Landfill Construction Documentation Completeness Checklist
Chapter NR 516, Wis. Adm. Code

Revised January 2018

Waste & Materials Management
P.O. Box 7921
Madison, WI 53707-7921

Instructions: This checklist is intended for use by department staff for the review of landfill liner and final cover construction documentation reports to determine completeness. The checklist may also be used by applicants and submitted with a landfill construction documentation reports to facilitate department review. Refer to applicable statues and codes for exact requirements.

General information

Facility Name: _____ License/Monitoring # _____

Facility Type: _____

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

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

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

Construction phase being documented and reviewed: _____ Number of acres _____

LANDFILL CONSTRUCTION DOCUMENTATION REPORT REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
NR 500.05 GENERAL SUBMITTAL REQUIREMENTS.					
(1) Has the adequate review fee been submitted per NR 520.04?					
(2) Has a cover letter detailing the desired action been submitted?					
(3) Have the appropriate number of copies and one electronic copy been submitted?					
(4) Has P.E. and P.G. certification been provided?					
(5) Technical Procedures:					

Facility Name: _____

LANDFILL CONSTRUCTION DOCUMENTATION REPORT REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
Were all technical procedures used to investigate the facility current standard procedures?					
Were all test procedures specified in the report?					
(6) Do all maps, plan sheets, drawings, isometrics, cross-sections, figures, photographs and tables meet the following requirements?					
(a) No larger than 30 inches x 42 inches & no smaller than 8 ½ inches x 11 inches.					
(b) Appropriate scale to show required detail.					
(c) Do visuals meet the following requirements? __ numbered __ referenced in the narrative __ titled __ legends for all symbols __ horizontal & vertical scales __ drafting and origination dates					
(d) Are uniform scales used?					
(e) Are north arrows shown?					
(f) Is the mean sea level datum used as basis for all elevations?					
(g) Do visuals contain a survey grid based upon monuments established in the field?					
(h) Is the original topography and a grid system shown on the plan sheets that show construction, operation and closure topography?					
(i) Do cross-sections meet the following requirements? __ Show survey grid locations __ Reference major plan sheets __ Include a reduced diagram of plan view showing cross-section location					
(7) Is a table of contents provided listing all sections of the submittal?					
(8) Is an appendix provided listing the following? __ names of all references __ testing and sampling procedures, __ all raw data, __ calculations					
NR 516.04 GENERAL REQUIREMENTS.					
(1) REPORT PREPARATION.					
Note: The report needs to document all aspects of construction for the initial construction of a landfill; the construction of all subsequent phases or portions thereof; the construction of any storm water, groundwater, leachate or gas control structures; the implementation of remedial actions; and the closure of each major disposal area.					
(2) QUALITY ASSURANCE.					

Facility Name: _____

LANDFILL CONSTRUCTION DOCUMENTATION REPORT REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
(a) Was a registered professional engineer (PE) or qualified technician who is directly supervised by a PE continuously on-site and performing assigned QA duties throughout the activities listed below? Have these individuals and their associated PE registration numbers been identified for the following activities: __ Placement and testing of the clay component of the liner and cover systems. __ Installation and testing of the geosynthetic components of liner and cover systems. __ All aspects of sump and sideslope riser construction or penetrations of the sidewall liner. __ Manhole and tank installation. __ Placement of the drainage layer or cover soil above the geosynthetic liner. Were these personnel on-site to inspect the following activities after their completion? __ Temporary and permanent erosion control measures such as ditches, fencing and sedimentation basins. __ Subbase and leachate collection line undercut excavation and grading. __ Clay liner surface preparation and grading, leachate, lysimeter and gas piping prior to their covering with soil. __ Piping with tanks, manholes or vaults and installation of instrumentation and controls. __ Gas extraction well heads. __ Other critical construction activities, if required writing by the department.					
(b) With respect to par. (a):					
Were there any substitutions of personnel due to substandard performance, vacations or uncontrollable circumstances such as injury, illness, employee termination or resignation?					
If necessary in order to provide experienced personnel, was geomembrane installation QA performed by a different registered PE or qualified technician directly supervised by that registered PE?					
Were the personnel performing quality assurance for geomembrane installation employed by the geomembrane manufacturer, fabricator or installer? If yes, were the necessary steps taken to assure that the facility owner provided QA personnel not employed by these entities?					

