Design and Construction Criteria Completeness Checklist
Chapter NR 504, Wis. Adm. Code

Revised August 2022

Waste & Materials Management
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Instructions: This checklist is intended for use by department staff for the review of landfill plan of operation, feasibility reports, or other submittals when determining completeness with respect to the requirements under ch. NR 504, Wis. Adm. Code. The checklist may also be used by applicants and submitted with a landfill plan of operation, feasibility report, or other applicable submittal to facilitate department review. Refer to applicable statues and codes for exact requirements.

General Information

Facility Name: _____ Facility Identification (FID) # _____

Facility Type: _____ License/Monitoring # _____

Submittal Type: _____

Initial Submittal: Date Received: ____/____/____ Completeness Due: ____/____/____ DNR Response: ____/____/____ (Complete: __ yes __ no)

Addendum # __ Date Received: ____/____/____ Completeness Due: ____/____/____ DNR Response: ____/____/____ (Complete: __ yes __ no)

DESIGN & CONSTRUCTION CRITERIA REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
NR 504.04(3) LOCATIONAL CRITERIA. Are the proposed limits of filling within:					
(a) 1,000 feet of any navigable lake, pond or flowage not including landfill drainage or sedimentation control structures? __ yes __ no __ If yes, was an exemption requested?					
(b) 300 feet of any navigable river or stream? __ yes __ no __ If yes, was an exemption requested?					
(c) A 100-year flood plain? __ yes __ no __ If yes, was an exemption requested?					

Facility Name: _____

DESIGN & CONSTRUCTION CRITERIA REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
(d) 1,000 feet of the nearest edge of the right-of-way of any state trunk highway, interstate or federal aid primary highway or any public park or state natural area? __ yes __ no __ If yes, was a line of site study provided showing that the landfill would not be visible from the road, park or natural area through the use of screening and/or, __ was an exemption requested? Note: If waste may be visible for periods of time even with the use of screening, then an exemption should be requested.					
(e) 10,000 feet of the end of an airport runway designed or planned to be designed and used by turbojet aircraft or within 5,000 feet of any airport runway designed for and used by piston type aircraft? __ yes __no Is FAA notification required? __ yes __ no Note: If the proposed limits of waste filling would be within 5 miles (for expansions of an existing MSW landfill) or within 6 miles (for new MSW landfills, after year 2000) of the end of the runway of any airport used by turbojet or piston type aircraft, the applicant must provide notice to both the Federal Aviation Administration (FAA) and the affected airport. The report should contain all correspondence related to the notices including any determinations made by the FAA. (Ref. 49 U.S.C. § 44718(d), See FAA Advisory Circular AC 150/5200-34A, dated 1/26/2006)					
(f) 1,200 feet of any water supply well (i.e. public, private, irrigation or stock water supply wells)? __ yes __ no __ was an exemption requested? If yes, have the following been provided for each identified well? __ well location __ former and present well owner __ well driller __ well construction log Note: Exemptions may not be granted if the above information is not provided.					
(g) 200 feet of a fault that has had displacement in Holocene time? __ yes __ no __ If yes, was an exemption requested?					
(h) Seismic impact zones? __ yes __ no __ If yes, was an exemption requested?					
(i) Unstable areas? __ yes __ no __ If yes, was an exemption requested?					
NR 504.04(4) PERFORMANCE STANDARDS. Will the proposed landfill cause the following:					

Facility Name: _____

DESIGN & CONSTRUCTION CRITERIA REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
(a) A significant adverse impact on wetlands? __ yes __ no Has a practicable alternatives analysis and a wetland functional values analysis been completed in accordance with ch. NR 103, if a wetland will be affected by the proposed landfill or any noncommercial soil borrow source activity? Note: See DNR wetland regulation website (https://dnr.wisconsin.gov/topic/Wetlands/permits) to help determine if a wetland permit may be needed per s. 281.36, Stats.					
(b) A take of an endangered or threatened species in accordance with s. 29.604, Stats? __ yes __ no					
(c) A detrimental effect on any surface water? __ yes __ no Note: Exemptions are not granted.					
(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? __ yes __ no __ Has an exemption been requested to the groundwater standards in accordance with ss. NR 507.29 and NR 140.28, Wis. Adm. Code? If an exemption is required, does the feasibility report include: __ A list of the specific wells and parameters for which an exemption is being requested. __ A discussion of how the criteria listed in s. NR 140.28(2), (3) and (4) are met.					
(e) The migration and concentration of explosive gases in excess of 25% of the lower explosive limit for such gases at any time? __yes __ no					
(f) The emission of any hazardous air contaminant exceeding the limitations for those substances contained in s. NR 445.04 or 445.05? __ yes __ no					
NR 504.05 GENERAL DESIGN AND CONSTRUCTION CRITERIA.					
(1) Is the landfill designed in substantial conformance with the design criteria in ss. NR 504.06 to 504.09?					
(2) Is supporting justification included for any differences from ss. NR 504.06 to 504.09?					
(3) Is the proposed operating life of the landfill between 10 and 15 years?					
If the proposed life is not between 10-15 years is the facility exempted in s. 289.28(2), Stats. or the expansion of an existing facility?					
NR 504.06 MINIMUM DESIGN AND CONSTRUCTION CRITERIA FOR LANDFILL LINERS AND LEACHATE COLLECTION SYSTEMS.					
(1) GENERAL.					

Facility Name: _____

DESIGN & CONSTRUCTION CRITERIA REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
(a) If the landfill is proposed to accept municipal solid waste does the design incorporate a composite liner and a leachate collection system capable of limiting the average leachate head on the composite liner to 1 foot or less during operation and after closure of the landfill?					
Does the composite liner consist of the following: __ An upper geomembrane component with nominal 60-mil minimum thickness __ A lower component of 4 foot minimum compacted clay meeting NR 504.06(2)(a)					
(2) COMPOSITE OR CLAY LINED LANDFILLS. Does the composite liner or clay liner design meet the following requirements:					
(a) Will all clay used in liner construction meet the following specifications: __ A minimum of 50% by weight passing 200 sieve __ A saturated hydraulic conductivity of $1x10^{-7}$ cm/sec or less __ An average liquid limit of 25 or greater with no values less than 20 __ An average plasticity index of 12 or greater with no values less than 10					
(b) Is there at least a 10 foot separation between the seasonal high groundwater table and the bottom of the clay liner component? Note: For zone of saturation landfills select NA.					
(c) Is there at least a 10 foot separation between the bedrock surface and the bottom of the clay liner component?					
(d) Is there a minimum 2% liner surface slope toward the leachate collection system?					
(e) Is there a minimum 4 foot thick clay component of a composite liner or a minimum 5 foot clay liner thickness?					
(f) 1. Are the clay layers proposed to be constructed in the following manner: __ Lift heights no greater than 6 inches after compaction __ Footed compaction equipment having feet at least as long as the loose lift height __ Disking or mechanical processing of clay to break up clods and adjust moisture __ Clod size no greater than 4 inches __ All compaction equipment to have a minimum static weight of 30,000 pounds __ Alternative procedures or equipment proposed					
2. A sufficient number of equipment passes to ensure complete remolding of clay?					
3. Is clay compaction proposed to be 90% modified Proctor density at 2% wet of the optimum or 95% standard Proctor density at wet of the optimum moisture content? Alternately, the line of optimums method may be used.					
(g) Are interior sidewall slopes at a maximum of 3H:1V or at a minimum of 5H:1V?					
(h) Are clay components of the liner in adjacent phases keyed together?					

