scavenging shall be prohibited and salvaging operations shall be controlled.

(b) Litter shall be controlled within the permitted facility.

(c) An all-weather access road shall be provided to the dumping face.

(d) Measures shall be taken to prevent the breeding or accumulation of disease vectors. If determined necessary by the Department or the State Health Department, additional disease vector control measures shall be conducted.

(e) Environmental monitoring and treatment structures shall be clearly marked and identified, protected and maintained in good repair and shall be easily accessible.

(f) Completed sites or portions of sites shall be properly closed as provided by this Division and approved facility plans.

(g) The average daily volume of waste received at a MSWLF shall be calculated by dividing the total month's receipts by the total number of days in the reporting month. Records shall be maintained on the average daily volume of waste received at MSWLFs. A quarterly report which summarizes the daily volumes, with volumes received reported in a format specified and approved by the Department, shall be submitted to the Department and maintained on file in the operating record of the facility by the permittee. If the average daily volume is exceeded for two or more consecutive quarters, by 20 percent or 100 tons/day, whichever is less, a modification would be required to adjust the permitted average daily volume.

(3) Additional Requirements.

(a) Owners or operators of all MSWLFs must ensure that the units do not violate any applicable requirements developed under a State Implementation Plan (SIP) approved or promulgated by the Administrator pursuant to Section 110 of the Clean Air Act, as amended.

(b) Notwithstanding this rule, additional requirements for operating and maintaining a MSWLF may be imposed by the

Department, as deemed necessary, to comply with the Act and this Division.

Author: Russell A. Kelly, S. Scott Story, Heather M. Jones, Jason Wilson

Statutory Authority: Code of Ala. 1975, §§22-27-3, 22-27-4, 22-27-7.

History: November 18, 1981; **Amended:** July 21, 1988; October 2, 1990. **Amended:** Filed September 28, 1993; effective November 2, 1993. **Amended:** Filed June 21, 1996; effective July 26, 1996. **Amended:** Filed April 24, 2018; effective June 8, 2018. **Amended:** Filed June 25, 2019; effective July 9, 2019. **Amended:** Published October 29, 2021; effective December 13, 2021. **Amended:** Published October 31, 2024; effective December 15, 2024.

335-13-4-.23 Specific Requirements For Inert-Construction/ Demolition Landfills And Industrial Landfills.

The following requirements in conjunction with 335-13-4-.21 shall be for operating and maintaining an acceptable C/DLF or ILF:

(1) Operation.

(a) All waste shall be covered as follows:

1. A minimum of six inches of compacted earth or other alternative cover material that is approved by the Department shall be added at the conclusion of each week's operation or as otherwise specified by the Department to control disease vectors, fires, odors, blown litter and scavenging.

2. In the event that erosion develops on previously covered disposal areas, or when covered waste otherwise becomes exposed, cover must be re-applied to comply with the minimum cover requirements of subparagraph (1)(a)1. of this section.

3. Final closure shall be carried out in accordance with 335-13-4-.20 of this Division.

(b) All waste shall be thoroughly spread in layers two feet or less in thickness and thoroughly compacted weekly with adequate landfill equipment prior to placing additional layers of waste or placing the weekly cover as specified in 335-13-4-.23(1)(a)1., unless otherwise approved by the Department. Waste, such as construction/ demolition waste and other types of waste, which cannot be managed by landfill equipment in this manner shall be managed in a manner approved.

(c) All waste shall be confined to as small an area as possible within a single working face and placed onto an appropriate slope not to exceed 4 to 1 (25%) or as approved by the Department.

(d) The facility shall be operated in accordance with approved plans and permits.

(e) The site shall be adequately secured to prevent entry except by authorized person(s) unless an operator is on site.

(f) If the site is available to the public or commercial haulers, a sign shall be posted at the landfill stating:

1. Name of permittee,

2. Owner and/or operator,

3. Name of landfill,

4. Days and hours of operation,

5. Waste types accepted, and

6. Disposal fees for use of the landfill.

(g) Provisions shall be made for disposal activities in adverse weather conditions.

(h) Adequate personnel shall be provided to ensure continued and smooth operation of the site.

(i) Adequate equipment shall be provided to ensure continued operation in accordance with the permit and regulations.

(j) Bulk or non-containerized liquid waste, or containers capable of holding liquids, shall not be accepted at a C/DLF or ILF unless:

1. The liquid is leachate or gas condensate derived from the C/DLF or ILF unit, and

2. The C/DLF or ILF unit is designed with a minimum single liner and leachate collection system or approved equivalent liner and leachate collection system.

(k) Empty containers larger than 10 gallons in size must be rendered unsuitable for holding liquids prior to disposal in the landfill unit unless otherwise approved by the Department.

(l) Unless otherwise provided by 335-13-4-.23(1)(j), free liquids are prohibited from disposal in the landfill unit.

(2) Routine Maintenance.

(a) Scavenging shall not be permitted, and salvaging operations shall be controlled.

(b) Litter shall be controlled within the permitted facility.

(c) Completed sites or portions of sites shall be properly closed as provided by this Division and approved facility plans.

(d) An all-weather access road shall be provided to the dumping face.

(e) Environmental monitoring and treatment structures shall be protected and maintained in good repair and easily accessible.

(f) The average daily volume of waste received at a C/DLF or ILF shall be calculated by dividing the total month's receipts by the total number of days in the reporting month. Records shall be maintained on the average daily volume of waste received at C/DLFs and ILFs. A quarterly report which summarizes the daily volumes, with volumes received reported in a format specified and approved by the Department, shall be submitted to the Department and maintained on file in the operating record of the facility by the permittee. If the average daily volume is exceeded for two or more consecutive quarters, by 20 percent or 100 tons/day, whichever is less, a modification would be required to adjust the permitted average daily volume.

(g) Measures shall be taken to prevent the breeding or accumulation of disease vectors. If determined necessary by the Department or the State Health Department, additional disease vector control measures shall be conducted.

(3) Additional Requirements.

(a) Notwithstanding this rule, certain requirements for operating and maintaining a C/DLF or ILF may be enhanced or reduced by the Department as deemed necessary to comply with the Act and this Division.

(b) [Reserved].

(c) Industrial landfills which accept coal combustion residuals must also adhere to the applicable requirements of ADEM Admin. Code 335-13-15.

Author: Russell A. Kelly, Eric L. Sanderson, Heather M. Jones, Jason Wilson
Statutory Authority: Code of Ala. 1975, §§22-27-3, 22-27-4, 22-27-7.
History: November 18, 1981; **Amended:** July 21, 1988; October 2, 1990. **Amended:** Filed September 28, 1993; effective November 2, 1993. **Amended:** Filed June 21, 1996; effective July 26, 1996. **Amended:** Filed April 24, 2018; effective June 8, 2018. **Amended:** Filed June 25, 2019; effective July 9, 2019. **Amended:** Published October 29, 2021; effective December 13, 2021. **Amended:** Published October 31, 2024; effective December 15, 2024.

335-13-4-.24 Septic Tank Pumpings And Sewage Sludge.

The practice of accepting septic tank pumpings and sewage sludge shall not occur at landfill units unless specifically approved in writing by the Department.

Author:
Statutory Authority: Code of Ala. 1975, §§22-27-3, 22-27-7.
History: November 18, 1981; **Amended:** July 21, 1988. **Amended:** Filed September 28, 1993; effective November 2, 1993.

335-13-4-.25 Specific Requirements For Other Disposal Methods (Repealed 6/21/96; effective 7/26/96).

Author:
Statutory Authority: Code of Ala. 1975, §§22-27-3, 22-27-7.
History: November 18, 1981; **Amended:** July 21, 1988. **Amended:** Filed September 28, 1993; effective November 2, 1993. Repealed June 21, 1996; effective July 26, 1996.

335-13-4-.26 Requirement For Management And Disposal Of Special Waste.

(1) Exceptions.

(a) Requirements for the management and disposal of special waste at a landfill unit permitted by the Department shall meet the requirements of this rule.

(b) Certain requirements may be modified by the Department as deemed necessary to comply with the Act and this Division.

1. Waste types for which specific rules and regulations under this Division have not been developed shall be

managed and disposed of in a manner as determined by the Department to be consistent with the intent of the Act and this Division.

2. Generators of a special waste may be required by the Department to provide an analysis and certification that the waste is nonhazardous waste or treated medical waste.

(2) Disposal requirements for friable asbestos. Any person who generates, processes, treats, or disposes of friable asbestos shall comply with the following practices:

(a) Friable asbestos shall be disposed of in a facility permitted by the Department. The friable asbestos shall arrive at the landfill unit in properly labeled, leak-tight containers as determined by the Department's Air Division.

(b) Containers shall be placed intact in a specially prepared place and covered with a minimum of 12 inches of earth or other alternative cover material, as approved by the Department, at the end of each working day. Asbestos waste may be landfilled in an excavation at the bottom of the operating face if no liner is present or the design depth restriction is not exceeded. The waste may also be placed in a separately designated area. If a separate area is utilized, it shall be clearly marked to prevent future excavation into the waste.

(c) Proper handling precautions shall be taken to ensure that containers are not ruptured prior to placing the required daily cover as noted in 335-13-4-.26(2)(b). No machinery shall be operated directly over uncovered containers.

(d) Final cover shall be as noted in 335-13-4-.20(2)(b).

(3) Disposal requirements for foundry wastes. Foundry waste which exhibits less than 50 percent of each of the TC Levels for metals as defined by the USEPA's Toxicity Characteristic Leaching Procedure (TCLP) may be managed in the following manner:

(a) Foundry waste may be managed in areas other than

1. Flood Plains;

2. Wetlands;

3. Residential zones; or

4. Areas less than 5 feet above the uppermost aquifer.

(b) Each foundry must maintain records at the manufacturing facility. These records must include:

1. A description of the site to within the 1/4, 1/4 Section of a specific township and range.

2. Volume of foundry waste disposed of at each location.

(c) The waste must be certified by the generator on a quarterly basis or whenever the process changes which would significantly alter the test results, whichever is more frequent. Certification of the foundry waste shall be accomplished by submitting the following:

1. A completed Solid/Hazardous Waste Determination Form.

2. A TCLP analysis for metals.

(d) Each foundry must contact the Water Division of ADEM with regards to General Stormwater and/or NPDES permits.

(e) Foundry waste from two or more foundries may be managed at one location provided adequate documentation and record keeping is maintained for each foundry.

(f) Foundry waste not meeting the requirements of paragraph (3) of this rule must be managed at an approved recycle/reuse facility or at a landfill unit approved for the disposal of foundry waste and permitted by the Department.

(4) Disposal requirements for petroleum contaminated waste. Any person who disposes of petroleum contaminated waste shall comply with the following practices:

(a) Petroleum contaminated waste must be disposed of in a MSWLF and/or a synthetically lined facility having a solid waste disposal permit issued by the Department and having groundwater monitoring wells.

(b) Prior to disposing of a petroleum contaminated waste in accordance with subparagraph (a) of this paragraph, the generator of the waste must provide the Department with a written certification that the waste is non-hazardous.

1. The generator of a petroleum contaminated waste may use knowledge of the processes producing the waste to certify that the waste is non-hazardous; however the Department, on a case-by-case basis, may require additional information and/or laboratory analyses to support the generator’s certification.

2. The written certification that the waste is non-hazardous must include laboratory analysis for metals if the source of the petroleum contamination is leaded gasoline, used automotive crank case oil, or if the

generator has reason to believe that the source contains TCLP metals.

(c) Small quantities of petroleum contaminated waste may be disposed in MSWLFs, C/DLFs, or ILFs, and shall not require approval and/or testing, provided that the waste:

1. Contains less than twenty-five (25) gallons of petroleum; and

2. Total material (i.e., soil, rags, sorbent, etc.) is less than five (5) cubic yards per occurrence.

(5) Disposal requirements for municipal solid waste ash. Municipal solid waste ash shall be disposed of at a MSWLF meeting at a minimum the design criteria established under 335-13-4-.18. Alternative disposal methods or uses must be approved by the Department prior to implementation.

(6) Disposal requirements for wood ash waste. Wood ash waste which exhibits less than 50 percent of each of the TC Levels for metals as defined by the USEPA's Toxicity Characteristic Leaching Procedure (TCLP) may be managed in the following manner:

(a) Wood ash waste may be managed in areas other than

1. Flood Plains;

2. Wetlands;

3. Residential zones; or

4. Areas less than 5 feet above the uppermost aquifer.

(b) Facilities managing wood ash waste in an area that is not a permitted landfill unit, not within the property boundaries of the generator, and meets the requirements of 335-13-4-.26(6)(a) must maintain records at the facility that include the following:

1. A description of the site to within the ¼, ¼ Section of a specific Township and Range.

2. Volume of the wood ash waste disposed of at each location on a quarterly basis.

3. Certification of the wood ash waste on a quarterly basis or whenever the waste generating process changes which would significantly alter the test results, whichever is more frequent. Certification of the wood ash waste must be accomplished by submitting the following:

(i) A completed Solid/Hazardous Waste Determination Form.

(ii) A TCLP analysis for metals.

(c) Facilities managing wood ash waste in an area that is not a permitted landfill unit, within the property boundaries of the generator, and meets the requirements of 335-13-4-.26(6)(a) must maintain records at the facility that include the following:

1. Certification of the wood ash waste on a two (2) year basis or whenever the waste generating process changes which would significantly alter the test results, whichever is more frequent. Certification of the wood ash waste must be accomplished by submitting the following:

(i) A completed Solid/Hazardous Waste Determination Form.

(ii) A TCLP Analysis for metals.

(d) Each facility managing wood ash waste in accordance with 335-13-4-.26(6) shall submit an annual report on or before January 31st of each year utilizing a format approved by the Department which contains the following:

1. Summary of the components of 335-13-4-.26(6)(b) and/or (c).

2. Documentation of the non-coal permitted fuel burned on a quarterly basis to include the type, quantity (mass input basis), and the percentage of total fuel, of each type of fuel burned.

(e) Facilities managing wood ash waste in an area that is not a permitted landfill unit and meets the requirements of 335-13-4-.26(6)(a) must contact the Water Division of the ADEM with regards to NPDES requirements for waste management areas.

(f) Wood ash waste from two or more facilities may be managed at one location provided adequate documentation and record keeping is maintained for each generator.

(g) Wood ash waste not meeting the requirements of paragraph (6) of this rule must be managed at a landfill unit approved for the disposal of wood ash waste and permitted by the Department.

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Statutory Authority: Code of Ala. 1975, §§22-27-3, 22-27-4, 22-27-7.
History: July 21, 1988; **Amended:** Published October 2, 1990. **Amended:** Filed September 28, 1993; effective November 2, 1993. **Amended:** Filed June 21, 1996; effective July 26, 1996. **Amended:** Filed February 23, 2016; effective April 8, 2016. **Amended:** Filed April 24, 2018; effective June 8, 2018. **Amended:** Published October 29, 2021; effective December 13, 2021.

335-13-4-.27 Groundwater Monitoring And Corrective Action.

The requirements for groundwater monitoring and corrective action at MSWLFs, C/DLFs, and ILFs are presented in the following paragraphs:

(1) Applicability.