Facility Name: _____

LANDFILL CONSTRUCTION DOCUMENTATION REPORT REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
Where justified by the size of the construction project, did multiple registered PEs or qualified technicians perform QA work concurrently?					
Were there any observed deviations from the approved plans and specifications, including any changes in materials?					
(3) CERTIFICATION.					
Is a certification section included as the first section of any construction documentation report prepared for construction or closure of a portion of a landfill?					
Does the certification section include the following:					
(a) Is a signed certification statement as per s. NR 500.05(4), and the seal of all registered PEs who either performed QA work on the project or supervised qualified technicians who did so, included in the report?					
(b) Is a table included clearly identifying the following: __ Each registered PE and qualified technician who performed QA during the construction. __ Which aspects of construction each person provided on site QA. __ Number of days each was present at the landfill performing QA work. __ Total hours each spent at the site performing QA work. __ The registered PE supervising each qualified technician. __ The table should clearly identify the registered professional engineer supervising each qualified technician.					
(c) Is a second table included identifying who prepared each portion of the construction documentation report including both narrative and plan sheets?					
(d) Are separate signed statements by the registered PE identified in sub. (2) certifying to the best of their knowledge, information and belief that the construction of each item identified in the following subdivisions was accomplished in conformance with the approved plans and all applicable solid waste administrative code requirements? __ Have all observed deviations been explicitly noted and discussed including any changes in materials? __ Does the certification include language that, “this certification may not be construed to be either an implied or express guarantee or warranty regarding the performance of the construction documented in this report? No further qualifications to the certification statement may be made”? __ Does each statement clearly identify the personal observations, knowledge or other information on which the certification is based?					

Facility Name: _____

LANDFILL CONSTRUCTION DOCUMENTATION REPORT REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
Have separate signed statements been included for the following subdivisions?					
1. For the clay component of a liner or cap? Does the statement specifically address the following:					
a. The quality of clay material used and the methods utilized in its placement?					
b. Connections with previously placed clay layers?					
c. Preparation of leachate collection trenches, sumps, gas header trenches and any pipe penetrations through the clay component?					
d. Preparation of the upper portions of the clay component of a composite-lined or composite-capped landfill for installation of the geomembrane, including smoothness of the surface, removal of rocks and other foreign objects, and repair of the clay surface due to rain, rutting or other damage?					
e. Placement of soil or other materials placed over the composite liner or composite cap?					
All observed deviations are explicitly noted and discussed including any changes in material?					
2. For geomembranes, grids, fabrics, nets and appurtenances? Does the statement specifically address:					
a. Connections with all previously placed geosynthetics?					
b. Placement of geomembrane in collection trenches, sideslope riser sump areas and other irregularly shaped areas?					
c. Connections of geomembrane around leachate transfer pipes, gas extraction wells and any other penetration of the composite liner or composite cap?					
d. Removal of geomembrane wrinkles which were higher than they were wide?					
All observed deviations are explicitly noted and discussed including any changes in material?					

Facility Name: _____

LANDFILL CONSTRUCTION DOCUMENTATION REPORT REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
3. For elements of the construction relating to leachate or storm water routing, collection, storage and transportation as well as gas extraction systems? Does the statement include but not limited to: __ Construction of leachate collection and transfer lines. __ Side slope risers for leachate pumping. __ All liner penetrations. __ Collection tanks, manholes, lift stations. __ Lysimeters. __ Gas extraction system construction. __ Leachate headwells.					
NR 516.05 CONSTRUCTION OF LANDFILL AREAS.					
(1) ENGINEERING PLANS.					
Do the plans contain the following information:					
(a) A plan view sheet documenting the constructed grades for the following (prior to liner placement): __ Sub-base __ Sidewalls __ Leachate collection trench undercuts __ Sub-base appurtenances such as lysimeters or drain pipes __ Grades on a maximum 50-foot grid pattern __ Leachate collection trench undercut elevations every 25 linear feet Note: If a total station or laser equipment is used to set elevations, the elevations may be taken every 50 lineal feet. __ Approved sub-base grades shown for the same area in a clear and legible manner					

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LANDFILL CONSTRUCTION DOCUMENTATION REPORT REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
(b) Plan view drawings showing the locations of all the various soil and geomembrane testing performed including the following: __ Each test location clearly labeled with the appropriate identification codes __ Any areas where removal and recompaction of clay was necessary in order to attain the minimum required specifications For composite-lined and composite-capped landfills, does the plan view drawing clearly show: __ Geomembrane panel placement. __ Geomembrane patches and seam repairs. __ Geomembrane destructive sample locations. Note: Multiple plan views may be shown on a single plan sheet if legibility is not compromised.					
(c) A plan sheet documenting the constructed elevations for the linear system including the following: __ Spot elevations of base, sidewalls and leachate collection. __ Grades on a maximum 50-foot grid pattern __ Leachate collection trench elevations every 25 linear feet Note: If a total station or laser equipment is used to set elevations, the leachate collection trench elevations may be taken every 50 linear feet. __ Approved base grades shown for the same area in a clear and legible manner					
(d) A plan view drawing included showing the following: __ Constructed base grades __ Locations and elevations of all leachate collection and transfer piping, manholes, lift stations, culverts, berms __ Location of all unsaturated zone, groundwater, gas, leachate monitoring and cleanout devices __ Surface drainage features __ Other pertinent structures Note: This information may be shown on the plan sheet required in par. (c) if legibility is not compromised.					

