

## Chapter NR 504

## LANDFILL LOCATION, PERFORMANCE AND DESIGN CRITERIA

|           |   |           |  |
|-----------|---|-----------|--|
| NR 504.01 | Purpose                                     | NR 504.06 | Alternative design criteria for land disposal facilities for high volume industrial wastes |
| NR 504.02 | Applicability                               | NR 504.07 | Final cover system design  |
| NR 504.03 | Definitions                                 | NR 504.08 | Disposal of residue produced by burning municipal solid waste                              |
| NR 504.04 | Landfill location and performance standards |           |  |
| NR 504.05 | Minimum design criteria                     |           |  |

**NR 504.01 Purpose.** The purpose of this chapter is to help ensure that efficient, nuisance-free and environmentally acceptable solid waste management procedures are practiced in Wisconsin and to provide information on locational criteria, performance standards and the minimum design requirements for solid waste disposal facilities. This chapter is adopted under ss. 144.43 to 144.47 and 227.11, Stats.

**History:** Cr. Register, January, 1988, No. 385, eff. 2-6-88.

**NR 504.02 Applicability.** (1) Except as otherwise provided, this chapter governs all solid waste disposal facilities as defined in s. 144.43 (5), Stats., except landspreading facilities regulated under ch. NR 518, hazardous waste facilities as defined in s. 144.61 (5m), Stats., and regulated under chs. NR 600 to 685 and metallic mining operations as defined in s. 144.81 (5), Stats., and regulated under ch. NR 182.

(2) This chapter does not apply to the design, construction or operation of industrial wastewater facilities, sewerage systems and waterworks treating liquid wastes approved under s. 144.04, Stats., or permitted under ch. 147, Stats., nor to facilities used solely for the disposal of liquid municipal or industrial wastes which have been approved under s. 144.04, Stats., or permitted under ch. 147, Stats., except for facilities used for the disposal of solid waste.

**History:** Cr. Register, January, 1988, No. 385, eff. 2-6-88; correction in (1) made under s. 13.93 (2m) (b) 7., Stats., Register, May, 1995, No. 473.

**NR 504.03 Definitions.** The terms in this chapter are defined in s. NR 500.03.

**History:** Cr. Register, January, 1988, No. 385, eff. 2-6-88.

**NR 504.04 Landfill location and performance standards.** (1) **GENERAL.** As part of the feasibility report required under ch. NR 512 an applicant shall demonstrate to the department that the proposed facility will comply with all of the location and performance standards of this section unless an exemption is granted.

(2) **EXEMPTIONS.** (a) Exemptions from compliance with subs. (3) (a), (b), (d), (e) and (4) (b), (e) and (f) may be granted only upon demonstration by the applicant of circumstances which warrant such an exemption. Exemptions from compliance with sub. (4) (a) may be granted only in accordance with the standards set forth in s. NR 1.95. Exemptions from compliance with subs. (3) (c) and (4) (c) will not be granted. Exemptions from compliance with sub. (4) (d) may be granted only according to the procedures set forth in chs. NR 508 and 140. Exemptions

from compliance with sub. (3) (f) will be based on an evaluation of the information contained in par. (b). However, no exemptions from sub. (3) (f) may be granted unless information on the well location, former and present well owner, well driller, well log and construction details and the general hydrogeologic setting is submitted to the department.

(b) Additional factors which may be considered by the department in determining whether or not to grant exemptions under this section include waste types, characteristics and quantities; the geology and hydrogeology of the facility; the proposed facility design and operation; the availability of other environmentally suitable alternatives; compliance with other state and federal regulations and the health, safety and welfare of the public. Requests for exemptions and information needed to demonstrate the circumstances that warrant such exemptions shall be addressed by the applicant in the feasibility report.

(3) **LOCATION STANDARDS.** No person may establish, construct, operate, maintain or permit the use of property for a solid waste land disposal facility where the limits of filling are or would be within the following areas:

(a) Within 1,000 feet of any navigable lake, pond or flowage not including facility drainage or sedimentation control structures.

(b) Within 300 feet of any navigable river or stream.

(c) Within a floodplain.

(d) Within 1,000 feet of the nearest edge of the right-of-way of any state trunk highway, interstate or federal aid primary highway or the boundary of any public park, unless the facility is screened by natural objects, plantings, fences or other appropriate means so that it is not visible from the highway or park.