(a) The requirements in this rule shall apply to all MSWLF units and, when determined necessary by the Department to protect public health and the environment, the requirements in this rule or any part thereof shall apply to C/DLF units or ILF units, except as provided in subparagraph (b) of this paragraph.

(b) Groundwater monitoring requirements under paragraphs (2) through (4) of this rule may be suspended by the Department for a LF unit if the owner or operator can demonstrate that there is no potential for migration of hazardous constituents from that LF unit to the first saturated zone, as defined in 335-13-1-.03, during the active life of the unit and the post-closure care period.

This demonstration must be certified by a qualified groundwater scientist, as defined in 335-13-1-.03, and approved by the Department, and must be based upon:

1. Site-specific field collected measurements, sampling, and analysis of physical, chemical, and biological processes affecting contaminant fate and transport, and

2. Contaminant fate and transport predictions that maximize contaminant migration and consider impacts on human health and environment.

(c) Owners and operators of LF units must comply with the groundwater monitoring requirements of this rule according to the following schedule.

1. All LF units must be in compliance with the groundwater monitoring requirements specified in paragraphs (2) through (4) of this rule.

2. New LF units must be in compliance with the groundwater monitoring requirements specified in paragraphs (2) through (4) of this Rule before waste can be placed in the unit.

(d) Once established at a LF unit, groundwater monitoring shall be conducted throughout the active life and post-closure care period of that LF unit as specified in 335-13-4-.20.

(e) The Department may establish alternative schedules for demonstrating compliance with Department notification (and placement of notification in operating record) requirements of this rule.

(2) Groundwater Monitoring Requirements.

(a) A groundwater monitoring system must be installed that consists of a sufficient number of wells, installed at appropriate locations and depths, to yield groundwater samples from the first saturated zone (as defined in 335-13-1-.03 that:

1. 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:

(i) Hydrogeologic conditions do not allow the owner or operator to determine what wells are hydraulically upgradient; or

(ii) Sampling at other wells will provide an indication of background groundwater quality that is as representative or more representative than that provided by the upgradient wells; and

2. Represent the quality of groundwater passing the relevant point of compliance specified by the Department under subparagraph (a)3 of this paragraph.

(i) The downgradient monitoring system must be installed at the relevant point of compliance specified by the Department under subparagraph (a)3. of this paragraph that ensures detection of groundwater contamination in the first saturated zone.

(ii) When physical obstacles preclude installation of groundwater monitoring wells at the relevant point of compliance at existing units, the down-gradient monitoring system may be installed at the closest practicable distance hydraulically down-gradient from the relevant point of compliance specified by the Department under subparagraph (a)3. of this paragraph that ensures detection of groundwater contamination in the uppermost aquifer.

3. The relevant point of compliance shall be no more than 150 meters (492 feet) from the waste management unit boundary and shall be located on land owned by the owner of the landfill unit. In determining the relevant point of compliance, the following factors shall be considered, at a minimum:

(i) The hydrogeologic characteristics of the facility and surrounding land;

(ii) The volume and physical and chemical characteristics of the leachate;

(iii) The quantity, quality, and direction of groundwater flow;

(iv) The proximity and withdrawal rate of the groundwater users;

(v) The availability of alternative drinking water supplies;

(vi) The existing quality of the groundwater, including other sources of contamination and their cumulative impacts on the groundwater and whether groundwater is currently used or reasonably expected to be used for drinking water;

(vii) Public health, safety, and welfare effects; and

(viii) Practicable capability of the owner or operator.

(b) The Department may approve a multi-unit groundwater monitoring system instead of separate groundwater monitoring systems for each MSWLF unit when the facility has several units, provided the multi-unit groundwater monitoring system meets the requirement of subparagraph (a) of this paragraph and will be as protective of human health and the environment as individual monitoring

systems for each MSWLF unit. This approval will be 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.

(c) Well design and construction

1. Groundwater monitoring wells shall be designed and constructed in accordance with the following reference: "Design and Installation of Groundwater Monitoring Wells in Aquifers", ASTM Subcommittee D18.21 on Groundwater Monitoring, or otherwise as specifically approved by the Department.

2. Plans for groundwater monitoring well location, design, construction and/or abandonment shall be submitted to the Department for review and approval prior to installation.

3. The monitoring wells must be cased in a manner that maintains the integrity of the monitoring well bore hole.

(i) This casing must be screened or perforated and packed with gravel or sand, where necessary, to enable collection of groundwater samples.

(ii) The annular space (i.e., the space between the bore hole and well casing) above the sampling depth must be sealed to prevent contamination of samples and the groundwater.

4. The owner or operator must notify the Department that the design, installation, development, and/or abandonment of any monitoring wells, piezometers and other measurement, sampling, and analytical devices has been documented and placed in the operating record; and

(d) The monitoring wells, piezometers, and other measurement, sampling, and analytical devices must be operated and maintained so that they perform to design specifications throughout the life of the monitoring program.

(e) Abandoned wells and bore holes shall be abandoned in accordance with the following procedures in order to prevent contamination of groundwater resources. A plan of abandonment must be submitted and approved by the Department prior to implementing abandonment of any well.

1. A well shall be measured for depth prior to sealing to ensure that it is free from any obstructions that may interfere with sealing operations.

2. Where feasible, wells shall be completely filled with neat cement. If the well cannot be completely filled, the sealing materials for the top 20 feet must be neat cement and no material that could impart taste, odor, or toxic components to water may be used in the sealing process.

3. Liner pipe shall be removed from each well in order to ensure placement of an effective seal. If the liner pipe cannot be readily removed, it shall be perforated to ensure that proper sealing is obtained.

4. Concrete, cement grout, or neat cement shall be used as primary sealing materials and shall be placed from the bottom upwards using methods that will avoid segregation or dilution of material.

5. Complete, accurate records of the abandonment procedure shall be kept for each well abandoned. The record of abandonment shall include, at a minimum, the depth of each layer of all sealing and backfilling materials, the quantity of sealing materials used, measurements of static water levels and depths, and any changes made in the well during the sealing. A copy of these records shall be submitted to the Department and a copy placed in the operating record.

(f) The number, spacing, and depths of monitoring systems shall be:

1. Determined based upon site-specific technical information that must include thorough characterization of:

(i) Aquifer thickness, groundwater flow rate, groundwater flow direction including seasonal and temporal fluctuations in groundwater flow; and

(ii) 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: thickness, stratigraphy, lithology, hydraulic conductivity, porosity and effective porosity.

2. Certified by a qualified groundwater scientist and approved by the Department. Within 14 days of the Department's approval, the owner or operator must notify the Department that the certification has been placed in the operating record.

(g) The groundwater monitoring program must include consistent sampling and analytical methods that are:

1. Designed to ensure monitoring results that provide an accurate representation of groundwater quality at the background and downgradient wells which have been installed in compliance with subparagraph (a) of this paragraph.

(i) The groundwater monitoring program, and subsequent documentation, must be submitted to the Department for approval and appropriate copies placed in the operating record.

(ii) The program must include procedures and techniques for:

(I) Sample collection;

(II) Sample preservation and shipment;

(III) Analytical procedures;

(IV) Chain of custody control;

(V) Quality assurance and quality control.

(2) Appropriate for groundwater sampling and that accurately measure hazardous constituents and other monitoring parameters in groundwater samples.

(h) Groundwater samples shall not be field-filtered prior to laboratory analysis.

(i) The sampling procedures and frequency must be protective of human health and the environment.

1. Groundwater elevations must be measured in each well immediately prior to purging, each time groundwater is sampled.

2. Groundwater elevations in wells which monitor the same waste management area must be measured within a 48 hour period to avoid temporal variations in groundwater flow which could preclude accurate determination of groundwater flow rate and direction.

3. The owner or operator must determine the rate and direction of groundwater flow each time groundwater is sampled.

(j) 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 LF unit, as determined under subparagraphs (3)(a) or (4)(a) of this rule. Background groundwater quality may be established at wells that are not located hydraulically upgradient from the LF unit if it meets the requirements of subparagraph (a)1. of this paragraph.

(k) The number of samples collected to establish groundwater quality data must be consistent with the appropriate statistical procedures determined pursuant to subparagraph (1) of this paragraph. The sampling procedures shall be those specified under subparagraph (3)(b) of this rule for detection monitoring, subparagraphs (4)(b) and (4)(d) of this rule for assessment monitoring, and subparagraph (5)(b) of this rule for corrective action.

(l) The owner or operator must specify in writing to the Department and place in the operating record one of the following statistical methods to 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 subparagraph (m) of this paragraph. The owner or operator must place a justification for this alternative in the operating record and submit it to the Department for approval to use this alternative test. The justification must demonstrate that the alternative method meets the performance standards of subparagraph (m) of this paragraph.

(m) Any statistical method chosen under subparagraph (1) of this paragraph shall comply with the following performance standards, as appropriate:

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 should be transformed or a distribution-free theory test should 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 no 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 no less than 0.05; however, the Type I error of no less than 0.01 for individual well comparisons must be maintained. This performance standard does not apply to tolerance intervals, prediction intervals, or control charts.

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

considering the number of samples in the background data base, the data distribution, and the range of the concentration values for each constituent of concern.

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 considering the number of samples in the background data base, the data distribution, and the range of the concentration values for each constituent of concern.

5. The statistical method shall account for data below the limit of detection with one or more statistical procedures that are protective of human health and the environment. 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.

(n) The owner or operator must determine and certify in writing to the Department if there is a statistically significant increase (SSI) over background values for each parameter or constituent required in the groundwater monitoring program.

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 to the background value of that constituent, according to the statistical procedures and performance standards specified under this rule.

2. Within 30 days after completing sampling and receiving analytical results, the owner or operator must determine whether there has been an SSI over background at each monitoring well.

3. If an SSI over background groundwater quality is detected, the owner/operator must notify the Department within 14 days of this event.

(3) Detection Monitoring.

(a) Detection monitoring is required at LF units for all groundwater monitoring wells defined under subparagraphs (2)(a)1.(i) and (ii) of this rule.

1. At a minimum, a detection monitoring program for MSWLF units must include the monitoring for the constituents listed in Appendix I of this chapter.

2. Detection monitoring programs for C/DLFs or ILFs may include monitoring for constituents listed in Appendix I of this chapter, or an alternative list, as specified by the Department.

3. The Department may delete any of the detection monitoring parameters for a LF unit if it can be shown that the removed constituents are not reasonably expected to be contained in or derived from the waste contained in the unit.

4. The Department may establish an alternative list of indicator parameters for a MSWLF unit, in addition to the Appendix I constituents, if the additional parameters provide a reliable indication of releases from the MSWLF unit to the groundwater. In determining alternative parameters, the Department shall consider the following factors:

(i) The types, quantities, and concentrations of constituents in waste managed at the LF (JHM1) unit;

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

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

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

(b) Frequency.

1. The monitoring frequency for all constituents listed in Appendix I, or in the alternative list approved in accordance with subparagraph (a) of this paragraph, shall be at least semiannual during the active life of the facility (including closure) and the post-closure period. The owner or operator must

submit a semi-annual report to the Department to coincide with and report the results of the semi-annual sampling event within ninety (90) days of the date of sampling. The report shall be certified by a qualified groundwater scientist.

(i) A minimum of four independent samples from each well (background and downgradient) must be collected and analyzed for the Appendix I constituents, or the alternative list approved in accordance with subparagraph (a) of this paragraph, during the first semiannual sampling event.

(ii) At least one sample from each well (background and downgradient) must be collected and analyzed during subsequent semiannual sampling events.

2. The Department may specify an appropriate alternative frequency for repeated sampling and analysis for Appendix I constituents, or the alternative list approved in accordance with subparagraph (a) of this paragraph, during the active life (including closure) and the post-closure care period.

(i) The alternative frequency during the active life (including closure) shall be no less than annual.

(ii) The alternative frequency shall be based on consideration of the following factors:

(I) Lithology of the aquifer and unsaturated zone;

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

(III) Groundwater flow rates;

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

(V) Resource value of the aquifer.

(c) If the owner or operator determines, pursuant to subparagraph (2)(1) of this rule, 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 (a) of this paragraph, at

any monitoring well at the boundary specified under subparagraph (2)(a)1.(ii) of this rule, the owner or operator:

1. Must, within 14 days of this finding, place a notice in the operating record, and submit a copy of this notice to the Department, indicating which constituents have shown statistically significant changes from background levels, and notify the Department that this notice was placed in the operating record; and

2. Must establish an assessment monitoring program meeting the requirements of subparagraphs (4)(a) through (j) of this rule within 90 days except as provided for under subparagraph (2)(c)3. of this rule.

3. May demonstrate that a source other than a LF unit caused the contamination or that the SSI resulted from an error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality.

(i) A report documenting this demonstration must be certified by a qualified groundwater scientist, approved by the Department and be placed in the operating record.

(ii) If a successful demonstration is made and documented, the owner or operator may continue detection monitoring as specified in this rule. If, after 90 days, a successful demonstration is not made, the owner or operator must initiate an assessment monitoring program as required in subparagraphs (4)(a) through (j) of this rule.

(4) Assessment Monitoring.

(a) Assessment monitoring is required whenever an SSI over background has been detected for one or more of the constituents listed in Appendix I or in the alternative list approved in accordance with subparagraph (3)(a) of this rule.

(b) Frequency.

1. 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 of this Chapter.

(i) A minimum of one sample from each downgradient well must be collected and analyzed during each sampling event.

(ii) For any constituent detected in the downgradient wells as the result of the complete Appendix II analysis, a minimum of four independent samples from each well (background and downgradient) must be collected and analyzed to establish background for the new constituents.

2. 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 a LF 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. The Department may establish an alternative list of parameters for a facility required to conduct groundwater monitoring, in addition to the Appendix II constituents, if the addition of the parameters is warranted based on waste handling practices at the facility. In determining alternative parameters, the Department shall consider the factors listed in 335-4-.27(3)(a)4.(i) through (iv).

(c) The Department may specify an appropriate alternate frequency for repeated sampling and analysis for the full set of Appendix II constituents, or the alternative list approved in accordance with subparagraph (4)(b)2. of this rule, required by subparagraph (b) of this paragraph, during the active life (including closure) and post-closure care of the unit considering 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);

5. Resource value of the aquifer; and

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

(d) After obtaining the results from the initial or subsequent sampling events required in subparagraph (b) of this paragraph, the owner or operator must:

1. Within 14 days, place a notice in the operating record identifying the Appendix II constituents, or the alternative list approved in accordance with subparagraph (4)(b)2. of this rule, 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

(i) Resample all wells specified by subparagraph (2)(a) of this rule with a minimum of one sample from each well (background and downgradient) being collected and analyzed during these sampling events,

(ii) Conduct analyses for all constituents in Appendix I or in the alternative list approved in accordance with subparagraph (3)(a) of this rule, and for those constituents in Appendix II, or the alternative list approved in accordance with subparagraph (4)(b)2. of this rule, that are detected in response to subparagraph (b) of this paragraph, and

(iii) Record their concentrations in the facility operating record.

