

3745-29-01

Definitions.

As used in Chapter 3745-29 of the Administrative Code, the definitions contained in rules 3745-27-01 and 3745-30-01 of the Administrative Code and the following definitions are applicable:

- (A) "Industrial solid waste" or "industrial waste" means a type of solid waste generated by manufacturing or industrial operations and includes, but is not limited to, solid waste resulting from the following manufacturing processes: electric power generation; fertilizer/agricultural chemicals; food and food-related products/by-products; inorganic chemicals; iron and steel manufacturing; leather and leather products; nonferrous metals manufacturing; plastics and resins manufacturing; pulp and paper industry; rubber and miscellaneous plastic products; stone, glass, clay and concrete products; textile manufacturing; and transportation equipment. "Industrial solid waste" does not include solid wastes generated by commercial, agricultural, or community operations. Industrial solid wastes may be disposed in a licensed sanitary landfill facility, a licensed industrial waste landfill facility, or in a licensed residual waste landfill facility, provided that the class number for the residual waste landfill facility is not greater than the class number necessary for that residual waste as determined by the residual waste characterization and landfill classification in accordance with rules 3745-30-03 and 3745-30-04 of the Administrative Code.
- (B) "Industrial solid waste landfill facility" or "industrial waste landfill facility" means a sanitary landfill facility where one or any combination of industrial solid wastes as defined in paragraph (A) of this rule are exclusively disposed, and which has not during its operating life, disposed of significant amounts of "municipal solid waste" as that term is defined in rule 3745-27-01 of the Administrative Code. Nontoxic fly ash, nontoxic bottom ash, nontoxic spent foundry sand, slag, or construction and demolition debris may also be disposed at a residual waste facility.

3745-29-02

Applicability.

- (A) Chapter 3745-29 of the Administrative Code is applicable only to a sanitary landfill facility which, in accordance with paragraph (B) of rule 3745-29-01 of the Administrative Code, may be deemed an industrial solid waste landfill facility.
- (B) Chapter 3745-29 of the Administrative Code is applicable to a facility originally permitted and licensed as an industrial solid waste landfill facility after the effective date of this rule.
- (C) The owner or operator of a facility as specified in paragraph (A) of this rule may submit to the director a complete, signed notification, on forms prescribed by the director, of intent to comply with Chapter 3745-29 of the Administrative Code in lieu of Chapter 3745-27 of the Administrative Code. The owner or operator shall comply with Chapter 3745-29 of the Administrative Code and the facility shall be licensed as an industrial solid waste landfill facility.
- (D) Ohio Administrative Code rules 3745-27-01, 3745-27-02, 3745-27-03, 3745-27-04 and 3745-27-05 apply to Chapter 3745-29 of the Administrative Code.

3745-29-06

Industrial solid waste landfill permit to install application.

- (A) A permit to install application as required by section 3734.05 of the Revised Code shall be submitted, and approved by the director, before the establishment or modification of the industrial solid waste landfill facility is begun. Compliance with this rule shall not exempt any person from compliance with any other permit, license, or other obligation for authorization.
- (1) The permit to install application shall contain all the information required in paragraphs (B) and (C) of this rule, as specified below, so that the director can determine if the criteria set forth in rules 3745-27-02 and 3745-29-07 of the Administrative Code are satisfied. If Ohio EPA determines that information in addition to that required by paragraphs (B) and (C) of this rule is necessary to determine whether the criteria set forth in rules 3745-27-02 and 3745-29-07 of the Administrative Code are satisfied, the applicant shall supply such information as a precondition to further consideration of the permit to install application.
- (a) The permit to install application for a new industrial solid waste landfill facility, to modify an industrial solid waste landfill facility for a lateral expansion, or one that is submitted in response to division (A)(3), (A)(4), or (A)(5) of section 3734.05 of the Revised Code, shall contain all the information required in paragraphs (B) and (C) of this rule with the exception of paragraph (B)(5)(d) of this rule.
- (b) The permit to install application to modify an industrial solid waste landfill facility for a vertical expansion to the upper limits of solid waste placement shall contain the following information:
- (i) All of the plan sheets specified in paragraphs (B)(1), (B)(2), (B)(3)(g), (B)(4), (B)(5) and (B)(6) of this rule.
- (ii) The plan sheet showing the location of proposed explosive gas control system, if necessary, specified in paragraph (B)(3)(f) of this rule.
- (iii) Detail drawings, as necessary, specified in paragraph (B)(7) of this rule.
- (iv) All the reports specified in paragraphs (C)(1), (C)(2) and (C)(7) of this rule.
- (v) The subsurface investigation report, as necessary to provide

- supporting information for the stability analysis, specified in paragraph (C)(3) of this rule.
- (vi) Stability analysis for bearing capacity, static stability, seismic stability and settlement specified in paragraphs (C)(4)(b) to (C)(4)(f) of this rule.
 - (vii) Calculations, as necessary, specified in paragraph (C)(5) of this rule.
 - (viii) The quality assurance/quality control and final closure/post-closure care plans, specified in paragraphs (C)(8)(c) and (C)(8)(d) of this rule.
 - (ix) The letters, description, and list of permits specified in paragraphs (C)(9)(a), (C)(9)(b), and (C)(9)(c) of this rule.
- (c) The permit to install application to modify an industrial solid waste landfill facility for a vertical expansion to the lower limits of solid waste placement shall contain the following information:
- (i) All of the plan sheets specified in paragraphs (B)(1) to (B)(6) of this rule.
 - (ii) Detail drawings, as necessary, specified in paragraph (B)(7) of this rule.
 - (iii) All of the reports specified in paragraphs (C)(1), (C)(2), (C)(3), and (C)(7) of this rule.
 - (iv) Stability analysis for hydrostatic uplift, bearing capacity, static stability, seismic stability and settlement specified in paragraphs (C)(4)(a) to (C)(4)(e) of this rule.
 - (v) Calculations, as necessary, specified in paragraph (C)(5) of this rule.
 - (vi) The explosive gas monitoring and quality assurance/quality control plans specified in paragraphs (C)(8)(b) and (C)(8)(c) of this rule.
 - (vii) The letters, description, and list of permits specified in paragraphs

(C)(9)(a), (C)(9)(b), and (C)(9)(c) of this rule.

(d) The permit to install application to modify a industrial solid waste landfill facility for a change to the information specified in paragraph (C)(7) of this rule shall discuss the change pursuant to paragraph (C)(7) of this rule in addition to the following:

(i) The summary specified in paragraph (C)(1) of this rule.

(ii) Any variance or exemption requests specified in paragraph (C)(2) of this rule.

(iii) If the change is to the authorized maximum daily waste receipt, the calculations showing gross volume and life specified in paragraph (C)(5)(a) of this rule.

(e) The permit to install application to modify a industrial solid waste landfill facility, other than what is listed in paragraphs (A)(1)(b) to (A)(1)(d) of this rule, shall contain the information specified by paragraphs (B) and (C) of this rule that are affected by the change and shall incorporate any alterations that were previously approved for those components affected by the change.

(2) The permit to install application shall contain detail engineering plans, specifications, and information that shall follow the format specified in paragraphs (B) and (C) of this rule. Detail shall be sufficient to allow clear understanding for technical review of the permit application, to provide assurance that the facility is designed and will be operated in accordance with Chapters 3745-29 and 3745-37 of the Administrative Code.

(3) [Reserved.]

(4) For regulatory review purposes, the initial application and any subsequent revisions to the application, shall be submitted in duplicate to the director with a third copy sent to the board of health of the health district where the facility is or will be located. Any revisions to the application must be accompanied by an index listing the change and the page(s) where the change occurred. Upon written request from Ohio EPA, the applicant shall submit two additional and identically complete copies of the revised application to the director and a notarized statement that, to the best of the knowledge of the applicant, the detail engineering plans, specifications, and information in the permit application are true and accurate.

- (5) Concurrent to submitting the permit to install application, the applicant shall also do the following:
 - (a) Submit a disclosure statement to the office of the attorney general as required in rules 109:6-1-01 to 109:6-1-04 of the Administrative Code.
 - (b) Submit to the division of Ohio EPA regulating air pollution control and water pollution control, written notification of intent to site an industrial solid waste landfill facility and a written request for information pertaining to any regulatory requirements under Chapter 3704. or Chapter 6111. of the Revised Code.
 - (6) The permit to install application, notwithstanding any deficiencies, may be considered and acted upon if sufficient information is provided in the application for the director to determine whether the criteria set for in rules 3745-27-02 and 3745-29-07 of the Administrative Code are satisfied.
 - (7) Upon issuance of the permit to install, the director will send one copy of the permit to install and approved permit application to the board of health where the facility is or will be located, will return one copy to the applicant, and will retain two copies in Ohio EPA's files.
 - (8) The permit to install shall remain in effect until the director has discontinued the post-closure care period at the industrial solid waste landfill facility, unless the permit has been revoked or terminated in accordance with rule 3745-27-02 of the Administrative Code.
- (B) Plan sheets. The following detail engineering plans, specifications, and information for an industrial solid waste landfill facility shall be shown by means of drawings and narrative descriptions where appropriate. Minimum dimensions of the plan drawings shall be twenty-four inches by thirty-six inches.
- (1) The detail engineering plan cover sheet, to be numbered sheet 1, shall contain the following information:
 - (a) The name of the industrial solid waste landfill facility.
 - (b) The precise geographic location and boundaries of the industrial solid waste landfill facility and the area within a five-mile radius shown on a road map with a scale of one inch equals no greater than one mile shall be used.

- (c) The name and address of the permit to install applicant and for the industrial solid waste landfill facility.
 - (d) The name and address of the owner(s) and operator(s) of the land to be used for the industrial solid waste landfill facility, if different from the applicant.
 - (e) The name and address of the person who prepared the plans.
 - (f) Index of plan sheets.
- (2) Plan drawings, showing the following items located within the facility boundary or within one thousand feet of the limits of solid waste placement or as otherwise specified in this paragraph, shall contain all information in paragraphs (B)(2)(a) to (B)(2)(c) of this rule. Those items specified in paragraphs (B)(2)(b) and (B)(2)(c) of this rule shall be illustrated on a series of plan drawings which shall be numbered consecutively: 2A, 2B, 2C, etc. All items specified in an individual subheading shall be shown on the same plan drawing or a note shall be on the plan sheet stating the item does not exist within the specified distance of the limits of solid waste placement. An individual plan drawing may contain information specified in more than one individual subheading. A scale of one inch equals no greater than two hundred feet shall be used.
- (a) All plan drawings required by paragraph (B)(2) of this rule shall include the following:
 - (i) The property lines of land owned or leased for the industrial solid waste facility as determined by a property survey conducted by a professional surveyor registered in Ohio.
 - (ii) The limits of solid waste placement.
 - (iii) All occupied structures.
 - (iv) Existing topography showing streams, lakes, springs, wetlands and other surface waters, with a contour interval no greater than five feet.
 - (v) The north arrow.

(vi) The location of all survey marks.

(vii) The facility boundary.

(b) The following based on publicly available information. For the purposes of this rule, "publicly available information" means written or published information from public or private sources that is reasonably available to the public, and includes but is not limited to visual surveys from public right-of-ways and public lands of the area surrounding the proposed industrial solid waste landfill facility and/or written or oral surveys of the landowners around the proposed industrial solid waste landfill facility.

[Comment: As long as the applicant can document that a reasonable attempt was made to obtain the information, the application will be considered complete even if information is lacking (e.g. the written or oral survey is not responded to).]

(i) All zoning classifications, property owners, and political subdivisions.

(ii) All man-made potential explosive gas migration pathways, including underground utilities (sewers, water lines, electric cables), field tiles, french drains, pipelines, and all other potential sources of explosive gas including oil wells and gas wells and other landfills. This requirement applies only to facilities regulated in accordance with rule 3745-27-12 of the Administrative Code.

(iii) The limits of all regulatory flood plains.

(iv) National park or recreation areas, candidate areas for potential inclusion into the national park system, and any state park or established state park purchase areas.

(v) State nature preserves, state wildlife areas, national and state scenic rivers, any national wildlife refuge, special interest areas, research natural areas in the Wayne national forest, outstanding national resource waters, and exceptional coldwater habitats, or exceptional warmwater habitats defined in Chapter 3745-1 of the Administrative Code.

- (vi) All public and private water supply wells within two thousand feet of the limits of solid waste placement (use a scale insert if necessary).
 - (vii) The limits of all wellhead protection areas or ground water source water assessment and protection areas that have been endorsed or delineated by Ohio EPA for a public water supply.
 - (viii) Faults that have had displacement in Holocene time.
 - (ix) All surface and underground mining of coal and noncoal minerals and the angle of draw within two thousand feet of the limits of solid waste placement (use a scale insert if necessary) and all oil and gas wells.
 - (x) The limits of all aquifers declared by the federal government under the Safe Drinking Water Act, 42 U.S.C 300f et. seq. (2003), to be a sole source aquifer.
- (c) The limits of disturbance and the facility boundary. The limits of disturbance includes but is not limited to the limits of excavation, borrow areas, storage areas, staging areas, areas to be cleared and grubbed, and roadways.
- (3) Plan drawings, showing the following items located within three hundred feet of the limits of solid waste placement, shall contain all information in paragraphs (B)(3)(a) to (B)(3)(h) of this rule. Those items specified in paragraphs (B)(3)(a) to (B)(3)(h) of this rule shall be illustrated on a series of plan drawings which shall be numbered consecutively: 3A, 3B, 3C, etc. All items specified in an individual subheading shall be shown on the same plan drawing (unless specified otherwise). An individual plan drawing may contain information specified in more than one individual subheading. A scale of one inch equals no greater than two hundred feet shall be used.
- (a) All plan drawings required by paragraph (B)(3) of this rule shall include those items specified in paragraph (B)(2)(a) of this rule.
 - (b) The location of existing or proposed pipes and conduits, electric lines, french drains, roads, and railroads, and any easements bordering or within the proposed facility boundaries.

- (c) The location of all subsurface investigation sites, which are any location where subsurface conditions are investigated by data collection and/or evaluation, including but not limited to borings, test pits, monitoring wells, piezometers, tensiometers, geophysical survey stations and soil gas survey stations; and all proposed ground water monitoring wells.
 - (d) Potentiometric maps of the uppermost aquifer system and all significant zones of saturation above the uppermost aquifer system (more than one plan sheet may be used).
 - (e) The location of any permanent ground water control structures.
 - (f) The location of any existing or proposed explosive gas control system.
 - (g) A diagram showing the phases of the industrial solid waste landfill facility.
 - (h) The land set aside for leachate treatment/pre-treatment facilities as required in paragraph (K)(5) of rule 3745-29-19 of the Administrative Code.
- (4) Plan drawings for the entire industrial solid waste landfill facility showing the boundaries and elevations of the following items shall be on plan drawings numbered consecutively 4A, 4B, 4C, etc. The scale on these drawings shall be one inch equals no greater than two hundred feet and contour intervals shall be no greater than five feet for slopes less than or equal to twenty-five per cent and ten feet for slopes greater than twenty-five per cent.
- (a) The horizontal and vertical limits of excavation proposed in the permit to install application, showing any areas where added geologic material necessary to comply with the isolation distance requirement in rule 3745-29-07 of the Administrative Code is to be placed.
 - (b) The horizontal limits and top and bottom elevations of the recompacted soil liner proposed in the permit to install application.
 - (c) The top elevation of leachate collection layer, pipe inverts, and layout of the leachate collection and management system(s), including any leachate storage tanks, proposed in the permit to install application.
 - (d) The horizontal limits and top and bottom elevations of all existing waste

and waste placement proposed in the permit to install application. Limits and elevations of existing waste can be determined by surveys. If an industrial solid waste landfill facility was not required or does not have survey results, the owner or operator shall provide justification of the limits shown in the permit to install application. If the authorizing document(s) does not show limits of existing waste placement, then the elevation of final waste placement shall be deemed to be two feet below the final grade shown, unless alternative limits are satisfactorily demonstrated to Ohio EPA.

- (e) If a separatory liner/leachate collection system is required, its horizontal limits and top and bottom elevations.
 - (f) The horizontal limits and top and bottom elevations of the composite cap system; surface water control structures including permanent ditches to control run-on and runoff; and sedimentation ponds including the inlet and outlet; and any permanent ground water control structures proposed in the permit to install application.
 - (g) Establish a grid system with northings and eastings not more than five hundred feet apart.
- (5) Cross sections of the following shall be on plan drawings numbered consecutively 5A, 5B, 5C, etc. and shall clearly show the horizontal and vertical scale used:
- (a) The hydrogeology of the industrial solid waste landfill facility intercepted by borings or other subsurface investigation methods showing the following:
 - (i) Existing topography.
 - (ii) The horizontal and vertical limits of excavation proposed in the permit to install application.
 - (iii) The horizontal limits and top and bottom elevations of any added geologic material.
 - (iv) The horizontal limits and bottom elevations of the recompacted soil liner.

- (v) Geologic stratigraphy and significant zones of saturation corresponding to site-boring information from the subsurface investigation.
 - (vi) The uppermost aquifer system and all saturated stratigraphic units above the uppermost aquifer system.
 - (vii) All subsurface investigation logs, and monitoring well and piezometer construction diagrams, intercepted by the cross-section.
 - (viii) Any permanent ground water control structures.
- (b) The perimeter of the property showing the natural potential explosive gas migration pathways. This requirement applies only to facilities regulated in accordance with rule 3745-27-12 of the Administrative Code.
- (c) The length and width of the industrial solid waste facility dividing the facility into quarters (i.e. three cross-sections in each direction) showing the following:
- [Comment: Additional cross-sections may be submitted.]
- (i) Existing topography.
 - (ii) The proposed horizontal and vertical limits of excavation.
 - (iii) The horizontal limits and top and bottom elevations of all existing waste and all proposed areas of waste placement.
 - (iv) The horizontal limits and top and bottom elevations of the proposed composite cap system.
- (d) If the permit to install application is for a vertical expansion, show the following at an interval no greater than every three hundred feet of length and width of the vertical expansion:
- (i) Limits of existing waste with the date of the survey.

- (ii) Approved and proposed limits of waste placement.
 - (iii) Separatory liner/leachate collection systems.
- (6) Plan drawings showing the systematic development of each phase of the industrial solid waste landfill facility. Each plan drawing numbered consecutively 6A, 6B, 6C, etc. shall show the phase, all previously operated phases, the grid system established in accordance with paragraph (B)(4)(g) of this rule, and all of the following:
- (a) The location of any ground water monitoring wells, piezometers, explosive gas permanent monitors and punch bar stations and alarms, leachate collection and management structures, or surface water control structures to be installed prior to accepting waste in the depicted phase.
 - (b) The extent of waste placement for that phase.
 - (c) The contours of any previously filled phases.
 - (d) The limits of final cover, transitional cover, and intermediate cover on the previously filled phases.
 - (e) The contours of the bottom limits of solid waste placement for the depicted phase.
 - (f) The location of access roads for the depicted phase.
 - (g) The permanent and temporary measures to be utilized to control surface water run-on and runoff, erosion, and any temporary or permanent ground water control structures.
- (7) The following detail drawings shall be on plan drawings numbered consecutively 7A, 7B, 7C, etc.:
- (a) Recompact soil liner, flexible membrane liner, and geosynthetic clay liner (if applicable), the liner cushion layer, leachate collection layer, and filter layer including any engineered components that are constructed through the composite liner system, and the interface between phases.

- (b) Composite cap system, including any engineered components that are constructed through the composite cap system, and surface water control structures.
 - (c) Relationship of the composite cap system to the leachate collection and management system and recompacted soil liner.
 - (d) All leachate collection and management system elements, including but not limited to the following:
 - (i) Leachate collection layer.
 - (ii) Collection pipes, including bedding media and boots.
 - (iii) Filter layer.
 - (iv) Sumps.
 - (v) Conveyance apparatus.
 - (vi) Storage tanks.
 - (e) Permanent ground water control structures, if any.
 - (f) Ground water monitoring well and piezometer construction.
 - (g) Explosive gas control system elements, if any.
 - (h) Separatory liner/leachate collection systems, if applicable.
 - (i) Sedimentation pond and discharge structures and surface water run-on and runoff control structures.
 - (j) Other necessary details, including but not limited to structural fill for berms and subbase, gas collection layer, and transitional cover.
- (C) Reports. The following information shall be presented in narrative form in a report with a table of contents and divided and labeled according to paragraphs and subparagraphs (C)(1) and (C)(9) of this rule.

- (1) Summary. Summary of the facility environs and demonstration that the industrial solid waste landfill facility will meet the criteria for permit approval by the director specified in rules 3745-27-02 and 3745-29-07 of the Administrative Code. The demonstration shall include a discussion of the facility's, owner's, or operator's compliance with the applicable authorizing document(s).
- (2) Variance and exemption requests. Any variance or exemption requests from the requirements in rule 3745-29-07, 3745-29-08, 3745-29-10, 3745-29-11, 3745-27-12, 3745-29-14, 3745-27-15, 3745-27-16 or 3745-29-19 of the Administrative Code.
- (3) Site investigation. A hydrogeologic and geotechnical site investigation report(s), which shall at a minimum include the following:
 - (a) Sufficient information to allow the director to determine the suitability of the site for solid waste disposal through the following:
 - (i) Identification and characterization of the hydrogeology of the uppermost aquifer system and all stratigraphic units that exist above the uppermost aquifer system.
 - (ii) Characterization of the site geology and hydrogeology to allow for the evaluation of the proposed design of the industrial solid waste landfill facility and to ensure that it will be in compliance with the requirements of rule 3745-29-07 and rule 3745-29-10 of the Administrative Code.