(e) Within 10,000 feet of any airport runway used or planned to be used by turbojet aircraft or within 5,000 feet of any airport runway used only by piston type aircraft or within other areas where a substantial bird hazard to aircraft would be created. This criterion applies only when the facility will be used for disposing of putrescible waste.

(f) Within 1,200 feet of any public or private water supply well.

(4) **PERFORMANCE STANDARDS.** No person may establish, construct, operate, maintain or permit the use of property for a solid waste land disposal facility within an area where there is a reasonable probability that the facility will cause:

NR 504.04

- (a) A significant adverse impact on wetlands.
- (b) A significant adverse impact on critical habitat areas.
- (c) A detrimental effect on any surface water.
- (d) A detrimental effect on groundwater quality or will cause or exacerbate an attainment or exceedance of any preventive action limit or enforcement standard at a point of standards application as defined in ch. NR 140. For the purposes of design the point of standards application is defined by s. NR 140.22 (1).

(e) The migration and concentration of explosive gases in any facility structures, excluding the leachate collection system or gas control or recovery system components, or in the soils or air at or beyond the facility property boundary in excess of 25% of the lower explosive limit for such gases at any time.

(f) The emission of any hazardous air contaminant exceeding the limitations for those substances contained in s. NR 445.03.

History: History: Cr. January, 1988, No. 385, eff. 2-6-88.

**NR 504.05 Minimum design criteria.** Unless otherwise approved by the department in writing, the minimum design criteria set forth in this section apply to all new facilities and to the expansion of existing facilities for which the plan of operation was not approved before February 1, 1988. These criteria shall be used by the applicant to the greatest degree practical when preparing design plans for initial site reports, feasibility reports and plans of operation and for the submittal of any plan modification or closure plan. Facilities designed in substantial conformance with these design criteria are presumed to be capable of meeting the performance standards of s. NR 504.04 (4) (d) regarding groundwater quality. If the proposed design differs from these requirements the applicant shall provide supporting justification for any differences.

(1) **GENERAL.** (a) All solid waste land disposal facilities shall be designed to contain and collect leachate to the maximum practical extent unless the applicant can demonstrate that no significant quantity of leachate will be generated due to the unique character of the waste or facility type. This shall be accomplished by designing the facility to meet the standards contained in either sub. (3) or (4), unless the department approves the applicant's alternative design, which provides an equivalent or better level of performance than the standards contained in this chapter.

(b) If the applicant does not complete construction of the first major phase of the facility within 2 years from the date of the plan of operation approval, the applicant must reapply to the department for approval to begin construction. This application does not constitute a feasibility report as defined in s. 144.44 (2), Stats. The department may require additional conditions of approval and require redesign of the facility in accordance with state-of-the-art design criteria.

(2) **DESIGN CAPACITY.** All facilities shall meet the requirements of this subsection unless they are exempted in s. 144.44 (2) (nr), Stats. The minimum design capacity of a solid waste land disposal facility shall equal or exceed the expected volume of solid waste and daily and intermediate

cover that will be disposed of at the facility within 10 years after operations begin. The maximum design capacity of the facility may not exceed the expected volume of solid waste and daily and intermediate cover that will be disposed of at the facility within 15 years after operations begin. Waste approved for use in construction of facility components shall not be included in the calculation of design capacity. Expansions of existing facilities are not subject to the 10-year minimum design capacity requirement.

(3) **CLAY-LINED LANDFILLS.** All facilities designed with a clay liner shall meet the following requirements:

(a) Soil used for the clay liner shall meet the specifications contained in sub. (5).

(b) A leachate collection system shall be included in each horizontal phase of the facility. This system shall be designed to limit the post closure average leachate head level on the liner to one foot or less.

(c) The separation distance between the seasonal high groundwater table and the bottom of the clay liner shall be at least 10 feet.

(d) The separation distance between the competent bedrock surface and the bottom of the clay liner shall be at least 10 feet.

(e) The minimum slope on the top of the clay liner toward the leachate collection lines shall be at least 2%.

(f) The minimum thickness of the clay liner at all locations shall be at least 5 feet measured perpendicular to the liner surface.

(g) The clay-lined base and interior sidewalls shall be constructed in lift heights no greater than 6 inches after compaction.

(h) The slope of the interior sidewalls shall not exceed 3 horizontal to one vertical.