(iv) The Department may specify an alternative monitoring frequency during the active life (including closure) and the post closure period for the constituents referred to in this paragraph. The alternative frequency for Appendix I constituents, or the alternative list approved in accordance with subparagraph (3)(a) of this rule, during the active life (including closure) shall be no less than annual. The alternative frequency shall be based on consideration of the factors specified in subparagraph (c) of this paragraph;

3. Establish background concentrations for any constituents detected pursuant to subparagraph (b) or subparagraph (d)2. of this paragraph; and

4. Establish groundwater protection standards for all constituents detected pursuant to subparagraph (b) or subparagraph (d)2. of this paragraph. The groundwater protection standards shall be established in

accordance with subparagraphs (h) or (i) of this paragraph.

(e) If the concentrations of all Appendix II constituents, or the alternative list approved in accordance with subparagraph (4)(b)2. of this rule, are shown to be at or below background values, using the statistical procedures in paragraph (2)(1) of this rule, 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, or the alternative list approved in accordance with subparagraph (4)(b)2. of this rule, are above background values, but all concentrations are below the groundwater protection standard established under subparagraphs (h) or (i) of this paragraph, using the statistical procedures in subparagraph (2)(1) of this rule, the owner or operator must continue assessment monitoring in accordance with this rule.

(g) If one or more Appendix II constituents, or the alternative list approved in accordance with subparagraph (4)(b)2. of this rule, are detected at statistically significant levels above the groundwater protection standard established under subparagraphs (h) or (i) of this paragraph in any sampling event, within 14 days of this finding, the owner or operator must:

1. Place a notice in the operating record identifying the Appendix II constituents, or the alternative list approved in accordance with subparagraph (4)(b)2. of this rule, that have exceeded the groundwater protection standard and

2. Notify the Department and all appropriate local government officials that the notice has been placed in the operating record.

3. And must, either:

(i) Characterize the nature and extent of the release by installing additional monitoring wells as necessary,

(ii) 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 (d)2. of this paragraph,

(iii) 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 as indicated by sampling of wells in accordance with subparagraphs (g)3.(i) and (ii) of this paragraph, and

(iv) Initiate an assessment of corrective measures as required by subparagraphs (5)(a) through (d) of this rule within 90 days;

4. Or may demonstrate that a source other than a LF 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 or 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 subparagraphs (a) through (j) of this paragraph, and may return to detection monitoring if the Appendix II constituents, or the alternative list approved in accordance with subparagraph (4)(b)2. of this rule, are at or below background as specified in subparagraph (e) of this paragraph. Until a successful demonstration is made, the owner or operator must comply with subparagraph (g) of this paragraph, including initiating an assessment of corrective measures.

(h) The owner or operator must establish a groundwater protection standard for each Appendix II constituent, or the alternative list approved in accordance with subparagraph (4)(b)2. of this rule, 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 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 subparagraph (2)(a)1. of this rule; or

3. For constituents for which the background level is higher than the MCL identified under subparagraph (h)1. of this paragraph or health based levels

identified under subparagraph (i)1. of this paragraph, 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 levels that satisfy the following criteria:

1. The level is derived in a manner consistent with EPA guidelines for assessing the health risks of environmental pollutants (51 FR 33992, 34006, 34014, 34028, September 24, 1986);

2. The level is based on scientifically valid studies conducted in accordance with the Toxic Substances Control Act Good Laboratory Practice Standards (40 CFR 792) or equivalent;

3. For carcinogens, the level represents a concentration associated with an excess lifetime cancer risk level (due to continuous lifetime exposure) with the 1 x 10-4 to 1 x 10-6 range; and

4. For systemic toxicants, the level represents a concentration to which the human population (including sensitive subgroups) could be exposed to on a daily basis that is likely to be without appreciable risk of deleterious effects during a lifetime. For purposes of this rule, systemic toxicants include toxic chemicals that cause effects other than cancer or mutation.

(j) In establishing groundwater protection standards under subparagraph (i) of this paragraph, the Department may consider the following:

1. Multiple contaminants in the groundwater;

2. Exposure threats to sensitive environmental receptors; and

3. Other site-specific exposure or potential exposure to groundwater.

(5) Corrective Action Requirements.

(a) Within 90 days of finding that any of the constituents listed in Appendix II or the alternative list approved in accordance with subparagraph (4)(b)2. of this rule, have been detected at a statistically significant level exceeding the groundwater protection standards defined under subparagraphs (4)(h) or (i) of

this rule, the owner or operator must initiate an assessment of corrective measures. Such an assessment must be completed within a reasonable period of time.

(b) The owner or operator must continue to monitor in accordance with the assessment monitoring program as specified in subparagraphs (4)(a) through (j) of this rule.

(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 subparagraphs (c) through (i) of this paragraph, 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(s).

(d) The owner or operator must discuss the results of the corrective measures assessment, prior to the selection of remedy, in a public meeting with interested and affected parties.

(e) Based on the results of the corrective measures assessment conducted under subparagraphs (5)(a) through (d) of this paragraph, the owner or operator must select a remedy that, at a minimum, meets the standards listed in this paragraph. The owner or operator must notify the Department, within 14 days of selecting a remedy, that a report describing the selected remedy has been placed in the operating record and how it meets the standards in this paragraph. Remedies must:

1. Be protective of human health and the environment;

2. Attain the groundwater protection standard as specified pursuant to subparagraphs (4)(h) or (i) of this rule;

3. Control the source(s) of releases so as to reduce or eliminate, to the maximum extent practicable, further releases of Appendix II constituents, or the alternative list approved in accordance with subparagraph (4)(b)2. of this rule, 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 subparagraph (m) of this paragraph.

(f) In selecting a remedy that meets the standards of subparagraph (e) of this paragraph, the owner or operator shall consider the following evaluation factors:

1. The long- 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:

(i) Magnitude of reduction of existing risks;

(ii) Magnitude of residual risks in terms of likelihood of further releases due to waste remaining following implementation of a remedy;

(iii) The type and degree of long-term management required, including monitoring, operation, and maintenance;

(iv) 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, and redisposal or containment;

(v) Time until full protection is achieved;

(vi) 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;

(vii) Long-term reliability of the engineering and institutional controls; and

(viii) 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:

(i) The extent to which containment practices will reduce further releases;

(ii) 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 types of factors:

(i) Degree of difficulty associated with constructing the technology;

(ii) Expected operational reliability of the technologies;

(iii) Need to coordinate with and obtain necessary approvals and permits from other agencies;

(iv) Availability of necessary equipment and specialists; and

(v) Available capacity and location of needed treatment, storage, and disposal services.

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

5. The degree to which community concerns are addressed by a potential remedy(ies).

(g) 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 this paragraph. 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 paragraphs (4)(h) or (i) of this rule 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 technologies that are not currently 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:

(i) Current and future uses;

(ii) Proximity and withdrawal rate of users;

(iii) Groundwater quantity and quality;

(iv) The potential damage to wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents;

(v) The hydrogeologic characteristic of the facility and surrounding land;

(vi) Groundwater removal and treatment costs; and

(vii) The cost and availability of alternative water supplies.

7. Practicable capability of the owner or operator.

8. Other relevant factors.

(h) The Department may determine that remediation of a release of an Appendix II constituent, or the alternative list approved in accordance with subparagraph (4)(b)2. of this rule, from a LF unit is not necessary if the owner or operator demonstrates to the Department that:

1. The groundwater is additionally contaminated by substances that have originated from a source other than a LF unit and those substances are present in concentrations such that cleanup of the release from the LF unit would provide no significant reduction in risk to actual or potential receptors; or

2. The constituent(s) is present in groundwater that:

(i) Is not currently or reasonably expected to be a source of drinking water; and

(ii) Is not hydraulically connected with waters to which the hazardous constituents are migrating or are likely to migrate in a concentration(s) that would exceed the groundwater protection standards established under subparagraphs (4)(h) or (i) of this rule; or

3. Remediation of the release(s) is technically impracticable; or

4. Remediation results in unacceptable cross-media

(i) A determination by the Department pursuant to subparagraph (h) of this paragraph shall not affect the authority of the State to require the owner or operator to undertake source control measures or other measures that may be necessary to eliminate or minimize further releases to the groundwater, to prevent exposure to the groundwater, or to remediate the groundwater to concentrations that are technically practicable and significantly reduce threats to human health or the environment.

(j) Based on the schedule established under subparagraph (g) of this paragraph for initiation and completion of remedial activities the owner/operator must:

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

(i) At a minimum, meets the requirements of an assessment monitoring program under subparagraphs (4)(a) through (j) of this rule;

(ii) Indicates the effectiveness of the corrective action remedy; and

(iii) Demonstrates compliance with groundwater protection standards pursuant to subparagraph (n) of this paragraph.

2. Implement the corrective action remedy selected under subparagraphs (e) through (i) of this paragraph; 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 subparagraphs (e) through (i) of this paragraph. The following factors must be considered by an owner or operator in determining whether interim measures are necessary:

(i) Time required to develop and implement a final remedy;

(ii) Actual or potential exposure of nearby populations or environmental receptors to hazardous constituents;

(iii) Actual or potential contamination of drinking water supplies or sensitive ecosystems;

(iv) Further degradation of the groundwater that may occur if remedial action is not initiated expeditiously;

(v) Weather conditions that may cause hazardous constituents to migrate or be released;

(vi) Risks of fire or explosion, or potential for exposure to hazardous constituents as a result of an accident or failure of a container or handling system; and

(vii) Other situations that may pose threats to human health and the environment.

(k) An owner or operator may determine, based on information developed after implementation of the remedy has begun or other information, that compliance with requirements of subparagraph (e) of this paragraph are not being achieved through the remedy selected. In such cases, the owner or operator must implement other methods or techniques that could practicably achieve compliance with the requirements, unless the owner or operator makes the determination under subparagraph (l) of this paragraph.

(l) If the owner or operator determines that compliance with requirements under subparagraph (e) of this paragraph cannot be practically achieved with any currently available methods, the owner or operator must:

1. Obtain certification of a qualified groundwater scientist or approval by the Department that compliance with requirements under subparagraph (e) of this paragraph cannot be practically 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; and

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

(i) Technically practicable; and

(ii) Consistent with the overall objective of the remedy.

4. Notify the Department within 14 days that a report justifying the alternative measures prior to implementing the alternative measures has been placed in the operating record.

(m) All solid wastes that are managed pursuant to a remedy required under subparagraphs (e) through (i) of this paragraph, or an interim measure required under subparagraph (j)3. of this paragraph, shall be managed in a manner:

1. That is protective of human health and the environment; and

2. That complies with applicable RCRA requirements.

(n) Remedies selected pursuant to subparagraphs (e) through (i) of this paragraph shall be considered complete when:

1. The owner or operator complies with the groundwater protection standards established under subparagraphs (4)(h) or (i) of this Rule at all points within the plume of contamination that lie beyond the groundwater monitoring well system established under subparagraph (3)(a) of this rule.

2. Compliance with the groundwater protection standards established under subparagraphs (4)(h) or (i) of this rule has been achieved by demonstrating that concentrations of Appendix II constituents, or the alternative list approved in accordance with subparagraph (4)(b)2. of this rule, have not exceeded the groundwater protection standard(s) for a period of three consecutive years using the statistical procedures and performance standards in subparagraphs (4)(l) and (m) of this rule. The Department may specify an alternative length of time during which

the owner or operator must demonstrate that concentrations of Appendix II constituents, or the alternative list approved in accordance with subparagraph (4)(b)2. of this rule, have not exceeded the groundwater protection standard(s) taking into consideration:

(i) Extent and concentration of the release(s);

(ii) Behavior characteristics of the hazardous constituents in the groundwater;

(iii) Accuracy of monitoring or modeling techniques, including any seasonal, meteorological, or other environmental variabilities that may affect the accuracy; and

(iv) Characteristics of the groundwater.

3. All actions required to complete the remedy have been satisfied.

(o) Upon completion of the remedy, the owner or operator must notify the Department within 14 days that a certification that the remedy has been completed in compliance with the requirements of subparagraph (n) of this paragraph has been placed in the operating record. The certification must be signed by the owner or operator and by a qualified groundwater scientist or approved by the Department.

(p) 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 subparagraph (n) of this paragraph, the owner or operator shall be released from the requirements for financial assurance for corrective action under 335-13-4-.28(4).

Author: Russell A. Kelly, Heather M. Jones
Statutory Authority: Code of Ala. 1975, §§22-27-3, 22-27-4, 22-27-7.
History: **New Rule:** Filed September 28, 1993; effective November 2, 1993. **Amended:** Filed June 21, 1996; effective July 26, 1996. **Amended:** Filed April 24, 2018; effective June 6, 2018. **Amended:** Filed June 25, 2019; effective July 9, 2019. **Amended:** Published October 29, 2021; effective December 13, 2021.

335-13-4-.28 Financial Assurance Criteria.

(1) The requirements of 335-13-4-.28 apply to owners and operators of all MSWLF, except owners or operators who are state or federal

government entities whose debts and liabilities are the debts and liabilities of the State or the United States.

(2) Financial Assurance for Closure.

(a) The owner or operator shall have a detailed written estimate, in current dollars, of the cost of hiring a third party to close the largest area of all landfill cells at the MSWLF ever requiring a final cover as required under 335-13-4-.20 at any time during the active life in accordance with the closure plan. The owner or operator shall place the closure cost estimate in the operating record and submit a copy of the estimate to ADEM for approval.

1. The closure cost estimate shall equal the cost of closing the largest area of the MSWLF ever requiring a final cover at any time during the active life when the extent and manner of its operation would make closure the most expensive, as indicated by its closure plan. The cost estimate shall include the costs of continuing the operation of the gas collection and control systems as may be required in 335-3-10-.02(75) or 335-3-19, as applicable.

2. During the active life of the MSWLF, the owner or operator shall annually adjust the closure cost estimate for inflation.

3. The owner or operator shall increase the closure cost estimate and the amount of financial assurance provided under 335-13-4-.28(2)(b) if changes to the closure plan or landfill conditions increase the maximum cost of closure at any time during the remaining active life.

4. The owner or operator may reduce the closure cost estimate and the amount of financial assurance provided under 335-13-4-.28(2)(b) if the cost estimate exceeds the maximum cost of closure at any time during the remaining life of the MSWLF. The owner or operator shall place the justification for the reduction of the closure cost estimate and the amount of financial assurance in the operating record and submit a copy of the justification and new estimate to ADEM for approval.

(b) The owner or operator of a MSWLF shall establish financial assurance for closure of the MSWLF in compliance with 335-13-4-.28(5). The owner or operator shall provide continuous coverage for closure until released from financial assurance requirements by ADEM.

(3) Financial Assurance for Post-Closure Care.

(a) The owner or operator shall have a detailed written estimate, in current dollars, of the cost of hiring a third party to conduct post-closure care for the MSWLF in compliance with the post-closure requirements in 335-13-4-.20(3). The post-closure cost estimate used to demonstrate financial assurance in 335-13-4-.28(3)(b) shall account for the total costs of conducting post-closure care, including annual and periodic costs as described in the post-closure plan over the entire post-closure care period. The owner or operator shall place the estimate in the operating record and submit a copy of the estimate to ADEM for approval.