[Comment: The narrative portion of the hydrogeologic and geotechnical report focuses on the siting and ground water monitoring issues. The subsurface investigation portion of the report also addresses stability and design issues.]
 - (b) A description, based on publicly available information, of the regional geology and hydrogeology within one mile of the proposed industrial solid waste landfill facility. This shall include, but is not limited to the following:

[Comment: Publicly available information regarding unstable areas is placed in a separate section located in the stability analysis in paragraph (C)(4) of this rule.]

- (i) The identification and average yield of the regional aquifer system(s).
 - (ii) The direction of ground water flow in the regional aquifer system(s).
 - (iii) The identification of recharge and discharge areas of the regional aquifer system(s).
 - (iv) Regional stratigraphy, including any regional stratigraphic or structural features, such as the bedrock surface, bedrock dip, or joint systems, that may influence the ground water flow system.
 - (v) A description of the regional geomorphology, including the location of surface water bodies, flood plains, etc. and a description of any topographic features that may influence the ground water flow system.
- (c) The following documents:
- (i) If any surface or underground mines were identified in accordance with paragraph (B)(2)(b)(ix) of this rule, a letter from the Ohio department of natural resources division of mineral resources management or other appropriate agency verifying type, mining method, location, depth, and status.
 - (ii) Documentation of who owns the mineral rights below the industrial waste landfill facility.
 - (iii) If any oil or gas wells were identified in accordance with paragraph (B)(2)(b)(ix) of this rule, a letter from the Ohio department of natural resources or other appropriate agency verifying type, location, depth and status.
 - (iv) A letter from the army corps of engineers agreeing with the wetland delineation, as depicted on the plan drawing with the information required by paragraph (B)(2)(a)(iv) of this rule, including if appropriate, that no wetlands are present, and if any wetlands are isolated.
- (d) A detailed description and analysis of the geology and hydrogeology

under the proposed industrial solid waste facility. This description shall be based on data collected using appropriate subsurface investigatory methods such as borings, monitoring wells, tensiometers, piezometers, geophysical surveys, soil gas surveys, dutch cone penetrometers, and test pits. The description and analysis shall include, but is not limited to, the following:

[Comment: This information may also be used in the stability analysis required by paragraph (C)(4) of this rule.]

(i) The consolidated and unconsolidated stratigraphic units from the ground surface down to the base of the uppermost aquifer system including the following:

(a) Characteristics, composition and features including the following:

(i) For unconsolidated stratigraphic units, the textural classification using the Unified Soil Classification System (USCS), described in ASTM D2487-00.

(ii) For consolidated stratigraphic units, the rock type(s) such as limestone, dolomite, coal, shale, siltstone, sandstone.

(iii) Color; moisture content; stratigraphic features such as layering, interbedding, or weathering; fracturing, jointing, and other types of secondary porosity; and any visible accessory minerals such as pyrite, calcite or gypsum.

(iv) Hydraulic conductivity.

(b) Thickness.

(c) Lateral extent.

(d) Depth and elevation.

(e) Variations in texture, saturation, stratigraphy, structure, or mineralogy exhibited by each stratigraphic unit that could

influence the ground water flow or quality in the uppermost aquifer system or any overlying zones of saturation.

- (ii) The local geomorphology at the proposed industrial solid waste landfill facility including surface water bodies or topographic features that could influence the ground water flow or quality in the uppermost aquifer system or any overlying zones of saturation.
- (iii) Any local structural geology features under the proposed industrial solid waste landfill facility that could influence the ground water flow or quality in the uppermost aquifer system or any overlying zones of saturation.
- (iv) The uppermost aquifer system and all significant zones of saturation above the uppermost aquifer system. The description shall include the depth to, and lateral and vertical extent of, the uppermost aquifer system and all significant zones of saturation above the uppermost aquifer system. This description and analysis shall include but not be limited to the following:
 - (a) Temporal fluctuations in ground water levels over a period of time to determine the seasonal effects on ground water flow directions.

[Comment: Temporal fluctuations will also be used for determining the temporal high phreatic and piezometric surfaces, required to address stability issues.]
 - (b) An interpretation of the ground water flow system, including hydraulic conductivity, rate of flow, direction of flow, vertical and lateral components of flow, and interconnections between and within the uppermost aquifer system and any significant zones of saturation above the uppermost aquifer system. This interpretation shall be described in both narrative and map form.
 - (c) Identification and characterization of recharge and discharge areas within the boundaries of the proposed industrial solid waste landfill facility. This shall include any relationships of ground water with seeps, springs, streams, and other surface water features.

- (d) Yield of any significant zones of saturation and of the uppermost aquifer system(s).
- (v) If the applicant chooses, site specific justification that an unconsolidated aquifer system capable of sustaining a yield of one hundred gallons per minute for a twenty-four-hour period (based on evidence gathered in accordance with paragraph (C)(3)(b) of this rule), is not located beneath the facility.
- (e) A description and quantification of the ground water quality of the uppermost aquifer system and all significant zones of saturation above the uppermost aquifer system. The description and quantification of ground water quality shall describe and quantify the rate, extent, and concentration of any ground water contamination located under the facility.
- (f) Subsurface investigation information. The following information will be used to prepare the site investigation report narrative required in paragraphs (C)(3)(b), (C)(3)(d), and (C)(3)(e) of this rule and the stability analyses required in paragraph (C)(4) of this rule. All submitted information shall be adequate to satisfy the performance standards of paragraphs (C)(3)(a) and (C)(4) of this rule. At a minimum the information shall include the following:
- [Comment: The narrative portion of the hydrogeologic and geotechnical report focuses on the siting and ground water monitoring issues. The subsurface investigation portion of the report also address stability and design issues.]
- (i) Publicly available information collected and used to prepare the site investigation report narrative required in paragraph (C)(3)(b) of this rule and the plan sheets required in paragraph (B)(2) of this rule. For the purposes of this rule, "publicly available information" means written or published information from public or private sources that is reasonably available to the public, and includes but is not limited to visual surveys from public right-of-ways and public lands of the area surrounding the proposed industrial solid waste landfill facility and/or written or oral surveys of the landowners around the proposed industrial solid waste landfill facility. At a minimum, the publicly available information includes the following:

[Comment: As long as the applicant can document that a

System (USCS), described in ASTM D2487-00.

- (ii) Color.
 - (iii) Moisture content.
 - (iv) Stratigraphic features such as layering, interbedding, or weathering.
 - (v) Structural features such as fracturing or jointing.
 - (vi) Visible accessory minerals such as pyrite, calcite or gypsum.
 - (vii) Rock type such as limestone, dolomite, coal, shale, siltstone or sandstone.
 - (viii) Thickness.
 - (ix) Variations in texture, saturation, stratigraphy, structure or mineralogy in each stratigraphic unit.
- (e) Depth to saturation.
- (f) Hydraulic conductivity, including the following:
- (i) For saturated unconsolidated stratigraphic units, at least one field measurement of hydraulic conductivity per saturated unconsolidated unit and one additional measurement per saturated unconsolidated unit for each twenty acres.
 - (ii) For unconsolidated stratigraphic units, from which an undisturbed sample can be collected, at least one laboratory measurement of vertical hydraulic conductivity per unconsolidated unit and one additional measurement per unconsolidated unit for each twenty acres.
 - (iii) For saturated consolidated stratigraphic units, at least one field measurement of hydraulic conductivity per

saturated consolidated unit and one additional measurement per saturated consolidated unit for each twenty acres.

[Comment: Most field methods for measuring hydraulic conductivity primarily evaluate lateral hydraulic conductivity, but also account for at least some effects of vertical hydraulic conductivity over the tested interval. In cases where laboratory measurements of vertical hydraulic conductivity are obtained for unconsolidated saturated units which are wholly or partially saturated, the vertical hydraulic conductivity should be compared to the field hydraulic conductivity to help evaluate the extent to which near-vertical fractures may be contributing to ground water flow through the unit. Hydraulic conductivity data should be interpreted with respect to the primary and secondary porosity features that are observed or are reasonably expected to occur in the investigated units, as well as the stratigraphic and structural features of the investigated units.]

- (g) Yield of any significant zones of saturation and of the uppermost aquifer.
- (h) If an unconsolidated aquifer system capable of sustaining a yield of one hundred gallons per minute for a twenty-four-hour period is suspected beneath the facility based on evidence gathered in accordance with paragraph (C)(3)(b) of this rule, and the applicant proposes to revise that finding, the applicant must provide adequate site-specific information on the suspected aquifer system to justify any requested revision, including but not limited to the yield of any aquifer systems below the uppermost aquifer system.
- (iii) Construction diagrams of all monitoring wells and piezometers. At a minimum the diagrams shall include the following:
 - (a) The top-of-casing elevation used for water level measurement reference surveyed to the nearest hundredth of a foot.
 - (b) The boring diameter and the inside diameter of the well casing.

- (c) The total depth of the boring and the total depth of the well.
 - (d) The screened interval depth and elevation, and the screen slot size.
 - (e) A description of all construction materials and depth intervals for all construction materials.
- (iv) Data gathered by sampling and analyzing the ground water from the uppermost aquifer system and all significant zones of saturation above the uppermost aquifer system. These samples shall, at a minimum, be analyzed for compounds 1 to 78 listed in appendix I of rule 3745-29-10 of the Administrative Code.
- (v) Information collected at the site and used to prepare the stability analysis required in paragraph (C)(4) of this rule. This information shall be presented on logs appropriate for the subsurface investigatory method used. The subsurface investigatory method(s) and frequency must be adequate to find the unconsolidated stratigraphic units susceptible to bearing capacity failure, static stability failure, seismic stability failure, or settlement, at the site. The information shall be collected for each unconsolidated stratigraphic unit under the facility down to fifty feet below the proposed depths of excavation. At a minimum the information shall include the following:

[Comment: Ohio EPA recommends a frequency of one subsurface investigatory site for every four acres on a more or less uniform grid across the site. However, for sites which are located in areas where landslides or mass movements of unconsolidated material have occurred, or are underlain by complex geology with multiple unconsolidated stratigraphic units, more borings may be necessary pursuant to paragraph (A)(1) of this rule. Sites which are located in areas with a consistent stratigraphy, which is supported by comprehensive and reliable information from previous studies, may use a lower frequency of borings. Ohio EPA recommends against boring through cap, existing waste, or liner to obtain this information. Other methods or increased borings around the landfill footprint should be used.]

[Comment: Given the objective of finding thin unconsolidated stratigraphic units susceptible to bearing capacity failure, static stability failure, seismic stability failure, or settlement, the

unconsolidated stratigraphic units should be logged continuously, and the subsurface investigation may also need to go deeper if publicly available data gathered pursuant to paragraph (C)(4)(g) of this rule or if field data gathered pursuant to paragraphs (C)(3)(d)(i) of this rule indicate that deeper susceptible units exist.]

[Comment: The subsurface investigation conducted to provide the information required by this paragraph may be combined with the subsurface investigation conducted to provide the information required by paragraph (C)(3)(f)(ii) of this rule.]

- (a) Northing and easting location coordinates.
- (b) Surface elevation surveyed to the nearest tenth of a foot.
- (c) Depth interval for each stratigraphic unit.
- (d) Field descriptions of the unconsolidated units. At a minimum the information shall include the following:
 - (i) Textural classification for each unconsolidated stratigraphic unit using the Unified Soil Classification System (USCS), described in ASTM D2487-00.
 - (ii) Color.
 - (iii) Moisture content.
 - (iv) Stratigraphic features such as layering, interbedding, or weathering.
 - (v) For fine-grained unconsolidated units (e.g. silts and clays), field descriptions of consistency and plasticity or dilatancy.
 - (vi) Thickness.
 - (vii) Variations in texture, saturation, stratigraphy, structure or mineralogy in each stratigraphic unit.

(e) Identification of the depth interval of any samples collected including those submitted for laboratory testing.

(f) Depth to phreatic and piezometric surfaces.

[Comment: "Phreatic surface" is synonymous with the term "water table" and "piezometric surface" is synonymous with the term "potentiometric surface." Hydrogeologic investigations generally use "water table" for a water level surface in an unconfined saturated unit and "potentiometric surface" for the pressure head surface associated with a confined saturated unit. In hydrogeologic applications, the "water table" is considered a special type of potentiometric surface where the head pressure is equal to atmospheric pressure.]

[Comment: Any piezometric surfaces associated with bedrock that may affect the facility during excavation or construction may also be identified.]

(g) Results from penetration testing following ASTM D1586-99, plus the corrected and normalized standard penetration number, or results from mechanical cone penetration testing following ASTM D3441-98.

(h) If appendix I of rule 3745-29-08 of the Administrative Code will be used, the vertical hydraulic conductivity of each unsaturated stratigraphic unit.

(vi) Laboratory analysis on representative samples of all the unconsolidated stratigraphic units under the facility down to a minimum of fifty feet below the proposed depths of excavation. The information is used to prepare the stability analysis required in paragraph (C)(4) of this rule. At a minimum the information shall include the following:

[Comment: Undisturbed samples from at least ten per cent of the borings passing through each susceptible unit, or a minimum of three, whichever is greater, should be collected to provide representative data.]

(a) Grain size distribution (sieve and hydrometer curves).

- (b) Atterberg limits.
- (c) Specific gravity.
- (d) In situ unit weight.
- (e) In situ moisture content.
- (f) Dry unit weight.
- (g) For unconsolidated stratigraphic units susceptible to bearing capacity failure, the effective drained or undrained peak shear strength parameters as appropriate using direct shear (ASTM D3080-03), unconsolidated undrained compression (ASTM D2850-03a), or consolidated undrained triaxial compression (ASTM D6467-99).
- (h) For unconsolidated stratigraphic units susceptible to static stability failure or seismic stability failure, the effective shear strength using ASTM D3080-03 (direct shear test) or ASTM D4767-02 (consolidated undrained triaxial compression test), or ASTM D6467-99 (torsional ring shear test).
- (i) For unconsolidated stratigraphic units susceptible to static stability failure or seismic stability failure due to excessive increase in pore pressures from construction and operation activities, the undrained shear strength using fully saturated samples shall be determined using ASTM D2850-03a (unconsolidated-undrained triaxial compression).
- (j) For unconsolidated stratigraphic units susceptible to settlement, the following parameters:
 - (i) The coefficient of consolidation.
 - (ii) The over consolidation ration.
 - (iii) The pre-consolidation pressure.

- (i) Well evacuation.
 - (ii) Sample withdrawal.
 - (iii) Sample containers and handling.
 - (iv) Sample preservation.
- (c) Performance of field analysis, including the following:
 - (i) Procedures and forms for recording data and the exact location, time, and facility-specific considerations associated with the data acquisition.
 - (ii) Calibration of field devices.
- (d) Decontamination of equipment.
- (e) Analysis of ground water samples.
- (f) Chain of custody control, including the following:
 - (i) Standardized field tracking reporting forms to record sample custody in the field prior to and during shipment.
 - (ii) Sample labels indicating a unique sample number date, time, sample media, sample type, analytical methods, any preservatives, and any other information necessary for effective sample tracking.
- (g) Field and laboratory quality assurance and quality control including the following, the number of which shall be enough to adequately demonstrate the accuracy of the analysis results:
 - (i) Collection of duplicate samples.
 - (ii) Submission of field-bias blanks.

(iii) Potential interferences.

(4) Stability analysis. The following analyses establishing the stability of the industrial solid waste landfill facility and the subsurface. The analyses shall provide sufficient information to allow Ohio EPA to sufficiently characterize the facility geology to allow for the evaluation of the proposed design of the industrial solid waste landfill facility.

(a) The hydrostatic uplift analysis shall include the following:

(i) The scope, extent, and findings of the subsurface investigation conducted in accordance with paragraph (C)(3) of this rule, as it pertains to hydrostatic uplift.

(ii) A narrative description of the rationale used for the selection of the analysis input parameters.

(iii) A description of the method used to calculate hydraulic uplift.

(iv) A description of the assessed failure modes and conditions.

(v) A narrative description of the rationale used for the selection of the critical cross section that, at a minimum, shall consider the worst case intersection of the highest phreatic or piezometric surface with the maximum excavation depth.

(vi) A plan drawing showing the greatest temporal high phreatic or piezometric surface (prepared in compliance with paragraph (B)(3)(d) of this rule) and the horizontal and vertical limits of excavation (prepared in compliance with paragraph (B)(4)(a) of this rule).

(vii) A profile view of the critical area that fully depicts the analysis input model including the following:

(a) The material boundaries.

(b) The applicable dimensions including but not limited to the depth of excavation, and depth to the temporal high phreatic and piezometric surfaces.

conducted in accordance with paragraph (C)(3) of this rule, and earthen materials testing program as it pertains to static stability.

- (ii) A narrative description of the rationale used for the selection of the analysis input parameters.
- (iii) A description of the method used to calculate static stability.
- (iv) An assessment of failure modes and conditions that at a minimum should include the following:
 - (a) Deep-seated translational and rotational failure mechanisms of internal slopes, interim slopes and final slopes for drained conditions and, as applicable, undrained conditions.
 - (b) Shallow translational and rotational failure mechanisms of internal slopes and final slopes for saturated conditions and drained conditions.
- (v) For each of the failure modes and conditions assessed, provide a narrative description of the rationale used for the selection of the critical cross sections for the internal slopes, interim slopes, and final slopes.
- (vi) A profile view of the critical cross sections that fully depicts the analysis input model including the following:
 - (a) The material boundaries.
 - (b) The temporal high phreatic and piezometric surfaces.
 - (c) The material types.
 - (d) The in situ unit weights and, where applicable, the in situ saturated unit weights.
 - (e) The material shear strengths.
- (vii) The plan view of the critical cross sections that includes the northings and eastings for the endpoints of the sections.

(viii) A summary of the results using two dimensional limit equilibrium methods or other methods acceptable to the director for each of the critical cross sections.

(ix) The actual calculations and/or computer output.

(d) The seismic stability analysis shall demonstrate that the design meets the specifications in paragraph (C)(13) of rule 3745-29-08 of the Administrative Code and shall include the following:

(i) The scope, extent, and findings of the subsurface investigation conducted in accordance with paragraph (C)(3) of this rule, and earthen materials testing program as it pertains to seismic stability.

(ii) A narrative description of the rationale used for the selection of the analysis input parameters.

(iii) A description of the method used to calculate the seismic stability.

(iv) An assessment of failure modes and conditions that, at a minimum, should include the following:

(a) Deep-seated translational and rotational failure mechanisms of final slopes for drained conditions.

(b) Deep-seated translational and rotational failure mechanisms of internal and interim slopes for drained conditions, if required by the director.

(c) Shallow translational and rotational failure mechanisms of final slopes for drained conditions.

(d) Liquefaction failure mechanisms of internal slopes, interim slopes, and final slopes.

(v) For each of the failure modes and conditions assessed, provide a narrative description of the rationale used for the selection of the critical cross sections for the internal slopes, interim slopes, and final slopes.

- (vi) The profile views of the critical cross sections that fully depict the analysis input model including the following:
 - (a) The material boundaries.
 - (b) The temporal high phreatic and piezometric surfaces.
 - (c) The material types.
 - (d) The in situ unit weights and, where applicable, the in situ saturated unit weights.
 - (e) The material shear strengths.
- (vii) The plan views of the critical cross sections that include the northings and eastings for the endpoints of the section.
- (viii) A summary of the results using two or three dimensional limit equilibrium methods or other methods acceptable to the director for each of the critical cross sections.
- (ix) The actual calculations and/or computer output.
- (e) The settlement analyses of the composite liner system shall include the following:
 - (i) The scope, extent, and findings of the subsurface investigation conducted in accordance with paragraph (C)(3) of this rule, and earthen materials testing program as it pertains to settlement.
 - (ii) A narrative description of the rationale used for the selection of the analysis input parameters.
 - (iii) A description of the method used to calculate the settlement.
 - (iv) A description of the assessed failure modes and conditions.
 - (v) A summary of the results.

- (vi) The actual calculations of settlement and/or computer output.
- (f) If a separatory liner is used and is designed with a slope other than that specified by rule 3745-29-08 of the Administrative Code, the settlement analysis of the separatory liner shall include the following:
 - (i) A narrative description of the rationale used for the selection of the analysis input parameters.
 - (ii) A description of the method used to calculate the settlement.
 - (iii) A description of the assessed failure modes and conditions.
 - (iv) A summary of the results.
 - (v) The actual calculations of settlement and/or computer output.
- (g) A description, based on publicly available information, of unstable areas within one mile of the limits of solid waste placement. For the purposes of this rule, "publicly available information" means written or published information from public or private sources that is reasonably available to the public, and includes but is not limited to visual surveys from public right-of-ways and public lands of the area surrounding the proposed industrial solid waste landfill facility and/or written or oral surveys of the landowners around the proposed industrial solid waste landfill facility. The description shall include the following:

[Comment: As long as the applicant can document that a reasonable attempt was made to obtain the information, the application will be considered complete even if information is lacking (e.g. the written or oral survey is not responded to).]