(i) A minimum 1-foot thick granular drainage blanket shall be placed on top of the clay-lined base and sidewalls. The granular drainage blanket shall contain no more than 5% material by weight which passes the 200 sieve, have a uniformity coefficient of less than 4 for gravel soils and less than 6 for sandy soils, and a hydraulic conductivity which is greater than or equal to  $1 \times 10^{-3}$  cm/sec at the anticipated field density.

(j) Clay-lined phases of the facility constructed adjacent to each other shall be keyed together to form a continuous clay seal. This shall be accomplished by excavating steps along the edge of the existing clay-lined phase and overlapping the lifts of clay being placed for the liner of the new phase with the steps in the existing liner.

(k) All leachate transfer lines, tanks or other structures used to convey or store leachate outside the clay-lined area shall be constructed above the seasonal high groundwater table unless it is not technically feasible to do so and the design meets the requirements of s. NR 504.05 (6) (k).

(l) All major horizontal clay-lined phases shall be designed with a collection basin lysimeter to monitor the unsaturated zone.

(4) **ZONE-OF-SATURATION LANDFILLS.** All facilities proposed with base grades beneath the groundwater table shall meet the following requirements:

(a) A leachate collection system shall be included for each horizontal phase of the facility. The system shall be designed to limit the post-closure average leachate head level on the recompacted clay base to one foot or less. Unless otherwise approved by the department, an analysis using a numerical flow model shall be performed to predict whether the facility will maintain inward gradients following closure and during the period of long-term care.

(b) The facility shall be located in a fine-grained soil environment.

(c) A minimum of 5 feet of recompacted clay shall be maintained at all locations beneath the proposed base and sidewalls. The applicant may propose a thicker recompacted clay base to offset deficiencies in the natural clay soil environment.

(d) The recompacted clay base and sidewalls shall meet the requirements in sub. (3) (e), (g), (h), (i) and (j).

(5) **CLAY SPECIFICATIONS.** Soil for a clay liner, recompacted clay base or sidewalls shall meet the following specifications:

(a) A minimum of 50% by weight which passes the 200 sieve.

(b) A clay size content of 25% by weight or greater.

(c) A saturated hydraulic conductivity of  $1 \times 10^{-7}$  cm/sec or less.

(d) A liquid limit of 30% or greater.

(e) A plasticity index of 15% or greater.

(f) Compacted to 90% modified or 95% standard Proctor density or greater.

(6) **LEACHATE COLLECTION SYSTEMS.** All leachate collection systems shall incorporate the following design features:

(a) The minimum slope on all leachate collection pipes shall be 0.5%.

(b) The minimum diameter of all leachate collection or transfer pipes shall be 6 inches. Schedule 80 PVC pipe or an approved substitute shall be used.

(c) The collection efficiency of the leachate collection system shall be calculated using an analytical or numerical model acceptable to the department. An analytical model for clay-lined landfills above the water table and a numerical flow model for zone-of-saturation facilities shall be utilized unless otherwise approved by the department. The analysis shall be used to predict the volume of liquid that will be collected, the volume of liquid that may percolate through the liner, the predicted head of liquid on the liner, and the efficiency of the collection system over a one year period. The analysis shall be performed for the periods of time during active operations when the maximum amount of area has been filled but not capped and following facility closure. A table shall be presented in the feasibility report and plan of operation showing the results of this analysis.

(d) The bedding material utilized in backfilling the leachate collection pipe trenches shall have a uniformity coefficient of less than 4, a maximum particle diameter of 2 inches, a maximum of 5% of the material which passes the 4 sieve and consist of rounded to subangular gravel. A minimum depth of 6 inches of gravel shall be placed in the trenches prior to installation of the leachate pipes. After the pipes have been properly installed, the remaining backfill shall be placed such that a minimum of 6 inches of material exists above the top of the pipe and within the trenches. A geotextile shall be used to line the base and sidewalls of all leachate collection trenches. In cases where the particle size of the drainage blanket is significantly less than the collection trench bedding, a properly designed graded soil filter or geotextile shall be utilized to minimize the migration of the drainage blanket material into the collection trenches. Limestone and dolomite shall not be used in the leachate collection system unless no other suitable material is reasonably available.

(e) Properly sized geotextiles or other suitable means to reduce the potential for migration of fines shall be used at all interfaces of granular and fine-grained soil where the potential for piping or migration of fines exists. This includes the interface of the clay liner and the granular backfill in the collection lysimeters.