1. The cost estimate for post-closure care shall be based on the most expensive costs of post-closure care during the post-closure care period.

2. During the active life of the MSWLF and during the post-closure care period, the owner or operator shall annually adjust the post-closure cost estimate for inflation.

3. The owner or operator shall increase the post-closure care cost estimate and the amount of financial assurance provided under 335-13-4-.28(3)(b) if changes in the post-closure plan or MSWLF conditions increase the maximum costs of post-closure care.

4. The owner or operator may reduce the post-closure cost estimate and the amount of financial assurance provided under 335-13-4-.28(3)(b) if the cost estimate exceeds the maximum costs of post-closure care remaining over the post-closure care period. The owner or operator shall place the justification for the reduction of the post-closure cost estimate and the amount of financial assurance in the operating record and submit a copy of the justification and new estimate to ADEM for approval.

(b) The owner or operator of a MSWLF shall establish, in accordance with 335-13-4-.28(5), financial assurance for the costs of post-closure care required under 335-13-4-.28(3). The owner or operator shall provide continuous coverage for post-closure care until released from financial assurance requirements for post-closure care under 335-13-4-.20(3)(e).

(4) Financial Assurance for Corrective Action.

(a) An owner or operator of a MSWLF required to undertake a corrective action program under 335-13-4-.27(5) shall have a detailed written estimate, in current dollars, of the cost of hiring a third party to perform the corrective action in accordance with the program required under 335-13-4-.27(5). The corrective action cost estimate shall account for the total costs of corrective action activities as described in

the corrective action plan for the entire corrective action period. The owner or operator shall place the estimate in the operating record and submit a copy to ADEM for approval.

1. The owner or operator shall annually adjust the estimate for inflation until the corrective action program is completed in accordance with 335-13-4-.27(5).

2. The owner or operator shall increase the corrective action cost estimate and the amount of financial assurance provided under 335-13-4-.28(4)(b) if changes in the corrective action program or MSWLF conditions increase the maximum costs of corrective action.

3. The owner or operator may reduce the amount of the corrective action cost estimate and the amount of financial assurance provided under 335-13-4-.28(4)(b) if the cost estimate exceeds the maximum remaining costs of corrective action. The owner or operator shall place the justification for the reduction of the corrective action cost estimate and the amount of financial assurance in the operating record and submit a copy of the justification and new estimate to ADEM for approval.

(b) The owner or operator of a MSWLF required to undertake a corrective action program under 335-13-4-.27(5) shall establish, in a manner in accordance with 335-13-4-.28(5), financial assurance for the most recent corrective action program. The owner or operator shall provide continuous coverage for corrective action until released from financial assurance requirements for corrective action by demonstrating compliance with 335-13-4-.27(5)(o) and (p).

(5) Allowable Mechanisms for Financial Assurance. Allowable mechanisms used to demonstrate financial assurance under 335-13-4-.28 shall ensure that the funds necessary to meet the costs of closure, post-closure care, and corrective action for known releases will be available whenever they are needed. Owners and operators shall choose from the options specified in 335-13-4-.28(5)(a) through (j).

(a) Trust Fund.

1. An owner or operator may satisfy the requirements of 335-13-4-.28 by establishing a trust fund that conforms to the requirements of 335-13-4-.28(5)(a). The trustee shall be an entity that has the authority to act as a trustee and whose trust operations are regulated and examined by a federal or state agency. A copy of the trust agreement shall be placed in the MSWLF operating record and a copy submitted to ADEM for approval.

2. Payments into the trust fund shall be made annually by the owner or operator over the life of the MSWLF permit or over the remaining life of the MSWLF, whichever is shorter, in the case of a trust fund for closure or post-closure care, or over one-half of the estimated length of the corrective action program in the case of corrective action for known releases. This period is referred to as the pay-in period.

3. For a trust fund used to demonstrate financial assurance for closure and post-closure care, the first payment into the fund shall be at least equal to the current cost estimate for closure or post-closure care, except as provided in 335-13-4-.28(5)(k), divided by the number of years in the pay-in period as defined in 335-13-4-.28(5)(a)2. The amount of subsequent payments shall be determined by the following formula:

$$\text{Next Payment} = [CE - CV]/Y$$

where

CE is the current cost estimate for closure or post-closure care (updated for inflation or other changes),

CV is the current value of the trust fund, and Y is the number of years remaining in the pay-in period.

4. For a trust fund used to demonstrate financial assurance for corrective action, the first payment into the trust fund shall be at least equal to one-half of the current cost estimate for corrective action, except as provided in 335-13-4-.28(5)(k), divided by the number of years in the corrective action pay-in period as defined in 335-13-4-.28(5)(a)2. The amount of subsequent payments shall be determined by the following formula:

$$\text{Next Payment} = [RB - CV]/Y$$

where

RB is the most recent estimate of the required trust fund balance for corrective action (i.e., the total costs that will be incurred during the second half of the corrective action period),

CV is the current value of the trust fund, and Y is the number of years remaining in the pay-in period.

5. The initial payment into the trust fund shall be made before the initial receipt of waste or before the effective date of the requirements of 335-13-4-.28 in the

case of closure and post-closure care, or no later than 120 days after the corrective action remedy has been selected in accordance with the requirements of 335-13-4-.27(5).

6. If the owner or operator establishes a trust fund after having used one or more alternate mechanisms specified in 335-13-4-.28(5), the initial payment into the trust fund shall be at least the amount that the fund would contain if the trust fund were established initially and annual payments were made according to the specifications of 335-13-4-.28(5)(a).

7. The owner or operator, or other person authorized to conduct closure, post-closure care, or corrective action activities may request reimbursement from the trustee for these expenditures. Requests for reimbursement will be granted by the trustee only if sufficient funds are remaining in the trust fund to cover the remaining costs of closure, post-closure care, or corrective action, and if justification and documentation of the cost is placed in the operating record, submitted to and approved by ADEM. The owner or operator shall place the documentation of the justification for reimbursement in the operating record and notify ADEM that reimbursement has been received.

8. The trust fund may be terminated by the owner or operator only if the owner or operator substitutes alternate financial assurance as specified in 335-13-4-.28(5) or if he is no longer required to demonstrate financial responsibility in accordance with the requirements of 335-13-4-.28(2)(b), (3)(b), or (4)(b).

(b) Surety Bond Guaranteeing Payment or Performance.

1. An owner or operator may demonstrate financial assurance for closure or post-closure care by obtaining a payment or performance surety bond which conforms to the requirements of 335-13-4-.28(5)(b). An owner or operator may demonstrate financial assurance for corrective action by obtaining a performance bond which conforms to the requirements of 335-13-4-.28(5)(b). The bond shall be effective before the initial receipt of waste or before the effective date of the requirements of 335-13-4-.28(2) and (3) in the case of closure and post-closure care, or no later than 120 days after the corrective action remedy has been selected in accordance with the requirements of 335-13-4-.27(5). The owner or operator shall place a copy of the bond in the operating record and submit a copy of the bond to ADEM for approval. The surety company issuing the bond shall, at a minimum, be among those listed as

acceptable sureties on federal bonds in Circular 570 of the U.S. Department of the Treasury.

2. The penal sum of the bond shall be in an amount at least equal to the current closure, post-closure care or corrective action cost estimate, whichever is applicable, except as provided in 335-13-4-.28(5)(k).

3. Under the terms of the bond, the surety will become liable on the bond obligation when the owner or operator fails to perform as guaranteed by the bond.

4. The owner or operator shall establish a standby trust fund. The standby trust fund shall meet the requirements of 335-13-4-.28(5)(a) except the requirements for initial payment and subsequent annual payments specified in 335-13-4-.28(5)(a)2. through 5.

5. Payments made under the terms of the bond will be deposited by the surety directly into the standby trust fund in accordance with instructions from ADEM. Payments from the trust fund shall be approved by the trustee and ADEM.

6. Under the terms of the bond, the surety may cancel the bond by sending notice of cancellation by certified mail to the owner and operator and to ADEM 120 days in advance of cancellation. If the surety cancels the bond, the owner or operator shall obtain alternate financial assurance as specified in 335-13-4-.28(5).

7. The owner or operator may cancel the bond only if alternate financial assurance is substituted as specified in 335-13-4-.28(5) or if the owner or operator is no longer required to demonstrate financial responsibility in accordance with 335-13-4-.28(2)(b), (3)(b), or (4)(b).

(c) Letter of Credit.

1. An owner or operator may satisfy the requirements of 335-13-4-.28(5) by obtaining an irrevocable standby letter of credit which conforms to the requirements of 335-13-4-.28(5)(c). The letter of credit shall be effective before the initial receipt of waste or before the effective date of the requirements of 335-13-4-.28(2) and (3) in the case of closure and post-closure care, or no later than 120 days after the corrective action remedy has been selected in accordance with the requirements of 335-13-4-.27(5). The owner or operator shall place a copy of the letter of credit in the operating record and submit a copy of the letter of credit to ADEM for approval. The issuing institution shall be an entity that has the authority to issue letters of credit and whose

letter-of-credit operations are regulated and examined by a federal or state agency.

2. A letter from the owner or operator referring to the letter of credit by number, issuing institution, and date shall be included with the letter of credit in the operating record. The letter shall provide the name, address of the MSWLF, and the amount of funds assured.

3. The letter of credit shall be irrevocable and issued for a period of at least one year in an amount at least equal to the current cost estimate for closure, post-closure care or corrective action, whichever is applicable, except as provided in 335-13-4-.28(5)(k). The letter of credit shall provide that the expiration date will be automatically extended for a period of at least one year unless the issuing institution has cancelled the letter of credit by sending notice of cancellation by certified mail to the owner and operator and to ADEM 120 days in advance of cancellation. If the letter of credit is cancelled by the issuing institution, the owner or operator shall obtain alternate financial assurance.

4. The owner or operator may cancel the letter of credit only if alternate financial assurance is substituted as specified in 335-13-4-.28(5) or if the owner or operator is released from the financial assurance requirements in accordance with 335-13-4-.28(2)(b), (3)(b), or (4)(b).

(d) Insurance.

1. An owner or operator may demonstrate financial assurance for closure and post-closure care, and corrective action by obtaining insurance which conforms to the requirements of 335-13-4-.28(5). The insurance shall be effective before the initial receipt of waste or before the effective date of the requirements of 335-13-4-.28(2) and (3) in the case of closure and post-closure care, or no later than 120 days after the corrective action remedy has been selected in accordance with the requirements of 335-13-4-.27(5). At a minimum, the insurer shall be licensed to transact the business of insurance, or eligible to provide insurance as an excess or surplus lines insurer, in one or more States. The owner or operator shall place a copy of the insurance policy in the operating record and submit a copy of the insurance policy to ADEM for approval.

2. The closure or post-closure care insurance policy shall guarantee that funds will be available to close the MSWLF whenever final closure occurs or to provide post-closure care for the MSWLF whenever the post-closure care period begins, whichever is applicable. The policy shall

also guarantee that once closure or post-closure care begins, the insurer will be responsible for the paying out of funds to the owner or operator or other person authorized to conduct closure or post-closure care, up to an amount equal to the face amount of the policy upon the direction of ADEM.

3. The insurance policy shall be issued for a face amount at least equal to the current cost estimate for closure or post-closure care, whichever is applicable, except as provided in 335-13-4-.28(5)(k). The term face amount means the total amount the insurer is obligated to pay under the policy. Actual payments by the insurer will not change the face amount, although the insurer's future liability will be lowered by the amount of the payments.

4. An owner or operator, or other person authorized to conduct closure or post-closure care, may receive reimbursements for closure or post-closure expenditures, whichever is applicable. Requests for reimbursement will be granted by the insurer only if the remaining value of the policy is sufficient to cover the remaining costs of closure or post-closure care, and if justification and documentation of the cost is placed in the operating record and approved by ADEM. The owner or operator shall place the documentation of the justification for reimbursement in the operating record and notify ADEM that reimbursement has been received.

5. The insurance policy shall contain a provision allowing assignment of the policy to a successor owner or operator. Such assignment may be conditional upon consent of the insurer, provided that such consent is not unreasonably refused.

6. The insurance policy shall provide that the insurer may not cancel, terminate, or fail to renew the policy except for failure to pay the premium. The automatic renewal of the policy shall, at a minimum, provide the insured with the option of renewal at the face amount of the expiring policy. If there is a failure to pay the premium, the insurer may cancel the policy by sending notice of cancellation by certified mail to the owner and operator and to ADEM 120 days in advance of cancellation. If the insurer cancels the policy, the owner or operator shall obtain alternate financial assurance as specified in 335-13-4-.28(5).

7. For insurance policies providing coverage for post-closure care, commencing on the date that liability to make payments pursuant to the policy accrues, the insurer will thereafter annually increase the face amount of the policy. Such increase shall be equivalent to the face

amount of the policy, less the payments made, multiplied by an amount equivalent to 85 percent of the most recent investment rate or of the equivalent coupon-issue yield announced by the U.S. Treasury for 26-week Treasury securities.

8. The owner or operator may cancel the insurance policy only if alternate financial assurance is substituted as specified in 335-13-4-.28(5) or if the owner or operator is no longer required to demonstrate financial responsibility in accordance with the requirements of 335-13-4-.28(2)(b), (3)(b), or (4)(b).

(e) Corporate Financial Test. An owner or operator that satisfies the requirements of 335-13-4-.28(5)(e) may demonstrate financial assurance up to the amount specified in 335-13-4-.28(5)(e):

1. Financial Component.

(i) The owner or operator shall satisfy one of the following three conditions:

(I) A current rating for its senior unsubordinated debt of AAA, AA, A, or BBB as issued by Standard and Poor's or Aaa, Aa, A or Baa as issued by Moody's, or

(II) A ratio of less than 1.5 comparing total liabilities to net worth, or

(III) A ratio of greater than 0.10 comparing the sum of net income plus depreciation, depletion and amortization, minus $10 million, to total liabilities.

(ii) The tangible net worth of the owner or operator shall be greater than:

(I) The sum of the current closure, post-closure care, corrective action cost estimates and other environmental obligations, including guarantees, covered by a financial test plus $10 million except as provided in 335-13-4-.28(5)(e)1.(ii)(II).

(II) $10 million in net worth plus the amount of the guarantees that have not been recognized as liabilities on the financial statements provided all of the current closure, post-closure care, and corrective action costs and other environmental obligations covered by a financial test are recognized as liabilities on the owner's

or operator's audited financial statements, and subject to the approval of ADEM.

(iii) The owner or operator shall have assets located in the United States amounting to at least the sum of current closure, post-closure care, corrective action cost estimates and other environmental obligations covered by a financial test as described in 335-13-4-.28(5)(e)3.