 - (i) Regional stratigraphic or structural features that are susceptible to bearing capacity failure, static stability failure, seismic stability failure, or settlement.
 - (ii) Areas susceptible to liquefaction.
 - (iii) Areas susceptible to mass movement such as landslides, debris slides and falls, and rock falls.

(iv) Areas impacted by natural and human induced activities such as cutting and filling, draw down of ground water, rapid weathering, heavy rain, seismic activity and blasting.

(v) Presence of karst terrain.

(vi) Presence of underground mining.

(vii) Areas susceptible to coastal and river erosion.

If the industrial solid waste landfill facility is located in any of these unstable areas, provide an analysis that the design meets the specifications in paragraph (C)(12) of rule 3745-29-08 of the Administrative Code.

(5) Calculations. The following design calculations with references to equations used, showing site-specific input and assumptions that demonstrate compliance with the design requirements of rule 3745-29-08 of the Administrative Code:

(a) Calculations showing gross volume of the industrial solid waste landfill facility in cubic yards and anticipated life in years.

(b) Recompacted soil liner thickness calculations, from appendix I of rule 3745-29-08 of the Administrative Code, if any.

(c) Calculations for the leachate head and flow.

(d) If leachate is to be recirculated, calculations for the amount of leachate to be recirculated and the leachate head and flow.

(e) Calculations for sizing any leachate storage tanks based on the volume after final closure.

(f) Pump size and pipe size calculations based on paragraphs (C)(5)(c) and (C)(5)(d) of this rule.

(g) Pipe strength and pipe deflection calculations for the leachate management system.

- (h) An itemized written final closure cost estimate, in current dollars, based on the following:
 - (i) The cost of final closure of a industrial solid waste landfill facility in accordance with rule 3745-29-11 of the Administrative Code.
 - (ii) A third-party conducting the final closure activities, assuming payment to its employees of not less than the applicable prevailing wage.
- (i) An itemized written post-closure care cost estimate, in current dollars, based on the following:
 - (i) The cost of post-closure care of the phase(s) of the industrial waste landfill facility in accordance with rule 3745-29-14 of the Administrative Code.
 - (ii) A third-party conducting the post-closure care activities, assuming payment to its employees not less than the applicable prevailing wage.
- (j) Soil erosion calculations.
- (k) Calculations for sizing surface water control structures and verifying that scouring and crushing is minimized.
- (l) Sedimentation basin calculations.
- (m) Other relevant calculations.
- (6) Construction information. Discussion of the following construction information:
 - (a) Installation of the items specified in rule 3745-29-10 of the Administrative Code.
 - (b) Demonstration of physical and chemical resistance as required in paragraphs (D)(10) and (D)(13) of rule 3745-29-08 of the Administrative Code.
 - (c) Compaction equipment slope limitations.

(7) Operational information. State the following information, which if modified, could require a permit:

- (a) Authorized maximum daily waste receipt, as defined in rule 3745-27-01 of the Administrative Code, requested for the industrial solid waste landfill facility.
- (b) Technique of waste receipt, including but not limited to acceptance of baled waste or loose waste.
- (c) Type of waste to be received, including but not limited to industrial solid waste, residual solid waste, asbestos or asbestos containing waste that is subject to the provisions of NESHAP, 40 CFR Part 61, subpart M, July 1, 2003, or construction and demolition debris.
- (d) Type of equipment to be used to construct, operate, and maintain the industrial solid waste landfill facility.

[Comment: A change in equipment that decreases the capability of the owner or operator to handle the waste received, may be considered to endanger human health and may require a permit.]

(8) Plans. The following plans:

- (a) Ground water detection monitoring program as required in rule 3745-29-10 of the Administrative Code, and, if applicable, the ground water quality assessment plan and/or the corrective measures plan pursuant to rule 3745-29-10 of the Administrative Code.
- (b) Explosive gas monitoring plan in accordance with rule 3745-27-12 of the Administrative Code for a permit to install application for a new industrial solid waste landfill facility or for a lateral expansion of an existing industrial solid waste landfill facility with an occupied structure located within one thousand feet of the limits of solid waste placement.
- (c) The quality assurance/quality control plan for the engineered components addressing the following:
 - (i) Surveying.

(ii) Calibration of testing equipment.

(iii) Sampling and testing procedures to be used in the field and in the laboratory, including but not limited to the following:

(a) Testing required by rule 3745-29-08 of the Administrative Code.

(b) Testing required due to design requirements that must be met.

(c) Voluntary testing.

Procedures shall establish testing frequency, parameters, and sample locations.

(iv) Procedures to be followed if a test fails.

(d) The "final closure/post closure care plan" as detailed in paragraph (B) of rule 3745-29-11 of the Administrative Code.

(9) Notifications and certifications. All applications shall include the following:

(a) Letters of intent to establish or modify a industrial solid waste landfill facility, which include a description of property and facility boundaries, shall be sent via certified mail or any other form of mail accompanied by a receipt to the following entities (copies of these letters of intent with copies of the mail receipts shall be included with the application):

(i) The governments of the general purpose political subdivisions where the industrial solid waste landfill facility is located, i.e., county commissioners, legislative authority of a municipal corporation, or the board of township trustees.

(ii) The single county or joint county solid waste management district.

(iii) The owner or lessee of any easement or right of way bordering or within the proposed facility boundaries that may be affected by the proposed industrial solid waste landfill facility.

(iv) The local zoning authority having jurisdiction, if any.

- (v) The airport administrator and the federal aviation administration, if the placement of solid waste has occurred or will occur within ten thousand feet of any airport runway used by turbojet aircraft or within five thousand feet of any airport runway used by only piston-type aircraft. "Airport" is defined in rule 3745-27-01 of the Administrative Code.
 - (vi) The park system administrator, if any part of the industrial solid waste landfill facility is located within or shares the park boundary.
 - (vii) The conservancy district, if any part of the industrial solid waste landfill facility is located within or shares the conservancy district boundary.
- (b) If the facility exclusively disposes of solid waste generated by the owner of the facility, a description of efforts at the original source of generation to prevent or reduce generation of the industrial solid waste, and efforts to recycle or reuse the industrial solid waste in a manner other than disposal.
- [Comment: The applicant can contact the office of pollution prevention at Ohio EPA for information on source reduction and recycling. The applicant can contact waste exchanges to find a user for the industrial solid waste.]
- (c) A list of the permits, licenses, plan approvals, authorizations or other approvals that have been applied for and the local, state or federal office or agency where application has been made.
 - (d) Proof of property ownership or lease agreement to use the property as an industrial solid waste landfill facility.

3745-29-07

Additional criteria for approval of industrial solid waste landfill facility permit to install applications.

(A) General criteria. The director shall not approve any permit to install application for an industrial solid waste landfill facility unless the director determines that all of the following criteria are met:

- (1) Establishment or modification and operation of the industrial solid waste landfill facility will not violate Chapter 3704., 3734., or 6111. of the Revised Code.
- (2) The industrial solid waste landfill facility will be capable of being constructed, operated, closed, and maintained during the post-closure care period in accordance with Chapter 3745-29 of the Administrative Code, and with the terms and conditions of the permit.
- (3) The applicant, and/or the person(s) listed as owner and operator if the owner and operator are not the applicant, who has previously been or is currently responsible for the management or operation of one of more solid waste facilities, has managed or operated such facility in substantive compliance with applicable provisions of Chapters 3704., 3734., 3714., and 6111. of the Revised Code, and any rules, permits or other authorizations issued thereunder, and has maintained substantial compliance with all applicable orders issued by the director, the Ohio environmental review appeals commission, or courts having jurisdiction in accordance with Chapter 3746-13 of the Administrative Code, in the course of such previous or current management or operations. The director may take into consideration whether substantial compliance has been maintained with any applicable order from a board of health maintaining a program on the approved list and any other courts having jurisdiction.
- (4) The person listed as operator meets the requirements of division (L) of section 3734.02 of the Revised Code and rules adopted thereunder.
- (5) The applicant meets the requirements of sections 3734.42 to 3734.44 of the Revised Code and rules adopted thereunder.

(B) Discretionary criteria. The director may consider, when determining whether or not to approve a permit to install application for an industrial solid waste landfill facility, the following:

- (1) The impact the proposed industrial solid waste landfill facility may have on corrective actions that have been taken, are presently being taken, or are proposed to be taken at the facility or in the immediate area.

- (2) The technical ability of the owner or operator to adequately monitor the impact of the industrial solid waste landfill facility on the environment.
- (C) Design criteria. The director shall not approve a permit to install application unless the director determines that the application conforms to the appropriate paragraphs of rule 3745-29-08 of the Administrative Code as follows:
- (1) New industrial solid waste landfill facilities and lateral expansion areas shall comply with paragraphs (B), (C), and (D) of rule 3745-29-08 of the Administrative Code.
 - (2) A proposed vertical expansion, as defined in rule 3745-27-01 of the Administrative Code, shall do the following:
 - (a) At a minimum, comply with paragraphs (B)(1)(a) and (B)(1)(e) to (B)(1)(h), paragraph (B)(2) as required, paragraph (B)(3) as relevant, paragraphs (C)(4) to (C)(7), and paragraphs (D)(1) to (D)(3) and (D)(18) to (D)(27) of rule 3745-29-08 of the Administrative Code if the expansion is above the authorized fill area of the industrial solid waste landfill facility.
 - (b) At a minimum, comply with paragraphs (B), (C), and (D) of rule 3745-29-08 of the Administrative Code if the vertical expansion is below the authorized fill area of the industrial solid waste landfill facility.

[Comment: If a land fill is permitted to vertically expand below a previously approved, but unfilled, area, that area must be constructed in accordance with current rule requirements.]
 - (3) Vertical expansion construction. For a permit application submitted after the effective date of this rule that includes a vertical expansion over an authorized fill area, the expansion area(s) must be constructed over either of the following:
 - (a) A separatory liner system constructed in accordance with rule 3745-29-08 of the Administrative Code.
 - (b) An authorized fill area that is underlain by a composite liner or engineered liner previously approved by the director, and a leachate collection system.

- (4) Applications for an industrial solid waste landfill facility submitted in response to divisions (A)(3) and (A)(4) of section 3734.05 of the Revised Code shall comply with paragraphs (B), (C), and (D) of rule 3745-29-08 of the Administrative Code, with the exception that filled areas of the industrial solid waste landfill facility shall, at a minimum, meet the requirements of paragraphs (D)(1) to (D)(4), (D)(18) to (D)(23), and (D)(25) to (D)(27) of rule 3745-29-08 of the Administrative Code.
- (5) Permit to install applications exclusively requesting a change in technique of waste receipt, or type of waste received, or type of equipment used, need not comply with rule 3745-29-08 of the Administrative Code.
- (6) Applications exclusively requesting a change in the authorized maximum daily waste receipt (AMDWR) and submitted pursuant to paragraph (E) of this rule need not comply with rule 3745-29-08 of the Administrative Code.
- (7) Other modifications of an industrial solid waste landfill facility, as that term is defined in rule 3745-27-02 of the Administrative Code shall comply with the relevant paragraphs of rule 3745-29-08 of the Administrative Code.

(D) [Reserved.]

(E) Additional criteria for authorized maximum daily waste receipt (AMDWR) applications.

The director shall not approve a permit to install application for a permanent change in the AMDWR for the industrial solid waste landfill facility unless the owner or operator demonstrates that the industrial solid waste landfill facility can operate in compliance with all applicable solid waste regulations while receiving the requested maximum daily waste receipt. An adequate demonstration for an industrial solid waste landfill facility includes, but is not limited to, the following:

- (1) An explanation of the overall facility design including construction time frames and fill sequences for the industrial solid waste landfill facility.
- (2) Operational criteria such as the industrial solid waste landfill facility's equipment availability, cover availability, and manpower.
- (3) If applicable, the owner's or operator's previous compliance history throughout the life of the industrial solid waste landfill facility and the daily logs for any period that the industrial solid waste landfill facility was out of compliance.

[Comment: An application for a temporary increase in the AMDWR must satisfy the criteria specified in rule 3745-37-14 of the Administrative Code.]

(F) [Reserved.]

(G) Applicability of siting criteria.

For the purposes of this rule, an "authorized fill area" is an area within the limits of solid waste placement of an industrial solid waste landfill facility that is authorized, by a permit(s) to install, plan approval, operational report, or other authorizing document(s) to accept industrial solid waste as of the date of submittal of the permit to install application for a lateral or vertical expansion.

The director shall not approve the permit to install application for an industrial solid waste landfill facility unless the director determines that the application meets the criteria specified in paragraph (H) of this rule, as follows:

(1) Call-in permits. An individual solid waste landfill facility for which a permit to install application, including any proposed lateral or vertical expansions, is submitted in response to division (A)(3) or (A)(4) of section 3734.05 of the Revised Code, shall meet all the criteria specified in paragraph (H) of this rule; however, the director may approve the application for one or more noncontiguous areas which meet the criteria specified in paragraph (H) of this rule, even though other areas do not meet the criteria specified in paragraph (H) of this rule.

[Comment: The purpose of a call-in permit is to upgrade a facility to the standards in Chapter 3745-29 of the Administrative Code. The review of a call-in permit should be distinguished from a "voluntary" expansion, or AMDWR permit application. Since the call-in process looks at the entire facility, including any expansions proposed in the call-in application, a voluntary application which by be approvable by itself may not be adequate when viewed in the context of the entire facility. It is the applicant's option to submit voluntary vertical or lateral expansions with the call-in application or to submit a voluntary application before the call-in application.]

(2) Operation changes. A permit to install application that exclusively proposes a substantial change in technique of waste receipt, or type of waste received, or type of equipment used at the industrial solid waste landfill facility, need not comply with the criteria specified in paragraph (H) of this rule.

(3) AMDWR increase. A permit to install application which exclusively proposes a change in the AMDWR limit for the industrial solid waste landfill facility

need not comply with the criteria specified in paragraph (H) of this rule.

(4) Other modification permits. A permit to install application that incorporates a "modification" of the industrial solid waste landfill facility, as that term is defined in rule 3745-27-02 of the Administrative Code, and the modification does not incorporate a capacity increase or otherwise change the vertical or horizontal limits of waste placement, need not comply with the criteria specified in paragraph (H) of this rule.

(5) Vertical expansion. For the purposes of this rule, a vertical expansion, as defined in rule 3745-27-01 of the Administrative Code, includes the proposed vertical expansion and all waste within the vertical projection above or below the proposed vertical expansion. When evaluating a proposed vertical expansion, the director shall apply the following criteria:

(a) All of the criteria specified in paragraph (H) of this rule, except for paragraph (H)(4) of this rule (general setbacks).

[Comment: Paragraph (H)(4) of this rule includes setbacks for natural areas, three hundred feet from facility boundary, one thousand feet from domicile, and two hundred feet from surface waters.]

(b) The criteria specified below apply to all areas of the authorized fill area that are contiguous to the proposed vertical expansion but which are not directly above or below the proposed vertical expansion:

(i) Paragraph (H)(1) of this rule (location in national park, etc.).

(ii) Paragraph (H)(2) of this rule (ground water aquifer system protection).

[Comment: Paragraph (H)(2) of this rule includes protection standards for sand/gravel pits, limestone/sandstone quarries, sole source aquifer system, one hundred gpm aquifer system, and fifteen foot separation distance.]

[Comment: See diagram no. 1 in appendix I of this rule. Vertical expansion permits seek a voluntary vertical change in waste placement boundaries. A decision for final denial of a voluntary vertical expansion permit application does not alter the current authorizing document(s) for the facility. Filling may continue in the authorized fill area in accordance with the applicable authorizing document(s).]

(6) Proposed new landfill or lateral expansion.

A proposed new landfill or a lateral expansion of an existing landfill shall meet all of the criteria specified in paragraph (H) of this rule; however, the director may approve the application for one or more noncontiguous areas proposed in the application that meet the criteria specified in paragraph (H) of this rule, even though other proposed areas do not meet the criteria specified in paragraph (H) of this rule.

(7) "Authorized fill area," that is contiguous or noncontiguous to a proposed lateral expansion.

(a) Noncontiguous authorized fill area. When evaluating a proposed lateral expansion, the criteria specified in paragraph (H) of this rule do not apply to an authorized fill area that is noncontiguous with the lateral expansion proposed in the permit to install application.

[Comment: In this situation, the permit to install application proposes a lateral expansion of the facility that is not contiguous to the currently permitted fill area (the "authorized fill area"). All siting criteria apply to the "lateral expansion"; no siting criteria apply to the authorized fill area. See diagram no. 2 in appendix I of this rule.]

(b) Contiguous authorized fill area. When evaluating a permit to install application that includes a proposed contiguous new unit(s) without a vertical expansion above or below some or all of the authorized fill areas, the following apply:

[Comment: In the situation addressed in this paragraph, the permit to install application proposes a lateral expansion of the facility that is contiguous to the currently permitted fill area (the "authorized fill area"). All siting criteria apply to the "lateral expansion"; however, paragraphs (G)(7)(b)(i) and (G)(7)(b)(ii) of this rule specify the criteria that apply to the authorized fill area. A final denial decision on the voluntary proposed lateral expansion application does not alter the approval to fill in the authorized fill area.]

(i) When evaluating a proposed lateral expansion, the following criteria specified in paragraph (H) of this rule do not apply to the authorized fill area contiguous with the lateral expansion proposed in the permit to install application:

(a) Paragraph (H)(3) of this rule (ground water setbacks).

(b) Paragraph (H)(4) of this rule (general setbacks).

[Comment: Paragraph (H)(3) of this rule includes setbacks for five year time of travel to public water supply well, underground mines, and one thousand feet from water supply well. Paragraph (H)(4) of this rule includes setbacks for natural areas, three hundred feet from facility boundary, one thousand feet from domicile, and two hundred feet from surface waters.]

(ii) When evaluating a proposed lateral expansion, the following criteria always apply to the authorized fill area contiguous to the lateral expansion in the permit to install application:

(a) Paragraph (H)(1) of this rule (location in national park, etc.).

(b) Paragraph (H)(2) of this rule (ground water aquifer system protection).

[Comment: Paragraph (H)(2) of this rule includes protection standards for sand/gravel pits, limestone/sandstone quarries, sole source aquifer system, one hundred gpm aquifer system, and fifteen-foot separation distance.]

(c) Contiguous lateral expansion, authorized fill area, and vertical expansion. When evaluating a permit to install application that includes a proposed contiguous lateral expansion and also includes a vertical expansion above or below some or all of the authorized fill area, the following apply:

(i) Evaluate the vertical expansion component of the permit to install application in accordance with paragraph (G)(5) of this rule, and, if it meets the criteria specified in paragraph (G)(5) of this rule, then

(ii) Evaluate the proposed lateral expansion component of the permit to install application and the authorized fill area in accordance with paragraph (G)(7)(b) of this rule.

[Comment: See diagram no. 3 in appendix I of this rule. If the vertical expansion component does not meet the criteria specified in paragraph (G)(5) of this rule, then the applicant may consider revising the application to meet the requirements specified in

paragraph (G)(7)(b) of this rule. A final denial decision on this voluntary permit does not alter the filling approved in the authorized fill area.]

(H) Siting criteria.

(1) National parks, national recreation areas, and state parks.

The limits of solid waste placement of the industrial solid waste landfill facility are not located within one thousand feet of or within any of the following areas, in existence on the date of receipt of the permit to install application by Ohio EPA:

- (a) National park or recreation area.
- (b) Candidate area for potential inclusion in the national park system.
- (c) State park or established state park purchase area.
- (d) Any property that lies within the boundaries of a national park or recreation area but that has not been acquired or is not administered by the secretary of the United States department of the interior.

The one-thousand-foot setback from the limits of solid waste placement does not apply if the applicant obtains a written authorization from the owner(s) and the designated authority of the areas designated in paragraph (H)(1) of this rule to locate the limits of solid waste placement within one thousand feet. Such authorizations must be effective prior to the issuance date of the permit.

[Comment: Pursuant to division (M) of section 3734.02 of the Revised Code, the limits of solid waste placement cannot be located within these areas.]

If the industrial solid waste landfill facility is located within a park or recreation area and exclusively disposes of wastes generated within the park or recreation area, this paragraph shall not apply.

(2) Ground water aquifer system protection.

- (a) Sand or gravel pit.

The industrial solid waste landfill facility is not located in a sand or gravel pit where the sand or gravel deposit has not been completely removed.

For the purposes of this paragraph, a sand or gravel pit is an excavation resulting from a mining operation where the removal of sand or gravel is undertaken for use in another location or for commercial sale. This term does not include excavations of sand or gravel resulting from the construction of the industrial solid waste landfill facility.

(b) Limestone or sandstone quarry.

The industrial solid waste landfill facility is not located in a limestone quarry or sandstone quarry.

For the purposes of this paragraph, a limestone or sandstone quarry is an excavation resulting from a mining operation where limestone or sandstone is the principal material excavated for use in another location or for commercial sale. This term does not include excavations of limestone resulting from the construction of the industrial solid waste landfill facility.

(c) Sole source aquifer.