(f) All leachate collection lines shall have cleanout access points installed on both ends of each line. The maximum length of the line shall be minimized to take into account the capabilities of the available cleanout equipment. Where practical, the leachate lines shall be designed so that the entire line does not exceed the capabilities of the cleanout device in one direction.

(g) Leachate lines, manholes and other engineering structures shall not penetrate the liner in the vertical direction. Leachate transfer lines may penetrate the liner in the horizontal direction only. The number of liner penetrations shall be kept to a minimum.

(h) Any leachate line that penetrates a clay liner shall have an anti-seep collar placed around it. A minimum of 5 feet of compacted clay shall be placed around the collar in all directions.

(i) All leachate lines transporting leachate out of the facility shall be constructed with valves so the flow of leachate can be controlled. The valves shall be compatible with the leachate and be capable of being operated from the ground surface. This requirement may be waived if the applicant shows that leachate overflow from the containment structures will not be possible based on the design.

(j) The overall slope of the leachate collection lines and clay-lined base in each phase shall be toward the perimeter of the facility where a lesser thickness of refuse exists. The base may be sloped internally toward the leachate collection lines.

(k) All leachate transfer lines located outside of the clay-lined area shall be designed to assure groundwater protection by being fully encased in at least 2 feet of clay, through the use of double-cased pipe or by using another approved secondary containment method. Regardless of the proposed design, all leachate transfer lines shall be pressure tested prior to their use.

(l) Leachate collection tanks, manholes and sumps shall be designed with a secondary containment system to prevent the discharge of leachate to ground and surface waters in the event of a leak or spill. Means shall be provided to monitor the tank and sump within the secondary containment system.

(m) Material specifications for the leachate storage tanks shall be submitted. This information shall include the tank material, wall thickness, protective coatings for both the inside and outside of the tank, the proposed installation method, bedding material and the need for any anchoring. Methods for documenting the integrity of the tank after placement and during facility operations shall also be proposed. Leachate collection tanks should be designed, constructed and maintained in accordance with the appropriate portions of chapter 2 in the national fire protection association's publication no. 30, 1984.

**Note:** This publication may be obtained from the Department of Natural Resources, Bureau of Solid Waste Management, 101 S. Webster Street, Natural Resources Building, Madison, Wisconsin 53707.

(n) All leachate collection tanks shall be designed to withstand the soil and liquid loads that will be encountered during installation and use. The installation of the tanks shall follow the recommendations of the consultant and manufacturer.

(o) Measures shall be proposed to prevent accidental discharges at the leachate loadout facility from entering groundwater or surface water. Unless an alternate method is approved by the department, the leachate loading station shall be paved with a concrete or asphalt pad and sloped to a catch basin to direct all spills back into the leachate holding tank.

(p) All manholes and enclosed structures for leachate and gas control systems shall be designed to allow for proper venting and access control.

(q) All control systems such as pumps, valves and meters shall be designed to be operated from the ground surface.

(r) All leachate and groundwater collection systems shall be designed to accurately and continuously monitor the volume of liquid removed by the system.

(7) **GAS CONTROL.** All facilities accepting wastes with the potential to generate gas shall be designed to prevent the migration of explosive gases generated by the waste fill and shall meet the following minimum requirements:

(a) The concentration of gases in any facility structures, excluding the leachate collection system or gas control or recovery system components, and in the soils or air at or beyond the facility property boundary, shall not exceed 25% of the lower explosive limit for such gases at any time. The department may require that the concentration of gases not exceed the lower detection limit for that gas at the facility property boundary.

(b) Each facility shall be designed with a system which allows surficial gas venting from the entire landfill unless the facility will utilize an active gas recovery system. An analysis shall be performed to determine the spacing needed between gas venting trenches for an effective system.

(c) Gas venting trenches consisting of gravel surrounding perforated pipes running through the center of the trench shall be placed within the waste along the high points of the final grades and along major changes in slope. The system shall be designed such that the perforated pipes can be utilized as part of an active gas extraction system.

(d) All landfills with waste depths greater than 40 feet shall be designed with engineering features to vent gas that is generated in the depths of the waste fill.

(e) Alternate types of passive and active gas venting systems may be proposed by the applicant. An analysis of the effectiveness of any alternate system shall be included in the proposal.

(f) A series of gas monitoring probes shall be designed outside the limits of waste fill on all sides of the facility in deposits of granular soil and other soil formations where gas migration may occur. At least one set of gas probes shall be designed at the elevation of the base of the facility, unless the geologic environment prevents migration from that level.