2. Recordkeeping and Reporting Requirements.

(i) The owner or operator shall place the following items into the MSWLF operating record, and submit a copy to ADEM:

(I) A letter signed by the owner's or operator's chief financial officer that:

I. Lists all the current cost estimates covered by a financial test, including, but not limited to, cost estimates required for municipal solid waste management facilities under 335-13-4-.28, cost estimates required for UIC facilities under 40 CFR part 144, if applicable, cost estimates required for petroleum underground storage tank facilities under 40 CFR part 280, if applicable, cost estimates required for PCB storage facilities under 40 CFR part 761, if applicable, and cost estimates required for hazardous waste treatment, storage, and disposal facilities under 335-14-5 and 335-14-6, if applicable, and

II. Provides evidence demonstrating that the firm meets the conditions of either 335-13-4-.28(5)(e)1.(i)(I) or (i)(II) or (i)(III); and 335-13-4-.28(5)(e)1.(ii) and 1.(iii).

(II) A copy of the independent certified public accountant's unqualified opinion of the owner's or operator's financial statements for the latest completed fiscal year. To be eligible to use the financial test, the owner's or operator's financial statements shall receive an unqualified opinion from the independent certified public accountant. An adverse opinion, disclaimer of opinion, or other qualified opinion will be cause for disallowance, with the potential exception for qualified opinions provided in the next sentence. ADEM may evaluate qualified opinions on

a case-by-case basis and allow use of the financial test in cases where ADEM deems that the matters that form the basis for the qualification are insufficient to warrant disallowance of the test. If ADEM does not allow use of the test, the owner or operator shall provide alternate financial assurance that meets the requirements of 335-13-4-.28(5).

(III) If the chief financial officer's letter providing evidence of financial assurance includes financial data showing that owner or operator satisfies 335-13-4-.28(5)(e)1.(i)(II) or (i)(III) that are different from data in the audited financial statements referred to in 335-13-4-.28(5)(e)2.(i)(II) or other audited financial statement or data filed with the SEC, then a special report from the owner's or operator's independent certified public accountant to the owner or operator is required. The special report shall be based upon an agreed upon procedures engagement in accordance with professional auditing standards and shall describe the procedures performed in comparing the data in the chief financial officer's letter derived from the independently audited, year-end financial statements for the latest fiscal year with the amounts in such financial statements, the findings of that comparison, and the reasons for the differences.

(IV) If the chief financial officer's letter provides a demonstration that the firm has assured for environmental obligations as provided in 335-13-4-.28(5)(e)2.(ii)(II), then the letter shall include a report from the independent certified public accountant that verifies that all of the environmental obligations covered by a financial test have been recognized as liabilities on the audited financial statements, how these obligations have been measured and reported, and that the tangible net worth of the firm is at least $10 million plus the amount of the guarantees provided.

(ii) An owner or operator shall place the items specified in 335-13-4-.28(5)(e)2.(i) in the operating record before the initial receipt of waste or before the effective date of the requirements of 335-13-4-.28(2) and (3) in the case of closure, and post-closure care, or no later than 120 days after the corrective action remedy has been selected in accordance with the requirements of 335-13-4-.27(5).

(iii) After the initial placement of items specified in 335-13-4-.28(5)(e)2.(i) in the operating record, the owner or operator shall annually update the information and place updated information in the operating record within 90 days following the close of the owner or operator's fiscal year. ADEM may provide up to an additional 45 days for an owner or operator who can demonstrate that 90 days is insufficient time to acquire audited financial statements. The updated information shall consist of all items specified in 335-13-4-.28(5)(e)2.(i).

(iv) The owner or operator is not required to submit the items specified in 335-13-4-.28(5)(e)2. or comply with the requirements 335-13-4-.28(5)(e) when:

(I) They substitute alternate financial assurance as specified in 335-13-4-.28(5) that is not subject to these recordkeeping and reporting requirements, or

(II) They are released from the financial assurance requirements in accordance with 335-13-4-.28(2)(b), (3)(b), and (4)(b).

(v) If the owner or operator no longer meets the requirements of 335-13-4-.28(5)(e)1., the owner or operator shall, within 120 days following the close of the owner or operator's fiscal year, obtain alternative financial assurance that meets the requirements of 335-13-4-.28, place the required submissions for that assurance in the operating record, and notify ADEM that the owner or operator no longer meets the criteria of the financial test and that alternate assurance has been obtained. Proof of alternate assurance shall be submitted to ADEM for review.

(vi) An owner or operator using the mechanism in 335-13-4-.28(5)(e)1. shall provide an annual report of its financial condition in addition to or including current financial test documentation as specified in 335-13-4-.28(5)(e)2., to ADEM. If ADEM finds that the owner or operator no longer meets the requirements of 335-13-4-.28(5)(e)1., the owner or operator must provide alternate financial assurance that meets the requirements of 335-13-4-.28.

3. Calculation of Costs to be Assured. When calculating the current cost estimates for closure, post-closure care, corrective action, or the sum of the combination of such costs to be covered, and other environmental obligations assured by a financial test referred to in

335-13-4-.28(5)(e), the owner or operator must include cost estimates required for municipal solid waste management facilities under this part, as well as cost estimates required for the following environmental obligations, if it assures them through a financial test: obligations associated with UIC facilities under 40 CFR part 144, petroleum underground storage tank facilities under 40 CFR part 280, PCB storage facilities under 40 CFR part 761, and hazardous waste treatment, storage, and disposal facilities under 335-14-5 and 335-14-6.

(f) Local Government Financial Test. An owner or operator that satisfies the requirements of 335-13-4-.28(5)(f)1. to 3. may demonstrate financial assurance up to the amount specified in 335-13-4-.28(5)(f)4.

1. Financial Component.

(i) The owner or operator must satisfy 335-13-4-.28(5)(f)1.(i)(I) or (II) as applicable:

(I) If the owner or operator has outstanding, rated, general obligation bonds that are not secured by insurance, a letter of credit, or other collateral or guarantee, it must have a current rating of Aaa, Aa, A or Baa, as issued by Moody's, or AAA, AA, A, or BBB, as issued by Standard and Poor's on all such general obligation bonds, or

(II) The owner or operator must satisfy all of the following financial ratios based on the owner or operator's most recent audited annual financial statement:

I. A ratio of cash plus marketable securities to total expenditures greater than or equal to 0.05, and

II. A ratio of annual debt service to total expenditures less than or equal to 0.20.

(ii) The owner or operator must prepare its financial statements in conformity with Generally Accepted Accounting Principles for governments and have its financial statements audited by an independent certified public accountant (or appropriate State agency).

(iii) A local government is not eligible to assure its obligations under 335-13-4-.28(5)(f) if it:

(I) Is currently in default on outstanding general obligation bonds, or

(II) Has outstanding general obligation bonds rated lower than Baa as issued by Moody's or BBB as issued by Standard and Poor's, or

(III) Operated at a deficit equal to five percent or more of total annual revenue in each of the past two fiscal years, or

(IV) Receives an adverse opinion, disclaimer of opinion, or other qualified opinion from the independent certified public accountant (or appropriate State agency) auditing its financial statement as required under 335-13-4-.28(5)(f)1.(ii). However, ADEM may evaluate qualified opinions on a case-by-case basis and allow use of the financial test in cases where ADEM deems the qualification insufficient to warrant disallowance of use of the test.

(iv) The following terms used in 335-13-4-.28(5)(f) are defined as follows:

(I) Deficit equals total annual revenues minus total annual expenditures.

(II) Total revenues include revenues from all taxes and fees but does not include the proceeds from borrowing or asset sales, excluding revenue from funds managed by local government on behalf of a specific third party.

(III) Total expenditures include all expenditures excluding capital outlays and debt repayment.

(IV) Cash plus marketable securities is all the cash plus marketable securities held by the local government on the last day of a fiscal year, excluding cash and marketable securities designated to satisfy past obligations such as pensions, and

(V) Debt service is the amount of principal and interest due on a loan in a given time period, typically the current year.

2. Public Notice Component. The local government owner or operator must place a reference to the closure and post-closure care costs assured through the financial test into its next comprehensive annual financial report (CAFR) after the effective date of 335-13-4-.28 or before

the initial receipt of waste at the MSWLF, whichever is later. Disclosure must include the nature and source of closure and post-closure care requirements, the reported liability at the balance sheet date, the estimated total closure and post-closure care cost remaining to be recognized, the percentage of landfill capacity used to date, and the estimated landfill life in years. A reference to corrective action costs must be placed in the CAFR not later than 120 days after the corrective action remedy has been selected in accordance with the requirements of 335-13-4-.27(5). For the first year the financial test is used to assure costs at a particular MSWLF, the reference may instead be placed in the operating record until issuance of the next available CAFR if timing does not permit the reference to be incorporated into the most recently issued CAFR or budget. For closure and post-closure costs, conformance with Government Accounting Standards Board Statement 18 assures compliance with this public notice component.

3. Recordkeeping and Reporting Requirements.

(i) The local government owner or operator must place the following items in the MSWLF operating record, and submit a copy to ADEM:

(I) A letter signed by the local government's chief financial officer that:

I. Lists all the current cost estimates covered by a financial test, as described in 335-13-4-.28(5)(f)4.

II. Provides evidence and certifies that the local government meets the conditions of 335-13-4-.28(5)(f)1.(i), (ii), and (iii).

III. Certifies that the local government meets the conditions of 335-13-4-.28(5)(f)2. and 4.

(II) The local government's independently audited year-end financial statements for the latest fiscal year (except for local governments where audits are required every two years where unaudited statements may be used in years when audits are not required), including the unqualified opinion of the auditor who must be an independent certified public accountant or an appropriate State agency that conducts equivalent comprehensive audits.

(III) A report to the local government from the local government's independent certified public accountant (CPA) or the appropriate State agency based on performing an agreed upon procedures engagement relative to the financial ratios required by 335-13-4-.28(5)(f)1.(i)(II), if applicable, and the requirements of 335-13-4-.28(5)(f)1.(ii) and 335-13-4-.28(5)(f)1.(iii)(III) and (IV). The CPA or State agency's report should state the procedures performed and the CPA or State agency's findings.

(IV) A copy of the comprehensive annual financial report (CAFR) used to comply with 335-13-4-.28(5)(f)2. or certification that the requirements of General Accounting Standards Board Statement 18 have been met.

(ii) The items required in 335-13-4-.28(5)(f)3.(i) must be placed in the MSWLF operating record as follows:

(I) In the case of closure and post-closure care, either before the effective date of 335-13-4-.28(2) and (3), or before the initial receipt of waste at the MSWLF, whichever is later.

(II) In the case of corrective action, not later than 120 days after the corrective action remedy is selected in accordance with the requirements of 335-13-4-.27(5).

(iii) After the initial placement of the items in the MSWLF operating record, the local government owner or operator must update the information and place the updated information in the operating record within 180 days following the close of the owner or operator's fiscal year. In addition, a copy of the updated information must be submitted to ADEM.

(iv) The local government owner or operator is not required to meet the requirements of 335-13-4-.28(5)(f)3. if:

(I) The owner or operator substitutes alternate financial assurance as specified in 335-13-4-.28(5); or

(II) The owner or operator is released from the financial assurance requirements in accordance with 335-13-4-.28(2)(b), (3)(b), or (4)(b).

(v) A local government must satisfy the requirements of the financial test at the close of a fiscal year. If the local government owner or operator no longer meets the requirements of the local government financial test it must, within 210 days following the close of the owner or operator's fiscal year, obtain alternative financial assurance that meets the requirements of 335-13-4-.28(5), place the required submissions for that assurance in the operating record, and notify ADEM that the owner or operator no longer meets the criteria of the financial test and that alternate assurance has been obtained.

(vi) ADEM, based on a reasonable belief that the local government owner or operator may no longer meet the requirements of the local government financial test, may require additional reports of financial condition from the local government at any time. If ADEM finds, on the basis of such reports or other information, that the owner or operator no longer meets the requirements of the local government financial test, the local government must provide alternate financial assurance in accordance with 335-13-4-.28(5).

4. Calculation of Costs to be Assured. The portion of the closure, post-closure, and corrective action costs for which an owner or operator can assure under 335-13-4-.28 is determined as follows:

(i) If the local government owner or operator does not assure other environmental obligations through a financial test, it may assure closure, post-closure, and corrective action costs that equal up to 43 percent of the local government's total annual revenue.

(ii) If the local government assures other environmental obligations through a financial test, including those associated with UIC facilities under 40 CFR 144.62, petroleum underground storage tank facilities under 40 CFR Part 280, PCB storage facilities under 40 CFR Part 761, and hazardous waste treatment, storage, and disposal facilities under 335-14-5 and 6, it must add those costs to the closure, post-closure, and corrective action costs it seeks to assure under 335-13-4-.28. The total that may be assured must not exceed 43 percent of the local government's total annual revenue.

(iii) The owner or operator must obtain an alternate financial assurance instrument for those

costs that exceed the limits set in 335-13-4-.28(5)(f)4.(i) and (ii).

(g) Corporate Guarantee.

1. An owner or operator may meet the requirements of 335-13-4-.28(5) by obtaining a written guarantee. The guarantor must be the direct or higher-tier parent corporation of the owner or operator, a firm whose parent corporation is also the parent corporation of the owner or operator, or a firm with a "substantial business relationship" with the owner or operator. The guarantor must meet the requirements for owners or operators in 335-13-4-.28(5)(e) and must comply with the terms of the guarantee.

2. A certified copy of the guarantee must be placed in the MSWLF operating record along with copies of the letter from the guarantor's chief financial officer and accountants' opinions. If the guarantor's parent corporation is also the parent corporation of the owner or operator, the letter from the guarantor's chief financial officer must describe the value received in consideration of the guarantee. If the guarantor is a firm with a "substantial business relationship" with the owner or operator, this letter must describe this "substantial business relationship" and the value received in consideration of the guarantee.

3. The guarantee must be effective and all required submissions placed in the operating record before the initial receipt of waste or before the effective date of the requirements of 335-13-4-.28(2) and (3) in the case of closure and post-closure care, or in the case of corrective action no later than 120 days after the corrective action remedy has been selected in accordance with the requirements of 335-13-4-.27(5).

4. The terms of the guarantee must provide that:

(i) If the owner or operator fails to perform closure, post-closure care, and/or corrective action of a MSWLF covered by the guarantee, the guarantor will:

(I) Perform, or pay a third party to perform, closure, post-closure care, and/ or corrective action as required (performance guarantee); or

(II) Establish a fully funded trust fund as specified in 335-13-4-.28(5)(a) in the name of the owner or operator (payment guarantee).

(ii) The guarantee will remain in force for as long as the owner or operator must comply with the applicable financial assurance requirements of 335-13-4-.28 unless the guarantor sends prior notice of cancellation by certified mail to the owner or operator and to ADEM. Cancellation may not occur, however, during the 120 days beginning on the date of receipt of the notice of cancellation by both the owner or operator and ADEM, as evidenced by the return receipts.

(iii) If notice of cancellation is given, the owner or operator must, within 90 days following receipt of the cancellation notice by the owner or operator and ADEM, obtain alternate financial assurance, place evidence of that alternate financial assurance in the MSWLF operating record, and notify ADEM. If the owner or operator fails to provide alternate financial assurance within the 90-day period, the guarantor must provide that alternate assurance within 120 days of the cancellation notice, obtain alternative assurance, place evidence of the alternate assurance in the MSWLF operating record, and notify ADEM.