The industrial solid waste landfill facility is not located above an aquifer declared by the federal government under the Safe Drinking Water Act, 42 U.S.C 300f et seq. (2003), to be a sole source aquifer prior to the date of receipt of the permit to install application by Ohio EPA.

(d) One hundred gallons per minute (gpm) aquifer system.

The industrial solid waste landfill facility is not located above an unconsolidated aquifer system capable of sustaining a yield of one hundred gpm for a twenty-four-hour period to an existing or future water supply well located within one thousand feet of the limits of solid waste placement of the industrial solid waste landfill facility.

(e) Isolation distance.

The isolation distance between the uppermost aquifer system and the bottom of the recompacted soil liner of a industrial solid waste landfill facility is not less than fifteen feet of in-situ or added geologic material constructed in accordance with rule 3745-29-08 of the Administrative

Code.

(3) Ground water setbacks.

(a) Five year time of travel.

The limits of solid waste placement of the industrial solid waste landfill facility and any temporary or permanent leachate ponds or lagoons are not located within the surface and subsurface areas of either of the following:

- (i) Surrounding an existing or proposed public water supply well through which contaminants may move toward and may reach the public water supply well through underground geologic or man-made pathways within a period of five years.

For purposes of this paragraph, a proposed public water supply well is a well for which plans have been submitted to Ohio EPA for inclusion in a public water supply system on, or before, the date the permit to install application was received by Ohio EPA for which a final denial has not been issued.

- (ii) A wellhead protection area or drinking water source protection area for a public water system using ground water.

For purposes of this paragraph, a wellhead protection area includes areas near or surrounding a public water supply well or well field as delineated by the owner or operator of the public water supply well or well field and endorsed by Ohio EPA. For purposes of this paragraph, a drinking water source protection area for a public water system using ground water includes areas near or surrounding a public water supply well or well field as delineated by Ohio EPA. For the purposes of this paragraph, the prohibition against siting in a drinking water source protection area for a public water system using ground water shall not be effective until a map of the delineated area is sent by Ohio EPA and received by the owner or operator of the relevant public water supply well or well field.

[Comment: Information on wellhead protection areas and a drinking water source protection area for a public water system using ground water may be obtained from Ohio EPA's division of drinking and ground waters.]

(b) Underground mine.

The industrial solid waste landfill facility is not located within an area of potential subsidence due to an underground mine or within the angle of draw of an underground mine in existence on the date of receipt of the permit to install application by Ohio EPA unless the potential impact to the facility due to subsidence is minimized.

[Comment: Removal or filling of the mines is an acceptable method for minimizing the potential for subsidence.]

(c) One thousand feet from water supply well.

The limits of solid waste placement of the industrial solid waste landfill facility are not located within one thousand feet of a water supply well or a developed spring in existence on the date the permit to install application was received by Ohio EPA, unless one or more of the following conditions are met:

(i) The water supply well or developed spring is controlled by the owner or operator of the industrial solid waste landfill facility and provided the following:

(a) The water supply well or developed spring is needed as a source of nonpotable water in order to meet the requirements of the approved permit.

(b) No other reasonable alternate water source is available.

(c) The water supply well or developed spring is constructed to prevent contamination of the ground water.

(ii) The water supply well or developed spring is at least five hundred feet hydrogeologically upgradient of the limits of solid waste placement of the industrial solid waste landfill facility and the applicant demonstrates that the potential for migration of landfill gas to that well or developed spring is minimized.

[Comment: If the applicant does not meet the demonstration, then the limits of solid waste placement must be located at least one thousand feet hydrogeologically downgradient of the water supply well or developed spring.]

[Comment: Constructing a landfill with a composite bottom liner system or an active gas management system is an acceptable means to minimize the potential for gas migration.]

- (iii) The water supply well or developed spring is separated from the limits of solid waste placement of the industrial solid waste landfill facility by a hydrogeologic barrier.
- (iv) The water supply well or developed spring was constructed and is used solely for monitoring ground water quality.

For the purposes of this paragraph, a developed spring is any spring that has been permanently modified by the addition of pipes or a collection basin to facilitate the collection and use of the spring water.

(4) General setbacks.

- (a) One thousand feet from natural areas.

The limits of solid waste placement of the industrial solid waste landfill facility are not located within one thousand feet of the following, that are in existence on the date of receipt of the permit to install application by Ohio EPA:

- (i) Areas designated by the Ohio department of natural resources as either a state nature preserve including all lands dedicated under the Ohio natural areas law, a state wildlife area, or a state wild, scenic or recreational river.
- (ii) Areas designated, owned, and managed by the Ohio historical society as a nature preserve.
- (iii) Areas designated by the United States department of the interior as either a national wildlife refuge or a national wild, scenic or recreational river.
- (iv) Areas designated by the United States forest service as either a special interest area or a research natural area in the Wayne national forest.
- (v) Stream segments designated by Ohio EPA as either a state resource

water, a coldwater habitat, or an exceptional warmwater habitat.

[Comment: Stream segments designated as state resource waters may include some wetlands. Those wetlands that do not meet this designation are addressed in paragraph (H)(4)(d) of this rule.]

- (b) Three hundred feet from property line.

The limits of solid waste placement of the industrial solid waste landfill facility are not located within three hundred feet of the industrial solid waste landfill facility's property line.

- (c) One thousand feet from domicile.

The limits of solid waste placement of the industrial solid waste landfill facility are not located within one thousand feet of a domicile, whose owner has not consented in writing to the location of the industrial solid waste landfill facility, in existence on the date of receipt of the permit to install application by Ohio EPA.

- (d) Two hundred feet from surface waters.

The limits of solid waste placement of the industrial solid waste landfill facility are not located within two hundred feet of areas determined by Ohio EPA or the United States army corps of engineers to be a stream, lake, or wetland.

- (5) The industrial solid waste landfill facility is not located in a floodway, and the limits of solid waste placement and the leachate management system of the industrial solid waste facility are not locate in a regulatory flood plain.

[Comment: Pursuant to division (A) or (G) of section 3734.02 of the Revised Code, an applicant may request a variance or exemption from any of the siting criteria contained in this rule. However, pursuant to division (M) of section 3734.02 of the Revised Code, the director shall not issue a permit, variance or exemption that authorizes a new industrial solid waste landfill facility, or an expansion of an existing industrial solid waste landfill facility, within the boundaries of the areas indicated in paragraph (H)(1) of this rule.]

3745-29-08

Industrial solid waste landfill facility construction.

- (A) **Applicability.** The construction requirements for an industrial solid waste landfill facility specified in this rule are applicable to a particular facility or permit to install application as specified in rules 3745-29-06, 3745-29-07, 3745-29-11, and 3745-29-19 of the Administrative Code.

[Comment: The construction requirements specified in this rule represent the minimum standards that must be met by all industrial solid waste landfill facilities. Authorizing documents such as permits to install also establish construction requirements, but they may be different than the rule requirements based on site specific factors. Since the authorizing document must meet, at a minimum, the requirements in this rule, if there are differences between the requirements in this rule and the authorizing document for the facility, the compliance standard shall be based on the authorizing document. The owner or operator is required to comply with the approved authorizing documents unless changes are required by specific references in this rule or other applicable rules or authorized by a director's action.]

- (B) **Engineered components for industrial solid waste landfill facilities.** The owner or operator shall incorporate the following engineered components in the design and construction of an industrial solid waste landfill facility:

- (1) All industrial solid waste landfill facilities, at a minimum, shall include the following:

(a) Survey marks.

(b) A prepared in-situ foundation.

(c) A composite liner system that includes the following:

(i) A recompacted soil liner.

(ii) A flexible membrane liner.

(d) A leachate collection and management system that includes the following:

(i) A leachate collection layer.

(ii) Leachate collection pipes.

(iii) A filter layer.

- (iv) A sump.
 - (v) Leachate conveyance apparatus.
 - (e) Surface water control structures including sedimentation ponds.
 - (f) A composite cap system that includes the following:
 - (i) A soil barrier layer.
 - (ii) A flexible membrane liner.
 - (iii) A drainage layer.
 - (iv) A cap protection layer.
 - (g) An explosive gas control system.
 - (h) Access roads.
- (2) Supplemental engineered components that may be required to address site specific conditions include, but are not limited to, the following:
 - (a) Permanent ground water control structures to control the impact of ground waters on other engineered components.
 - (b) Structural fill for berms and subbase.
 - (c) Added geologic material to meet the isolation distance requirement of rule 3745-29-07 of the Administrative Code.
 - (d) Liner cushion layer.
 - (e) Leachate storage tanks, if there is no permitted discharge to a public sewer system or a permitted waste water treatment system.
 - (f) Separatory liner/leachate collection systems may include the following components:

- (i) A gas collection layer.
 - (ii) A recompacted soil liner.
 - (iii) A flexible membrane liner.
 - (iv) A leachate collection layer.
 - (v) Leachate collection pipes.
 - (vi) A filter layer.
 - (vii) A geosynthetic clay liner.
 - (g) A gas collection system.
- (3) Optional engineered components that an owner or operator may propose for use in an industrial solid waste landfill facility include, but are not limited to, the following:
- (a) Geosynthetic clay liner in lieu of a portion of the recompacted soil liner of the composite liner system.
 - (b) Geosynthetic clay liner in lieu of the recompacted soil barrier layer of the composite cap system.
 - (c) Engineered subbase for a geosynthetic clay liner in a composite cap system.
 - (d) Transitional cover.
- (C) General design criteria. The objective of the design for any engineered component or system of components shall be to meet or exceed the specifications for design, construction and quality assurance testing required in paragraph (D) of this rule along with the following general design criteria:
- (1) The composite liner system shall be designed to do the following:
 - (a) Serve as a barrier to prevent the discharge of any leachate to ground or

surface waters.

- (b) For new facilities or lateral expansions of existing facilities, the composite liner system shall have at least a 2.0 percent slope in all areas, except along flow lines augmented by leachate collection pipes, after accounting for one hundred percent of the primary consolidation settlement and the secondary consolidation settlement of the compressible materials beneath the facility which includes, as applicable, in-situ soil, added geologic material, structural fill material, and recompacted soil liner.

For the purposes of this paragraph, secondary settlement shall be calculated using a one hundred year time frame or another time frame acceptable to the director.

- (c) For existing facilities where an owner or operator proposes to vertically expand over a composite liner system that was constructed after December 31, 2003, the slope of the existing composite liner system located beneath the vertical expansion shall meet the design standard in paragraph (C)(1)(b) of this rule.

[Comment: When initially designing and constructing a composite liner system, a conservative approach may be necessary to account for further settlement of the underlying materials caused by any potential vertical expansion above the initial design.]

[Comment: An owner or operator may revise the applicable authorizing document(s) or modify the facility, with Ohio EPA approval, to meet the design standard in paragraph (C)(1)(b) of this rule.]

- (d) For existing facilities where an owner or operator proposes to vertically expand over a composite liner system that was constructed before December 31, 2003, the owner or operator shall demonstrate to the director that the existing composite liner system located beneath the vertical expansion maintains, at a minimum, positive drainage in the leachate collection system and has no more than one foot of head of leachate after accounting for the additional waste and one hundred percent of the primary consolidation settlement and the secondary consolidation settlement of the compressible materials beneath the facility which includes, as applicable, in-situ soil, added geologic material, structural fill material, and recompacted soil liner.

For the purposes of this paragraph, secondary settlement shall be calculated using a one hundred year time frame or another time frame

acceptable to the director.

(e) Have a maximum slope based on the following:

(i) Compaction equipment limitations.

(ii) Slope stability.

(2) The separatory liner/leachate collection system shall be designed to do the following:

(a) Serve as a barrier to direct all leachate from new waste placement into the leachate collection system associated with the vertical expansion and to manage any explosive gas generated from the waste placement below the barrier.

(b) Have at least a 10.0 percent constructed grade in all areas except along flow lines augmented by leachate collection pipes, or have some other minimum slope based on a design acceptable to the director.

(c) Have a maximum slope based on the following:

(i) Compaction equipment limitations.

(ii) Slope stability.

(d) The leachate collection and management system portion of the separatory liner shall be designed to limit the level of leachate to a maximum of one foot on the separatory liner throughout the operation and post closure of the facility.

(e) Include a combination of engineered components as listed in paragraph (B)(2)(f) of this rule that will function throughout the operational life and post closure period of the landfill. Alternative specifications to those included in paragraph (D) of this rule may be proposed in any new permit or permit modification.

(f) Minimize the amount of waste filled beneath the separatory liner system needed to obtain the required minimum slope.

(3) The leachate collection and management system shall be designed to do the following:

- (a) Any components located outside of the limits of solid waste placement shall be no less protective of the environment than the industrial solid waste landfill facility by complying with this paragraph.
- (b) The selection and specifications for the materials that will make up the leachate collection layer shall be protective of the flexible membrane liner or the design must include a liner cushion layer.
- (c) Limit the level of leachate in areas other than sumps to a maximum of one foot throughout the operation and post closure of the facility.

For the purposes of this rule, a sump is an excavated depression of limited size that serves as a collection and transfer point for leachate.

- (d) Have at least a 0.5 percent grade for the leachate collection pipes after accounting for one hundred percent of the primary consolidation settlement and ninety-five percent of the secondary consolidation settlement of the compressible materials beneath the facility which includes, as applicable, in-situ soil, added geologic material, structural fill material, and recompacted soil liner.

For the purposes of this paragraph, secondary settlement shall be calculated using a one hundred year time frame or another time frame acceptable to the director.

(4) The composite cap system shall be designed to do the following:

- (a) Minimize infiltration of surface water.
- (b) Serve as a barrier to prevent leachate outbreaks.
- (c) Have at least a 5.0 percent grade in all areas except where surface water control structures are located.
- (d) Have a maximum slope based on the following:
 - (i) Compaction and maintenance equipment limitations.

- (ii) Slope stability.
 - (e) Provide protection for all composite cap system components from the effects of the formation of landfill gas.
- (5) If applicable, the design of the explosive gas control system may utilize a passive venting system or an active extraction system to satisfy air pollution control requirements and shall be designed to maintain explosive gas concentrations below the explosive gas threshold limits. For each permanent or temporary explosive gas monitor, the explosive gas threshold limit is either one hundred percent of the lower explosive limit at the facility boundary, or twenty five percent of the lower explosive limit in structures within the facility's boundary.
- (6) The design of all geosynthetic materials specified in the engineered components, including but not limited to, flexible membrane liners, geosynthetic clay liners, and geosynthetic drainage nets, shall not rely on any of the tensile qualities of these geosynthetic components.
- (7) The design for the stability of all engineered components and the waste mass shall address any configuration throughout the applicable developmental and post closure periods. Potential failures associated with internal, interim and final slopes as these slopes are defined in rule 3745-29-06 of the Administrative Code, shall be used to define the minimum construction specifications and materials that, at a minimum, will meet the following:
- (a) The factor of safety for hydrostatic uplift shall not be less than 1.40 at any location during the construction and operation of the facility.
 - (b) The factor of safety for bearing capacity of any vertical sump risers on the composite liner system shall not be less than 3.0.
 - (c) The factor of safety for static slope stability shall not be less than 1.50 using two dimensional limit equilibrium methods or another factor of safety using a method acceptable to the director when assessed for any of the following failure modes and conditions:
 - (i) Deep-seated translational and deep-seated rotational failure mechanisms of internal slopes, interim slopes, and final slopes for drained conditions and as applicable conditions representing the presence of excess pore water pressure at the onset of loading or unloading. For slopes containing geosynthetic interfaces placed at

grades greater than 5.0 percent, residual shear strength conditions shall be used for any soil to geosynthetic or geosynthetic to geosynthetic interfaces.

[Comment: Ohio EPA considers any failure that occurs through a material or along an interface that is loaded with more than one thousand four hundred forty pounds per square foot to be a deep seated failure mode.]

- (ii) Shallow translational and shallow rotational failure mechanisms of internal slopes and final slopes for unsaturated conditions.

[Comment: Peak shear strengths can be used for most shallow failure modes.]

- (d) The factor of safety for seismic slope stability shall not be less than 1.00 using two or three dimensional limit equilibrium methods, or another factor of safety using a method acceptable to the director when assessed for any of the following failure modes and conditions:

- (i) Deep-seated translational and deep-seated rotational failure mechanisms of final slopes for drained conditions and as applicable conditions representing the presence of excess pore water pressure at the onset of loading or unloading. For slopes containing geosynthetic interfaces placed at grades greater than 5.0 percent, residual shear strength conditions shall be used for any soil to geosynthetic or geosynthetic to geosynthetic interfaces.

If required by the director, deep-seated translational and deep-seated rotational failure mechanisms of interim and internal slopes for drained conditions and as applicable conditions representing the presence of excess pore water pressure at the onset of loading or unloading. For slopes containing geosynthetic interfaces placed at grades greater than 5.0 percent, residual shear strength conditions shall be used for any soil to geosynthetic or geosynthetic to geosynthetic interfaces.

- (ii) Shallow translational and shallow rotational failure mechanisms of final slopes for unsaturated conditions.

- (e) The factor of safety against liquefaction shall not be less than 1.00 for internal slopes, interim slopes and final slopes.

(f) The factor of safety for static slope stability shall not be less than 1.10 using two dimensional limit equilibrium methods or other methods acceptable to the director when assessed for any of the following failure modes and conditions:

(i) If required by the director, shallow translational and shallow rotational failure mechanisms of internal slopes in which the protective soils over the leachate collection layer have reached field capacity. Calculations shall use the maximum head predicted for the fifty year, one hour design storm.

(ii) Shallow translational and shallow rotational failure mechanisms of final slopes in which the cover soils over the drainage layer have reached field capacity. Calculations shall use the maximum head predicted for the one hundred year, one hour design storm.

[Comment: The number of digits after the decimal point indicates that rounding can only occur to establish the last digit. For example, 1.485 can be rounded to 1.49, but not 1.5 or 1.50.]

(D) Design, construction and testing specifications. The owner or operator shall meet or exceed the following specifications in the design, construction, and quality assurance testing of all engineered components of an industrial solid waste landfill facility.

[Comment: The order of the engineered components in this paragraph reflects a logical bottom to top or a typical construction sequencing approach. Reporting requirements will be dependent on which engineered components are being certified. In general, a test pad certification report submitted to Ohio EPA for written concurrence may be used repeatedly in future construction certifications provided the soil properties of the borrow soil remain the same. Pre-construction testing results for borrow soils or shear strength testing results for geosynthetic components may be submitted as often as necessary during the construction process to allow for their continued use. A single construction certification report for each construction project shall be submitted in accordance with rule 3745-29-19 of the Administrative Code to Ohio EPA for written concurrence with all quality assurance testing and for approval of all alterations that are included in the certification report.]

(1) For survey marks: at least three permanent survey marks, with each located on separate sides of the proposed sanitary landfill facility, shall be established prior to any construction and within easy access to the limits of solid waste placement in accordance with the following:

- (a) Survey marks shall be referenced horizontally to the "1927 North American Datum," "1983 North American Datum," or "State Plane Coordinate System" and vertically to the "1929 or 1988 North American Vertical Sea Level Datum" as identified on the 7.5 minute series quadrangle sheets published by the United States geological survey.
- (b) Survey marks shall be at least as stable as a poured concrete monument ten inches in diameter installed to a depth of forty-two inches below the ground surface. Each constructed survey mark shall include a corrosion resistant metallic disk which indicates horizontal and vertical coordinates of the survey mark and shall contain a magnet or ferromagnetic rod to allow identification through magnetic detection methods.
- (c) Survey control standards for the survey marks shall be in accordance with the following:
 - (i) For the first facility survey mark established from the known control point, minimum horizontal distance accuracy shall be one foot horizontal to two thousand five hundred feet horizontal.
 - (ii) For each facility survey mark established from the first facility survey mark, minimum horizontal accuracy shall be one foot horizontal distance to five thousand feet horizontal.
 - (iii) For the first facility survey mark established from the known control point and for each facility survey mark established from the first facility survey mark, minimum vertical accuracy shall be one inch to five thousand feet horizontal.

[Comment: Certification of the establishment of survey marks should follow the requirements in paragraph (H)(6) of this rule.]

- (2) For surface water control structures: surface water run-on and run-off control structures shall comply with the following:
 - (a) Accommodate the peak flow from the twenty-five year/twenty-four hour storm event.
 - (b) Minimize silting and scouring.