(8) **HAZARDOUS AIR CONTAMINANT CONTROL.** All solid waste disposal facilities which will accept municipal solid waste shall be designed to efficiently collect and combust hazardous air contaminants emitted by the facility. Control techniques other than combustion may be approved by the department.

(9) **RUNOFF CONTROL.** All facilities shall incorporate the following requirements for runoff control:

(a) All surface water drainage ditches, culverts and other drainage control structures shall be designed using the 10 year, 24-hour rainfall event as defined in s. NR 205.05 to determine peak flow rates.

(b) A runoff analysis shall be performed to determine the amount and velocity of runoff prior to facility development, at critical periods during operations, and during the long-term care period. Sizing for surface water drainage ditches, structures and sedimentation control structures shall be based on this analysis.

(c) Rainfall runoff shall be diverted away from the active fill area of the facility and any borrow areas to a sedimentation control structure. Drainage swales designed to convey surface water runoff over waste disposal areas shall be lined with a minimum thickness of 2 feet of clay.

(d) Surface water drainage ditches, structures and sedimentation basins shall be installed during the initial stages of construction to control rainfall runoff and limit entrained sediment from reaching surface water bodies. Temporary sediment control measures may be used during initial construction if approved in writing by the department.

(e) Surface water drainage ditches, structures and sedimentation basins shall discharge along existing drainage patterns capable of accepting the anticipated flow volume. An analysis shall be performed to document compliance with this requirement.

(f) Surface water diversion and construction at a facility shall be designed to minimize impacts on adjacent property, such as erosion, sedimentation and flooding.

(10) MISCELLANEOUS. All facilities shall be designed to meet the following requirements:

(a) A method of controlling any dust or windblown debris shall be included in the facility design. Unless otherwise approved by the department, the design shall include a temporary or permanent berm at least 10 feet in height constructed around the active area of a landfill phase. A fence at least 5 feet in height shall be constructed on top of the berm to control any blowing debris. Waste shall not be deposited above the top elevation of the berm. The factors which will be considered by the department when evaluating alternative provisions for controlling dust and windblown debris includes the remoteness of the facility, natural screening and windbreaks and waste types.

(b) Access to the facility shall be restricted through the use of fencing, natural barriers or other methods approved in writing by the department.

(c) All access roads for the facility, including those leading to the active area, shall be designed for all weather operation.

(d) All access roads shall be designed with a maximum grade no greater than 10%. The intersection of the facility access road with an existing highway shall be designed to provide sufficient sight distance and minimum interference with traffic on the highway.

(e) All borrow areas shall be abandoned in accordance with section 208.3, Wisconsin department of transportation standard specifications for road and bridge construction. Pre-existing commercial borrow sources are exempt from this requirement.

(f) A minimum separation distance of 100 feet shall be maintained between the limits of waste filling and adjacent property line. A minimum distance of 50 feet shall be maintained between any permanent berms or excavations associated with the facility, excluding surface water diversion structures and the adjacent property line.

(g) The facility shall be designed so that final grades in each phase are reached as soon as possible and the open area used for refuse filling is minimized.

(h) The final slopes of the facility shall be greater than 5%, but shall not exceed 4 horizontal to one vertical.

(i) All facilities which may obstruct flight patterns to instrument approach airports shall follow FAA guidelines in designing intermediate and final grades.

(j) A minimum of 2 leachate head wells shall be designed for each major horizontal phase of the facility unless otherwise approved by the department.

(k) All facilities with a design capacity greater than 50,000 yd<sup>3</sup> and proposing to accept municipal solid waste shall be supplied with a weight scale unless the applicant can document an alternative method for accurately determining waste tonnages.

(l) All facilities shall be designed with properly protected permanent benchmarks for horizontal and vertical control. Elevations shall be tied to USGS datum and hori-

zontal control shall be referenced to the property boundary.

(m) All facilities shall be designed to allow for rapid gas and leachate movement to the collection and removal systems.

History: Cr. Register, January, 1988, No. 385, eff. 2-6-88.

**NR 504.06 Alternative design criteria for land disposal facilities for high volume industrial wastes.** This section applies to landfills designed principally for high volume industrial waste, wood residue and minor amounts of other wastes as approved by the department. This section applies to all new facilities and to the expansion of existing facilities for which the plan of operation was not approved before February 1, 1988.