Facility Name: _____

DESIGN & CONSTRUCTION CRITERIA REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
Is the keying accomplished by excavating a minimum of 4 steps with a total width of spliced area measuring at least 15 feet?					
(3) COMPOSITE-LINED LANDFILLS. If the landfill is composite lined, are the following requirements specified in the plan of operation:					
(a) Is the geomembrane specifically formulated for waste containment purposes?					
Is the nominal geomembrane thickness 60 mil or greater with no thickness below minimum industry accepted manufacturing tolerances?					
(b) Is there geomembrane protection along areas of traffic or concentrated activity such as sumps, sideslope risers and entry ramps?					
(c) For slopes in excess of 10%, will geomembrane panels be installed with panel seams perpendicular to the contour lines of the slope?					
(d) Prior to geomembrane placement, will the clay surface be prepared as follows: __ Rolling and grading of clay surface to remove irregularities, protrusions, loose soil and abrupt changes in grade, __ Free of stone, grading stakes, construction debris and contain no areas softened by high water content __ Sufficiently dry and dense clay surface such that the construction equipment will not create ruts __ Depressions and large cracks filled with tamped clay					
(e) Will the geomembranes be welded as follows: __ Geomembrane panels welded by double-tracked, fusion welding machines for all linear seams, __ Fusion welding of corners, butt seams and long repairs where possible, __ Extrusion or fusion welding for all other repairs, detail work and patches, __ Request for Department approval for other welding methods.					
(f) Will geomembrane components in adjacent phases be welded together to form a continuous geomembrane surface?					
Will the liner extended beyond the proposed edge of waste at a phase junction be protected from traffic and weather?					
(g) Will wrinkles which are taller than they are wide be smoothed or cut out prior to covering with soil?					
Will guidance be provided to machine operators placing soil on geomembrane by the use of an observer with an unobstructed view of the advancing lift of soil.					
(h) Are the following minimum soil thickness on geomembrane proposed before vehicular traffic may occur: __ 1 foot for vehicles with ground pressure less than 5 pounds per square inch, __ 2 feet for other vehicles equipped with tracks and floatation tires, __ 3 feet or more for trucks or wheeled hauling equipment.					

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DESIGN & CONSTRUCTION CRITERIA REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
(i) In order to lessen desiccation effects, will the landfill base and the lower 10 feet of the sideslope be covered with a drainage blanket within 30 days after completing quality control and quality assurance testing?					
Will the remaining sideslope be covered with either drainage material or geotextile to prevent damage to the geomembrane?					
(j) Will placement of soil over the geomembrane be performed during cooler temperature periods to the extent possible using methods which minimize wrinkling?					
(k) Will anchor trenches be designed and constructed around the landfill to secure the permanent edges of the geomembrane?					
Will geomembrane be seamed completely to the edge of the panel end to minimize potential of tear propagation?					
(4) ZONE-OF-SATURATION LANDFILLS. Landfills with proposed base grades below the groundwater table must meet the following:					
(a) Is the landfill located in a fine-grained soil environment?					
(b) Does the landfill meet the requirements of sub. (2)(a), (d), (e), (f), (g) and (h) and the requirements under sub. (3), if the landfill will accept municipal solid waste?					
(c) Has an analysis been performed on the effect which groundwater may have on uplift of the liner and the short and long-term stability of the geomembrane component?					
Does the analysis evaluate the effect of an underdrain or other dewatering system?					
(d) Have borings, backhoe pits or other means of exposing the subsurface soils been proposed on a 100-foot grid to a minimum 5 foot depth below the subbase grades of the liner?					
Are all granular or silty soils detected within this 5 foot depth proposed to be removed?					
(5) LEACHATE COLLECTION SYSTEMS. The leachate collection system must incorporate the following design features:					
(a) Does the leachate collection system design include the following features: __ A leachate collection system included in each horizontal phase, __ Leachate routed to the landfill perimeter in the most direct manner possible, __ Limit average leachate head on the liner to 1 foot or less, __ Limit maximum leachate flow distance to the perforated collection pipe to 130 feet.					
(b) Is the slope on the leachate collection pipe a minimum of 0.5%?					
(c) Is the minimum diameter of all leachate collection pipes 6 inches?					

Facility Name: _____

DESIGN & CONSTRUCTION CRITERIA REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
Are all collection pipes proposed to be Schedule 80 PVC pipe or an approved substitute?					
(cm) Are the proposed pipe fittings for use with PVC and HDPE pipe secured to the leachate collection pipe as follows: __ PVC fittings and pipe solvent-welded __ HDPE fittings and pipe fusion welded					
(d) Do the leachate collection trenches conform to the following: __ Rectangular leachate collection trenches for clay liners __ V-trenches with a maximum 18 inches depth and 3H: 1V sideslope for composite liners __ V-trenches smooth-drum rolled prior to placement of the membrane					
(dm) __ Is a geotextile with a weight of 12 oz/yd^2 used to line the trench base and sidewalls and is it placed directly over the geomembrane __ Does the design show that the geotextile does not overlap across the top of the trench. __ Are the geotextile specifications, including manufacturer's data for grab and puncture strength, used to demonstrate the resistance to damage from the aggregate to be placed over the geotextile?					
(e) Does the leachate collection pipe trench backfill conform to the following: __Uniformity coefficient of less than 4, __Maximum particle diameter of 1 ½ inches, __Maximum of 5% passing the number 4 sieve, __Rounded to subangular gravel, __Minimum 4 inches bedding depth before installation of leachate pipe, __Minimum 6 inches of granular material above the pipe, and an additional 12 inches of material mounded above the trench, __Graded soil filter or geotextile to minimize migration of drainage blanket into the trench, in cases where particle size of the bedding is significantly less than the collection trench bedding __ No use of limestone and dolomite as trench backfill. __ If limestone and dolomite are proposed for use as trench backfill, does the plan of operation address that there is no other suitable material reasonably available?					
(f) Have the sand and gravel sizes and geotextile and pipe openings been analyzed for the control of piping of soil materials and have the materials been chosen to achieve a stable and self-filtering structure under all conditions of leachate flow?					
(g) Do leachate collection lines have cleanout access on both ends of pipes?					
Does each leachate collection line have a maximum distance of 1,200 feet from the end of one cleanout to the toe of the opposite slope?					