- (c) Use non-mechanical means for all permanent structures.
- (3) For sedimentation ponds: sedimentation ponds shall comply with the following:
- (a) Minimum storage volume, excluding sediment volume, shall be based on the larger of the following:
 - (i) The calculated run-off volume from a ten year/twenty-four hour storm event.
 - (ii) The scheduled frequency of pond clean-out, that shall be no more often than once per year, multiplied by 0.125 acre-feet per year for each acre of disturbed area within the upstream drainage area.
 - (b) The principal spillway shall safely discharge the flow from a ten-year/twenty-four hour storm event using non-mechanical means.
 - (c) The inlet elevation of the emergency spillway shall provide flood storage with no flow entering the emergency spillway while allowing flow through the principal spillway during a twenty-five year/twenty-four hour storm event.
 - (d) The combination of principal and emergency spillways shall safely discharge the flow from a one hundred year/twenty-four hour storm event using non-mechanical means.
 - (e) The embankment design shall provide for no less than one foot net freeboard when flow is at the design depth, after allowance for embankment settlement.
- (4) For permanent ground water control structures: permanent ground water control structures shall adequately control ground water infiltration through the use of non-mechanical means such as impermeable barriers or permeable drainage structures. However, no permanent ground water control structures may be used to dewater an aquifer system, except if the recharge and discharge zone of the aquifer system are located entirely within the boundary of the industrial solid waste landfill facility.
- (5) For the in-situ foundation: the unconsolidated or consolidated stratigraphic units that make up the in-situ foundation shall comply with the following:

- (a) Be free of debris, foreign material, and deleterious material.
- (b) Not be comprised of solid waste.
- (c) Not have any abrupt changes in grade that may result in damage to the composite liner system.
- (d) Be proof rolled, if applicable.
- (e) Be determined to have adequate strength to satisfy bearing capacity and slope stability strength requirements.
- (f) Have quality control testing of any stratigraphic units that have not been anticipated and that are more susceptible to slope failure than the stratigraphic units that were tested and reported in the permit to install. This testing shall be in accordance with the following:
 - (i) The effective shear strength of each unconsolidated stratigraphic unit that may be susceptible to slope failure and the recompacted soil liner shall be determined using ASTM D3080-98 (direct shear test) or ASTM D4767-95 (consolidated-undrained triaxial compression test), or ASTM D6467-99 (torsional ring shear test).
 - (ii) The undrained shear strength of all applicable unconsolidated stratigraphic units using fully saturated samples shall be determined using ASTM D2850-95 (unconsolidated-undrained triaxial compression).

[Comment: Record drawings for the bottom of recompacted soil liner are required in the certification report. All necessary surveying should be completed before beginning construction of the recompacted soil liner.]

- (6) For structural fill: rock fills or soil fills for a structural berm or subbase shall comply with the following:
 - (a) Be durable rock for rock fills only.
 - (b) Be free of debris, foreign material, and deleterious material.
 - (c) Not be comprised of solid waste.

- (d) Not have any abrupt changes in grade that may result in damage to the composite liner system.
 - (e) For soil fills, have pre-construction testing of the borrow soils performed on representative samples to determine the maximum dry density and optimum moisture content according to ASTM D698-00a (standard proctor), or ASTM D1557-00 (modified proctor) at a frequency of no less than once for every ten thousand cubic yards.
 - (f) Be constructed in lifts to achieve uniform compaction of soil fills. Each lift shall comply with the following:
 - (i) Be constructed in loose lifts of twelve inches or less.
 - (ii) Be compacted to at least ninety five percent of the maximum dry density as determined by ASTM D698-00a (standard proctor) or at least ninety percent of the maximum dry density as determined by ASTM D1557-00 (modified proctor).
 - (g) Be determined to have adequate strength to satisfy bearing capacity and slope stability strength requirements.
 - (h) Have quality control testing of the soil fills on the constructed lifts performed to determine the density and moisture content according to ASTM D2922-01 and ASTM D3017-01 (nuclear methods), ASTM D1556-00 (sand cone), ASTM D2167-94 (rubber balloon) or other methods acceptable to the director or his authorized representative at a frequency of no less than five tests per acre per lift. The locations of the individual tests shall be adequately spaced to represent the constructed area.
- (7) For added geologic material: added geologic material shall comply with the following:
- (a) Provide at least fifteen feet of isolation distance between the uppermost aquifer system and the bottom of the recompacted soil liner.
 - (b) Be free of debris, foreign material, and deleterious material.
 - (c) Not be comprised of solid waste.

- (d) The soil shall have low permeability, good compactability, cohesiveness, relatively uniform texture, and shall not contain large objects in such quantities as may interfere with its application and intended purpose. The soil shall be a well-compacted loam, silt loam, clay loam, silty clay loam, silty clay or other soil types that can achieve the intended purpose.
- (e) Not have any abrupt changes in grade that may result in damage to the composite liner system.
- (f) Have pre-construction testing of the borrow soils performed on representative samples to determine the following:
 - (i) The maximum dry density and optimum moisture content according to ASTM D698-00a (standard proctor), or ASTM D1557-00 (modified proctor) at a frequency of no less than once for every ten thousand cubic yards.
 - (ii) The recompacted laboratory permeability using ASTM D5084-00e1 (falling head) at a frequency of no less than once for every ten thousand cubic yards.
 - (iii) The grain size distribution according to ASTM D422-63 (sieve and hydrometer) at a frequency of no less than once for every three thousand cubic yards.
- (g) Be constructed in lifts to achieve uniform compaction. Each lift shall comply with the following:
 - (i) Be constructed in loose lifts of twelve inches or less.
 - (ii) Be constructed of a soil with a maximum clod size that does not exceed the lift thickness.
 - (iii) Be compacted to at least ninety five percent of the maximum dry density as determined by ASTM D698-00a (standard proctor) or at least ninety percent of the maximum dry density as determined by ASTM D1557-00 (modified proctor).
 - (iv) Be placed with a soil moisture content that shall not be less than two percent below or more than four percent above the optimum

moisture content as determined by ASTM D698-00a or ASTM D1557-00.

- (v) Have a maximum permeability of one times ten to the negative five centimeters per second (1×10^{-5} cm/sec).
 - (h) Be determined to have adequate strength to satisfy bearing capacity and slope stability strength requirements.
 - (i) Have quality control testing of the constructed lifts performed to determine the density and moisture content according to ASTM D2922-01 and ASTM D3017-01 (nuclear methods), ASTM D1556-00 (sand cone), ASTM D2167-94 (rubber balloon) or other methods acceptable to the director or his authorized representative at a frequency of no less than five tests per acre per lift. The locations of the individual tests shall be adequately spaced to represent the constructed area. Any penetrations shall be repaired using bentonite.
- (8) For recompacted soil liners: the recompacted soil liner shall comply with the following:
- (a) Be at least five feet thick or as follows:
 - (i) An alternate thickness, to be no less than three feet, based on the result of the calculations outlined in appendix I of this rule.
 - (ii) Three feet thick if used in conjunction with a geosynthetic clay liner that meets the specifications in paragraph (D)(9) of this rule.
 - (iii) An alternate thickness, to be no less than one and one-half feet thick, based on the results of the calculations outlined in appendix I of this rule if used in conjunction with a geosynthetic clay liner that meets the specifications in paragraph (D)(9) of this rule.
 - (iv) Two feet thick for the recompacted soil liner component of a separatory liner/leachate collection system.
 - (b) Be free of debris, foreign material, and deleterious material.
 - (c) Not be comprised of solid waste.

- (d) Be placed beneath all areas of waste placement.
- (e) Not have any abrupt changes in grade that may result in damage to the geosynthetics.
- (f) Have pre-construction testing of the borrow soils performed on representative samples and the results submitted to the appropriate Ohio EPA district office no later than seven days prior to the intended use of the material in the construction of the recompacted soil liner. The pre-construction testing shall determine the following:
 - (i) The maximum dry density and optimum moisture content according to ASTM D698-00a (standard proctor), or ASTM D1557-00 (modified proctor) at a frequency of no less than once for every one thousand five hundred cubic yards.
 - (ii) The grain size distribution according to ASTM D422-63 (sieve and hydrometer) at a frequency of no less than once for every one thousand five hundred cubic yards.
 - (iii) The atterberg limits according to ASTM D4318-00 at a frequency of no less than once for every one thousand five hundred cubic yards.
 - (iv) The recompacted laboratory permeability according to ASTM D5084-00e1 (falling head) at a frequency of no less than once for every ten thousand cubic yards.
- (g) Be constructed in lifts to achieve uniform compaction. Each lift shall include the following:
 - (i) Be constructed with qualified soils and the corresponding construction details established by written concurrence from Ohio EPA with the test pad certification report required by paragraph (E) of this rule and the following specifications or an alternative to qualifying soils with a test pad if it is demonstrated to the satisfaction of the director or his authorized representative that the materials and techniques will result in each lift having a maximum permeability of 1×10^{-7} cm/sec and the following specifications:

- (a) With loose lifts of eight inches or less.
 - (b) With a maximum clod size of three inches or half the lift thickness, whichever is less.
 - (c) With one hundred percent of the particles having a maximum dimension not greater than two inches.
 - (d) With not more than ten percent of the particles, by weight, having a dimension greater than 0.75 inches.
-
- (ii) Be compacted to at least ninety five percent of the maximum dry density as determined by ASTM D698-00a (standard proctor) or at least ninety percent of the maximum dry density as determined by ASTM D1557-00 (modified proctor) or an alternative compaction specification approved by the director.
 - (iii) Be placed with a minimum soil moisture content that shall not be less than the optimum moisture content as determined by ASTM D698-00a or ASTM D1557-00 or an alternative soil moisture content specification approved by the director.
 - (iv) Have a maximum permeability of one times ten to the negative seven centimeters per second (1×10^{-7} cm/sec).
-
- (h) Be adequately protected from damage due to desiccation, freeze/thaw cycles, wet/dry cycles, and the intrusion of objects during construction and operation.
 - (i) Be determined to have adequate strength to satisfy bearing capacity and slope stability strength requirements.
 - (j) Have quality control testing of the constructed lifts performed to determine the density and moisture content according to ASTM D2922-01 and ASTM D3017-01 (nuclear methods), ASTM D1556-00 (sand cone), ASTM D2167-94 (rubber balloon), or other methods acceptable to the director or his authorized representative at a frequency of no less than five times per acre per lift. The locations of the individual tests shall be adequately spaced to represent the constructed area. Any penetrations shall be repaired using bentonite.

(9) For geosynthetic clay liners: a geosynthetic clay liner used in lieu of part of the recompacted soil liner pursuant to paragraph (D)(8) of this rule, or in lieu of the recompacted soil barrier layer, pursuant to paragraph (D)(21) of this rule, shall comply with the following:

(a) Be negligibly permeable to fluid migration.

(b) Have a dry bentonite mass per unit area of at least 0.75 pounds per square foot at zero percent moisture content.

(c) Have pre-construction testing of the geosynthetic clay liner material performed on representative samples and the results submitted to the appropriate Ohio EPA district office no later than seven days prior to the intended use of the material. The pre-construction testing shall determine:

(i) The internal drained shear strength using ASTM D6243-98 (direct shear test) at least twice for the initial use and at least once for each subsequent construction event. Tests involving geosynthetic clay liner material shall be conducted with hydrated samples.

[Comment: If a shear stress point plots below the Mohr-Coulomb shear strength failure envelope defined by the required factor of safety, it will be considered a failed test.]

(ii) The dry bentonite mass (at zero percent moisture content) per square foot of geosynthetic clay liners according to ASTM D5993-99 at a frequency of no less than once per fifty thousand square feet.

(iii) The interface shear strength according to paragraph (G) of this rule.

(d) Be installed in the following manner:

(i) To allow no more than negligible amounts of leakage by a minimum overlap of six inches, or, for end-of-panel seams, a minimum overlap of twelve inches. Overlap shall be increased in accordance with manufacturer's specifications or to account for shrinkage due to weather conditions.

(ii) In accordance with the manufacturer's specifications in regards to

handling and the use of granular or powdered bentonite to enhance bonding at the seams.

(iii) Above the recompacted soil liner when used in liner systems or above an engineered subbase pursuant to paragraph (D)(22) of this rule when used in cap systems. Geosynthetic clay liners without internal reinforcement shall not be used in areas beneath leachate collection piping, in sump areas, or on any slope with a grade that is steeper than ten percent.

(iv) On a surface that shall not have any sharp edged protrusions or any particles protruding more than one quarter of one inch.

(10) For flexible membrane liners. The flexible membrane liner shall comply with the following:

(a) Be, at a minimum, a sixty mil high density polyethylene (HDPE) geomembrane for composite liner systems or be, at a minimum, a forty mil geomembrane for composite cap systems or other materials and/or thicknesses acceptable to the director.

(b) Be physically and chemically resistant to attack by the solid waste, leachate, or other materials that may come in contact with it using U.S. EPA method 9090 or other documented data.

(c) Have pre-construction interface testing performed according to paragraph (G) of this rule.

(d) Be placed above and in direct and uniform contact with the recompacted soil liner or the recompacted soil barrier layer or the geosynthetic clay liner.

(e) Be seamed to allow no more than negligible amounts of leakage; the seaming material shall be physically and chemically resistant to chemical attack by the solid waste, leachate, or other materials that may come in contact with the seams.

(f) Have quality control testing in accordance with the following, unless the manufacturer's specifications for testing are more stringent, in which case the manufacturer's specifications shall be used:

- (i) For the purpose of testing every seaming apparatus in use each day, peel tests according to an appropriate method shall be performed on scrap pieces of flexible membrane liner when an apparatus is started, operators change, an apparatus is restarted, or at the beginning of each seaming period.
 - (ii) Nondestructive testing shall be performed on one hundred percent of the flexible membrane liner seams.
 - (iii) Destructive testing for peel according to the appropriate ASTM method shall be performed on randomly selected samples at a frequency of no less than once per five hundred feet of seam completed by a particular seaming apparatus. An alternate means may be used if it is demonstrated to the satisfaction of the director or his authorized representative that the alternate means meets the requirements of this paragraph.
- (11) For the liner cushion layer: the liner cushion layer shall be placed above the flexible membrane liner and protect it from damage that may be caused by construction materials and activities and have pre-construction interface testing performed according to paragraph (G) of this rule.
- (12) For the leachate collection layer: the leachate collection layer shall be placed above the composite liner system which may be protected by the cushion layer and shall comply with the following:
- (a) Be comprised of granular materials that meet the following requirements:
 - (i) Have a minimum thickness of one foot.
 - (ii) Have no more than five percent of the particles, by weight, passing through the two hundred mesh sieve.
 - (iii) Have no more than five percent carbonate content by weight.
 - (iv) Have a minimum permeability of one times ten to the negative two centimeters per second (1×10^{-2} cm/sec).
 - (v) Granular materials shall have quality control testing in accordance with the following at a frequency of no less than once for every three thousand cubic yards of material:

system.

If an owner or operator is proposing a vertical expansion over areas that have leachate collection pipes in place, the leachate collection pipes will be re-evaluated and this performance standard shall be applied to allow for any additional loads or settlement from the vertical expansion. A conservative design may be needed initially to prepare for any possible future expansion.

- (c) Be provided with access for clean-out devices which shall be protected from differential settling.
 - (d) Have lengths and configurations that shall not exceed the capabilities of clean-out devices.
 - (e) Have joints sealed to prevent separation.
 - (f) Be physically and chemically resistant to attack by the solid waste, leachate, or other materials with which they may come into contact. Sealing material and means of access for cleanout devices shall also be resistant to physical and chemical attack by the solid waste, leachate, or other materials with which they may come into contact.
 - (g) An alternative to leachate collection pipes may be used if it is demonstrated to the satisfaction of the director or his authorized representative that the means for leachate transport meet the requirements of this paragraph.
- (14) For filter layers: the filter layer of the leachate collection and management system shall comply with the following:
- (a) Be placed above the leachate collection layer and leachate collection pipes.
 - (b) Be designed to minimize clogging of the leachate collection layer, leachate collection pipes, and sumps.
- (15) For sumps: the leachate collection and management system shall incorporate an adequate number of sumps that shall comply with the following:
- (a) Be protected from adverse effects from leachate and differential settling.

- (b) Be equipped with automatic high level alarms located no greater than one foot above the top elevation of the sump.

- (16) For leachate conveyance apparatus: the leachate collection and management system shall incorporate adequate measures that will automatically remove leachate from the landfill to the leachate storage tank(s), a permitted discharge to a public sewer, or a permitted waste water treatment system to facilitate the transfer of leachate from the storage tank(s) for the purpose of disposal. Any leachate conveyance apparatus located outside of the limits of solid waste placement shall comply with the following:
 - (a) Be monitored, as required by the director or his authorized representative.
 - (b) Be double cased with a witness zone.
 - (c) Be protected from the effects of freezing temperatures, crushing, or excess deflection.

- (17) For leachate storage tanks: leachate storage tanks shall have adequate storage capacity to receive the anticipated amount of leachate removed during normal operations from the leachate sumps to maintain a maximum one foot of head and at a minimum have at least one week of storage capacity using design assumptions simulating final closure completed in accordance with rule 3745-29-11 of the Administrative Code. Any leachate storage tanks located outside of the limits of solid waste placement shall be monitored, as required by the director or his authorized representative, and include one of the following:
 - (a) For above ground leachate storage tanks be provided with spill containment no less than one hundred ten percent of the tank volume.
 - (b) For underground leachate storage tanks, be double cased with a witness zone.

- (18) For access roads: all access roads used for waste hauling that are constructed within the horizontal limits of waste placement shall comply with the following:
 - (a) Not have grades in excess of twelve percent.
 - (b) Be designed to be stable and to prevent damage to the liner or cap systems

caused by the effects of traffic loading and braking or any other action.

(19) For transitional covers: within sixty days of a portion of the facility reaching final elevations, transitional cover, as specified in rule 3745-29-19 of the Administrative Code, shall be installed and comply with the following:

(a) A twenty-four inch thick layer of soil that shall be nonputrescible and have low permeability, good compactability, cohesiveness, and relatively uniform texture, and shall not contain large objects in such quantities as may interfere with its application and intended purpose. The soil shall be a well-compacted loam, silt loam, clay loam, silty clay loam, silty clay or other soil types that can achieve the intended purpose.

(b) The soil shall be of sufficient thickness and fertility to support vegetation and shall be seeded as soon as practicable. Healthy grasses or other vegetation shall form a complete and dense vegetative cover within one year of soil placement.

(c) In preparation for construction of the final cap system in accordance with this paragraph, the transitional cover shall be partially or completely removed or otherwise prepared as necessary for construction of the final cap system.

[Comment: The term transitional cover has replaced the term interim final cover.]

(20) For a gas collection system: the gas collection system shall be installed prior to the final cap system and shall comply with the following:

(a) Collect and transport gas and condensate without adversely impacting the final cap system.

(b) Facilitate maintenance to portions of the component without requiring the entire system to be closed down.

[Comment: Condensate may be allowed to remain in the waste mass provide that there is a composite liner and leachate collection system.]

(21) For cap soil barrier layers: design and construction of a recompacted soil barrier layer in the composite cap system shall comply with the following:

- (a) Be at least one of the following:
 - (i) Eighteen inches thick.
 - (ii) A geosynthetic clay liner that complies with paragraph (D)(9) of this rule with an engineered subbase, constructed in accordance with paragraph (D)(22) of this rule.
- (b) Be free of debris, foreign material, and deleterious material.
- (c) Not be comprised of solid waste.
- (d) Be placed above all areas of waste placement.
- (e) Not have any abrupt changes in grade that may result in damage to the geosynthetics.
- (f) Have pre-construction testing of the borrow soils performed on representative samples and the results submitted to the appropriate Ohio EPA district office no later than seven days prior to the intended use of the material in the construction of the cap soil barrier layer. The pre-construction testing shall determine the following:
 - (i) The maximum dry density and optimum moisture content according to ASTM D698-00a (standard proctor), or ASTM D1557-00 (modified proctor) at a frequency of no less than once for every one thousand five hundred cubic yards.
 - (ii) The grain size distribution according to ASTM D422-63 (sieve and hydrometer) at a frequency of no less than once for every one thousand five hundred cubic yards.
 - (iii) The recompacted laboratory permeability using ASTM D5084-00e1 (falling head) at a frequency of no less than once for every ten thousand cubic yards.
- (g) Be constructed in lifts to achieve uniform compaction. Each lift shall:
 - (i) Be constructed of soil in accordance with the following:

- (a) With loose lifts of eight inches or less.
 - (b) With a maximum clod size of three inches or half the lift thickness, whichever is less.
 - (c) With one hundred percent of the particles having a maximum dimension not greater than two inches.
 - (d) With not more than ten percent of the particles, by weight, having a dimension greater than 0.75 inches.
 - (e) With at least fifty percent of the particles, by weight, passing through the two hundred-mesh screen.
 - (f) Alternative soil specifications may be used provided that it is demonstrated to the satisfaction of the director or his authorized representative that the materials and techniques will result in each lift having a maximum permeability of 1×10^{-6} cm/sec.
- (ii) Be compacted to at least ninety five percent of the maximum dry density as determined by ASTM D698-00a (standard proctor) or at least ninety percent of the maximum dry density as determined by ASTM D1557-00 (modified proctor) or an alternative compaction specification approved by the director.
 - (iii) Be placed with a minimum soil moisture content that shall not be less than the optimum moisture content as determined by ASTM D698-00a (standard proctor), or ASTM D1557-00 (modified proctor) or an alternative moisture content specification approved by the director.
 - (iv) Have a maximum permeability of one times ten to the negative six centimeters per second (1×10^{-6} cm/sec).
- (h) Be adequately protected from damage due to desiccation, freeze/thaw cycles, wet/dry cycles, and the intrusion of objects during construction of the cap system.
 - (i) Have quality control testing of the constructed lifts performed to determine the density and moisture content according to ASTM D2922-01 and

ASTM D3017-01 (nuclear methods), ASTM D1556-00 (sand cone), ASTM D2167-94 (rubber balloon) or other methods acceptable to the director or his authorized representative at a frequency of no less than five tests per acre per lift. The locations of the individual tests shall be adequately spaced to represent the constructed area. Any penetrations shall be repaired using bentonite.