(1) GENERAL. (a) An applicant may design a high volume industrial waste landfill to meet the standards contained in ss. NR 504.05 and 504.07 or may propose an alternative design in accordance with the provisions of this section.

(b) If the applicant does not complete construction of the first major phase of the facility within 2 years from the date of the plan of operation approval, the applicant must reapply to the department for approval to begin construction. This application does not constitute a feasibility report as defined in s. 144.44 (2), Stats. The department may require additional conditions of approval and require redesign of the facility in accordance with state-of-the-art design criteria.

(2) DESIGN CAPACITY. Design capacity shall be in accordance with s. NR 504.05 (2).

(3) DESIGN CRITERIA. An applicant seeking approval of an alternative design under this section shall demonstrate in the feasibility report required in ch. NR 512 that the alternative design adequately protects public health, welfare and the environment and meets or exceeds the location and performance standards of s. NR 504.04. The applicant may include the following types of information as a part of such a demonstration:

(a) Facility characteristics including regional and specific information on land use, geology, hydrology, hydrogeology and soils.

(b) Waste characteristics including quantity and physical and chemical analyses of the waste and its leachate.

(c) Numerical groundwater quality modeling.

(d) Field demonstration data.

(e) Design and performance data for other similarly designed and constructed facilities.

(f) Accepted scientific or engineering analyses or field studies, field plots, research, manufacturers data or demonstrations.

(4) APPROVAL CRITERIA. The department shall approve the alternative design proposed by the applicant if the department determines to a reasonable degree of certainty that the alternative design adequately protects public health, welfare and the environment and meets or exceeds the location and performance standards of s. NR 504.04.

History: Cr. Register, January, 1988, No. 385, eff. 2-6-88.

Register, May, 1995, No. 473

**NR 504.07 Final cover system design. (1) GENERAL.** (a) All final cover systems shall be designed to minimize leachate generation by limiting the amount of percolation through the cap system, reduce facility maintenance by stabilizing the final surface through design of compatible slopes and establishment of vegetation, minimize the climatic effects of freeze-thaw and desiccation on the clay capping layer of the final cover system, and provide removal of leachate and venting of gas from those facilities which accept wastes with a high moisture content or which readily biodegrade.

(b) All new facilities and expansions of existing facilities for which the plan of operation was not approved before February 1, 1988 shall be designed with a final cover system meeting the requirements in subs. (2) to (6) unless it is established to the satisfaction of the department that portions of the cap system are not necessary based on the proposed waste types and the proposed design.

**(2) GRADING LAYER.** A minimum 6 inch thick grading layer shall be designed over the final elevation of facilities proposing to accept municipal solid waste materials to attain the required slope and provide for a stable base for subsequent system components. Daily and intermediate cover may be used for this purpose.

**(3) GAS VENTING SYSTEM.** Facilities designed to accept wastes which have the potential to generate gas shall have a final cover system capable of allowing removal of the generated gas. Facilities designed solely to accept coal ash are exempt from this requirement.

**(4) CLAY CAPPING LAYER.** A minimum 2 foot thick clay cap shall be designed to provide a low hydraulic conductivity barrier to percolation. Clay soil shall be used for this layer and shall meet the following specifications. The department may approve alternative materials such as geomembranes based on facility specific information.

(a) A minimum of 50% by weight which passes the 200 sieve.

(b) A saturated hydraulic conductivity of  $1 \times 10^{-7}$  cm/sec or less.

(c) Constructed in maximum 6 inch lift heights after compaction to at least 90% modified or 95% standard Proctor density.

(d) The department may require that the material meet specifications for liquid limit and plasticity index.

**(5) COVER LAYER.** A minimum 1.5 to 2.5 foot thick soil cover layer shall be designed above the clay capping layer to provide additional rooting depth for vegetation and to protect the clay capping layer from damage due to freeze-thaw and desiccation. Soils available on or near the proposed facility property may be proposed for this material. This layer shall not be densely compacted. The thickness of this layer shall be based on:

(a) The freeze-thaw susceptibility and moisture holding capacity of the proposed material,

(b) The geographic location of the facility, and

(c) The type and thickness of the capping layer.

**(6) TOPSOIL.** A minimum of 6 inches of topsoil shall be designed over the cover layer to support the proposed vegetation. A testing program of the proposed topsoil sources shall be designed which will document nutrient content and pH adjustments. Fertilizer and lime shall be added as indicated by the testing.