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(e) Cross-sections through the constructed area parallel and perpendicular to the base line of the facility and include the following: __ A minimum of 4 cross-sections shall be prepared, 2 of which shall be in each direction __ Additional cross-sections shall be prepared as necessary to add clarification Does each cross-section show the following: __ Actual and design sub-base and base grade contours. __ Top of granular drainage blanket. __ Leachate and groundwater pipe elevations. __ Actual base and sub-base contours of adjacent fill areas. Note: The design sub-base and base grade contours do not need to be shown if there is not an observable variation from the design grades.					
(f) Detail drawings, both plan view and cross-sections, including the following: __ All manholes, lift stations, storage tanks, sumps and sideslope risers. __ Locations where leachate transfer piping exits the lined area and secondary containment of these features. __ Leak detection monitoring points. __ Other pertinent construction details. At minimum, do the detail drawings show? __ Base and top elevations. __ Invert elevations of all associated piping, pump details, float level elevations. __ The extent of recompacted clay placed around and below the structures. Note: If float elevations are not available at the time of submittal of the construction documentation report, they shall be provided to the department when they are available.					
(g) Cross-section details illustrate all important construction features such as the following: __ Liner. __ Lysimeters. __ Leachate collection trenches and sumps. __ Sediment control and storm water management systems.					

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LANDFILL CONSTRUCTION DOCUMENTATION REPORT REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
(h) Detail drawings for leachate header lines or drain lines located outside the limits of waste in critical areas below-ground piping, such as where several pipes cross or meet, to illustrate sufficient pipe location and invert information?					
(i) Additional plan sheets, patterned after those specified in pars. (a) to (h), included for those facilities designed with the following? __ Multiple liners. __ Groundwater gradient control systems. __ Other nonstandard design features.					
(2) REPORT PREPARATION.					
Is the report comprehensive and does it contain a detailed narrative describing the construction of the area in a logical fashion?					
Does the report place emphasize any deviations from the approved plan of operation and to the explicit construction methods used for all locations where transfer piping exits the lined waste fill area?					
Does the documentation report include the following information:					
(a) __ An analysis and discussion of all soil and geomembrane testing work performed __ All density and moisture content testing results clearly indicating which Proctor curve or line of optimums is applicable to the soil being compacted __ Identified any changes in the referenced Proctor curve or line of optimums, when the change occurred and why the change was made __ All raw data from the soil and geomembrane testing performed included in an appendix to the report, unless other arrangements were previously approved by the department __ The raw data summarized using a tabulated format __ The make, model, weight and foot length of each piece of equipment used to compact clay					
(b) A table containing thicknesses of each layer in the liner system on a 100-foot grid pattern					
(c) __ A discussion included of how the leak tests were performed on lysimeters and sideslope riser sumps __ A discussion of any problems encountered and how they were resolved					

Facility Name: _____

LANDFILL CONSTRUCTION DOCUMENTATION REPORT REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
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(d) __ Documentation of the initial leachate collection pipe cleanout __ Documentation of the pressure testing of force mains and leachate storage tanks __ A description of all provisions used to seal pipe connections, manhole sections, and leachate storage tanks including protective coatings and corrosion protection __ The manufacturer's recommendations for the installation of all equipment included __ Discussion of deviations from these recommendations					
(e) Daily summary reports prepared by the professional engineer or qualified technician performing continuous quality assurance for each day that the installation of geomembrane or other geosynthetics is either attempted or accomplished when constructing composite-lined sites?					
Do the summary reports include the following:					
1. Identification and location of geomembrane panels placed, with modifications of the fabrication plan noted					
2. Identification of field seams and ends of panels, and results of all destructive and nondestructive field tests of test seams and installed seams					
3. Methods and procedural steps taken prior to field seaming of panels					
4. Identification of wrinkles that were large enough to double over and were cut out and repaired					
5. Identification of repairs and destructive samples and the results of the nondestructive testing of those repairs					
6. Amount and location of geotextile and other geosynthetics used in construction of the liner					
7. Identification of the sources and product information for manufactured items used in site construction including geosynthetics					
Identification of all solvents and other sealants used in pipe construction					
8. Weather conditions and constraints					
(f) A series of properly labeled color prints or digital photographs documenting all major aspects of facility construction					