[Comment: If an acceptable demonstration is made that the transitional cover can be prepared to function as a cap soil barrier layer, the director may approve an alteration for the use of the transitional cover materials in the demonstrated area.]

- (22) For engineered subbases: if a geosynthetic clay liner is used in the composite cap system in accordance with paragraph (D)(21) of this rule, it shall be placed above an engineered subbase. Design and construction of the engineered subbase shall comply with the following:
- (a) The thickness of the subbase shall be sufficient to achieve an evenly graded surface and shall be a minimum of twelve inches thick.
 - (b) Be free of debris, foreign material, and deleterious material.
 - (c) Not be comprised of solid waste.
 - (d) Not have any abrupt changes in grade that may result in damage to the geosynthetics.
 - (e) Not have any sharp edged protrusions or any particles protruding more than one quarter of one inch.
 - (f) Have pre-construction testing of the borrow soils performed on representative samples to determine the maximum dry density and optimum moisture content according to ASTM D698-00a (standard proctor), or ASTM D1557-00 (modified proctor) at a frequency of no less than once for every ten thousand cubic yards.
 - (g) Be constructed in lifts to achieve uniform compaction. Each lift shall include the following:
 - (i) Be constructed of soil as follows:

(a) Be constructed in loose lifts of twelve inches or less.

(b) Be constructed of a soil with a maximum clod size that does not exceed the lift thickness.

(ii) Be compacted to at least ninety five percent of the maximum dry density as determined by ASTM D698-00a (standard proctor) or at least ninety percent of the maximum dry density as determined by ASTM D1557-00 (modified proctor).

(h) Have quality control testing of the constructed lifts performed to determine the density and moisture content according to ASTM D2922-01 and ASTM D3017-01 (nuclear methods), ASTM D1556-00 (sand cone), ASTM D2167-94 (rubber balloon) or other methods acceptable to the director or his authorized representative at a frequency of no less than five tests per acre per lift. The locations of the individual tests shall be adequately spaced to represent the constructed area. Any penetrations shall be repaired using bentonite.

[Comment: If an acceptable demonstration is made that the transitional cover can be prepared to function as an engineered subbase, the director may approve an alteration for the use of the transitional cover materials in the demonstrated area.]

(23) For cap geosynthetic clay liners: a geosynthetic clay liner meeting the requirements of paragraph (D)(9) of this rule shall be placed above the engineered subgrade in the composite cap system.

(24) For cap flexible membrane liners: a flexible membrane liner meeting the requirements of paragraph (D)(10) of this rule shall be placed above the recompacted soil barrier layer or the geosynthetic clay liner in the composite cap system.

(25) For the cap drainage layers: the drainage layer for the composite cap system shall comply with the following:

(a) Be comprised of granular materials that meet the following requirements:

(i) Have a minimum thickness of one foot.

(ii) Not clog or freeze.

- (iii) Not damage the underlying flexible membrane liner.
 - (iv) Have no more than five percent of the particles, by weight, passing through the two hundred-mesh sieve.
 - (v) Have no greater than ten percent carbonate content by weight.
 - (vi) Have a minimum permeability of one times ten to the negative three centimeters per second (1×10^{-3} cm/sec).
 - (vii) Granular materials shall have quality control testing in accordance with the following at a frequency of no less than once for every three thousand cubic yards of material:
 - (a) Permeability using ASTM D2434-68 (constant head).
 - (b) Grain size distribution using ASTM D422-63 (sieve).
 - (c) Carbonate content using ASTM D3042-97 at a pH of 4.0.
 - (viii) An alternative material and/or thickness may be used provided it is demonstrated to the satisfaction of the director or his authorized representative that the material meets the requirements of this paragraph. The appropriate quality control testing and frequency of testing needs to be approved by Ohio EPA prior to use.
- (b) A geosynthetic drainage net used in lieu of a granular drainage layer shall meet the following requirements:
- (i) Have a minimum transmissivity to ensure that the cap system meets the slope stability requirements of this rule. The transmissivity shall be adjusted for elastic deformation, creep deformation, biological clogging, and chemical clogging by using the appropriate reduction factors.
 - (ii) The composite liner system must be protected from the intrusion of objects during construction.
 - (iii) Have quality control testing for transmissivity using ASTM D4716-01 at the maximum projected load and a frequency of

once per fifty thousand square feet.

- (iv) Any geosynthetic materials shall have pre-construction interface testing performed according to paragraph (G) of this rule.
- (26) For cap protection layers: a cap protection layer shall comply with the following:
- (a) Be placed above the cap drainage layer.
 - (b) Be a minimum of thirty-six inches thick for facilities located in the northern tier of counties in Ohio (Williams, Fulton, Lucas, Ottawa, Erie, Lorain, Cuyahoga, Lake, Geauga, and Ashtabula counties) and thirty inches thick for facilities located elsewhere in Ohio. The thickness of the drainage layer may be used to satisfy the thickness requirement of the cap protection layer.
 - (c) Have a maximum projected erosion rate of five tons per acre per year.
 - (d) Have sufficient fertility in the uppermost portion to support vegetation.
 - (e) Be constructed as follows:
 - (i) With best management practices for erosion control.
 - (ii) In a manner that healthy grasses or other vegetation shall form a complete and dense vegetative cover within one year of placement.
- (27) For explosive gas control systems: an explosive gas control system shall not compromise the integrity of the cap system, the leachate management system, or the composite liner system, and shall comply with the following:
- (a) Accommodate waste settlement.
 - (b) Provide for the removal of condensate.
 - (c) Prevent lateral movement of explosive gas from the industrial solid waste landfill facility.

(d) Prevent fires within the limits of solid waste placement.

(E) Test pad construction and certification. The construction of the recompacted soil liner shall be modeled by an approved test pad. The test pad shall determine the construction details required to achieve the permeability standard for recompacted soil liners and shall establish a set of parameters for certification of the soils to be used in the construction of the recompacted soil liner. Test pad construction and certification shall comply with the following:

(1) Be designed such that the proposed tests are appropriate and the results of each test are valid.

(2) Have an area large enough to perform valid field permeability testing and a minimum width three times the width of compaction equipment, and a minimum length two times the length of compaction equipment, including power equipment and any attachments.

(3) Have a thickness of no less than thirty inches.

(4) Have the following pre-construction testing performed on representative samples of the test pad construction soils at a minimum frequency of twice per lift for:

(a) The maximum dry density and optimum moisture content according to ASTM D698-00a (standard proctor), or ASTM D1557-00 (modified proctor).

(b) Grain size distribution using ASTM D422-63 (sieve and hydrometer).

(c) Atterberg limits using ASTM D4318-00.

(5) Be constructed as follows:

(a) Prior to the construction of the industrial solid waste landfill component that the test pad will model.

(b) The construction details include the following:

(i) The maximum loose lift thickness.

- (ii) The minimum soil moisture content that shall not be less than the optimum moisture content as determined by ASTM D698-00a or ASTM D1557-00.
 - (iii) The minimum soil dry density that shall not be less than ninety five percent of the maximum "Standard Proctor Density" using ASTM D698-00a or at least ninety percent of the maximum "Modified Proctor Density" using ASTM D1557-00.
 - (iv) The specific type and weight of compaction equipment manufactured for the purpose of compacting cohesive soils.
 - (v) The minimum number of passes of the compaction equipment. For the purpose of this rule, one pass is defined as a single contact of the compactor over an area.
- (6) Be reconstructed as follows:
- (a) With new borrow soil as many times as necessary to meet the permeability requirement.
 - (b) Whenever there is a significant change in soil material properties.
 - (c) Whenever the owner or operator would like to amend the construction details.
- (7) Have quality control testing of the constructed lifts performed to determine the density and moisture content according to ASTM D2922-01 and ASTM D3017-01 (nuclear methods), ASTM D1556-00 (sand cone), ASTM D2167-94 (rubber balloon) or other methods acceptable to the director or his authorized representative at a frequency of no less than three tests per lift. The locations of the individual tests shall be adequately spaced to represent the constructed area. Any penetrations shall be repaired using bentonite.
- (8) Have post-construction testing performed for field permeability using one of the following:
- (a) ASTM D6391-00 (two stage borehole).
 - (b) ASTM D3385-94 (double ring infiltrometer).

- (c) ASTM D5093-90 (sealed double ring infiltrometer).
 - (d) Other methods acceptable to the director or his authorized representative.
- (9) Be described in a certification report, signed and sealed by a professional engineer registered in the state of Ohio, containing a narrative that proposes: the construction details, the range of soil properties that will be used to construct the recompacted soil liner, and the results of all the testing required by this paragraph. The report shall be submitted to the appropriate Ohio EPA district office for written concurrence no later than fourteen days prior to the intended construction of the recompacted soil liner that will be modeled by the test pad.
- (10) An alternative to the test pads required by this rule may be used if it is demonstrated to the satisfaction of the director or his authorized representative that the alternative meets the permeability requirements in this rule.
- (F) [Reserved.]
- (G) Pre-construction interface testing and reporting. The specific soils and representative samples of the geosynthetic materials that will be used at the site shall be tested for interface shear strength over the entire range of normal stresses that will develop at the facility. Prior to the initial use of each specific geosynthetic material(s) in the construction of engineered components at a facility, the appropriate shear strengths for all soil to geosynthetic and geosynthetic to geosynthetic interfaces that include the material(s) shall be determined at least twice using ASTM D5321-92 (direct shear test) or ASTM D6243-98 (direct shear test for GCL) and at least once for each subsequent construction event using samples of the materials identified by the initial two tests to be at the highest risk for slope failure. Tests involving the flexible membrane liner interface shall be conducted with a recompacted soil that has the highest moisture content and the lowest density specified for construction of the recompacted soil liner. Tests involving geosynthetic clay liner material shall be conducted with hydrated samples. The results of pre-construction testing required by this rule must meet all applicable specifications in this rule and the set of approved parameters in the permit to install application that were established by the slope stability analysis and shall be evaluated and signed and sealed by a professional engineer registered in the state of Ohio and submitted to the appropriate Ohio EPA district office no later than seven days prior to the intended use of the materials.

[Comment: If a shear stress point plots below the shear strength failure envelope defined by the required factor of safety, it will be considered a failed test.]

[Comment: In order to initially test a soil to geosynthetic interface, one should run two tests over the entire range of normal stress to determine the shear strength failure envelope of that interface. Each test should consist of a representative sample of soil and geosynthetic.]

(H) Construction certification report. Pursuant to rule 3745-29-19 of the Administrative Code, a construction certification report shall be prepared and signed and sealed by a professional engineer registered in the state of Ohio and other professionals skilled in the appropriate discipline(s) and submitted to Ohio EPA and to the approved health department. Copies of the daily construction activity logs must be kept at the facility and upon request made available to Ohio EPA. The construction certification report shall include the following:

(1) A narrative section that identifies the engineering components that were constructed during the construction event and includes the following:

(a) A summary of the design and construction specifications given in the approved permit to install and a comparison with the components that were constructed during the construction event.

(b) A summary of how construction was impacted by weather and equipment limitations and other difficulties encountered.

(2) All alterations and other changes that relate to the installation of any of the components to be certified are to be presented as follows:

(a) A listing of all alterations previously concurred with by Ohio EPA.

(b) All alteration requests and supporting documentation which are proposed for concurrence. The alteration request shall be equivalent or more protective than the approved permit to install.

[Comment: Rule 3745-29-19 of the Administrative Code requires that the owner or operator obtain Ohio EPA's written concurrence with the certification report prior to placing waste in the phase. If an alteration will be submitted within a certification report, it is highly recommended that the appropriate district office of Ohio EPA be notified prior to construction. Ohio EPA may not concur with alterations submitted after they are constructed. If this occurs, reconstruction or amendment of the altered component will be required prior to waste placement.]

(c) A list of any other changes made by the owner or operator which do not

require Ohio EPA concurrence but which affect construction or the record drawings.

[Comment: The listing of these changes is for Ohio EPA's informational purposes only.]

- (3) Results of all testing required by this rule and the quality assurance/quality control plan for the construction of any engineered component or group of components. If the results of pre-construction testing of borrow soils were submitted in a format that is acceptable to Ohio EPA, only summary tables of data need to be included in the construction certification report.

However, if a quality assurance/quality control plan is not required by the applicable authorizing document(s), including an approved permit(s) to install, plan approval, operational report, or approved closure plan, the owner or operator shall include the results of testing, testing procedures, sampling frequency and location, parameters tested for, etc., performed to certify compliance with this rule.

[Comment: All quality assurance/quality control tests that do not meet the specifications outlined in this rule or the approved permit to install are failed tests that must be investigated and assessed. An area with a verified failure must be reconstructed to meet specifications. Reconstructed areas shall be retested at a frequency acceptable to the director. Reconstruction and retesting shall be performed in accordance with rule 3745-29-19 of the Administrative Code.]

- (4) Results of all surveys required by this rule, the quality assurance/quality control plan, or the approved permit to install for the construction of any engineered component or group of components. Survey data shall at a minimum be reported in a table(s) at the northing and easting for each designated survey point established to be no more than one hundred feet apart. The northings and eastings shall be based on the grid system established in the permit in accordance with rule 3745-29-06 of the Administrative Code. If the permit to install does not establish a grid system, the owner or operator shall establish a grid system for the purposes of construction certification. Additional points should be established at grade breaks and other critical locations.
 - (a) For the purpose of confirming the constructed elevations of the composite liner system and its distance to the uppermost aquifer system, the bottom of recompacted soil liner elevations shall be compared to the elevations in the approved permit to install.

(b) The survey grid shall also be used to demonstrate the thickness of the following constructed components with a comparison of the constructed thickness to the thickness specified in the approved permit to install:

- (i) Added geologic material.
- (ii) The recompacted soil liner.
- (iii) The leachate collection layer.
- (iv) The separatory soil barrier layer.
- (v) The separatory leachate collection layer
- (vi) The cap drainage layer.
- (vii) The cap protection layer.

(5) Record drawings of the constructed facility components showing the following:

- (a) Plan views with topographic representation with the elevations of the top of recompacted soil liner and the location of any berms and leachate collection pipes with inverts noted.
- (b) Plan views with topographic representation with the elevations of the top of the separatory soil barrier layer and the location of any berms and leachate collection pipes with inverts noted.
- (c) Plan views with topographic representation with the horizontal limits of all existing waste and the top elevations of the composite cap system and surface water control structures including permanent ditches to control run on and run off; and sedimentation ponds including the inlet and outlet; and any permanent ground water control structures.
- (d) Plan views of the deployment of the flexible membrane liner panels and the location and identification of the destructive tests and all repairs.
- (e) The location and as-built detail drawings of all components to be certified using the same views as required in rule 3745-29-06 of the Administrative Code.

- (f) If the certification report is submitted for the composite cap system, cross sections showing the top elevations of the existing waste, top elevations of the composite cap system, and the elevations of the surface water management system. The cross sections shall be taken at the same locations and using the same scale as in the approved permit to install. Otherwise, the cross sections shall be taken at an interval no greater than every three hundred feet of length and width.
- (6) After the initial construction and establishment of facility survey marks, the following information summarizing the activities performed to construct and establish the facility survey marks:
- (a) An identification and description of the known control point(s) used to establish the horizontal and vertical coordinate(s) of the facility survey marks.
 - (b) The horizontal and vertical coordinates of the known control point(s) and facility survey marks.
 - (c) A summary of surveying activities performed in determining the coordinates of the facility survey marks.
 - (d) A copy of the 7.5 minute series quadrangle sheet(s) used in establishing the survey marks with the known control point(s) and the location of the facility survey marks clearly identified.
 - (e) A detailed drawing(s) illustrating the design of the facility survey marks, as constructed.
- (7) Qualifications of testing personnel. A description of the experience, training, responsibilities in decision making, and other qualifications of the personnel that provided construction oversight and conducted all the testing on the engineered components for which the certification report is submitted.
- (8) Documentation demonstrating that any oil or gas wells that have been identified within the limits of solid waste placement have been properly plugged and abandoned in accordance with Chapter 1509. of the Revised Code prior to any construction in the area of the well(s).
- (9) A notarized statement that, to the best of the knowledge of the owner or operator, the certification report is true, accurate, and contains all information

required by this rule and by a quality assurance/quality control plan.

[Comment: A recommended format for the certification report will be developed by Ohio EPA]

3745-29-10

Ground water monitoring program for an industrial solid waste landfill facility.

(A) The owner or operator of an industrial solid waste landfill facility permitted and operating, undergoing closure, conducting post-closure care, or with an approved closure plan under Chapter 3745-29 of the Administrative Code shall comply with the requirements of rule 3745-30-08 of the Administrative Code and as follows:

(1) A ground water monitoring plan previously submitted as part of an industrial solid waste landfill facility permit to install or closure plan shall remain in effect until sixty days after the owner or operator submits to Ohio environmental protection agency a revised plan complying with rule 3745-30-08 of the Administrative Code.

(2) An alternate parameter list previously submitted and approved by the director or his authorized representative shall remain in effect.

[Comment: The owner/operator of an industrial solid waste landfill regulated under Chapter 3745-29 of the Administrative Code is only required to revise the portions of their current ground water monitoring plan that do not comply with this rule and are not required to submit a whole new plan. All variance approvals issued under the provisions of Chapter 3745-29 of the Administrative Code continue in effect.]

(3) A permit applicant acting in compliance with paragraph (C)(3)(e) of rule 3745-29-06 of the Administrative Code shall analyze the ground water using appendix III (H) of rule 3745-30-08 of the Administrative Code.

(4) An owner or operator acting in compliance with paragraph (M)(5) of rule 3745-29-19 of the Administrative Code shall analyze the leachate using appendix III (H) of rule 3745-30-08 of the Administrative Code.

3745-29-11

Final closure of an industrial solid waste landfill facility.

(A) For all industrial solid waste landfill facilities, the owner or operator shall submit a "final closure/post-closure plan" containing the information specified in paragraph (B) of this rule to the director not later than one hundred and eighty days prior to the anticipated date to cease accepting solid waste. The owner or operator of an industrial solid waste landfill facility that ceased acceptance of waste prior to June 1, 1994, as determined by the notification required by paragraph (E) of this rule, which has not submitted the final closure certification report in accordance with paragraph (J) of this rule, shall comply with paragraphs (F) and (G) to (L) of this rule, and rules 3745-29-10 and 3745-29-16 of the Administrative Code.

(B) Final closure/post-closure plan. The owner or operator shall prepare a final closure/post-closure plan in accordance with this rule for the industrial solid waste landfill facility, which shall, at a minimum, contain all the items specified in paragraphs (B)(1) to (B)(10) of this rule.

(1) The name and location of the facility.

(2) Any variances or exemptions from the requirements of this rule or rule 3745-29-14 of the Administrative Code or any alternative schedule for completing final closure activities.

[Comment: If a variance, exemption, or alternative schedule is identified, the request must be submitted to the director and must be received prior to approval; otherwise, the rule requirements are applicable and enforceable.]

(3) The name, address, and telephone number of the person or office to contact regarding the industrial solid waste landfill facility during the final closure and post-closure care periods.

(4) The following information to be presented in the same manner as outlined in rule 3745-29-06 of the Administrative Code:

(a) Plan drawings of the horizontal limits and top elevations of waste and the cap system; and surface water control structures including permanent ditches to control run-on and runoff; and sedimentation ponds including the inlet and outlet.

(b) Establish a grid system with northings and eastings not more than five hundred feet apart.

(c) Detail drawings of the cap system including but not limited to the key trench, any penetrations, cap drainage structures, and surface water

drainage structures.

- (d) Detail drawings of sedimentation pond and discharge structures and surface water run-on and runoff control structures.
 - (e) Static and seismic stability analysis.
 - (f) The ground water detection monitoring plan.
 - (g) The financial assurance information in accordance with rules 3745-27-15 and 3745-27-16 of the Administrative Code.
- (5) Description of availability and suitability of cap material.
- (6) Quality assurance/quality control plan for cap system construction.
- (7) Explosive gas monitoring plan in accordance with rule 3745-27-12 of the Administrative Code if an occupied structure is located within one thousand feet of the limits of solid waste placement of the industrial solid waste landfill facility and the industrial solid waste facility does not meet one of the exclusions specified in paragraph (A)(9) of rule 3745-27-12 of the Administrative Code.
- (8) Schedule of installation of any explosive gas control systems.
- (9) Description of anticipated measures to control erosion.
- (10) Contingency plans for leachate, fire, differential setting.
- (C) Mandatory closure. The owner or operator shall begin final closure activities in accordance with the final closure/post-closure plan and paragraph (G) of this rule no later than seven days after any of the occurrences specified in this paragraph. Approval of the final closure/post-closure plan does not affect the owner's or operator's obligations to begin and complete final closure activities in accordance with paragraphs (G) and (H) of this rule. It is mandatory to begin closure activities for an industrial solid waste landfill facility upon the occurrence of any of the following:
- (1) A solid waste disposal license issued for the industrial solid waste landfill facility has expired, and another license has not been applied for in the

manner prescribed in Chapter 3745-37 of the Administrative Code.