(7) **REVEGETATION.** The seed type and amount of fertilizer applied shall be proposed depending on the type and quality of topsoil and compatibility with both native vegetation and the final use. Unless otherwise approved by the department in writing, seed mixtures and application rates shall be in accordance with section 630, Wisconsin department of transportation standard specifications for road and bridge construction. Application rates for fertilizer and mulch shall also be specified.

**(8) FINAL USE.** The proposed final use shall be compatible with the final cover system. The following activities are prohibited at closed solid waste disposal facilities unless specifically approved by the department in writing.

(a) Use of the facility for agricultural purposes.

(b) Establishment or construction of any buildings.

(c) Excavation of the final cover or any waste materials.

History: Cr. Register, January, 1988, No. 385, eff. 2-6-88.

**NR 504.08 Disposal of residue produced by burning municipal solid waste. (1) APPLICABILITY.** This section applies to landfills designed for residue produced by the burning of municipal solid waste as approved by the department. This section applies to all new facilities and existing facilities.

**(2) LANDFILL DESIGN CRITERIA FOR RESIDUE PRODUCED BY BURNING MUNICIPAL SOLID WASTE.** (a) All municipal solid waste combustor residue disposal areas which are not substantially constructed prior to January 1, 1992 shall be designed and constructed, at a minimum, as composite lined monofills as specified in sub. (3).

(b) The department may approve alternate designs such as double liners if it finds that the design provides equivalent protection.

(c) All landfills which accept residue produced by burning municipal solid waste shall maintain a surface water runoff containment system approved by the department.

(d) All landfills which accept residue produced by burning municipal solid waste shall maintain access control to the landfill.

(e) All landfills which accept residue produced by burning municipal solid waste shall maintain a financial responsibility plan substantially meeting the requirements of ch. NR 520 and approved by the department.

**(3) DISPOSAL OF RESIDUE PRODUCED BY BURNING MUNICIPAL SOLID WASTE.** (a) No person may dispose of municipal solid waste combustor residue which does not exceed limits specified in s. NR 502.14 (8) (g) except according to the following criteria:

1. All residue shall be disposed of in a landfill designed, at a minimum, with a clay liner and leachate collection system and specifically approved by the department to accept municipal solid waste combustor residue.

2. After January 1, 1992 all residue shall be disposed of in a landfill area designed, at a minimum, as a monofill

cell approved by the department. Non-acidic leachate producing wastes such as foundry process waste and utility ash may be mixed with the residue.

3. After January 1, 1993 all municipal solid waste combustor residue shall be disposed of in a landfill area designed, at a minimum, as a composite lined monofill cell. The composite liner shall consist of a minimum 60 mil geomembrane overlying a minimum thickness of 4 feet of compacted clay meeting the specifications of s. NR 504.05. The leachate collection system shall be designed such that the leachate from the residue monofill cell can be sampled and collected separately from non-residue disposal areas.

4. All residue produced by a municipal solid waste combustor which begins initial operation after June 1, 1992 shall be disposed of in a landfill area designed, at a minimum, as a composite lined monofill cell.

(b) After January 1, 1993 all municipal solid waste combustor residue which exceeds the test limits in s. NR 502.14 (8) (g) and is not subsequently treated to below those limits shall be disposed of in a double composite lined landfill. The double composite liner shall be constructed of 2 separate composite liners with each liner consisting of a minimum 60 mil geomembrane overlying a minimum thickness of 4 feet of compacted clay. The com-

posite liners shall be separated by a leachate detection layer consisting of a minimum one foot layer of granular material. The clay components of the liner system shall have properties that meet the specifications of s. NR 504.05. Separate leachate collection systems shall be constructed above and between the composite liners. The leachate collection system shall be designed such that the leachate from the leachate detection layer can be sampled and collected separately from the upper leachate collection system and separately from the non-residue disposal areas. The department may approve alternate designs if it finds that the design provides equivalent protection.

(c) Operators of medical waste combustors with a design capacity of less than 10 tons per day may apply to the department for a written exemption to subd. 2 to 3 or both if they can demonstrate that no reasonable alternative is available. The department may place an expiration date on any exemption which is granted.

(d) All landfills which accept municipal solid waste combustor residue shall be approved by the department in accordance with s. NR 514.08 prior to accepting each specific residue waste stream.

History: Cr. Register, May, 1992, No. 437, eff. 6-1-92.