5. If a corporate guarantor no longer meets the requirements of 335-13-4-.28(5)(e)1., the owner or operator must, within 90 days, obtain alternative assurance, place evidence of the alternate assurance in the MSWLF operating record, and notify ADEM. If the owner or operator fails to provide alternate financial assurance within the 90-day period, the guarantor must provide that alternate assurance within the next thirty (30) days.

6. The owner or operator is not required to meet the requirements of 335-13-4-.28(5)(g) when:

(i) The owner or operator substitutes alternate financial assurance as specified in 335-13-4-.28(5); or

(ii) The owner or operator is released from the financial assurance requirements in accordance with 335-13-4-.28(2)(b), (3)(b), or (4)(b).

(h) Local Government Guarantee. An owner or operator may demonstrate financial assurance for closure, post-closure, and corrective action, as required by 335-13-4-.28(2), (3), and (4), by obtaining a written guarantee provided by a local government. The guarantor must meet the requirements of the local government financial test in 335-13-4-.28(5)(f), and must comply with the terms of a written guarantee.

1. Terms of the Written Guarantee. The guarantee must be effective before the initial receipt of waste in the case of closure, post-closure care, or no later than 120 days after the corrective action remedy has been selected in accordance with the requirements of 335-13-4-.27(5). The guarantee must provide that:

(i) If the owner or operator fails to perform closure, post-closure care, and/or corrective action of a MSWLF covered by the guarantee, the guarantor will:

(I) Perform, or pay a third party to perform, closure, post-closure care, and/or corrective action as required; or

(II) Establish a fully funded trust fund as specified in 335-13-4-.28(5)(a) in the name of the owner or operator.

(ii) The guarantee will remain in force unless the guarantor sends notice of cancellation by certified mail to the owner or operator and to ADEM. Cancellation may not occur, however, during the 120 days beginning on the date of receipt of the notice of cancellation by the owner or operator and ADEM, as evidenced by the return receipts.

(I) If a guarantee is cancelled, the owner or operator must, within 90 days following receipt of the cancellation notice by the owner or operator and ADEM, obtain alternate financial assurance, place evidence of that alternate financial assurance in the MSWLF operating record, and notify ADEM. If the owner or operator fails to provide alternate financial assurance within the 90-day period, the guarantor must provide that alternate assurance within 120 days following the guarantor's notice of cancellation, place evidence of the alternate assurance in the MSWLF operating record, and notify ADEM.

2. Recordkeeping and Reporting.

(i) The owner or operator must place a certified copy of the guarantee along with the items required under 335-13-4-.28(5)(f)3. into the MSWLF operating record before the initial receipt of waste in the case of closure, post-closure care, or no later than 120 days after the corrective action remedy has been selected in accordance with the requirements

of 335-13-4-.27(5). A copy of the guarantee along with other required items must be submitted to ADEM.

(ii) The owner or operator is not required to maintain the items specified in 335-13-4-.28(5)(h)2. when:

(I) The owner or operator substitutes alternate financial assurance as specified in 335-13-4-.28(5); or

(II) The owner or operator is released from the financial assurance requirements in accordance 335-13-4-.28(2)(b), (3)(b), or (4)(b).

(iii) If a local government guarantor no longer meets the requirements of 335-13-4-.28(5)(f), the owner or operator must, within ninety (90) days, obtain alternative assurance, place evidence of the alternate assurance in the MSWLF operating record, and notify ADEM. If the owner or operator fails to obtain alternate financial assurance within that 90-day period, the guarantor must provide that alternate assurance within the next thirty (30) days.

(i) State-Approved Mechanism. An owner or operator may satisfy the requirements of 335-13-4-.28 by obtaining other mechanisms that meets the criteria specified in 335-13-4-.28(5)(l), and that is approved by ADEM.

(j) State Assumption of Responsibility. If ADEM either assumes legal responsibility for an owner or operator's compliance with the closure, post-closure care and/or corrective action requirements of this part, or assures that the funds will be available from State sources to cover the requirements, the owner or operator will be in compliance with the requirements of 335-13-4-.28(5). A State assumption of responsibility must meet the criteria specified in 335-13-4-.28(5)(l).

(k) Use of Multiple Mechanisms. An owner or operator may demonstrate financial assurance for closure, post-closure, and corrective action, as required by 335-13-4-.28(2), (3), and (4), by establishing more than one financial mechanism per MSWLF, except that mechanisms guaranteeing performance, rather than payment, may not be combined with other instruments. The mechanisms must be as specified in 335-13-4-.28(5)(a) to (j), except that financial assurance for an amount at least equal to the current cost estimate for closure, post-closure care, and/or
corrective action may be provided by a combination of mechanisms, rather than a single mechanism.

(l) The language of the mechanisms listed in 335-13-4-.28(5)(a) to (j), must ensure that the instruments satisfy the following criteria:

1. The financial assurance mechanisms must ensure that the amount of funds assured is sufficient to cover the costs of closure, post-closure care, and corrective action for known releases when needed.

2. The financial assurance mechanisms must ensure that funds will be available in a timely fashion when needed.

3. The financial assurance mechanisms must be obtained by the owner or operator by the effective date of these requirements or before the initial receipt of solid waste, whichever is later, in the case of closure and post-closure care, and no later than 120 days after the corrective action remedy has been selected in accordance with the requirements of 335-13-4-.27(5), until the owner or operator is released from the financial assurance requirements under 335-13-4-.28(2), (3), and (4).

4. The financial assurance mechanisms must be legally valid, binding, and enforceable under state and federal law.

(6) Discounting. ADEM may allow discounting of closure cost estimates in 335-13-4-.28(2)(a), post-closure cost estimates in 335-13-4-.28(3)(a), and/or corrective action costs in 335-13-4-.28(4)(a) up to the rate of return for essentially risk free investments, net of inflation, under the following conditions:

(a) ADEM determines that cost estimates are complete and accurate and the owner or operator has submitted a statement from an engineer so stating.

(b) ADEM finds the MSWLF in compliance with applicable and appropriate permit conditions.

(c) ADEM determines that the closure date is certain and the owner or operator certifies that there are no foreseeable factors that will change the estimate of site life; and

(d) Discounted cost estimates must be adjusted annually to reflect inflation and years of remaining life.

Author: James L. Bryant, Heather M, Jones
Statutory Authority: Code of Ala. 1975, §§22-22A-5, 22-27-7, 22-27-8.
History: **New Rule:** Filed November 7, 2005; effective December 12, 2005. **Amended:** Filed April 24, 2018; effective June 6, 2018.

335-13-4-.29 Recordkeeping Requirements.

Recordkeeping shall be maintained as follows:

(1) Operating Record. The owner or operator of a MSWLF, C/DLF or ILF unit must record and retain in an operating record at the facility, or in an alternative location approved by the Department, the following information as it becomes available:

(a) Solid Waste Disposal Facility Permit as issued by the Department.

(b) Permit application, operational narrative, and engineering drawings. This may include, but is not limited to:

1. Any location restriction demonstration required under 335-13-4-.01 of this Division;

2. Any MSWLF unit design documentation for placement of leachate or gas condensate in a MSWLF unit as required under 335-13-4-.22(1)(k) of this Division;

3. Closure and post closure care plans as required by 335-13-4-.20 of this Division;

4. Explosive gas monitoring plans as required by 335-13-4-.16 of this Division;

5. Corrective action plan, if necessary, which includes detection in assessment monitoring;

6. Any other documentation submitted to the Department during the permitting process.

(c) Reports or documentation generated during the normal operation of the facility may include, but are not limited to:

1. Gas monitoring results from monitoring and any remediation plans required by 335-13-4-.16;

2. Inspection records, training procedures, notification procedures, and other information required in 335-13-4-.21(1)(b);

3. Any monitoring, testing, or analytical data as required by 335-13-4-.20 of this Division concerning closure;

4. Any demonstration, certification, finding monitoring, testing, or analytical data required by 335-13-4-.27 concerning groundwater monitoring and corrective action;

5. Quarterly volume reports as required in 335-13-4-.22(2)(g) or 335-13-4-.23(2)(f) of this Division;

6. Waste certifications as required by 335-13-4-.21(1)(c) of this Division;

7. Any other report or document generated in the normal operation of the facility which is submitted to the Department.

(d) Any cost estimates and financial assurance documentation required by 335-13-4-.28.

(2) Department notification. The owner/operator must notify the Department when the documents from subparagraph (1)(b) of this rule have been placed or added to the operating record, and all information contained in the operating record must be furnished upon request to the Department or be made available at all reasonable times for inspection by the Department.

(3) Alternative schedules. The Department can set alternative schedules for recordkeeping and notification requirements as specified in paragraphs (1) and (2) of this rule, except for notification requirements in 335-13-4-.01(1)(c) and 335-13-4-.27(4)(g)3.(iii).

Author: Russell A. Kelly, S. Scott Story
Statutory Authority: Code of Ala. 1975, §§22-22A-8, 22-27-7.
History: **New Rule:** Filed September 28, 1993; effective November 2, 1993. **Amended:** June 21, 1996; effective July 26, 1996. **Amended:** Filed April 24, 2018; effective June 6, 2018.

335-13-4-A1 **Appendix I Constituents For Detection Monitoring.**

APPENDIX I

CONSTITUENTS FOR DETECTION MONITORING[1]

Common Name[2]	CAS Number[3]
pH[4]	N/A
Specific Conductance[4]	N/A
Inorganic Constituents	
1. Antimony	Total
2. Arsenic	Total
3. Barium	Total
4. Beryllium	Total
5. Cadmium	Total
6. Chromium	Total
7. Cobalt	Total
8. Copper	Total
9. Lead	Total
10. Mercury	Total
11. Nickel	Total
12. Selenium	Total
13. Silver	Total
14. Thallium	Total
15. Vanadium	Total
16. Zinc	Total
Organic Constituents	
17. Acetone	67-64-1
18. Acrylonitrile	107-13-1
19. Benzene	71-43-2
20. Bromochloromethane	74-97-5
21. Bromodichloromethane	75-27-4
22. Bromoform; Tribromomethane	75-25-2
23. Carbon disulfide	75-15-0
24. Carbon tetrachloride	56-23-5
25. Chlorobenzene	108-90-7
26. Chloroethane; Ethyl chloride	75-00-3
27. Chloroform; Trichloromethane	67-66-3
28. Dibromochloromethane; Chlorodibromomethane	124-48-1
29. 1,2-Dibromo-3-chloropropane (DBCP)	96-12-8
30. 1,2-Dibromoethane; Ethylene dibromide; EDB	106-93-4
31. o-Dichlorobenzene; 1,2-Dichlorobenzene	95-50-1
32. p-Dichlorobenzene; 1,4-Dichlorobenzene	106-46-7
33. trans-1,4-Dichloro-2-butene	110-57-6

Common Name[2]	CAS Number[3]
34. 1,1-Dichloroethane; Ethylidene chloride	75-34-3
35. 1,2-Dichloroethane; Ethylene dichloride	107-06-2
36. 1,1-Dichloroethylene; 1,1-dichloroethene; Vinylidene chloride	75-35-4
37. cis-1,2-Dichloroethylene; cis-1,2- Dichloroethene	156-59-2
38. trans-1,2-Dichloroethylene; trans-1,2- Dichloroethene	156-60-5
39. 1,2-Dichloropropane; Propylene dichloride	78-87-5
40. cis-1,3-Dichloropropene	10061-01-5
41. trans-1,3-Dichloropropene	10061-02-6
42. Ethylbenzene	100-41-4
43. 2-Hexanone; Methyl butyl ketone	591-78-6
44. Methyl bromide; Bromomethane	74-83-9
45. Methyl chloride; Chloromethane	74-87-3
46. Methylene bromide; Dibromomethane	74-95-3
47. Methylene chloride; Dichloromethane	75-09-2
48. Methyl ethyl ketone; MEK; 2-Butanone	78-93-3
49. Methyl iodide; Iodomethane	74-88-4
50. 4-Methyl-2-pentanone; Methyl isobutyl ketone	108-10-1
51. Styrene	100-42-5
52. 1,1,1,2-Tetrachloroethane	630-20-6
53. 1,1,2,2-Tetrachloroethane	79-34-5
54. Tetrachloroethylene; Tetrachloroethene; Perchloroethylene	127-18-4
55. Toluene	108-88-3
56. 1,1,1-Trichloroethane; Methylchloroform	71-55-6
57. 1,1,2-Trichloroethane	79-00-5
58. Trichloroethylene; Trichloroethene	79-01-6
59. Trichlorofluoromethane; CFC-11	75-69-4
60. 1,2,3-Trichloropropane	96-18-4
61. Vinyl acetate	108-05-4
62. Vinyl chloride	75-01-4
63. Xylenes	1330-20-7

NOTES

[1] This list contains 47 volatile organics for which possible analytical procedure provided in EPA Report SW-846, "Test Methods for Evaluating Solid Waste," Third Edition, November 1986, as revised December 1987, includes Method 8260; and 15 metals for which SW-846 provides either Method 6010 or a method from the 7000 series of methods.

[2] Common names are those widely used in government regulations, scientific publications, and commerce; synonyms exist for many chemicals.

[3] Chemical Abstracts Service registry number. Where "Total" is entered, all species in the groundwater that contain this element are included.

[4] State specific requirements.

Author: Russell A. Kelly, Heather Jones
Statutory Authority: Code of Ala. 1975, §§22-27-4, 22-27-7.
History: New: Filed September 28, 1993; effective November 2, 1993. **Amended**: Filed June 21, 1996; effective July 26, 1996. **Amended**: Filed April 24, 2018; effective June 6, 2018.

335-13-4-A2 Appendix II List Of Hazardous Inorganic And Organic Constituents.