- (2) A solid waste disposal license issued for the industrial solid waste landfill facility has expired, and another license has been applied for and denied as a final action.
 - (3) A solid waste disposal license issued for the industrial solid waste landfill facility has been revoked as a final action.
 - (4) A solid waste disposal license issued for the industrial solid waste landfill facility has been suspended as a final action.
 - (5) The owner or operator declares that an industrial solid waste landfill facility will cease acceptance of waste for disposal by a date certain.
 - (6) All approved limits of solid waste placement have been reached, as specified in the plan approval, operational report, or permit to install, whichever is applicable, for an industrial solid waste landfill facility.
- (D) Notification of anticipated date to cease acceptance of solid waste.
- (1) The owner or operator shall provide notice by certified mail or any other form of mail accompanied by a receipt not less than ninety days prior to the anticipated date on which the industrial solid waste landfill facility will cease to accept solid waste if final closure is or will be triggered for the industrial solid waste landfill facility by any of the following occurrences:
 - (a) Paragraph (C)(1) of this rule.
 - (b) Paragraph (C)(5) of this rule.
 - (c) Paragraph (C)(6) of this rule.
 - (2) The owner or operator shall send a copy of the notice specified in paragraph (D)(1) of this rule to the following:
 - (a) The board of health having jurisdiction.
 - (b) The single or joint county solid waste planning district in which the facility is located.

- (c) The director.
- (3) Concurrently with the submission of the notice required by paragraph (D)(1) of this rule, the owner or operator shall commence publishing at three-week intervals, prominent notice of the anticipated date on which solid waste will cease to be accepted at the industrial solid waste landfill facility. Such notice shall be published in the county in which the industrial solid waste landfill facility is located and in any other county which has been a source of at least twenty-five per cent of the solid wastes deposited at the industrial solid waste landfill facility over the previous twelve months of operation. Notice shall be provided to the director and the board of health having jurisdiction that affirms the notices have been published in accordance with this paragraph.
- (4) The public notice requirement shall not apply to an industrial solid waste landfill facility, owned by a generator, exclusively disposing of solid wastes generated at premises owned by the generator.
- (5) Not less than thirty days prior to the anticipated date on which the facility will cease to accept solid waste, notice shall be provided by certified mail or any other form of mail accompanied by a receipt to the director of any changes to the information that identifies the facility's final closure contact person.
- (E) The owner or operator shall send notification by certified mail or any other form of mail accompanied by a receipt to the director and to the board of health having jurisdiction, as to the actual date that the industrial solid waste landfill facility ceased to accept solid waste. Notification shall be sent to the director and the board of health having jurisdiction not later than seven days after the date specified in the notification.
- (F) The owner or operator shall begin final closure activities of the industrial solid waste landfill facility, not later than seven days after any of the occurrences in paragraph (C) of this rule. Final closure activities for an industrial solid waste landfill facility shall include, at a minimum, the items specified in paragraphs (G) and (H) of this rule.
- (G) Cap system. The owner or operator shall construct a cap system in accordance with either of the following:
 - (1) The design approved in the permit or in a subsequently approved alteration.
 - (2) If an industrial solid waste landfill facility has areas which have been capped, graded, and seeded in accordance with paragraphs (C)(1) to (C)(4) of rule

3745-27-10 of the Administrative Code, as effective July 29, 1976, or in accordance with paragraph (C)(16) of rule 3745-29-08 of the Administrative Code, effective June 1, 1994, those areas need not have a cap system as required by rule 3745-29-08 of the Administrative Code. Any area to which this provision applies shall be defined by detail engineering plans, to be submitted not later than May 1, 2001.

(H) Other closure activities

- (1) The owner or operator shall continue to comply with rule 3745-29-19 of the Administrative Code and all monitoring and reporting activities required during the operating life of the industrial solid waste facility until closure certification is submitted and the post-closure care period begins.
- (2) The owner or operator shall install the required surface water control structures including permanent ditches to control run-on and runoff and sedimentation pond(s), as shown in the final closure/post-closure plan, and as necessary, grade all land surfaces to prevent ponding of water where solid waste has been placed and institute measures to control erosion.

[Comment: The minimum slope standard in OAC rule 3745-29-08 is a design standard. For closure certification, it is not necessary to regrade the site if there is not a ponding problem, even if the slope no longer meets the design in the closure/post-closure plan.]
- (3) The owner or operator shall design and install a ground water monitoring system in accordance with rule 3745-29-10 of the Administrative Code, if a system is not already in place.
- (4) The owner or operator shall bait for rodents and treat for other vectors as necessary.
- (5) The owner or operator shall record on the plat and deed to the industrial solid waste landfill facility property, or on some other instrument which is normally examined during title search, that will in perpetuity notify any potential purchaser of the property that the land has been used as industrial solid waste landfill facility, a notation describing the impacted acreage, exact location, depth, volume, and nature of solid waste deposited in the industrial solid waste landfill facility.
- (6) After ceasing acceptance of waste at an industrial solid waste landfill facility, the owner or operator shall post signs, in such a manner as to be easily visible

from all access roads leading onto the industrial solid waste landfill facility, stating in letters not less than three inches high that the industrial solid waste landfill facility no longer accepts solid waste. Signs shall be maintained in legible condition for not less than two years after final closure activities have been completed. This paragraph shall not apply to industrial solid waste landfill facilities owned and permitted by a generator of solid wastes if the industrial solid waste landfill facility exclusively disposes of solid wastes generated at the premises owned by the generator.

- (7) After ceasing acceptance of waste at an industrial solid waste landfill facility, the owner or operator shall block, by locked gates, fencing, or other sturdy obstacles, all entrances and access roads to the industrial solid waste landfill facility to prevent unauthorized access during the final closure and post-closure period.
- (I) Final closure activities shall be completed not later than one year after any of the occurrences in paragraph (C) of this rule, unless an alternate schedule has been approved by the director.
- (J) Final closure certification. Not later than ninety days after the completion of final closure activities, the owner or operator shall submit to the director, and to the board of health having jurisdiction, a written certification report. The final closure certification shall include verification that the industrial solid waste landfill facility has been closed in accordance with this rule and the "final closure/post-closure plan". The final closure certification shall at a minimum include the following:
 - (1) A list of the construction certification reports for construction of the cap system with the date of submittal and a topograph map of the entire industrial waste landfill facility showing the areas certified by each report. The map shall also show the horizontal limits of waste placement and the surface water control structures including permanent ditches to control run-on and runoff, and the following if present: the sedimentation pond(s) including the inlet and outlet, the outlet of any permanent ground water control structures, and the explosive gas control system.
 - (2) A demonstration that the ground water monitoring system meets the requirements of rule 3745-29-10 of the Administrative Code.
 - (3) A copy of the plat and deed or other instrument which is normally examined during a title search, showing the notation required by paragraph (H)(5) of this rule and bearing the mark of recordation of the office of the county recorder for the county in which the property is located.

- (4) A demonstration that the sign, if required by paragraph (H)(6), has been posted, and that all entrances and access roads have been blocked as required by paragraph (H)(7) of this rule.

- (K) The health commissioner and the director, or their authorized representatives, upon proper identification, may enter any part of the industrial solid waste landfill facility at any time during the final closure period for the purpose of determining compliance with this rule.

- (L) It is the responsibility owner or operator to complete final closure of the industrial solid waste landfill facility in a manner that minimizes the need for further maintenance and minimizes post-closure formation and release of leachate and explosive gases to air, soil, ground water, or surface water to the extent necessary to protect human health and the environment.

3745-29-14

Post-closure care of industrial solid waste landfill facilities.

(A) Following completion of final closure activities in accordance with rule 3745-29-11 of the Administrative Code or following closure activities in accordance with paragraph (C) of rule 3745-27-10 of the Administrative Code, as effective July 29, 1976, and completed on or after the date three years prior to March 1, 1990, the owner, operator, or permittee shall conduct post-closure care activities at the industrial solid waste landfill facility for a minimum of thirty years. The post-closure care period begins when the certification required by paragraph (J) of rule 3745-29-11 of the Administrative Code has been submitted for the industrial waste landfill facility. Post-closure care activities for all industrial solid waste landfill facilities shall include, but are not limited to the following:

- (1) Continuing operation and maintenance of the leachate management system, the surface water management system, any explosive gas extraction and/or control system, any explosive gas monitoring system, and the ground water monitoring system.
- (2) Maintaining the integrity and effectiveness of the cap system, including making repairs to the cap system as necessary to correct the effects of settling, dead vegetation, subsidence, ponding, erosion, leachate outbreaks or other events, and preventing run-on and runoff from eroding or otherwise damaging the cap system.
- (3) Repairing any leachate outbreaks detected at the industrial solid waste landfill facility by doing the following:
 - (a) Contain and properly manage the leachate at the industrial solid waste landfill facility.
 - (b) If necessary, collect, treat, and dispose of the leachate, including, if necessary, following the contingency plan for leachate storage and disposal prepared pursuant to rule 3745-29-19 of the Administrative Code.
 - (c) Take action to minimize, control, or eliminate the conditions which contribute to the production of leachate.
- (4) Quarterly inspection of the industrial solid waste landfill facility during each year of the post-closure care period and submittal of a written summary to the appropriate Ohio EPA district office not later than fifteen days after the inspection date detailing the results of the inspection and a schedule of any actions to be taken to maintain compliance with paragraphs (A)(1), (A)(2), and (A)(3) of this rule.

- (5) Fulfilling all monitoring and reporting requirements in accordance with rule 3745-29-10 of the Administrative Code for ground water, with rule 3745-27-12 of the Administrative Code for explosive gas, and with any monitoring required by any orders or authorizing documents. The thirty-year post-closure care period may be shortened for explosive gas monitoring, as outlined in rule 3745-27-12 of the Administrative Code after the initial ten years of the thirty-year post-closure care period. The frequency of ground water sampling and analysis may be changed in accordance with paragraph (D)(6) of rule 3745-29-10 of the Administrative Code.
 - (6) Submitting a report to the appropriate Ohio EPA district office and approved health department not later than the first day of April of each year, which contains the following:
 - (a) A summary of the quantity of leachate collected for treatment and disposal on a monthly basis during the year, and the location of leachate treatment and/or disposal.
 - (b) Results of analytical testing of an annual grab sample of leachate for the parameters specified in appendix I of rule 3745-29-10 of the Administrative Code. The grab sample shall be obtained from the leachate management system.
 - (c) The most recent updated post-closure cost estimate adjusted for inflation and for any change in the post-closure cost estimate required by rule 3745-27-16 of the Administrative Code.
 - (7) Records and reports generated by paragraphs (A)(4) to (A)(6) of this rule are to be kept for the duration of the post-closure care period at a location where the records and reports are available for inspection by Ohio EPA or the approved health department during normal working hours.
- (B) Upon completion of the post-closure care period of the industrial solid waste landfill facility, the owner or operator shall submit to the director written certification that the industrial solid waste landfill facility has completed post-closure activities in accordance with this rule and "final closure/post-closure plan." Based on such factors as the inspection or monitoring results required by paragraphs (A)(4) and (A)(5) of this rule and whether human health or safety or the environment is or will be protected, or whether a nuisance is or will be created, the director may either discontinue or extend the post-closure care period. The certification shall be accompanied by documentation which demonstrates that all post-closure care activities have been completed. The certification shall be signed and sealed by a

professional engineer registered in Ohio. The document shall include the following:

- (1) A summary of changes to leachate quality and quantity.
- (2) A summary of any on-going ground water assessment or corrective measures.
- (3) A summary of explosive gas migration and generation by the landfill.
- (4) An assessment of the integrity and stability of the cap system if post-closure care activities cease.

[Comment: If the landfill shows an improvement to leachate quality, the quantity of leachate generated will not cause an outbreak or slope failure, that ground water monitoring is no longer needed, that it is not generating explosive gas which has the potential to migrate underground, and that the cap system will maintain its integrity and stability if post-closure care activities cease, the director may release the owner, operator, or permittee from continuing post-closure care activities.]

(C) [Reserved].

(D) The health commissioner and the director, or their authorized representatives, upon proper identification, may enter any closed an industrial solid waste landfill facility at any time during the post-closure care period for the purpose of determining compliance with this rule.

3745-29-19

Operational criteria for an industrial solid waste landfill facility.

(A) Applicability. The owner or operator of an industrial solid waste landfill facility shall comply with the requirements and operational criteria specified in this rule until the final closure certification required by rule 3745-29-11 of the Administrative Code is submitted and the post-closure care period begins.

(B) Compliance.

(1) The owner or operator shall conduct all operations at an industrial solid waste landfill facility in strict compliance with the terms and conditions of the industrial solid waste disposal license issued for the facility in accordance with Chapter 3745-37 of the Administrative Code.

(2) The owner or operator shall conduct all construction and operation at an industrial solid waste landfill facility in strict compliance with the applicable authorizing document(s), including permit(s) to install, a plan approval, an operational report, an approved final closure plan, or an alteration(s) concurred with in writing by Ohio EPA, except as follows:

(a) For an industrial solid waste landfill facility with a plan approval issued by the Ohio department of health, an operational report submitted in accordance with paragraph (J) or (K) of rule 3745-27-09 of the Administrative Code, as effective July 29, 1976, or a permit to install approved prior to January 1, 1980, the owner or operator shall conduct operations in strict compliance with the plan approval, operational report, or a permit to install, whichever document is applicable, unless either of the following apply:

(i) The owner or operator of an industrial solid waste landfill facility has obtained a permit to install pursuant to the conditions and schedule outlined in division (A)(3) or (A)(4) of section 3734.05 of the Revised Code.

(ii) The owner or operator has obtained written concurrence from Ohio EPA for the alteration of the industrial solid waste landfill facility or the owner or operator has obtained a permit to install prior to modifying the industrial solid waste landfill facility.

[Comment: "Alteration" is defined in rule 3745-27-01 of the Administrative Code; "modification" is defined in rule 3745-27-02 of the Administrative Code.]

- (3) The owner or operator shall operate the facility in such a manner that noise, dust, and odors are strictly controlled so as not to cause a nuisance or a health hazard.
- (4) The owner or operator shall operate the facility in such a manner that the attraction, breeding, and emergence of insects, rodents, and other vectors are strictly controlled so as not to cause a nuisance or a health hazard. The owner or operator shall initiate effective supplemental vector control measures as deemed necessary by the health commissioner or the director.
- (5) The owner or operator shall operate the facility in such a manner that the operation does not cause water pollution pursuant to Chapter 6111. of the Revised Code, and does not violate any regulation adopted by the director pursuant to Chapter 3704. of the Revised Code.
- (6) The owner or operator shall comply with all of the following:
 - (a) The applicable design, construction and testing specifications in rule 3745-29-08 of the Administrative Code.
 - (b) The ground water monitoring, assessment, and corrective measures requirements of rule 3745-29-10 of the Administrative Code.
 - (c) The final closure, post-closure care, and financial assurance requirements of rules 3745-27-15, 3745-27-16, 3745-29-11, and 3745-29-14 of the Administrative Code.

(C) Construction certification, approval, and compliance.

- (1) Construction certification and approval. After the installation of any of the engineered components specified in rule 3745-29-08 of the Administrative Code, other than the cap system, in any phase of an industrial solid waste landfill facility, the owner or operator shall not accept waste in the phase until all of the following occur:
 - (a) A construction certification report for that phase, prepared in accordance with the paragraph (H) of rule 3745-29-08 of the Administrative Code, has been submitted to Ohio EPA and the approved health department.
 - (b) The owner or operator has received written concurrence from the appropriate Ohio EPA district office for the components specified in

paragraph (F)(1) of rule 3745-29-08 of the Administrative Code.

(2) Construction compliance. Upon discovery by the owner or operator, or upon notification by Ohio EPA, that a failed test or an alteration has occurred in construction of any engineered component or portion of an industrial solid waste landfill facility, the owner or operator shall comply with the procedures outlined in this paragraph.

(a) Failed test. For the purposes of this rule, a "failed test" occurs when a test performed on a component of the industrial solid waste landfill facility yields a result that does not meet the specifications outlined in the applicable authorizing document(s) specified in paragraph (B) of this rule or other requirements of these rules. If, prior to submission of the construction certification report for the component or portion of the industrial solid waste landfill facility, the owner or operator determines that there is a "failed test," the owner or operator shall do the following:

(i) Assess the component or portion of the facility to determine if construction is in compliance with the applicable authorizing document(s) or other requirements of these rules.

(ii) Implement measures to attain compliance with the applicable authorizing document or other requirements of these rules. An area with a verified failure must be reconstructed. Reconstructed areas must be retested at a frequency sufficient to demonstrate to the director that compliance has been achieved.

(b) Alteration.

If, prior to submission of the construction certification report for the component or portion of the industrial solid waste landfill facility, the owner or operator determines that there is an alteration, the owner or operator shall do all of the following:

(i) Include the applicable testing results and an examination of the alteration(s) in the certification report "alterations" section required by rule 3745-29-08 of the Administrative Code.

(ii) Provide a demonstration in the certification report that the alteration(s) is at least equivalent to the requirement in the applicable authorizing document(s) or other requirements of these rules.

(iii) Submit the certification report to Ohio EPA and the approved health department.

(iv) Continue to comply with paragraph (C)(1) of this rule.

[Comment: Paragraph (C)(2)(b) of this rule applies only to a change that qualifies as an alteration as that term is defined in rule 3745-27-01 of the Administrative Code. Rule 3745-27-02 and paragraph (A) of rule 3745-29-06 of the Administrative Code require an owner or operator to obtain a permit to install prior to the establishment of a new, or modification of an existing industrial solid waste landfill facility. Obtaining concurrence for an alteration in accordance with the procedures outlined in paragraph (C)(2) of this rule does not relieve the owner or operator from liability for failure to obtain a permit to install to modify the facility if the change being addressed constitutes a modification.]

(c) Detection after submission of certification report. If the owner or operator determines that the certification report is in error because a "failed test" or an alteration was detected after submission of the construction certification report to Ohio EPA, the owner or operator shall do the following:

(i) Notify, within twenty-four hours after discovery by phone and within seven days after discovery in writing, the appropriate Ohio EPA district office and the approved health department of the noncompliance.

(ii) Within fourteen days of submitting the written notification required by paragraph (C)(2)(c)(i) of this rule, do either of the following:

(a) Implement compliance with the applicable steps outlined in paragraph (C)(2)(a) of this rule and amend and resubmit the construction certification report to explain the circumstances and how compliance was achieved.

(b) Submit the information required by paragraph (C)(2)(b) of this rule.

[Comment: Compliance with paragraph (C)(2)(c) of this rule does not relieve the owner or operator from liability for failure to construct or operate the sanitary landfill facility in strict

compliance with the applicable authorizing document(s), other requirements of these rules, or failure to submit a certification report that is true, accurate, and complete as required by the construction certification requirements of rule 3745-27-08 of the Administrative Code.]

(D) Select waste layer.

(1) The owner or operator shall place select waste as the first layer of waste in all areas within the limits of waste placement adjacent to and/or in contact with the leachate collection system to protect the composite liner from the intrusion of objects during operation of the facility. The select waste layer shall:

- (a) Be spread but not compacted.
- (b) Not consist of items over two feet in length.
- (c) Not restrict the flow of liquid to the leachate collection system.
- (d) Not contain fines or small particles which can clog the leachate collection system.
- (e) Be placed as a single lift above the leachate collection layer required in accordance with paragraph (C)(4)(d) of rule 3745-29-08 of the Administrative Code so that a minimum distance of five feet is created between the liner and general waste placement.

[Comment: Granular drainage medium used in the leachate collection system provides some of the required protective material needed to create the five feet of distance between the liner and general waste placement. Thus, if the leachate collection system includes one foot of sand, then at least four feet of select waste would be needed to satisfy the requirement in paragraph (D)(1)(e) of this rule.]

(2) The owner or operator shall verify the placement of the select waste layer by submitting written notification to Ohio EPA within thirty days of placing the select waste material. This notification shall include the following information:

- (a) The date(s) on which select waste layer was placed.

- (b) The location of the cell or phase where the select waste layer was placed.
- (c) The thickness of the select waste layer.
- (d) The source of the select waste layer.

(E) General operational criteria.

(1) Construction.

- (a) The owner or operator shall clear naturally occurring vegetation to the extent necessary for proper operation of the facility.
- (b) Any oil wells and gas wells within the proposed limits of industrial waste placement shall be properly plugged and abandoned in accordance with Chapter 1509. of the Revised Code.
- (c) The owner or operator shall maintain the integrity of the engineered components of the industrial solid waste landfill facility and repair any damage to or failure of the components. "Engineered components" includes the components described in rule 3745-29-08 of the Administrative Code and components of the monitoring system(s) installed in accordance with rule 3745-29-10 of the Administrative Code. Failed or damaged engineered components shall be investigated and reconstructed in strict compliance with the existing applicable authorizing documents. If a redesign is necessary, prior approval of an alteration or a modification shall be obtained.
- (d) The owner or operator shall perform chemical compatibility testing if the director determines that such testing is necessary to demonstrate that the industrial solid waste to be received at the industrial solid waste landfill facility will not compromise the integrity of any material used to construct the industrial solid waste landfill facility.

(2) Access.