Facility Name: _____

DESIGN & CONSTRUCTION CRITERIA REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
(h) Are there no vertical liner penetrations due to leachate lines, manholes and other engineering structures?					
For clay lined landfills, are liner penetrations limited to leachate transfer lines in the horizontal direction only? For composite lined landfills, are there no liner perforations?					
(i) Is a 4'x4', 5 foot thick, anti-seep collar placed around any leachate transfer line penetrating the clay liner?					
(j) Is the composite lined landfill designed with a sump and sideslope riser meeting the following requirements: __1. Sump volume and pump capacity sized to accommodate an annual leachate collection rate of 6 inches taking into account the potential for solids to build up over time. __2. Sump base protected with polyethylene plate or other acceptable means and placed prior to sideslope riser and backfill installation. __3. Leachate discharge pipe between the sideslope riser and the tank installed with valves to prevent backflow into the waste disposal area. __ 4. Sideslope riser pipe has a minimum diameter of 18 inches and geometry at the junction of the sump and sidewall to assure passage of the pump and hardware and assure correct positioning of the intake of the pump. __ 5. The area of the sump and depth of gravel fill are sized to allow remedial installation of access and hardware for removal of leachate if the sideslope riser and pump system fail.					
(k) Are gravity lines transporting leachate out of the landfill constructed with valves for flow control, and are the valves compatible with the leachate and operable from the ground surface?					
(l) Are all leachate lines located outside the landfill double-cased or in an approved secondary containment?					
Are all leachate transfer lines proposed to be pressure tested prior to use?					
Is the upslope end of secondary pipe sealed and the downslope end open to drain into the manhole?					
(m) Are all leachate transfer lines, manholes, lift stations and other structures outside the waste limits designed to meet the following: __Designed as shallow as practical, and as far from the waste limits as possible so repair of these devices would not infringe on the landfill cover or liner systems __Constructed above the seasonal high groundwater table. __ If not constructed above the water table, is it not technically feasible to do so and does the design meet the requirements of (l) above.					

Facility Name: _____

DESIGN & CONSTRUCTION CRITERIA REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
(n) Are leachate collection tanks and manholes designed with the following: __ Secondary containment to prevent leachate discharge to ground and surface water __ Means to monitor the tank or manholes for leaks within the secondary containment __ If no, is an alternative method proposed?					
(o) Are the leachate tanks designed to: __ Contain leachate volume generated over a 4 day period, __ Withstand the soil and liquid loads encountered during installation and use __ Follow the consultant and manufacturer installation instructions.					
(p) Does the leachate loadout station design contain the following: __ Measures to prevent accidental leachate discharge at the loadout from entering ground or surface water, __ A loadout station paved and sloped to a catch basin to direct all spills to a catch basin.					
(q) Are leachate and gas system manholes and enclosures vented and do they have controlled access?					
For landfills designed with active extraction, are manholes and enclosures designed to minimize air intrusion?					
(r) Are all pumps, valves and meters designed to be controlled and operated from ground surface?					
(s) Are all leachate and groundwater collection systems designed to monitor the liquid volume removed?					
(t) Is there a minimum one foot thick granular drainage blanket placed on top of the geomembrane for a composite liner or on top of the clay component of a clay liner which contains the following elements: __ no more than 5% passing 200 sieve __ If the granular layer contains gravel greater than ¼ “, a certified needle free minimum 12 oz/yd^2 nonwoven geotextile below the drainage blanket					
(tm) __ Hydraulic conductivity (at anticipated field density) equal to or greater than 1 cm/sec for sites that accept any amount of MSW or 1x10^{-2} cm/sec for landfills that do not accept MSW __ Was the gradation of the drainage blanket (and associated hydraulic conductivity) selected to maintain the maximum head in the drain within the drain thickness?					
(u) If the major horizontal clay lined phase is above the saturated zone, is each phase designed with collection basin lysimeter (except for composite lined landfills)?					

Facility Name: _____

DESIGN & CONSTRUCTION CRITERIA REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
(6) ADDITIONAL REQUIREMENTS FOR LANDFILLS WITH EXTENDED COLLECTION LINES. Landfills with leachate collection lines that exceed 1,200 feet and will accept MSW must meet the following:					
(a) Do any leachate collection lines exceed 1,200 feet when measured from the end of <u>each</u> cleanout to the toe of the opposite slope? Will the landfill accept MSW? If no, check NA for (b) through (f) below.					
(b) Is the maximum length of each leachate collection line 2,000 feet or less from the access point at one end to the toe of the opposite slope?					
(c) Is the slope on the leachate collection pipe a minimum of 0.5% after accounting for primary and secondary settlement of the subgrade? Note: The minimum design slope is selected following computation of 100% of the primary and secondary consolidation settlement beneath the facility, which includes, as applicable, in-situ soil, added geologic material structural fill material, and compacted clay liner. Secondary settlement shall be calculated using a 100-year timeframe.					
(d) Is the pipe bedding material composed of course, uniform gravel with hydraulic conductivity greater than or equal 1 cm/sec? Note: This requirement is in addition to meeting the other requirements of s. NR 504.06(5)(e).					
(e) Has the maximum anticipated construction, operation and post-closure overburden loads over the leachate collection piping been calculated and used in selecting pipe material and wall thickness? __ Were the calculations based on a 6 inch pipe diameter and appropriate in-field consolidated density?					
(f) Have all components of the leachate collection system incorporated the following design features: __ prefabricated or smooth sweep bends with a minimum radius of 10 pipe diameters __ pipe alignments that minimize horizontal and vertical alignment changes for the entire pipe length __ elimination or minimization of obstructions which impose drag on pipe cleaning jetter hose or nozzles					
(7) COMPOSITE-LINED LANDFILLS USING GCLs.					
Is GCL proposed for use in a composite liner? If no, indicated NA for the following and (a) – (c).					
Does the landfill accept only non MSW waste? Or if it accepts MSW will the GCL be placed over the 4 foot clay liner? If yes to either, the design must meet the requirements of (a) – (c). If no to both, then GCL may not be used as proposed.					
(a) Has the hydraulic performance of the GCL been assessed by use of compatibility testing?					