Facility Name: _____

LANDFILL CONSTRUCTION DOCUMENTATION REPORT REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
Do the photos contain close-up photographs of the following: __ Clay liner and/or soil barrier placement and compaction equipment __ Geomembrane and all other geosynthetics placement and deployment equipment. (Include photo of thick polyethylene plate under sideslope riser) __ Leachate pipe placement including all places where transfer piping exits the lined waste fill area or sideslope riser installation __ Drainage blanket placement __ Installation of all manholes, sumps, sideslope risers, lift stations and storage tanks __ Panoramic views showing the prepared sub-base and the completed liner before and after granular blanket placement					
NR 516.06 CLOSURE OF LANDFILL AREAS.					
(1) ENGINEERING PLANS.					
Do the plans contain the following information:					
(a) A plan sheet documenting the following: __ Final refuse grades, including daily and intermediate cover __ Grades on a maximum 100-foot grid after grading has been performed to establish uniform slopes __ Grades for landfills which primarily accept papermill sludge or other low strength wastes performed as follows: __ At the surface of the support layer __ Accompanied with documentation of the thickness of the support layer on a 100-foot grid __ The orientation of any geosynthetics and pipe used for reinforcement, separation, filtration or drainage __ For areas less than 4 acres, on a 50-foot grid.					
(b) A plan view drawing for each one-foot thickness of clay or soil barrier layer placed showing the locations of the various testing performed at each test location					

Facility Name: _____

LANDFILL CONSTRUCTION DOCUMENTATION REPORT REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
(c) A plan view drawing showing the location of the following: __ Geomembrane tests __ Geomembrane panel layout __ Geomembrane patches and seam repairs __ Geomembrane destructive samples					
(d) A plan sheet documenting the following: __ Constructed final cap grades prior to topsoil placement on a maximum 100-foot grid __ Approved final cap grades shown for the same area in a clear and legible manner __ For areas less than 4 acres, on a 50-foot grid					
(e) A plan sheet documenting the following: __ Gas and condensate transfer piping layout __ Top of header pipe elevation at each gas extraction well, at all major changes in slope and at the driplegs and the condensate tank __ Location of the anti-seep collar around pipes exiting the waste					
(e) Cross-sections through the closed area parallel and perpendicular to the base line of the landfill and include the following: __ A minimum of 4 cross-sections shall be prepared, 2 of which shall be in each direction __ Does each of the cross-sections show all surficial and subsurface features encountered including the following: __ Gas extraction wells or vents __ Leachate lines __ Other landfill structures __ Cross-section tied into the grades of adjacent previously filled areas __ At a minimum, does each cross-section show actual sub-base grades, base grades, final refuse grades, and final topsoil grades					

Facility Name: _____

LANDFILL CONSTRUCTION DOCUMENTATION REPORT REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
(g) Detail drawings, plan view and cross-sections for the following: __ Typical gas extraction wells or gas vents. __ Bedding and assembly of the lateral and header pipes. __ Header pipe joining details. __ Header pipe exiting the site. __ Valves, driplegs, manholes, lift stations, and collection tanks. __ Blower building and flare.					
(h) Cross section details illustrating all important construction features of the final cover, drainage systems for gas condensate, and sediment control and storm water management structures					
(i) Detail drawings for gas header and gas condensate drain lines outside the limits of waste in critical areas of below-ground piping such as where several pipes cross or meet to illustrate sufficient pipe location and invert information					
(2) REPORT PREPARATION.					
Has a comprehensive report been prepared containing a detailed narrative describing the closure of the area in a logical fashion?					
Is particular emphasis placed on any deviations from the approved plans?					
Does this report also include the following information at a minimum:					
(a) __ An analysis and discussion of all soil and geomembrane testing work performed __ All density and moisture content testing results clearly indicating which Proctor curve or line of optimums is applicable to the soil being compacted __ Identified any changes in the referenced Proctor curve or line of optimums, when the change occurred and why the change was made __ All raw data from the soil and geomembrane testing performed included in an appendix to the report, unless other arrangements were previously approved by the department __ The raw data summarized using a tabulated format __ The make, model, weight and foot length of each piece of equipment used to compact clay					