APPENDIX II

335-13-4-APPENDIX II LIST OF HAZARDOUS INORGANIC AND ORGANIC CONSTITUENTS[1]

Common Name[2]	CAS Number[3]	Chemical Abstracts Service Index Name[4]	Suggested Methods[5]	PQL (µg/L)[6]
Acenaphthene	83-32-9	Acenaphthylene, 1,2-dihydro-	8100 8270	200 10
Acenaphthylene	208-96-8	Acenaphthylene	8100 8270	200 10
Acetone	67-64-1	2-Propanone	8260	100
Acetonitrile; Methyl cyanide	75-05-8	Acetonitrile	8015	100
Acetophenone	98-86-2	Ethanone, 1-phenyl-	8270	10
2-Acetylaminofluorene; 2-AAF	53-96-3	Acetamide, N-9H-fluoren-2-yl-	8270	20
Acrolein	107-02-8	2-Propenal	8030 8260	5 100
Acrylonitrile	107-13-1	2-Propenenitrile	8030 8260	5 200
Aldrin	309-00-2	1,4,5,8,-Dimethanonaphthalene 1,2, 3,4,10,10-hexachloro-1,4,4a,5,8, 8a- hexahydro-(1a,4a, 4aß,5a, 8a,8aß)-	8080 8270	0.05 10
Allyl chloride	107-05-1	1-Propene, 3-chloro-	8010 8260	5 10
4-Aminobiphenyl	92-67-1	[1,1'-Biphenyl]-4-amine	8270	20
Anthracene	120-12-7	Anthracene	8100 8270	200 10
Antimony	(Total)	Antimony	6010 7040 7041	300 2000 30
Arsenic	(Total)	Arsenic	6010 7060 7061	500 10 20
Barium	(Total)	Barium	6010 7080	20 1000
Benzene	71-43-2	Benzene	8020 8021 8260	2 0.1 5
Benzo[a]anthracene; Benzanthracene	56-55-3	Benz[a]anthracene	8100 8270	200 10
Benzo[b]fluoranthene	205-99-2	Benz[e]acephenanthrylene	8100 8270	200 10
Benzo[k]fluoranthene	207-08-9	Benzo[k]fluoranthene	8100 8270	200 10
Benzo[ghi]perylene	191-24-2	Benzo[ghi]perylene	8100 8270	200 10
Benzo[a]pyrene	50-32-8	Benzo[a]pyrene	8100 8270	200 10
Benzyl alcohol	100-51-6	Benzenemethanol	8270	20
Beryllium	(Total)	Beryllium	6010 7090 7091	3 50 2
alpha-BHC	319-84-6	Cyclohexane, 1,2,3,4,5,6- hexachloro- (1a,2a,3ß,4a,5ß,6ß)-	8080 8270	0.05 10
beta-BHC	319-85-7	Cyclohexane, 1,2,3,4,5,6- hexachloro- (1a,2ß,3a,4ß,5a,6ß)-	8080 8270	0.05 20
delta-BHC	319-86-8	Cyclohexane, 1,2,3,4,5,6- hexachloro-(1a,2a,3a,4ß,5a,6ß)-	8080 8270	0.1 20
gamma-BHC; Lindane	58-89-9	Cyclohexane, 1,2,3,4,5,6- hexachloro- (1a,2a,3ß,4a,5a,6ß)-	8080 8270	0.05 20
Bis(2-chloroethoxy)methane	111-91-1	Ethane, 1,1'-[methylenebis(oxy)] bis[2-chloro-	8110 8270	5 10
Bis(2-chloroethyl) ether;	111-44-4	Ethane, 1,1'-oxybis[2-chloro-	8110	3

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Common Name[2]	CAS Number[3]	Chemical Abstracts Service Index Name[4]	Suggested Methods[5]	PQL (µg/L)[6]
Dichloroethyl ether			8270	10
Bis(2-chloro-1-methylethyl) ether 2,21-Dichlorodisophropyl ether; DCIP, See note 7	108-60-1	Propane, 2,2[1]-oxybis[1-chloro-	8110 8270	10 10
Bis(2-ethylhexyl) phthalate	117-81-7	1,2-Benzenedicarboxylic acid, bis(2-ethylhexyl) ester	8060	20
Bromochloromethane; Chlorobromomethane	74-97-5	Methane, bromochloro-	8021 8260	0.1 5
Bromodichloromethane; Dibromochloromethane	75-27-4	Methane, bromodichloro-	8010 8021 8260	1 0.2 5
Bromoform; Tribromomethane	75-25-2	Methane, tribromo-	8010 8021 8260	2 15 5
4-Bromophenyl phenyl ether	101-55-3	Benzene, 1-bromo-4-phenoxy-	8110 8270	25 10
Butyl benzyl phthalate; Benzyl butyl phthalate	85-68-7	1,2-Benzenedicarboxylic acid, butyl phenylmethyl ester	8060 8270	5 10
Cadmium	(Total)	Cadmium	6010 7130 7131	40 50 1
Carbon disulfide	75-15-0	Carbon disulfide	8260	100
Carbon tetrachloride	56-23-5	Methane, tetrachloro-	8010 8021 8260	1 0.1 10
Chlordane	See note 8	4,7-Methano-1H-indene, 1,2,4,5, 6,7,8,8- octachloro- 2,3,3a,4,7,7a-hexahydro-	8080 8270	0.1 50
p-Chloroaniline	106-47-8	Benzenamine, 4-chloro-	8270	20
Chlorobenzene	108-90-7	Benzene, chloro-	8010 8020 8021 8260	2 2 0.1 5
Chlorobenzilate	510-15-6	Benzeneacetic acid, 4-chloro-a-(4-chlorophenyl)-a-hydroxy-ethyl ester	8270	10
p-Chloro-m-cresol; 4-Chloro-3-methylphenol	59-50-7	Phenol, 4-chloro-3-methyl-	8040 8270	5 20
Chloroethane; Ethyl chloride	75-00-3	Ethane, chloro-	8010 8021 8260	5 1 10
Chloroform; Trichloromethane	67-66-3	Methane, trichloro-	8010 8021 8260	0.5 0.2 5
2-Chloronaphthalene	91-58-7	Naphthalene, 2-chloro-	8120 8270	10 10
2-Chlorophenol	95-57-8	Phenol, 2-chloro-	8040 8270	5 10
4-Chlorophenyl phenyl ether	7005-72-3	Benzene, 1-chloro-4-phenoxy-	8110 8270	40 10
Chloroprene	126-99-8	1,3-Butadiene, 2-chloro-	8010 8260	50 20
Chromium	(Total)	Chromium	6010 7190 7191	70 500 10
Chrysene	218-01-9	Chrysene	8100 8270	200 10
Cobalt	(Total)	Cobalt	6010 7200 7201	70 500 10
Copper	(Total)	Copper	6010 7210 7211	60 200 10
m-Cresol; 3-methylphenol	108-39-4	Phenol, 3-methyl-	8270	10

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Common Name[2]	CAS Number[3]	Chemical Abstracts Service Index Name[4]	Suggested Methods[5]	PQL (µg/L)[6]
o-Cresol; 2-methylphenol	95-48-7	Phenol, 2-methyl-	8270	10
p-Cresol; 4-methylphenol	106-44-5	Phenol, 4-methyl-	8270	10
Cyanide	57-12-5	Cyanide	8270	10
2,4-D; 2,4-Dichlorophenoxyacetic acid	94-75-7	Acetic acid, (2,4-dichlorophenoxy)-	8150	10
4,4[1]-DDD	72-54-8	Benzene, 1,1[1]-(2,2-dichloro ethylidene) bis[4-chloro-	8080 8270	0.1 10
4,4[1]-DDE	72-55-9	Benzene, 1,1[1]-(dichloroethyen ylidene)bis[4-chloro-	8080 8270	0.05 10
4,4[1]-DDT	50-29-3	Benzene, 1,1[1]-(2,2,2-trichloro ethylidene)bis[4-chloro-	8080 8270	0.1 10
Diallate	2303-16-4	Carbamothioic acid, bis(1-methyl ethyl)-,S-(2,3-dichloro-2-propenyl) ester	8270	10
Dibenz[a,h]anthracene	53-70-3	Dibenz[a,h]anthracene	8100 8270	200 10
Dibenzofuran	132-64-9	Dibenzofuran	8270	10
Dibromochloromethane; Chlorodibromomethane	124-48-1	Methane, dibromochloro-	8010 8021 8260	1 0.3 5
1,2-Dibromo-3-chloropropane; DBCP	96-12-8	Propane, 1,2-dibrome-3-chloro-	8011 8021 8260	0.1 30 25
1,2-Dibromoethane; Ethylene dribromide; EDB	106-93-4	Ethane, 1,2-dibromo-	8011 8021 8260	0.1 10 5
Di-n-butyl phthalate	84-74-2	1,2-Benzenedicarboxylic acid, dibutyl ester	8060 8270	5 10
o-Dichlorobenzene; 1,2-Dichlorobenzene	95-50-1	Benzene, 1,2-dichloro-	8010 8020 8021 8120 8260 8270	2 5 0.5 10 5 10
m-Dichlorobenzene; 1,3-Dichlorobenzene	541-73-1	Benzene, 1,3-Dichloro-	8010 8020 8021 8120 8260 8270	5 5 0.2 10 5 10
p-Dichlorobenzene; 1,4-Dichlorobenzene	106-46-7	Benzene, 1,4-dichloro-	8010 8020 8021 8120 8260 8270	2 5 0.1 15 5 10
3,3[1]-Dichlorobenzidine	91-94-1	[1,1[1]-Biphenyl]-4,4[1]-diamine, 3,3[1]-dichloro-	8270	20
trans-1,4-Dichloro-2-butene	110-57-6	2-Butene, 1,4-dichloro-, (E)-	8260	100
Dichlorodifloromethane; CFC-12	75-71-8	Methane, dichlorodifluoro-	8021 8260	0.5 5
1,1-Dichloroethane; Ethyldidene chloride	75-34-3	Ethane, 1,1-dichloro-	8010 8021 8260	1 0.5 5
1,2-Dichloroethane; Ethylene dichloride	107-06-2	Ethane, 1,1-dichloro-	8010 8021 8260	0.5 0.3 5
1,1-Dichloroethylene; 1,1-Dichloroethene; Vinylidene chloride	75-35-4	Ethene, 1,1-dichloro-	8010 8021 8260	1 0.5 5
cis-1,2-Dichloroethylene; cis-	156-59-2	Ethene, 1,2-dichloro-,(Z)-	8021	0.2
1,2- Dichloroethene			8260	5
trans-1,2-Dichloroethylene	156-60-5	Ethene, 1,2-dichloro-,(E)-	8010	1

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Common Name[2]	CAS Number[3]	Chemical Abstracts Service Index Name[4]	Suggested Methods[5]	PQL (µg/L)[6]
trans-1,2- Dichloroethene			8021 8260	0.5 5
2,4-Dichlorophenol	120-83-2	Phenol, 2,4-dichloro-	8040 8270	5 10
2,6-Dichlorophenol	87-65-0	Phenol, 2,6-dichloro-	8270	10
1,2-Dichloropropane; Propylene dichloride	78-87-5	Propane, 1,2-dichloro-	8010 8021 8260	0.5 0.05 5
1,3-Dichloropropane; Trimethylene dichloride	142-28-9	Propane, 1,3-dichloro-	8021 8260	0.3 5
2,2-Dichloropropane; Isopropylidene chloride	594-20-7	Propane, 2,2-dichloro-	8021 8260	0.5 15
1,1-Dichloropropene	563-58-6	1-Propene, 1,1-dichloro-	8021 8260	0.2 5
cis-1,3-Dichloropropene	10061-01-5	1-Propene, 1,3-dichloro-, (Z)-	8010 8260	20 10
trans-1,3-Dichloropropene	10061-02-6	1-Propene, 1,3-dichloro-, (E)-	8010 8260	5 10
Dieldrin	60-57-1	2,7:3,6-Dimethanonaphth[2,3-b] oxirene,3,4,5,6,9,9-hexa, chloro-1a, 2,2a,3,6,6a,7,7a-octahydro-, (1aa, 2ß,2aa,3ß, 6ß,6aa,7ß,7aa)-	8080 8270	0.05 10
Diethyl phthalate	84-66-2	1,2-Benzenedicarboxylic acid, diethyl ester	8060 8270	5 10
0,0-Diethyl 0-2-pyrazinyl; phosphorothioate Thionazin	297-97-2	Phosphorothioic acid, 0,0-diethyl 0-pyrazinyl ester	8141 8270	5 20
Dimethoate	60-51-5	Phosphorodithioic acid, 0,0-dimethyl S-[2-(methylamino)-2-oxoethyl] ester.	8141 8270	3 20
p-(Dimethylamino)azobenzene	60-11-7	Benzenamine, N,N-dimethyl-4-(phenylazo)-	8270	10
7,12-Dimethylbenz[a]anthracene	57-97-6	Benz[a]anthracene, 7,12-dimethyl-	8270	10
3,3'-Dimethylbenzidine	119-93-7	[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dimethyl-	8270	10
2,4-Dimethylphenol; m-Xylenol	105-67-9	Phenol, 2,4-dimethyl-	8040 8270	5 10
Dimethyl phthalate	131-11-3	1,2-Benzenedicarboxylic acid, dimethyl ester	8060 8270	5 10
m-Dinitrobenzene	99-65-0	Benzene, 1,3-dinitro-	8270	20
4,6-Dinitro-o-cresol 4,6-Dinitro- 2-methylphenol	534-52-1	Phenol, 2-methyl-4,6-dinitro-	8040 8270	150 50
2,4-Dinitrophenol	51-28-5	Phenol, 2,4-dinitro-	8040 8270	150 50
2,4-Dinitrotoluene	121-14-2	Benzene, 1-methyl-2,4-dinitro-	8090 8270	0.2 10
2,6-Dinitrotoluene	606-20-2	Benzene, 2-methyl-1,3-dinitro-	8090 8270	0.1 10
Dinoseb; DNBP; 2-sec-Butyl-4,6-dinitrophenol	88-85-7	Phenol, 2-(1-methylpropyl)-4,6-dinitro-	8150 8270	1 20
Di-n-octyl phthalate	117-84-0	1,2-Benzenedicarboxylic acid, dioctyl ester	8060 8270	30 10
Diphenylamine	122-39-4	Benzenamine, N-phenyl-	8270	10
Disulfoton	298-04-4	Phosphorodithioic acid, 0,0-diethyl S-[2-(ethylthio)ethyl] ester	8140 8141 8270	2 0.5 10
Endosulfan I	959-98-8	6,9-Methano-2,4,3-benzodioxathi epin,6,7,8,9,10,10- hexachloro-1, 5,5a, 6,9,9a-hexahydro-,3-oxide,	8080 8270	0.1 20
Endosulfan II	33213-65-9	6,9-Methano-2,4,3-benzodioxathi	8080	0.05