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DESIGN & CONSTRUCTION CRITERIA REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
(b) Does the GCL meet the specifications of NR 504.07(4)(a)1 to 11?					
(c) Is the GCL underlain by a soil barrier layer a minimum 2 feet thick and meets the specifications of NR 504.07 (4)(a) 12. To 17.					
NR 504.07 MINIMUM DESIGN AND CONSTRUCTION CRITERIA FOR FINAL COVER SYSTEMS.					
(1) GENERAL.					
(a) Is the final cover system designed to? __ Minimize leachate generation by limiting the amount of percolation through the cap __ Reduce landfill maintenance by design of compatible surface slopes and vegetation __ Account for differential settlement and other stresses on the capping layer __ Minimize freeze-thaw effects and desiccation of clay capping layer __ Provide for removal of leachate and venting of gas from landfills accepting wastes with high moisture content or that which is readily biodegradable					
(b) Does the final cover system meet the requirements of subs. (2) to (9) below unless it is established (to the satisfaction of the department) that portions of final cover system are not needed based on proposed waste type and design?					
Is the geomembrane component included in the final cover design unless this is proposed to be an exclusively high volume industrial, or other landfill that does not accept municipal solid waste and is not composite lined?					
(c) If the landfill is designed with a composite liner, is it also designed with a final cover system meeting subs. (2) to (9) below?					
(d) Does the landfill accept papermill sludge or other industrial solid wastes with high water contents and low strength? Will the strength of the waste prohibit the type of cover system specified in this section (subs. (2) to (9))? If yes, an alternate final cover system may be proposed.					
(2) GRADING LAYER.					
If this is a municipal solid waste landfill, does the design include a 6 inch grading layer above the final waste elevation?					
(3) SUPPORT LAYER AND LOW-STRENGTH WASTES.					
If the landfill accepts industrial wastes with high water content and low strength, does the design include a support layer for stabilization, reinforcement and removal of leachate and gas?					
(4) CLAY CAPPING LAYER.					
__ Does the landfill design include a two foot clay cap that meets the specification of NR 504.06(2)(a) listed below? __ A minimum of 50% by weight passing 200 sieve					

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DESIGN & CONSTRUCTION CRITERIA REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
__ A saturated hydraulic conductivity of $1x10^{-7}$ cm/sec or less __ An average liquid limit of 25 or greater with no values less than 20 __ An average plasticity index of 12 or greater with no values less than 10 __ Will the clay capping layer be constructed according to NR 504.06(2)(f)?					
(a) If the two foot clay cap is replaced with a GCL and 2 foot soil barrier layer, does it meet the following: __ 1. GCL consist of a layer of bentonite clay between 2 geotextiles __ 2. GCL will be covered with a geomembrane the same day it is placed and in dry conditions __ 3. GCL will be installed in a relaxed condition, free of tension or stress __ 4. Adjoining panels of GCL have a minimum 6 inches overlap on longitudinal seams and a minimum 20 inches of overlap on panel end seams __ 5. Irregular shapes, cuts or tears in the GCL are covered with a GCL patch with a minimum 12 inch overlap __ 6. A seal of loose bentonite granules will be placed in seam overlaps at a minimum rate of 1 quarter pound per linear foot of seam for all seams __ 7. Loose bentonite or bentonite amended soil will be placed at all patches and penetrations __ 8. GCL panels are certified needle-free through magnetic and metal detection tests __ 9. GCL will be placed in direct contact with a soil barrier layer __ 10. Vehicle traffic on subgrade of GCL and on GCL will be restricted to minimum weight and number of machines to deploy GCL and geomembrane; vehicles operated to minimize damage to subgrade, GCL and geomembrane; deployment methods selected to prevent tearing or coming out of fibers of the GCL __ 11. Soil cover placement over the geosynthetics will be completed in the same construction season as the geosynthetic construction __ 12. Soil barrier layer will consist of fine-grained soil or a well graded sandy soil with fines, meeting USCS soil types ML, CL, CH, SM, or SC or dual -symbols classifications of these soils, with 25% by weight passing P200 sieve; upper one foot will have maximum particle size of 2 inches and lower one foot will have maximum particle size of 4 inches __ 13. Soil barrier layer will be compacted in lift heights of no greater than 12 inches after compaction using footed compaction equipment with feet at least 6 inches long; each lift will be disked to break up clods; clods no greater than 4 inches __ 14. Soil barrier layer will be compacted to ensure complete remolding of soil with equipment having a minimum static weight of 30,000 pounds					

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DESIGN & CONSTRUCTION CRITERIA REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
__ 15. Soil barrier layer will be compacted to 90% modified or 95% standard Proctor density or greater at a moisture content at or wet of optimum __ 16. Each lift of will be keyed into clay or soil barrier layer soils in adjacent phases to form a continuous seal; steps will be a minimum width of 2 feet and there will be a minimum of 2 steps __ 17. The surface of the top lift will be graded or compacted to be smooth and firm and will be inspected for removal of course grave, cobbles and debris prior to placement of GCL					
(b) For industrial waste landfills that predominantly accept compressible wastes or wastes with high water contents and low strength, will the landfill be replacing the clay layer with a GCL overlying a minimum one foot sand layer? If yes, will the gradation of the sand layer be a uniform sand selected to vent gas, drain leachate and provide hydration water to the GCL?					
(c) For industrial waste landfills that predominantly accept ash, will the landfill be replacing the clay layer with a GCL overlying a minimum two feet soil barrier layer? If yes, will the soil barrier layer meet the requirement of (a)13 to 17 above and will the upper foot of soil barrier layer meet the requirements of (a)12 above? Note: The lower foot shall be designed to provide a capillary break between the ash and the upper one foot of soil barrier layer.					
(d) If the lower one foot of the clay layer is replaced with a one foot of foundry green sand system sand, will the sand meet the following: __ Bentonite content of greater than 6% __ Liquid limit of greater than 20 __ Plasticity index of greater than 6 __ Hydraulic conductivity of less than $1X10^{-7}$ cm/sec __ Compaction of 90% modified or 95% standard Proctor density or greater at a moisture content at or wet of optimum					
(5) GEOMEMBRANE LAYER.					
If a geomembrane layer is proposed, does it meet the requirements of NR 504.06(3)(c) to (j) and the following:					
(a) Nominal geomembrane thickness 40 mils or greater, and no thickness measurements below accepted industry tolerance					
(b) Geomembrane installed in direct contact with the clay capping surface					
(c) Geomembrane penetrations fitted with prefabricated collar or a plate welded at the angle of final cover slope, which allows for differential settlement of waste without damage to the membrane seal					