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	Y	N	NA		
(b) __ A table containing thicknesses of each layer in the cover system on a 100-foot grid pattern __ Surveying information before and after soil layer placement on a 100-foot grid __ For areas less than 4 acres, on a 50-foot grid If the soil thickness were controlled using settlement plates and grade stakes __ clay thickness established on a 100-foot grid using auger borings __ boreholes backfilled with a soil-bentonite mix such that the in-place permeability of the backfilled material is equal to or less than the surrounding clay cap					
(c) If the auger method is used to determine soil layer thicknesses, is there a discussion of how the boreholes were backfilled and the materials used?					
(d) A table included showing gas extraction well construction information as follows: __ Location. __ Surface elevation. __ Depth of the borehole. __ Top of the casing elevation. __ Elevation and length of the solid and perforated piping. __ Elevation and length of the gravel backfill. __ Bentonite seal and other backfill materials.					
(e) Daily summary reports prepared by the professional engineer or qualified technician performing continuous quality assurance for each day that the installation of geomembrane or other geosynthetics is either attempted or accomplished when constructing composite-lined sites?					
Do the summary reports include the following:					
1. Identification and location of geomembrane panels placed, with modifications of the fabrication plan noted					
2. Identification of field seams and ends of panels, and results of all destructive and nondestructive field tests of test seams and installed seams					
3. Methods and procedural steps taken prior to field seaming of panels					
4. Identification of wrinkles that were large enough to double over and were cut out and repaired					

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LANDFILL CONSTRUCTION DOCUMENTATION REPORT REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
5. Identification of repairs and destructive samples and the results of the nondestructive testing of those repairs					
6. Amount and location of geotextile and other geosynthetics used in construction of the liner					
7. Identification of the sources and product information for manufactured items used in site construction including geosynthetics					
Identification of all solvents and other sealants used in pipe construction					
8. Weather conditions and constraints					
(f) The rates and types of fertilizer, seed and mulch applied, as well as liming requirements and actual rate of application					
(g) A series of properly labeled color prints or digital photography documenting all major aspects of facility construction including the following: __ Panoramic views of the closed area __ Close-up photographs of the construction process and completed engineering structures including: __ Gas extraction wells or vents __ Blower and flare stations __ Cleanout ports __ Drainage blanket placement __ Manholes, gas condensate tanks and other pertinent structures					
NR 516.07 SOIL AND GEOMEMBRANE TESTING REQUIREMENTS.					
(1) LINER SYSTEM AND FINAL COVER SYSTEM CONSTRUCTION.					
For all compacted clay soil construction, were the following tests performed:					
(a) __ Dry density and as-placed moisture content determined on an approximate 100-foot grid pattern for each one-foot thickness of clay placed __ The grid pattern is offset on each subsequent layer of tests __ A minimum of 2 density and moisture content tests for each one-foot thickness of clay placed was performed to fully define the degree of soil compaction obtained in confined areas where equipment movement is hindered or hand compaction is necessary					

Facility Name: _____

LANDFILL CONSTRUCTION DOCUMENTATION REPORT REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
(b) __ One moisture-density curve or line of optimums analysis was developed for every 5000 cubic yards or less of clay placed and for each major soil type utilized __ At least 5 points were established on each curve __ At least 2 curves were included for each analysis, if a line of optimums analysis was performed __ A representative sample for every 5000 cubic yards or less of clay placed was analyzed for grain size distribution through the 0.002 millimeter particle size and for Atterberg limits __ A one point Proctor analysis was utilized to verify the applicability of previously analyzed moisture-density curves, if apparent changes in soil quality are observed during clay placement					
(c) __ A minimum of one undisturbed sample for each acre or less for every one-foot thickness of clay placement was retrieved and analyzed for Atterberg limits, grain size distribution through the 0.002 millimeter particle size, moisture content and dry density __ Laboratory hydraulic conductivity tests using effective stresses less than or equal to 5 psi and hydraulic gradients less than or equal to 30 were performed on every third undisturbed sample NOTE: The department may require that a portion of the hydraulic conductivity testing for liner documentation be performed using leachate. If this was required, was the appropriate testing completed?					
(1m) SUBGRADE AND BERM COMPACTION.					
For all recompacted soil used in subgrade and berm construction, was the following testing performed:					
(a) __ Dry density and as-placed moisture content determined on an approximate 100-foot grid pattern for each one-foot thickness of clay placed __ The grid pattern is offset on each subsequent layer of tests __ A minimum of 2 density and moisture content tests for each one-foot thickness of clay placed was performed to fully define the degree of soil compaction obtained in confined areas where equipment movement is hindered or hand compaction is necessary					