- (a) The owner or operator shall construct and maintain all-weather access roads within the facility boundary in such a manner as to withstand the anticipated degree of use and allow passage of the loaded refuse vehicles at all times, with a minimum of erosion and dust generation.

(b) The owner or operator shall limit access to the facility by non-employees except during operating hours when operating personnel are present. The owner or operator shall, at all times, limit access to the facility as necessary to prevent scavenging and salvaging operations not conducted in accordance with paragraph (E)(4) of this rule. This paragraph shall not apply to the health commissioner or the director who, upon proper identification, may enter the facility at any time to determine compliance with Chapter 3745-29 of the Administrative Code.

(c) The owner or operator shall exclude live domestic and farm animals from the operating areas of the facility, except for animals used for security purposes.

(3) Equipment.

(a) The owner or operator shall have adequate equipment, material, and services available at or near the facility to control fire. The owner or operator shall act immediately to control or extinguish any fire.

(b) The owner or operator shall ensure that operable equipment of adequate size and quantity for the operations of the facility are available at all times, or that an appropriate contingency plan is prepared to properly handle and dispose of waste materials in the event of equipment failure.

(4) Scavenging and salvaging.

The owner or operator may only conduct salvaging in a manner approved by the director. Scavenging is prohibited.

(5) Personnel.

The owner or operator shall ensure that any individual meeting the definition of operator specified in rule 3745-27-01 of the Administrative Code shall be thoroughly familiar with the proper operational procedures, license, permits, and other authorizations pertaining to the facility.

(6) Inclement weather.

The owner or operator shall ensure preparations have been made such that, during inclement weather, the industrial solid waste landfill facility is able to receive, compact, and cover incoming industrial solid waste. The preparations

shall include, but need not be limited to, designation and preparation of areas where industrial solid waste will be deposited, compacted, and covered during inclement weather, construction and maintenance of all-weather access roads leading from the point(s) where loaded vehicles enter the site to the inclement weather areas, and stockpiling of cover material.

(7) Waste acceptance and placement.

- (a) Prior to accepting industrial solid waste at a unit(s) of a new industrial solid waste landfill facility, or in any unit(s) of a lateral expansion area, or in a vertical expansion approved on or after March 1, 1990, the owner or operator shall comply with all applicable requirements for leachate treatment and/or disposal, discharges to surface waters, management of surface water runoff, and air emissions.
- (b) The owner or operator shall not begin filling in a new phase, without completing the previous phase, except to the extent necessary for the proper operation of the industrial solid waste landfill facility.
- (c) The owner or operator shall confine unloading of waste materials to the smallest practical area(s). The owner or operator shall ensure that each unloading area is supervised by a person or persons knowledgeable regarding operations at the working face.
- (d) The owner or operator shall not deposit waste that is burning or is at a temperature likely to cause fire at the working face. Prior to placing the industrial solid waste at the working face, the owner or operator shall deposit such material in a separate location which is at a sufficient distance from the working face to prevent fires from spreading to the working face and shall immediately extinguish the fire or lower the temperature of the industrial solid waste.
- (e) Except as provided in paragraphs (D)(1) and (E)(7)(d) of this rule, the owner or operator shall ensure that all industrial solid waste admitted to the industrial solid waste landfill facility is deposited at the working face, spread in layers not more than two feet thick, and compacted to the smallest practical volume. An alternate method may be used if approved in writing by the director. During periods when inclement weather prevents compliance with this rule, the industrial solid waste shall be deposited at the area prepared in accordance with paragraph (B)(2)(a) of this rule.

- (f) The owner or operator shall employ all necessary means to ensure the following:
 - (i) Bulky materials can be compacted or otherwise managed in such a way as to ensure the proper placement of daily cover.
 - (ii) Dusty materials are handled, compacted, and covered in such a manner as to minimize the amount of dust that is generated by those materials.
- (g) The owner or operator shall exclusively accept for disposal industrial solid waste as defined in rule 3745-29-01 of the Administrative Code.

(8) Disposal restrictions.

The owner or operator shall not accept for disposal or dispose of any of the following materials at an industrial solid waste landfill facility:

- (a) Asbestos or asbestos-containing waste material that is subject to the provisions of NESHAP, 40 CFR Part 61, subpart M, July 1, 2003, without the necessary permits.
- (b) Containerized bulk liquids or non-containerized liquids without authorization from the director.
- (c) Materials that are defined as hazardous wastes pursuant to rule 3745-51-03 of the Administrative Code.
- (d) Polychlorinated biphenyls (PCB) wastes as defined in 40 CFR Part 761, July 1, 2003, unless otherwise authorized by 40 CFR part 761, July 1, 2003.
- (e) Low-level radioactive wastes as specified in section 3734.027 of the Revised Code.
- (f) Semi-solid material containing free liquids, as determined by results obtained from conducting method 9095 (1996) (paint filter liquids test) in SW-846, third edition: "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods," on the semi-solid material, unless the owner or operator has obtained prior written authorization from Ohio EPA to dispose of that semi-solid material in the facility.

(9) Litter.

The owner or operator shall employ all reasonable measures to collect, properly contain, and dispose of scattered litter, including the use of portable wind screens where necessary and frequent policing of the area.

(10) Daily log of operations.

- (a) The owner or operator shall keep a daily log of operations of the facility that contains all the information specified on forms prescribed by the director. All entries required by the log form shall be completed. The owner or operator of the facility may use alternate forms, either in paper or electronic formats, for the daily log of operations, provided that all of the information requested on the prescribed forms is present.
- (b) A copy of the log shall be available for inspection by the health commissioner or the director during normal operating hours.
- (c) When required by Ohio EPA, the owner or operator shall submit log forms or summaries of daily logs to the health commissioner or the director on either paper or electronic versions of forms prescribed by the director. The owner or operator may use alternate forms, either in paper or electronic formats, for the log forms or summary of daily logs, provided that all of the information requested on the prescribed forms is present.
- (d) The owner or operator shall make the completed daily logs available for inspection at the facility for a minimum of three years. The records retention period may be extended during the course of any unresolved litigation or when so requested by Ohio EPA. The three-year period for retention of records shall begin on the date the daily log form is completed.

(11) Inspection.

- (a) The owner or operator shall inspect the industrial solid waste landfill facility at least daily for ponding, erosion, and leachate outbreaks. Written results of the inspections, including a discussion of any corrective actions taken, the date, and weather conditions, shall be recorded on the daily log forms required pursuant to paragraph (E)(10) of this rule and shall be made available to the health commissioner or the director upon request.

- (b) The owner or operator shall inspect sedimentation ponds and sedimentation pond discharge structures, including pipes, ditches, and culverts at least weekly for erosion, clogging, or failure and take prompt corrective action, if necessary. Written results of the inspections, including a discussion of any corrective actions taken, any water quality samples taken, the date, and weather conditions, shall be recorded on the daily log forms required pursuant to paragraph (E)(10) of this rule and shall be made available to the health commissioner or the director upon request.

(12) Approved permit to install, detail plans and specifications.

The owner or operator shall ensure that a copy of the approved permit to install, detail plans, specifications and information is maintained at the industrial solid waste landfill facility and is available and may be inspected by the health commissioner or the director upon request during normal operating hours.

(F) Daily cover.

Daily cover shall be applied to all exposed industrial waste by the end of the working day to control fire hazards, blowing litter, odors, insects, vectors, and rodents. In no event shall industrial waste be exposed for more than twenty-four hours after unloading. Daily cover material shall be nonputrescible, shall not contain large objects in such quantities as may interfere with its application and intended purpose, and shall not be industrial solid waste, unless the owner or operator has received prior, written authorization in accordance with paragraph (F)(3)(a) of this rule.

- (1) For an industrial solid waste landfill facility having a leachate management system, a soil layer, at least six inches thick, shall be used. Daily cover applied in an area served by a leachate management system shall be removed or otherwise prepared as necessary so as not to impede the flow of leachate to the leachate management system within the limits of waste placement.

- (2) For an industrial solid waste landfill facility without a leachate management system, a six-inch thick soil layer, consisting of well-compacted loam, clay loam, silty clay loam, silty clay, or some combination thereof, shall be used.

(3) Alternative daily cover.

- (a) The director may approve industrial solid waste to be used as alternative

material for daily cover if the industrial solid waste is nonputrescible and the owner or operator can demonstrate to the satisfaction of the director that the proposed industrial solid waste provides protection that is comparable to six inches of soil and is protective of human health and the environment. The owner or operator must obtain written approval to use industrial solid waste for daily cover prior to utilizing the industrial solid waste.

(b) The director may approve other materials and/or thicknesses for daily cover if the owner or operator can demonstrate to the satisfaction of Ohio EPA that the proposed alternative material and/or thickness provides protection that is comparable to six inches of soil and is protective of human health and the environment. The owner or operator must obtain written approval to use an alternative material and/or thickness for daily cover prior to utilizing the alternative material and/or thickness.

(4) The director may approve frequencies, other than daily, if the owner or operator can demonstrate to the satisfaction of the director that the alternate frequency provides comparable and adequate protection.

(G) Intermediate cover.

(1) To minimize infiltration, intermediate cover shall be applied to all filled areas of an industrial solid waste landfill facility where additional industrial solid waste is not to be deposited for at least thirty days. The director may approve the use of some alternate time period, if the owner or operator can demonstrate to the satisfaction of the director that, by use of the alternate time period, infiltration will not be increased.

(2) Intermediate cover material shall be nonputrescible and have low permeability to water, good compactability, cohesiveness, and relatively uniform texture, and shall not contain large objects in such quantities as may interfere with its application and intended purpose. A twelve inch thick layer of soil, consisting of well-compacted loam, silt loam, clay loam, silty clay loam, silty clay or some combination thereof, shall be used. The owner or operator may use other materials and/or thicknesses for intermediate cover if the owner or operator can demonstrate to the satisfaction of the director that the proposed intermediate cover material and/or thickness provides comparable and adequate protection.

(3) Intermediate cover in an area shall be removed or otherwise prepared as

necessary prior to the placement of the next layer of industrial solid waste in that area so as not to impede the flow of leachate to the leachate management system within the limits of industrial solid waste placement.

- (4) The owner or operator shall perform measures to protect the intermediate cover from erosion.

(H) Final cover.

Within seven days of reaching the approved final elevations of industrial solid waste placement in a phase, the owner or operator shall begin constructing the final cap system by doing either of the following:

- (1) By constructing a cap system over the entire phase in accordance with rule 3745-29-08 of the Administrative Code as specified in rule 3745-29-11 of the Administrative Code.
- (2) By doing all of the following:
 - (a) Place transitional cover over the entire phase in accordance with paragraph (C)(17) of rule 3745-29-08 of the Administrative Code.
 - (b) When the industrial solid waste landfill facility in which the phase is located has reached approved final elevations of industrial solid waste placement, construct a cap system over the entire facility in accordance with rule 3745-29-08 of the Administrative Code as specified in paragraph (G) of rule 3745-29-11 of the Administrative Code.
 - (c) The owner or operator shall provide written notice to Ohio EPA and the approved health department clearly describing the phase(s), or portions thereof, where transitional cover will be installed in accordance with rule 3745-29-08 of the Administrative Code. The owner or operator shall submit the notification prior to beginning construction of transitional cover for a particular phase, or portion thereof.
 - (d) After completing construction of transitional cover in a particular phase, the owner or operator shall submit a certification report to Ohio EPA and the approved health department in accordance with rule 3745-29-08 of the Administrative Code. The certification report shall be submitted no later than the date for the submittal of the next annual operational report required pursuant to paragraph (M) of this rule.

- (e) Notwithstanding any prior notification that transitional cover will be installed, the owner or operator may choose to comply with paragraph (H)(1) of this rule. The owner or operator shall provide prior notice to Ohio EPA and the approved health department of any change from a previously submitted notification.

[Comment: Use of the transitional cover as specified in paragraph (H)(2) of this rule may increase the final closure cost estimate since the final cap system may not be installed over large areas of a facility until near the end of the facility's life. Paragraph (C) of rule 3745-27-15 requires the owner or operator to prepare cost estimates which reflect the cost of final closure activities at a point when final closure of the industrial solid waste landfill facility would be most expensive and which assumes final closure is performed by a third party. Paragraph (M)(6) of this rule requires the owner or operator to at least annually update the final closure cost estimate and submit the revised estimate with the annual operational report. Finally, rule 3745-27-15 of the Administrative Code mandates that when the current final closure cost estimate increases, the owner or operator must increase the dollar amount of the financial assurance mechanism. See paragraphs (F)(3), (F)(6), (G)(7), (H)(7), (I)(7), (J)(9), and (K)(5) of rule 3745-27-15 of the Administrative Code.]

(I) Scales.

The owner or operator of an industrial solid waste landfill facility, with an authorized maximum daily waste receipt greater than two hundred tons per day, shall use scales as the sole means of determining gate receipts. All scales shall be inspected, tested, and approved by the county auditor or city sealer having jurisdiction where the scale is located and shall meet the specifications, tolerances, and regulatory requirements of section 1327.49 of the Revised Code. This paragraph shall not apply to an industrial solid waste landfill facility owned by the generator that exclusively disposes of industrial solid wastes generated at premises owned by the generator.

(J) Surface water management.

- (1) The owner or operator shall ensure that surface water at a industrial solid waste landfill facility is diverted from areas where industrial solid waste is being, or has been, deposited. The owner or operator shall ensure that an industrial solid waste landfill facility is designed, constructed, maintained, and provided with surface water control structures that control run-on and runoff of surface water. These surface water control structures shall ensure minimal erosion and infiltration of water through the cover material and cap system. These

surface water control structures shall be designed in accordance with rule 3745-29-08 of the Administrative Code.

- (2) If ponding or erosion occurs on areas of the industrial solid waste landfill facility where industrial solid waste is being, or has been, deposited, the owner or operator shall undertake actions as necessary to correct the conditions causing the ponding or erosion.
- (3) If a substantial threat of surface water pollution exists, the director or health commissioner may require the owner or operator to monitor the surface water.

(K) Leachate management.

- (1) If a leachate outbreak(s) occurs at the industrial solid waste landfill facility, the owner or operator shall repair the outbreak(s) and do the following:
 - (a) Contain and properly manage the leachate at the industrial solid waste landfill facility.
 - (b) If necessary, collect and dispose of the leachate in accordance with paragraphs (K)(5) and (K)(6) of this rule.
 - (c) Take action to minimize, control, or eliminate the conditions which contribute to the production of leachate.
- (2) The owner or operator shall maintain at least one lift station back-up pump at the industrial solid waste landfill facility at all times.
- (3) The owner or operator shall inspect the collection pipe network of the leachate management system after placement of the initial lift of industrial solid waste to ensure that crushing has not occurred and shall inspect the collection pipe network annually thereafter to ensure that clogging has not occurred.
- (4) If authorized in writing by the director, the owner or operator may temporarily store leachate within the limits of waste placement until the leachate can be treated and disposed as outlined in the leachate contingency plan as required in paragraph (K)(6) of this rule.
- (5) The owner or operator shall treat and dispose of collected leachate in

accordance with one of the following:

- (a) Treat and dispose of collected leachate on site at the industrial solid waste landfill facility.
 - (b) Pretreat collected leachate on-site and dispose of collected leachate off-site of the industrial solid waste landfill facility.
 - (c) Treat and dispose of collected leachate off-site of the industrial solid waste landfill facility.
- (6) The owner or operator shall prepare a contingency plan for the storage and disposal of leachate. The plan shall describe the immediate and long term steps, including the setting aside of land for the construction and operation of an on-site treatment facility, to be taken for leachate management in the event that collected leachate cannot be managed in accordance with the management option selected in paragraph (K)(5) of this rule.
- (7) If a substantial threat of water pollution exists from the leachate entering surface waters, the director or health commissioner may require the owner or operator to monitor the surface water.

(L) [Reserved.]

(M) Annual operational report. The owner or operator of an industrial solid waste landfill facility shall submit an "Annual Operational Report" to the appropriate Ohio EPA district office and approved health department not later than the first day of April of each year. The "Annual Operational Report" shall include, at a minimum, the following information summarizing the previous calendar year's operations:

- (1) A topographic map of the industrial solid waste landfill facility, certified by a professional skilled in the appropriate discipline(s), with updated contour lines on the plan drawing containing information specified in rule 3745-29-06 of the Administrative Code. The scale and contour interval shall be consistent with the approved plans. At a minimum, the owner or operator shall identify the following:
 - (a) The calendar year which the submittal represents.
 - (b) The areal extent of each phase of construction.

- (c) The areal extent of closed areas that have a final cap system or have transitional cover.
 - (d) Areas that have intermediate cover.
 - (e) The current working phase.
 - (f) The projected phase(s) for filling in the coming year.
 - (g) Access roads and buildings.
 - (h) On-site borrow areas and cover material stockpiles.
 - (i) A comparison of the actual vertical and horizontal limits of emplaced waste to the vertical and horizontal limits of waste placement authorized in the applicable authorizing document(s), including an approved permit(s) to install, plan approval, or operational report. If emplaced waste exceeds the limits of vertical and horizontal waste placement authorized in the applicable authorizing document(s), this comparison shall include a topographic map which delineates the areal extent of emplaced waste that exceeds approved limits specified in such authorizing documents. In addition, the topographic map shall contain notes that indicate the following information for waste exceeding authorized limits of waste placement: the maximum estimated volume, the maximum depth, and the average depth.

[Comment: The submittal of this information does not relieve an owner or operator from complying with applicable authorizing documents or correcting violations.]
- (2) A summary of the daily logs for the previous year on forms prescribed by the director or alternate forms used pursuant to paragraph (E)(10) of this rule.
 - (3) An estimate of the remaining industrial solid waste landfill facility life, in years, and in terms of the remaining volume of the industrial solid waste landfill facility to be filled, in cubic yards.
 - (4) A summary of the quantity of leachate collected for treatment and disposal on a monthly basis during the year, location of leachate treatment and/or disposal, and verification that the leachate management system is operating in accordance with this rule.

- (5) Results of analytical testing of an annual grab sample of leachate for the parameters specified in appendix I of rule 3745-29-10 of the Administrative Code and for Polychlorinated Biphenyls (PCBs) if the owner or operator has accepted PCBs for disposal in accordance with paragraph (E)(8)(d) of this rule. The grab sample shall be obtained from the leachate management system.

[Comment: If PCBs are detected in leachate that will be discharged directly to or transported and discharged to a wastewater treatment plant, then the owner or operator of the industrial solid waste landfill facility generating the leachate should contact Ohio EPA, division of surface water, prior to discharging the leachate. If the wastewater treatment plant is not affiliated with the landfill facility, then the owner or operator should also contact the receiving wastewater treatment plant prior to discharge. The owner or operator of the industrial solid waste landfill facility should inform Ohio EPA, division of surface water (and the wastewater treatment plant, if applicable) of the presence and concentration of PCBs detected in the leachate. Depending upon the wastewater treatment plant's permitted discharge limit for PCBs, the owner or operator of the industrial solid waste landfill facility may be required to conduct pretreatment of the leachate to remove PCBs prior to discharging to the wastewater treatment plant.]

- (6) The most recent updated final closure cost estimate and post-closure care cost estimate adjusted for inflation and for any change in final closure cost estimate or post-closure care cost estimate required by rules 3745-27-15 and 3745-27-16 of the Administrative Code.
- (7) A summary of any maintenance performed on the leachate management system, ground water monitoring system, explosive gas monitoring system, and any other monitoring and control system installed at the industrial solid waste landfill facility or performed in response to this rule.
- (8) The results of the annual evaluation of the ground water surface elevation data in accordance with rule 3745-30-08 of the Administrative Code.
- (9) A notarized statement that, to the best of the knowledge of the owner or operator, the information contained in the annual report is true and accurate.

(N) Ten-year design demonstration.

Upon every tenth anniversary of the effective date of the initial permit to install issued to the owner or operator of the industrial solid waste landfill facility pursuant to Chapter 3734. of the Revised Code and each tenth anniversary thereafter, the

owner or operator shall submit to Ohio EPA an analysis demonstrating that the design of the un-constructed portions of the industrial solid waste landfill facility continues to be consistent with the design standards established in the current version of rule 3745-29-08 (industrial solid waste landfill facility construction) of the Administrative Code. If the director determines that the design is no longer consistent with the standards established in the current version of rule 3745-29-08 of the Administrative Code, then the director may require the owner or operator to make the necessary changes to the industrial solid waste landfill facility to bring the facility into compliance with the design standards in the current version of rule 3745-29-08 of the Administrative Code. Since these changes will represent deviations from what is contained in the current authorizing document(s), the owner or operator shall obtain the appropriate authorization from the director prior to making the changes. If a permit to install application is required, the director shall not apply the criteria outlined in paragraph (G) of rule 3745-29-07 of the Administrative Code, when considering the permit to install application.

[Comment: A deviation may be an alteration, a modification, or an other change depending upon the significance of the deviation. If the deviation represents an alteration, then the owner or operator is required to obtain written concurrence from Ohio EPA prior to making any change to the facility. If the deviation represents a modification, then the owner or operator is required to obtain a permit to install for the modification from Ohio EPA prior to making any change to the facility.]

[Comment: To determine when Ohio EPA does and does not apply siting criteria to the review of an application for a permit to install to modify the facility, see rule 3745-29-07 of the Administrative Code.]