Facility Name: _____

DESIGN & CONSTRUCTION CRITERIA REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
(6) DRAINAGE ROOTING ZONE LAYER. Does the design include a drainage and rooting zone layer over the geomembrane or the clay cap that meets the following requirements:					
A minimum thickness of 2.5 feet and is not densely compacted					
(a) Drainage layer is designed to be placed immediately above the capping layer and consists of a 1-foot sand layer with a min. hydraulic conductivity of $1x10^{-3}$ cm/sec., or a geosynthetic drain layer of equivalent or greater transmissivity, including: ___ Design includes an analysis which demonstrates whether the maximum head in the drain layer will be confined within the thickness of the drain, ___ Drain calculations include infiltration rates based on saturated characteristics of the topsoil and rooting zone, and ___ Drain calculations include hydraulic gradient of one through the topsoil and rooting zone.					
(b) A perimeter drain pipe at the low end of all final cover sideslopes with the following design elements: __ Drain pipe surrounded by a minimum of 6 inches of gravel or sand having a minimum hydraulic conductivity of $1x10^{-2}$ cm/sec __ Drain pipe sloped to outlets spaced 200 feet apart unless different spacing is supported by modeling					
(7) TOPSOIL.					
__ Is a minimum of 6 inches of topsoil included over the cover layer? __ Is fertilizer and lime addition proposed per section 630, WDOT or other spec.?					
(8) REVEGETATION.					
__ Is seed type and fertilizer based upon type and quality of topsoil, and compatibility with the native vegetation and final use? __ Is seed mix and application rates per section 630 WDOT specifications unless the department approved different seed mix and application rates? __ Are fertilizer and mulch application rates specified?					
(9) FINAL USE.					
(a) Is final use compatible with the final cover system?					
(b) Are the following activities prohibited when landfill is no longer in operation? __ Use of waste disposal area for agricultural purposes __ Establishment or construction of any buildings over the waste disposal areas __ Excavation of final cover or any waste materials					
NR 504.075 SOIL BORROW SOURCES.					
(1) GENERAL.					

Facility Name: _____

DESIGN & CONSTRUCTION CRITERIA REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
Is the soil borrow source being developed for the purpose of construction, operating or closing a landfill? If yes, this section applies. Note: Written approval from the department shall be obtained prior to initiating soil borrow activities at any borrow source subject to these requirements.					
(2) EXEMPTIONS. The following activities are exempt from the requirements of this section:					
(a) __ The production of processed aggregate products. __ Excavation of soils from construction projects off of the landfill property and not being used for compacted clay liner or capping layer, soil barrier layer, leachate collection layer or final cover drain layer?					
(b) Is the soil borrow source within the proposed or approved limits of filling for a landfill? If yes, then the landfill is not subject to the requirements of subs. (3) and (4)(b).					
(3) INITIAL SITE INSPECTION.					
Does the report include a copy of the department's initial site inspection for each proposed borrow source?					
(4) LOCATIONAL INFORMATION.					
(a) Does the submittal describe the following: __Total acreage __ Ownership __ Location (¼-¼ section) __ Present land use __ Transportation routes __ Any access restrictions __ Travel distance to and from landfill					
(b) Does the submittal include the following: __ Surface water drainage patterns __ Significant hydrologic features (surface waters, springs, drainage divides and wetlands) __ Areas of special natural resource interest (critical habitat or state/local natural areas) __ Historical/archaeological areas within and adjacent to proposed limits of excavation					
(5) FIELD AND LABORATORY INVESTIGATIONS FOR CLAY BORROW SOURCES AND SOIL BARRIER LAYER SOURCES.					
Does the submittal for soil borrow sources include field and laboratory investigations to define the physical characteristics of any clay borrow source or soil barrier layer source designated to be used for a liner or final cover?					

Facility Name: _____

DESIGN & CONSTRUCTION CRITERIA REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
Has an alternate geotechnical investigation program been approved by the department in writing prior to the field and laboratory investigation? __ yes __ no If yes, does the report include a copy of and justification for any approved alternative geotechnical investigation program? Note: An alternative geotechnical investigation program may be submitted in cases where previous information exists regarding the proposed soil borrow source.					
(a) Have the required number of test pits or borings been completed on a uniform grid pattern across the proposed borrow source(s)? __ 10 test pits/borings for the first 5 or less acres __ 1 additional test pit/boring for each additional 3 or less acres __ Proposed acreage of proposed borrow source(s) __ Number of test pits/borings required __ Number of test pits/borings made __ Have logs identifying geologic origin, testing results, USCS classification, and visual description of each major soil unit encountered also been included?					
(b) Does the report include Atterberg limits and grain size analyses to 0.002 mm particle size for 2 samples from each test pit/boring?					
(c) Does the report include the relationship of water content to dry density using either the modified or standard Proctor method (curves must be developed with a minimum of 5 points) for 1 sample from each major soil unit and no fewer than 3 samples for uniform clay deposits?					
(d) Does the report include laboratory hydraulic conductivity test results for each sample used to develop the Proctor curves?					
(6) STOCKPILING.					
Does the report include discussion of segregating stockpiled soils by USCS soil type, soil gradation, Atterberg limits and compaction specifications? Note: Stockpiling of soils obtained from clay borrow sources and soil barrier layer sources for landfill liner of final cover construction shall be conducted in an organized manner that minimizes mixing of dissimilar soil types. Soils from differing sources may not be commingled unless soil properties are similar.					
(7) DATA PRESENTATION FOR ALL CLAY BORROW SOURCES AND SOIL BARRIER LAYER SOURCES. Does the submittal for soil borrow sources for clay and soil barrier layers include the following?					
(a) Calculated volume of soil needed and the volume of acceptable soil available					
(b) Property boundaries and test pit/boring locations on a topographic map (scale: 1" = 500') that extends a minimum of 500 feet beyond the proposed borrow source					
(c) Isopach map showing thickness of acceptable soil					
(d) Description of methods for separating acceptable soil from unacceptable soil					
(e) Proposal for maintaining drainage and sedimentation control					

Facility Name: _____

DESIGN & CONSTRUCTION CRITERIA REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
(f) All data from the testing program					
(8) DATA PRESENTATION FOR OTHER BORROW SOURCES. Does the submittal for soil borrow sources other than those used for clay and soil barrier layers include the following?					
(a) Property boundaries shown on a topographic map (scale: 1" = 500') that extends a minimum of 500 feet beyond the proposed borrow source					
(b) Proposal for drainage and sedimentation control					
(9) STORMWATER MANAGEMENT.					
Does the submittal for a soil borrow source include a stormwater management plan that complies with the requirements of s. NR 504.09(1)(a) to (f) and (h) to (j), unless the borrow source is subject ot other permits with equivalent authority and requirements, such as a stormwater discharge permit or non-metallic mining reclamation permit?					
(10) RECLAMATION OR BORROW SITES.					
(a) Does the report include reclamation plans for borrow sources on the landfill property that include the following: __ post-mining land use that is integrated with the existing and proposed drainage __ surface water discharge requirements __ grades and final use of the landfill Is the reclamation plan consistent with NR 135.06 to 135.12?					
(b) For soil borrow areas not on landfill property, is the reclamation plan consistent with NR 135? If required, has a reclamation plan been submitted and a nonmetallic mining reclamation permit been received from the appropriate regulatory authority?					
(11) OTHER REQUIRMENTS.					
(a) If the proposed clay borrow source(s) contains less than a five foot, but greater than 2 foot uniform clay thickness, does the report contain a construction methodology and documentation procedure to ensure the liner meets the soil index property requirements of s. NR 504.06(2)(a)?					
(b) Does the report include a description of measures to be taken to comply with wetlands protection requirements, runoff and sediment controls and surface water discharge permit requirements and to minimize effects on areas of special natural resource interest and historical or archaeological areas within and adjacent to the proposed limits of excavation?					
NR 504.08 MINIMUM DESIGN AND CONSTRUCTION CRITERIA FOR LANDFILL GAS EXTRACTION SYSTEMS.					
(1) GENERAL.					