Facility Name: _____

LANDFILL CONSTRUCTION DOCUMENTATION REPORT REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
(b) __ One moisture-density curve or line of optimums analysis was developed for every 5000 cubic yards or less of clay placed and for each major soil type utilized __ At least 5 points were established on each curve __ At least 2 curves were included for each analysis, if a line of optimums analysis was performed __ A representative sample for every 5000 cubic yards or less of clay placed was analyzed for grain size distribution through the .002 millimeter particle size and for Atterberg limits __ A one point Proctor analysis was utilized to verify the applicability of previously analyzed moisture-density curves, if apparent changes in soil quality are observed during clay placement					
(2) GEOMEMBRANE.					
For all geomembrane installations, was the following testing performed?					
Was the testing performed by the quality assurance engineer or another laboratory not affiliated with the quality control testing?					
(a) Was conformance sampling and testing done on geomembrane materials delivered on site and used in construction?					
Was the sampling conducted by the quality assurance engineer or qualified technician?					
1. Was the geomembrane thickness measured at the facility in a minimum of 5 places per roll to ensure that the material delivered meets the approved specifications?					
2. Were the geomembrane tensile properties tested at a minimum of one test per 100,000 sq. ft. of geomembrane installed and a minimum of one test on rolls from each batch of resin used to manufacture rolls delivered to the site?					
Did the tensile properties include strength and elongation in yield and break?					
Did the tensile properties include strength and elongation in break, for resin that does not exhibit a distinct yield point?					
3. Were geomembrane density and melt index of the polymer tested at a rate of one test per 100,000 sq. ft. of geomembrane installed and a minimum of one test on rolls from each batch of resin used to manufacture rolls delivered on site?					

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LANDFILL CONSTRUCTION DOCUMENTATION REPORT REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
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4. Was geomembrane environmental stress cracking resistance documentation provided which shows that the manufacturer performed a minimum of one test on rolls from each batch of resin used to manufacture rolls delivered on site?					
(b) __ Pre-qualification tests for geomembrane fusion welding machines conducted by a minimum of 1 pre-qualification seams run per welding machine at the startup of each day by each seaming technician performing geomembrane welding, with additional test runs following work interruptions, weather changes or as directed by the quality assurance engineer or qualified technician __ At start up, was extrusion welding machine performance verified by a minimum of 1 test seams per day per machine with additional testing as directed by the quality assurance engineer or qualified technician __ The test repeated at intervals of no greater than 5 hours and with additional test runs following work interruptions, weather changes, changes to machine setting for temperature or speed or as directed by the quality assurance engineer or qualified technician __ A portion of each pre-qualification specimen tested in the field for acceptable tensile strength __ Test results collated for documentation along with notes on date, ambient temperature, technician and seaming machine used to make the seam, and results of field tests					
(c) Was constructed geomembrane seam testing and sampling completed by or observed by the quality assurance engineer or qualified technician including the following:					
1. Nondestructive field seam testing performed on all seams of geomembrane attached by welding or by mechanical attachments to other geomembrane sheet, plastic plate and pipe penetrations					

Facility Name: _____

LANDFILL CONSTRUCTION DOCUMENTATION REPORT REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
2. __ Destructive seam test samples taken at a rate of one sample per 500 feet of fusion seam accomplished, unless another frequency or spacing is approved by the department __ For landfills conducting leak location testing, destructing seam test samples taken at a rate of one sample per 1,000 feet of fusion seam accomplished, unless another frequency or spacing was approved by the department __ A portion of the sample tested both in the field and in the laboratory for shear and peel with a minimum of 5 samples for each test type __ Location of the destructive seam samples chosen by the quality assurance engineer or qualified technician					
3. __ Destructive samples taken from at least one end of each fusion weld greater than 100 feet long __ Samples subjected to a minimum of one field test each in shear and peel mode					
4. __ Field shear and peel tests of geomembrane seams and geomembranes performed using standardized specimen sizes in tensile testing machines? __ Tensile testing machine equipped with electrically controlled and smoothly moving jaw separation apparatus, and did it display jaw separation rates and tensile loadings exerted on the geomembrane samples __ Tensile testing machines accompanied by documentation for calibration conducted within 3 months of the start of geomembrane installation __ Geomembrane samples prepared for field analyses by use of templates and cutting tools that prepare uniformly sized samples					
5. __ Field and laboratory shear and peel testing of geomembrane seam samples tests include a minimum of 5 peel tests and 5 shear tests __ Fusion welds tested on both sides of the air channel track __ Acceptable fusion test results defined by a minimum 4 of the 5 samples for peel and shear testing meeting or exceeding minimum tensile strength and elongation requirements and 5 of the 5 samples exhibiting acceptable weld separation behavior					

Facility Name: _____

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(d) __ Leak location testing of the installed geomembrane completed by or observed by the quality assurance engineer or qualified technician __ Leak location testing conducted after the leachate collection layer has been placed on the base grades and lower half of the sideslopes __ Documentation of the testing method included describing the testing procedures and photo documentation __ Documentation of all detected defects and repairs included along with the testing data for geomembrane sheet and welding and photo documentation of the defect prior to and after repairs					
(2m) GEOSYNTHETIC CLAY LINERS AND SOIL BARRIER LAYERS.					
Was testing performed on the GCL and soil barrier layer and, at a minimum, include the following:					
(a) Testing of the GCL material delivered to the site (unless documentation is provided for testing performed by the GCL manufacturer prior to shipping panels to the landfill) __ Clay mass per unit area tested at a rate of one test per 40,000 ft2 of GCL installed; results shall be reported at 0% moisture content __ Grab and peel tensile strength, expressed as machine direction and cross direction, tested using ASTM-D6768-02 at a rate of one test per 100,000 ft2 of GCL installed __ Index flux tested using ASTM-D6496-99 at a rate of one test per 100,000 ft2 of GCL installed __ Bentonite recovered from GCL sample tested for free swell at a rate of one test per 100,000 ft2 of GCL installed					