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Common Name[4]	CAS Number[3]	Chemical Abstracts Service Index Name[4]	Suggested Methods[5]	PQL (µg/L)[6]
		epin, 6,7,8,9,10,10-hexachloro-1,5,5a,6,9,9a-hexahydro-,3-oxide,(3a, 5aa, 6ß,9ß,9na)-	8270	20
Endosulfan sulfate	1031-07-8	6,9-Methano-2,4,3-benzodioxathi epin,6,7,8,9,10,10-hexachloro-1,5,5a, 6,9,9a-hexahydro-3-3-dioxide.	8080 8270	0.5 10
Endrin	72-20-8	2,7:3,6-Dimethanonaphth[2,3-b] oxirene, 3,4,5,6,9,9-hexachloro-1a,2,2a,3,6,6a,7,7a-octahydro-, (1aa,2ß,2aß,3a,6a,6aß,7ß,7aa)-	8080 8270	0.1 20
Endrin aldehyde	7421-93-4	1,2,4-Methenocyclopenta cd]penta [lene-5-carboxaldehyde, 2,2a,3,3,4, 7-hexachlorodeca hydro-, (1a,2ß, 2aß, 4ß,4aß,5ß, 6aß,6bß,7R*)-	8080 8270	0.2 10
Ethylbenzene	100-41-4	Benzene, ethyl-	8020 8221 8260	2 0.05 5
Ethyl methacrylate	97-63-2	2-Propenoic acid, 2-methyl-, ethyl ester	8015 8260 8270	5 10 10
Ethyl methanesulfonate	62-50-0	Methanesulfonic acid, ethyl ester	8270	20
Famphur	52-85-7	Phosphorothioic acid, 0-[4-[(dimethylamino)sulfonyl]phenyl] 0,0-dimethyl ester	8270	20
Fluoranthene	206-44-0	Fluoranthene	8100 8270	200 10
Fluorene	86-73-7	9H-Fluorene	8100 8270	200 10
Heptachlor	76-44-8	4,7-Methano-1H-indene, 1,4,5,6,7,8, 8-heptachloro-3a,4,7,7a-tetrahydro-	8080 8270	0.05 10
Heptachlor epoxide	1024-57-3	2,5-Methano-2H-indeno[1,2-b]oxirene, 2,3,4,5,6,7,7-heptachloro-1a, 1b,5,5a,6,6a-hexahydro-,(1aa,1bß, 2a,5a, 5aß,6ß,6aa)	8080 8270	1 10
Hexachlorobenzene	118-74-1	Benzene, hexachloro-	8120 8270	0.5 10
Hexachlorobutadiene	87-68-3	1,3-Butadiene, 1,1,2,3,4,4-hexachloro-	8021 8120 8260 8270	0.5 5 10 10
Hexachlorocyclopentadiene	77-47-4	1,3-Cyclopentadiene, 1,2,3,4,5,5-hexachloro-	8120 8270	5 10
Hexachloroethane	67-72-1	Ethane, hexachloro-	8120 8260 8270	0.5 10 10
Hexachloropropene	1888-71-7	1-Propene, 1,1,2,3,3,3-hexachloro-	8270	10
2-Hexanone; Methyl butyl ketone	591-78-6	2-Hexanone	8260	50
Indeno(1,2,3-cd)pyrene	193-39-5	Indeno(1,2,3-cd)pyrene	8100 8270	200 10
Isobutyl alcohol	78-83-1	1-Propanol, 2-methyl-	8015	50
			8240	100
Isodrin	465-73-6	1,4,5,8-Dimethanonaphthalene,1,2,	8270	20

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Common Name[2]	CAS Number[3]	Chemical Abstracts Service Index Name[4]	Suggested Methods[5]	PQL (µg/L)[6]
		3,4,10,10- hexachloro-1,4,4a, 5,8,8a hexahydro- (1a,4a,4aß,5ß,8ß,8aß)-	8260	10
Isophorone	78-59-1	2-Cyclohexen-1-one, 3,5,5-trimethyl-	8090 8270	60 10
Isosafrole	120-58-1	1,3-Benzodioxole, 5-(1-propenyl)-	8270	10
Kepone	143-50-0	1,3,4-Metheno-2H-cyclobuta[cd] pentalen-2-one,1,1a,3,3a,4,5,5,5a, 5b,6-decachlorooctahydro-	8270	20
Lead	(Total)	Lead	6010 7420 7421	400 1000 10
Mercury	(Total)	Mercury	7470	2
Methacrylonitrile	126-98-7	2-Propenenitrile, 2-methyl-	8015 8260	5 100
Methapyrilene	91-80-5	1,2-ethanediamine,N.N.-dimethyl-N[1]-2-pyridinyl-N1/2-thienyl-methyl)-	8270	100
Methoxychlor	72-43-5	Benzene,1,1[1]-(1,2,2, trichloroethylidene) bis[4-methoxy-	8080 8270	2 10
Methyl bromide; Bromomethane	74-83-9	Methane, bromo-	8010 8021	20 10
Methyl chloride; Chloromethane	74-87-3	Methane, chloro-	8010 8021	1 0.3
3-Methylcholanthrene	56-49-5	Benz[j]aceanthrylene, 1,2-dihydro-3- methyl-	8270	10
Methyl ethyl ketone; MEK; 2-Butanone	78-93-3	2-Butanone	8015 8260	10 100
Methyl iodide; iodomethane	74-88-4	Methane,iodo-	8010 8260	40 10
Methyl methacrylate	80-62-6	2-Propenoic acid, 2-methyl-, methyl ester	8015 8260	2 30
Methyl methanesulfonate	66-27-3	Methanesulfonic acid, methyl ester	8270	10
2-Methylnaphthalene	91-57-6	Naphthalene, 2-methyl-	8270	10
Methyl parathion;Parathion methyl	298-00-0	Phosphorothioic acid, 0,0-dimethyl 0-(4-nitrophenyl) ester	8140 8141 8270	0.5 1 10
4-Methyl-2-pentanone; Methyl isobutyl ketone	108-10-1	2-Pentanone, 4-methyl-	8015 8260	5 100
Methylene bromide; Dibromomethane	74-95-3	Methane, dibromo-	8010 8021 8260	15 20 10
Methylene chloride; Dichloromethane	75-09-2	Methane, dichloro-	8010 8021 8260	5 0.2 10
Naphthalene	91-20-3	Naphthalene	8021 8100 8260 8270	0.5 200 5 10
1,4-Naphthoquinone	130-15-4	1,4-Naphthalenedione	8270	10
1-Naphthylamine	134-32-7	1-Naphthalenamine	8270	10
2-Naphthylamine	91-59-8	2-Naphthalenamine	8270	10
Nickel	(Total)	Nickel	6010 7520	150 400
o-Nitroaniline; 2-Nitroaniline	88-74-4	Benzenamine, 2-nitro-	8270	50
m-Nitroaniline; 3-Nitroaniline	99-09-2	Benzenamine, 3-nitro-	8270	50
p-Nitroaniline; 4-Nitroaniline	100-01-6	Benzenamine, 4-nitro	8270	20
Nitrobenzene	98-95-3	Benzene, nitro-	8090	40

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Common Name[2]	CAS Number[3]	Chemical Abstracts Service Index Name[4]	Suggested Methods[5]	PQL (µg/L)[6]
			8270	10
o-Nitrophenol; 2-Nitrophenol	88-75-5	Phenol, 2-nitro-	8040 8270	5 10
p-Nitrophenol; 4-Nitrophenol	100-02-7	Phenol, 4-nitro-	8040 8270	10 50
N-Nitrosodi-n-butylamine	924-16-3	1-Butananmine, N-butyl-N-nitroso-	8270	10
N-Nitrosodiethylamine	55-18-5	Ethanamine, N-ethyl-N-nitroso-	8270	20
N-Nitrosodimethylamine	62-75-9	Methanamine, N-methyl-N-nitroso-	8070	2
N-Nitrosodiphenylamine	86-30-6	Benzenamine, N-nitroso-N-phenyl-	8070	5
N-Nitrosodipropylamine; N-Nitroso- N- dipropylamine; Di-n-propylnitrosamine	621-64-7	1-Propanamine, N-nitroso-N-propyl-	8070	10
N-Nitrosomethylethalamine	10595-95-6	Ethanamine, N-methyl-N-nitroso-	8270	10
N-Nitrosopiperidine	100-75-4	Piperidine, 1-nitorso-	8270	20
N-Nitrosopyrrolidine	930-55-2	Pyrrolidine, 1-nitoso-	8270	40
5-Nitro-o-toluidine	99-55-8	Benezenamine, 2-methyl-5-nitro-	8270	10
Parathion	56-38-2	Phosphorothioic acid, 0,0-diethyl 0-(4-nitrophenyl) ester	8141 8270	0.5 10
Pentachlorobenzene	608-93-5	Benzene, pentachloro-	8270	10
Pentachloronitrobenzene	82-68-8	Benzene, pentachloronitro-	8270	20
Pentachlorophenol	87-86-5	Phenol, pentachloro-	8040 8270	5 50
Phenacetin	62-44-2	Acetamide, N-(4-ethoxyphenl)	8270	20
Phenanthrene	85-01-8	Phenanthrene	8100 8270	200 10
Phenol	108-95-2	Phenol	8040	1
p-Phenylenediamine	106-50-3	1,4-Benzenadiamine	8270	10
Phorate	298-02-2	Phosphorodithioic acid, 0,0-diethyl-S-[(ethylthio)methyl] ester	8140 8141 8270	2 0.5 10
Polychlorinated biphenyls; PCBs;Aroclors	See Note 9	1,1'-Biphenyl, chloro derivatives	8080 8270	50 200
Pronamide	23950-58-5	Benzamide, 3,5-dichloro-N-(1,1-dimethyl-2-propynyl)-	8270	10
Propionitrile; Ethyl cyanide	107-12-0	Propanenitrile	8015 8260	60 150
Pyrene	129-00-0	Pyrene	8100 8270	200 10
Safrole	94-59-1	1,3-Benzodioxole, 5-(2-propenyl)-	8270	10
Selenium	(Total)	Selenium	6010 7740 7741	750 20 20
Silver	(Total)	Silver	6010 7760 7761	70 100 10
Silvex; 2,4,5-TP	93-72-1	Propanoic acid, 2-(2,4,5-trichlorophenoxy)-	8150	2
Styrene	100-42-5	Benzene, ethenyl-	8020 8021 8260	1 0.1 10
Sulfide	18496-25-8	Sulfide	9030	4000
2,4,5-T; 2,4,5-Trichlorophenoxyacetic acid	93-76-5	Acetic acid, (2,4,5-trichlorophenoxy)-	8150	2
1,2,4,5-Tetrachlorobenzene	95-94-3	Benzene, 1,2,4,5-tetrachloro-	8270	10
1,1,1,2-Tetrachloroethane	630-20-6	Ethane, 1,1,1,2-tetrachloro-	8010 8021 8260	5 0.05 5

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Common Name[2]	CAS Number[3]	Chemical Abstracts Service Index Name[4]	Suggested Methods[5]	PQL (µg/L)[6]
1,1,2,2-Tetrachloroethane	79-34-5	Ethane, 1,1,2,2-tetrachloro-	8010 8021 8260	0.5 0.1 5
Tetrachloroethylene; Tetrachloroethene;	127-18-4	Ethene, tetrachloro-	8010	0.5
Perchloroethylene			8021 8260	0.5 5
2,3,4,6-Tetrachlorophenol	58-90-2	Phenol, 2,3,4,6-tetrachloro-	8270	10
Thallium	(Total)	Thallium	6010 7840 7841	400 1000 10
Tin	(Total)	Tin	6010	40
Toluene	108-88-3	Benzene, methyl-	8020 8021 8260	2 0.1 5
o-Toluidine	95-53-4	Benzenamine, 2-methyl-	8270	10
Toxaphene	See Note 10	Toxaphene	8080	2
1,2,4-Trichlorobenzene	120-82-1	Benzene, 1,2,4-trichloro-	8021 8120 8260 8270	0.3 0.5 10 10
1,1,1-Trichloroethane; Methylchloroform	71-55-6	Ethane, 1,1,1-trichloro-	8010 8021 8260	0.3 0.3 5
1,1,2-Trichloroethane	79-00-5	Ethane, 1,1,2-trichloro-	8010 8260	0.2 5
Trichloroethylene; Trichloroethene	79-01-6	Ethane, trichloro-	8010 8021 8260	1 0.2 5
Trichlorofluoromethane; CFC-11	75-69-4	Methane, trichlorofluoro-	8010 8021 8260	10 0.3 5
2,4,5-Trichlorophenol	95-95-4	Phenol, 2,4,5-trichloro-	8270	10
2,4,6-Trichlorophenol	88-06-2	Phenol, 2,4,6-trichloro-	8040 8270	5 10
1,2,3-Trichloropropane	96-18-4	Propane, 1,2,3-trichloro-	8010 8021 8260	10 5 15
O,O,0-Triethyl phosphorothioate	126-68-1	Phosphorothioic acid, 0,0,0-triethylester	8270	10
sym-Trinitrobenzene	99-35-4	Benzene, 1,3,5-trinitro-	8270	10
Vanadium	(Total)	Vanadium	6010 7910 7911	80 2000 40
Vinyl acetate	108-05-4	Acetic acid, ethenyl ester	8260	50
Vinyl chloride; Chloroethene	75-01-4	Ethene, chloro-	8010 8021 8260	2 0.4 10
Xylene (total)	See Note 11	Benzene, dimethyl-	8020 8021 8260	5 0.2 5
Zinc	(Total)	Zinc	6010 7950 7951	20 50 0.5

Notes

[1] The regulatory requirements pertain only to the list of substances; the right hand columns (Methods and PQL) are given for informational purposes only. See also footnotes 5 and 6.

[2] Common names are those widely used in government regulations, scientific publications, and commerce; synonyms exist for many chemicals.

[3] Chemical Abstracts Service registry number. Where "Total" is entered, all species in the groundwater that contain this element are included.

[4] CAS index are those used in the 9th Collective Index.

[5] Suggested Methods refer to analytical procedure numbers used in EPA Report SW-846 "Test Methods for Evaluating Solid Waste", third edition, November 1986, as revised, December 1987. Analytical details can be found in SW-846 and in documentation on file at the agency. CAUTION: The methods listed are representative SW-846 procedures and may not always be the most suitable method(s) for monitoring an analyte under the regulations.

[6] Practical Quantitation Limits (PQLs) are the lowest concentrations of analytes in groundwaters that can be reliably determined within specified limits of precision and accuracy by the indicated methods under routine laboratory operating conditions. The PQLs listed are generally stated to one significant figure. PQLs are based on 5 mL samples for volatile organics and 1 L samples for semivolatile organics. CAUTION: The PQL values in many cases are based only on a general estimate for the method and not on a determination for individual compounds; PQLs are not a part of the regulation.

[7] This substance is often called Bis(2-chloroisopropyl) ether, the name Chemical Abstracts Service applies to its noncommercial isomer, Propane, 2,2"-oxybis[2-chloro- (CAS RN 39638-32-9).

[8] Chlordane: This entry includes alpha-chlordane (CAS RN 5103-71-9), beta-chlordane (CAS RN 5103-74-2), gamma-chlordane (CAS RN 5566-34-7), and constituents of chlordane (CAS RN 57-74-9 and CAS RN 12789-03-6). PQL shown is for technical chlordane. PQLs of specific isomers are about 20 μg/L by method 8270.

[9] Polychlorinated biphenyls (CAS RN 1336-36-3); this category contains congener chemicals, including constituents of Aroclor 1016 (CAS RN 12674-11-2), Aroclor 1221 (CAS RN 11104-28-2), Aroclor 1232 (CAS RN 11141-16-5), Aroclor 1242 (CAS RN 53469-21-9), Aroclor 1248 (CAS RN 12672-29-6), Aroclor 1254 (CAS RN 11097-69-1), and Aroclor 1260 (CAS RN 11096-82-5). The PQL shown is an average value for PCB congeners.

[10] Toxaphene: This entry includes congener chemicals contained in technical toxaphene (CAS RN 8001-35-2), i.e., chlorinated camphene.

[11] Xylene (total): This entry includes o-xylene (CAS RN 96-47-6), m-xylene (CAS RN 108-38-3), p-xylene (CAS RN 106-42-3), and unspecified xylenes (dimethylbenzenes) (CAS RN 1330-20-7). PQLs for method 8021 are 0.2 for o-xylene and 0.1 for m- or p-xylene. The PQL for m-xylene is 2.0 μg/L by method 8020 or 8260.

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Statutory Authority: Code of Ala. 1975, §§22-27-3, 22-27-7.
History: November 2, 1993. **Amended:** Filed April 24. 2018; effective June 8, 2018.