Facility Name: _____

DESIGN & CONSTRUCTION CRITERIA REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
If the landfill has the potential to generate landfill gas, is the landfill designed to prevent the migration of explosive gases generated by the waste?					
(2) ACTIVE GAS EXTRACTION AND TREATMENT. Does landfill design include an active gas recovery system which includes the following features:					
(a) Vertical gas extraction wells with a maximum 150 foot radius of influence per well with lesser radii of influence on wells near the perimeter Note: The radii of influence of adjacent wells shall overlap. Alternate well spacings may be proposed if site specific data is obtained through performance of pump tests.					
(b) Vertical gas extraction wells extending to 10 feet above the leachate collection system, and installed in 36 inch diameter boreholes Note: An exemption may be proposed to allow for placement of gas extraction wells closer to the leachate collection system.					
(c) The pipe in the boreholes are a minimum 6 inch diameter, Schedule 80 PVC or an approved equal					
(d) The lower 2/3 to 3/4 of the pipe in the borehole is slotted or perforated pipe					
(e) Backfill around slotted pipe is one inch to 1 ½ inch washed stone and the top 10 feet of the borehole is sealed					
(f) Each gas extraction well has a flow control valve and sampling port					
(g) The header system is looped to allow alternate flow paths for the gas					
(h) A minimum slope of 2% for header pipes over the waste					
(i) Polyethylene is used for the header and lateral pipes					
(j) The blower, header and laterals are sized such that a minimum vacuum of 10 inches of water column is available at the well furthest from the blower					
(k) A drip leg or equivalent is installed immediately before the blower while preserving suction at the wells under maximum operating vacuum					
(l) All condensate and gas transfer piping outside waste limits are encased in 2 feet of clay, double-cased pipe or another approved secondary containment If the piping is not encased is the proposed system designed with multiple drip legs within the landfill where the bulk of the condensate has been removed?					
(m) The system has the ability to collect and treat all condensate, measure volumes and collect samples					
(n) A flare designed to meet the requirements of ch. NR 445					
(3) GAS MONITORING WELLS.					
__ Does the design provide at least one gas monitoring well on each side of the landfill? __ Will the wells be constructed per NR 507.11?					
(4) PASSIVE GAS EXTRACTION SYSTEMS. If the landfill accepts only industrial waste with the potential to generate gas and which does not use an active gas extraction system, is a passive gas venting system proposed which includes the following:					

Facility Name: _____

DESIGN & CONSTRUCTION CRITERIA REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
__ A design that allows gas venting from the entire landfill surface? __ An analysis to determine vent trench spacing for an effective system and to ensure compliance with ch. NR 445 limits for hazardous air contaminants __ A continuous 1 foot layer of granular soil placed under the capping layer with a minimum hydraulic conductivity of $1x10^{-3}$ cm/sec Note: This layer may be part of the support layer required in s. NR 504.07(3). __ A series of flexible, perforated pipes connected to a series of outlets					
NR 504.09 STORM WATER MANAGEMENT AND MISCELLANEOUS DESIGN AND CONSTRUCTION CRITERIA FOR LANDFILLS.					
(1) STORM WATER MANAGEMENT.					
(a) Are drainage ditches, structures and sedimentation basins proposed to be constructed during the initial stages of site construction to control runoff and limit entrained sediment from reaching surface water bodies?					
(b) Are the following concepts incorporated in the design of the temporary and permanent erosion and sediment control measures: __ Scheduling of grading and construction to minimize soil exposure __ Retention of existing vegetation whenever feasible __ Seeding and mulching of disturbed areas __ Diversion of runoff away from disturbed and active fill areas __ Minimization of runoff velocities __ Designing drainageways and outlets to handle concentrated and increased flows __ Trapping of sediment on-site __ Inspection and maintenance of runoff control structures Note: The applicant should submit a copy of the facility's storm water pollution prevention plan (SWPPP) with the plan of operation. The SWPPP may address the items listed above, in addition to storm water or surface water monitoring for the facility.					
(c) Are the calculations required in pars. (d), (e) and (f) performed for the period in the landfill's development where the surface conditions and contributing acreage would result in the greatest runoff volume?					
(d) Are all temporary and permanent storm water control structures designed to accommodate peak flow rates from a 25 year, time of concentration storm event?					

Facility Name: _____

DESIGN & CONSTRUCTION CRITERIA REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
(e) Are the storm water management features designed to accommodate the following: __ Temporary and permanent sediment controls are designed to settle the 0.015mm particle size for all storms up to and including the 25 year, 6 hour event? __ The sedimentation basin surface area is based upon the average rainfall intensity over the 25 year, 6 hour event? __ The principal spillway and outlet protection for the sedimentation basin is designed to pass a 25 year, time of concentration storm event? __ The emergency spillway for the sedimentation basin is designed to pass a 100 year, time of concentration event? __ The sedimentation basin dewatering structure is designed to drain the basin in less than 3 days __ A design analysis documenting compliance with the above is included					
(f) Is storm water diverted from active fill and borrow areas to sediment control structures?					
(g) Are the containment berms around active fill areas designed to comply with the following: __ Control and collect runoff from a 25 year-24 hour storm event __ Containment analysis is based upon the volume of liquid generated from areas with exposed waste and areas with daily cover __ Storm water in contact with active fill areas will be treated as leachate					
(h) Are storm water drainage ditches, structures and sedimentation basins designed to discharge along the existing drainage patterns capable of accepting anticipated flow volume?					
(i) Has an analysis been performed to determine the amount and velocity of runoff prior to landfill development and to document compliance with above requirement?					
(j) Does storm water diversion and construction at the landfill minimize impacts on adjacent property?					
(j) Do storm water management features comply with other applicable requirements such as those of, but not limited to, ch. NR 103 and ch. 30, Stats., permits? Note: The design should also comply with NR 151 storm water requirements.					
(2) MISCELLANEOUS.					
(a) Is a method of controlling any dust or windblown debris included in the design?					
(b) Is access restricted through fencing, natural barriers or other methods?					
(c) Are all access roads, including those in the active area, designed for all weather operation?					
(d) Are all access roads used by highway vehicles designed with less than 10% grade?					