Facility Name: _____

LANDFILL CONSTRUCTION DOCUMENTATION REPORT REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
(b) Testing of the soil barrier layer __ Dry density and as-placed moisture content determined on an approximate 100-foot grid pattern for each one-foot thickness of soil placed __ Grid pattern offset on each subsequent layer of tests __ A minimum of 2 density and moisture content tests for each one-foot thickness of soil placed shall be performed to fully define the degree of soil compaction obtained in confined areas where equipment movement is hindered or hand compaction is necessary __ One moisture-density curve or line of optimums analysis developed for every 5,000 cubic yards or less of soil placed and for each major soil type utilized? __ At least 5 points established on each curve __ If a line of optimums analysis was performed, were at least 2 curves included for each analysis __ One representative sample for every 5,000 cubic yards or less of soil placed analyzed for grain size distribution through the .002 millimeter particle size and for Atterberg limits __ If apparent changes in soil quality were observed during soil placement, a one-point Proctor analysis utilized to verify the applicability of previously analyzed moisture-density curves					
(3) DRAINAGE BLANKET.					
During placement of the leachate drainage blanket over the liner or the granular drain layer in the final cover, was the following testing performed:					
(a) __ If sand is used, one grain size distribution to the #200 sieve for each 1000 cu. yds. of material placed __ For lesser volumes, a minimum of 4 samples tested __ If washed stone or gravel is used, one grain size distribution to the #200 sieve for each 5000 cu. yds. of material placed __ For smaller landfills where construction of a liner or cap area involves lesser volumes, a minimum of 2 samples were tested					

Facility Name: _____

LANDFILL CONSTRUCTION DOCUMENTATION REPORT REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
(b) __ One remolded laboratory hydraulic conductivity test for each 2500 cu. yds. of sand drainage material placed NOTE: No hydraulic conductivity tests are required if washed stone or gravel is used. __ Samples tested at the anticipated field density __ Moisture content and density of each sample recorded __ If required by the department, a portion of the hydraulic conductivity tests performed by using leachate __ For smaller landfills where construction of a liner or cap area involves lesser volumes, a minimum of 2 samples tested					
(c) If required by the department, was chemical durability testing of the material exposed to leachate performed?					
(4) BEDDING MATERIAL.					
During placement of leachate collection pipes, lysimeter pipes, and groundwater collection pipes, were the following tests performed on the backfill material:					
(a) __ One grain size distribution to the #200 sieve for each 1000 linear feet of trench __ For construction projects with combined trench lengths of less than 3000 feet, a minimum of 3 grain analyses conducted __ Bedding for solid wall piping associated with transfer of leachate, groundwater or lysimeter fluids tested at the same frequency but only to the #4 sieve					
(b) One grain size distribution to the #200 sieve for each 500 cubic yards of drainage material placed in collection sumps					
(c) If required by the department, the following testing performed __Chemical durability testing of the material when exposed to leachate and __Laboratory hydraulic conductivity testing were performed					
(5) FINAL COVER.					
During construction of the final cover system, were the following tests performed:					
(a) __ Thickness of a support layer in the final cover for landfills which accept primarily papermill sludge or other low strength wastes on a 100-foot grid __ The source and composition of the support layer was documented by a description of the materials used in the support layer					