Facility Name: _____

DESIGN & CONSTRUCTION CRITERIA REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
Is the intersection of the landfill access road with an existing highway designed with sufficient sight distance and minimize traffic interference?					
(e) intentionally left blank					
(f) Is a minimum 100 foot separation distance between the fill limits and the adjacent property line, and a minimum 50 foot distance from landfill excavation or berm and the adjacent property line maintained (excluding storm waste diversion structures)?					
(g) Is the landfill designed such that final waste grades are reached as soon as possible and open refuse filling area is minimized?					
(h) Are the final slopes designed to be no less than 5% and no greater than 4H:1V, except for papermill sludge sites which may have a max.6H:1V final slope for papermill and wastewater treatment sludge landfills?					
(i) Are a minimum of 2 leachate headwells proposed per major horizontal phase?					
(j) Is a weight scale supplied (if proposed as a municipal solid waste landfill)?					
(k) Is the landfill designed with properly protected, permanent horizontal and vertical control benchmarks, and are the elevations tied to USGS datum and horizontal control referenced to property boundary?					
NR 504.095 DESIGN CRITERIA FOR LANDFILLS THAT RECIRCULATE LEACHATE					
(1) GENERAL. Leachate recirculation systems shall be designed to meet the following requirements:					
(a) Is the MSW landfill designed with a composite liner and leachate collection system meeting the requirements of NR 504.06? If no, leachate recirculation may not be approved.					
(b) Is the leachate recirculation limited to areas of the landfill where the leachate collection drainage blanket has a hydraulic conductivity of 1cm/sec or greater? Note: The department may approve leachate recirculation in existing cells with lower permeability leachate collection blankets, provided that the operator can demonstrate that the maximum leachate head on the liner can be maintained at less than 12 inches and that the recorded leachate head has not exceeded 12 inches in the past.					
(c) Is the leachate recirculation limited to areas of the landfill which are connected to the active gas extraction systems where the system is cabpable of collecting the additional gas expected? Note: Active gas extraction shall commence in those areas no later than the initiation of leachate recirculation.					
(d) Is the leachate recirculation distribution system more than 100 lateral feet from the exterior sideslope final grades?					
(e) Will there be a minimum depth of 20 feet of waste maintained between the landfill base and the lowest point of leachate distribution?					

Facility Name: _____

DESIGN & CONSTRUCTION CRITERIA REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
(f) Do the operating controls and instructions for leachate recirculation address the following: __ All weather and seasons of operation __ Cessation of leachate recirculation upon discovery of seeps, excessive pressures within the waste mass, saturated conditions within the waste mass, inadequate shear strength of the waste mass or other conditions indicative of instability?					
(2) SURFACE APPLICATION.					
(a) Is the leachate distribution system designed so no leachate is introduce into the waste in a manner that causes ponding or surface runoff of leachate (No open surface trenches or ponds)?					
(b) Is the leachate distribution system designed to minimize evaporation of the leachate and volatilization of compounds in leachate?					
(3) VERTICAL DISTRIBUTION SYSTEMS.					
(a) Are the wells designed for leachate recirculation and gas extraction?					
(b) Is the well spacing based on the leachate flow rates, pumping characteristics, permeability of the waste mass, and ability of the waste to accept liquid without being pressurized?					
(c) Are the leachate distribution wells designed with a surface seal to control odors and landfill gas?					
(d) Are the pumping pressures and pumping intervals for the wells designed to prevent surface emergence of leachate?					
(e) Is the leachate distribution system designed to achieve a uniform distribution of leachate throughout the zone of influence of the wells?					
(f) Are the leachate distribution wells designed to also extract landfill gas?					
(4) HORIZONTAL DISTRIBUTION SYSTEMS.					
(a) Is the leachate distribution piping designed to distribute leachate consistently along its length?					
(b) Is the distribution system designed with a permeable bedding material capable of rapidly dissipating recirculated leachate into the waste mass?					
(c) Is the distribution system designed with bedding material capable of maintaining its structure and characteristics during the expected operation life of the system?					
(d) Is the distribution system designed to operate with specific distribution periods with landfill gas extracted in the interval between those distribution periods and to minimize uncontrolled landfill gas emissions?					
(e) Are the pumping pressures and pumping intervals for the wells designed to prevent surface emergence of leachate?					

Facility Name: _____

DESIGN & CONSTRUCTION CRITERIA REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
NR 504.10 ALTERNATIVE DESIGN CRITERIA FOR LANDFILLS ACCEPTING HIGH VOLUME INDUSTRIAL WASTES.					
This section applies only to landfills designed primarily for high volume industrial waste, wood residue and minor amounts of other waste as approved by the Department. This section applies to all new landfills and to the expansion of existing landfills for which the plan of operation was approved after February 1, 1988. This section also applies to new and existing CCR landfills and lateral expansions of a CCR landfill.					
(1) GENERAL.					
(a) Has the landfill been designed to either meet the requirements of NR 504.05 to 504.09 or has an alternative design been proposed which meets the following provisions?					
(b) Note: If the applicant does not completed construction of the first major phase of the landfill within 2 years from the date of the plan of operation approval, the applicant shall reapply for approval to construct. The department may require additional conditions or approval and require redesign of the landfill in accordance with state-of-the-art design criteria.					
(c) Does municipal waste which is generated by the process, such as manufacturing process packaging not exceed 10% by weight? Note: If yes, then the landfill may not be subject of the design requirements of s. NR 504.05(1). Household and plant waste not generated as a direct result of the manufacturing process such as office and cafeteria waste, may not be disposed of in a landfill which does not meet the requirements of s. NR 504.05(1).					
(2) DESIGN CAPACITY.					
Does the design capacity meet NR 504.05(3)?					
(3) DESIGN CRITERIA.					
Does the feasibility study demonstrate that the alternative design adequately protects the public health, welfare and the environment, and the design meets or exceeds the NR 504.04 location and performance standards? If no, then an alternative design may not be approved. Is the alternative design supported with the following types of information:					
(a) Landfill characteristics including regional and specific information on land use, geology, hydrology, hydrogeology and soils					
(b) Waste characteristics such as quantity and physical/chemical analysis of waste and leachate					
(c) Analysis of any design to control geologic/hydrogeologic conditions					
(d) Field demonstration data					
(e) Design and performance data for similarly designed and constructed landfills					
(f) Accepted scientific or engineering analysis or field studies, field plots, research, manufacturer's data or demonstrations					

Facility Name: _____

DESIGN & CONSTRUCTION CRITERIA REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
(g) For new and existing CCR landfills and any lateral expansion of a CCR landfill, a demonstration that the alternative design meets the federal requirements located under 40 CFR part 257, Subpart D dated April 17,2015 (80 FR 21468), as amended at 83 FR 36451, July 30, 2018. Note: The code of federal regulations may be obtained at www.ecfr.gov. Copies of 40 CFR part 257, subpart D dated April 17, 2015 (80 FR 21468), as amended at 83 FR 36451, July 30, 2018 are available for inspection at the legislative reference bureau.					
NR 504.11 MINIMUM DESIGN AND CONSTRUCTION CRITERIA FOR LANDFILLS ACCEPTING 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 and existing landfills.					
(2) LANDFILL DESIGN CRITERIA FOR RESIDUE PRODUCED BY BURNING MUNICIPAL SOLID WASTE.					
(a) If the landfill has proposed to accept municipal solid waste combustor residue that tests below the NR 502.13(6)(g) limits, is it a composite lined monofill cell which follows the following criteria:					
__ Does the composite liner consist of a minimum 60 mil geomembrane overlying a minimum 4 foot thick compacted clay liner meeting NR 504.06 specifications?					
__ Is the monocell designed to separately sample and collect leachate from residue areas?					
__ If an alternate design is proposed, such as a double liner, does the design provide equivalent protection?					
(b) If the landfill is proposed to accept municipal solid waste combustor residue that tests above the limits in NR 502.13(6)(g), does the landfill design include a double composite lined monofill cell which meets the following criteria:					
__ Is there a double composite liner with 2 separate composite liners each with a minimum 60 mil geomembrane liner overlying a minimum 4 foot compacted clay liner meeting NR 504.06 specifications?					
__ Is the composite liner separated by a minimum one foot (detection) layer of granular material?					
__ Are separate leachate collection systems designed above and between the composite liners and is separate leachate sampling and collection from the detection layer possible?					
(c) Note: All landfills which accept municipal solid waste combustor residue shall be approved by the department in accordance with s. NR 514.07 (5) prior to accepting each specific residue waste stream.					
NR 504.12 MINIMUM DESIGN AND CONSTRUCTION CRITERIA FOR CCR LANDFILLS					

Facility Name: _____

DESIGN & CONSTRUCTION CRITERIA REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
(1) APPLICABILITY. In addition to ss. NR 504.04 to 504.10, applicable to all landfills or landfills accepting high volume industrial waste, this section includes design criteria that are applicable to the construction of a new or existing CCR landfill or a lateral expansion of a CCR landfill.					
(2) RUN-ON AND RUN-OFF CONTROLS. Does the submittal demonstrate that the CCR landfill is/will be designed, constructed, operated, and maintained with a run-off and run-on control system in accordance with the requirements under s. NR 504.09(1)(f) and (g) and all of the following: Note: Complete NR 504.09(1)(f) and (g) above.					
(a) A run-on control system that prevents flow onto the active portion of the CCR landfill during a peak discharge from a 24-hour, 25-year storm event.					
(b) A run-off control system from the active portion of the CCR landfill that collects and controls, at a minimum, the water volume resulting from a 24-hour, 25-year storm event.					
(3) LINER DESIGN. (a) Does the submittal for a new CCR landfill or a lateral expansion of a CCR landfill demonstrate the landfill is/will be designed, constructed, operated, and maintained with a composite liner that meets the requirements under s. NR 504.06(2) and (3), and a leachate collection and removal system that meets the requirements under s. NR 504.06(5). Note: This section does not apply to existing CCR landfills. Complete NR 504.06(2), (3), and (5) above.					
Is the new CCR landfill or lateral expansion of a CCR landfill constructed or designed with a composite liner that consists of 2 components: ___ An uppermost component that consists of a nominal 60-mil or thicker geomembrane liner, ___ A lower component that consists of a minimum 4-foot-thick layer of compacted clay, OR ___ A geosynthetic clay liner (GCL) used in place of the clay liner of a composite liner in accordance with s. NR 504.06(7). Note: Complete NR 504.06(7)(a) – (c) above if a GCL is used. This includes s. NR 504.07(4)(a) 1 to 17 as referenced.					
In addition to the minimum design and contruction criteria for landfill liners and leachate collection systems under s. NR 504.06, does the liner and leachate collection system meet all of the following:					
1. The leachate collection and removal system is/will be designed, constructed, operated, and maintained to limit the leachate head level on the liner to one foot or less.					

Facility Name: _____

DESIGN & CONSTRUCTION CRITERIA REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
2. The leachate collection and removal system is/will be constructed of materials that exhibit all of the following properties: a. ___ Chemically resistant to the CCR and any non-CCR waste managed in the CCR landfill and the leachate expected to be generated. b. ___ Of sufficient strength and thickness to prevent collapse under the pressures exerted by overlying waste, waste cover materials, and equipment used at the CCR landfill.					
3. The leachate collection and removal system is/will be designed and operated to minimize clogging during the active life and during the long-term care of the landfill.					
4. The geomembrane component of the liner is/will be installed in direct and uniform contact with the compacted clay soil component.					
5. A liner that utilizes a GCL and soil barrier layer in accordance with s. NR 504.06 (7) is/will be designed to have a liquid flow rate no greater than the liquid flow rate through 2 ft of compacted soil with a hydraulic conductivity 1 x 10^{-7} cm/sec. The liquid flow rate comparison shall be made using the following equation, which is derived from Darcy's Law for gravity flow through porous media: $Q/A = q = k\,(h/t + 1)$ Where: Q = flow rate (cubic centimeters / second). A = surface area of the liner (squared centimeters). q = flow rate per unit area (cubic centimeters / second / squared centimeter). k = hydraulic conductivity of the liner (centimeters / second). h = hydraulic head above the liner (centimeters). t = thickness of the liner (centimeters).					
(b) A new CCR landfill or a lateral expansion of a CCR landfill shall be designed and constructed with a subbase grade that is located no less than 5 feet above the upper limit of the uppermost aquifer, or shall demonstrate that there will not be an intermittent recurring or sustained hydraulic connection between any portion of the base of the CCR landfill and the uppermost aquifer due to normal fluctuations in groundwater elevations, including the seasonal high water table. Note: A new CCR landfill or lateral expansion of a CCR landfill is also required to comply with s. NR 504.06(2)(b) or (4) for zone-of-saturation landfills. The definition of an uppermost aquifer can be found under s. NR 500.03(246m).					
(c) A new CCR landfill or a lateral expansion of a CCR landfill may not be constructed over a closed CCR surface impoundment.					

Facility Name: _____

DESIGN & CONSTRUCTION CRITERIA REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
(4) FINAL COVER SYSTEM. (a) Does the submittal for a new or existing CCR landfill or a lateral expansion of a CCR landfill demonstrate the landfill is/will be designed and constructed with a final cover system that meets requirements under s. NR 504.07? Note: Complete NR 504.07 above.					
(b) If an alternative final cover design is proposed within the written closure plan, does it meet the requirements under s. NR 504.10 and all of the following: Note: Complete NR 504.10 above.					
1. The permeability of the final cover system is/will be less than or equal to the permeability of any bottom liner system or natural subsoils present or shall be no greater than 1 x 10^{-5} cm/sec, whichever is less.					
2. The design of the final cover system is/will include an infiltration layer that achieves an equivalent reduction in infiltration as the layers specified under s. NR 504.07 (4).					
3. The design of the final cover system is/will include an erosion layer that provides equivalent protection from wind or water erosion as the topsoil layer specified under s. NR 504.07 (7).					
4. The disruption of the integrity of the final cover system is/will be minimized through a design that accommodates settling and subsidence.					