Facility Name: _____

LANDFILL CONSTRUCTION DOCUMENTATION REPORT REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
(b) One grain size distribution to the #200 sieve for each 1000 cubic yards of gravel used for pipe bedding and drain outlets for the drain layer and toe drain					
(c) If required by the department, testing of samples of geotextiles, geocomposite drains or other geosynthetic materials used in construction of the final cover system					
NR 516.08 TESTING REQUIREMENTS FOR LANDFILLS WITH EXTENDED COLLECTION LINES					
(1) REQUIREMENTS:					
Landfills shall meet the requirements of subs. (2) and (3) where they will accept municipal solid waste and contain leachate collection lines that exceed 1,200 feet from the end of each cleanout to the toe of the opposite slope. Where the requirements of this section differ from other requirements of this chapter, these requirements shall take precedence.					
(2) PIPE AND TRENCH:					
In addition to the information specified in s. NR 516.04 (3) (d), reports documenting the construction of all new landfill areas shall include the following information, at a minimum:					
(a) Observations of collection trench and leachate collection pipe installation. Observations shall verify that collection pipe is handled and placed in a manner that prevents holes from being blocked by mud and that assures that holes are located 45 degrees from the springline. Records shall note any changes in alignment of collection trenches or leachate collection pipes and construction methods which produce obstructions or interference with pipe cleaning equipment. Specifications of pipe, specialty fittings and sweep bends installed in construction shall be included in tables or appendices to reports. Documentation of sweep bends shall include the fabricated or field-achieved radius of bend and conformance with minimum radii of bend specified by approved plans or required by the department's plan approval. Reports shall describe methods used to provide support and cover for collection pipe, specialty fittings and sweep bends.					
(b) Documentation of the presence of registered engineers or qualified technicians providing quality assurance monitoring during all aspects of installation of leachate collection pipe and pipe bedding and placement of aggregate cover over the pipe.					
(c) Documentation of initial leachate collection pipe cleaning after placement of the leachate collection layer. This documentation shall include, at a minimum:					

Facility Name: _____

LANDFILL CONSTRUCTION DOCUMENTATION REPORT REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
1. The equipment, methods and chemicals that were used successfully to insert cleanout devices through all leachate collection pipes from each access point to, at a minimum, the toe of the opposite sideslope.					
2. The necessary minimum hose or machine pressures, nozzles, hose materials and other features necessary to achieve successful cleaning of leachate collection pipes.					
3. Any significant adaptations needed to complete pipe cleaning, and any problems encountered in pipe cleaning and their resolution.					
4. Any repairs or modifications made to the collection piping in response to the pipe cleaning operation.					
5. Recommendations to the operator for the necessary equipment, specifications, and operating conditions for future pipe cleaning.					
(3) SOIL TESTING.					
Testing shall be performed during the construction of any landfill areas. At a minimum, this testing shall include test results from a minimum of one hydraulic conductivity test performed on representative samples of drainage media used for the leachate collection blanket and for the leachate collection trench backfill. The test procedure and any adaptations used to accommodate high-capacity drainage material shall be identified.					
NR 504.06 MINIMUM DESIGN AND CONSTRUCTION CRITERIA FOR LANDFILL LINERS AND LEACHATE COLLECTION SYSTEMS.					
(2) COMPOSITE OR CLAY LINED LANDFILLS. Does the composite liner or clay liner construction meet the following requirements:					
(a) Does 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) Not applicable for construction.					
(c) Not applicable for construction.					
(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?					

Facility Name: _____

LANDFILL CONSTRUCTION DOCUMENTATION REPORT REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
(f) 1. Are the clay layers 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?					
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 construction documentation report:					
(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, was 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					

Facility Name: _____

LANDFILL CONSTRUCTION DOCUMENTATION REPORT REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
(e) Was 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) Was geomembrane components in adjacent phases be welded together to form a continuous geomembrane surface?					
Was the liner extended beyond the proposed edge of waste at a phase junction be protected from traffic and weather?					
(g) Was wrinkles which are taller than they are wide be smoothed or cut out prior to covering with soil?					
Was 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) Were the following minimum soil thickness provided on geomembrane 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.					
(i) In order to lessen desiccation effects, are 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?					
When will the remaining sideslope be covered with either drainage material or geotextile to prevent damage to the geomembrane?					
(j) Was placement of soil over the geomembrane be performed during cooler temperature periods to the extent possible using methods which minimize wrinkling?					
(k) Was anchor trenches be designed and constructed around the landfill to secure the permanent edges of the geomembrane?					
Was 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) Not applicable to construction.					

Facility Name: _____

LANDFILL CONSTRUCTION DOCUMENTATION REPORT REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
(c) Not applicable to construction.					
(d) Have borings, backhoe pits or other means of exposing the subsurface soils been completed on a 100-foot grid to a minimum 5 foot depth below the subbase grades of the liner?					
Were all granular or silty soils detected within this 5 foot depth removed?					
(5) LEACHATE COLLECTION SYSTEMS. The leachate collection system must incorporate the following design features:					
(a) Not applicable to construction.					
(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?					
Are all collection pipes Schedule 80 PVC pipe or an approved substitute?					
(cm) Are the constructed 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?					

Facility Name: _____

LANDFILL CONSTRUCTION DOCUMENTATION REPORT REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
(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 used 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?					
(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?					

Facility Name: _____

LANDFILL CONSTRUCTION DOCUMENTATION REPORT REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
(j) Is the composite lined landfill constructed with a sump and sideslope riser meeting the following requirements: __ 1. Not applicable for construction. __ 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 constructed 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.					
(n) Are leachate collection tanks and manholes constructed 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?					

Facility Name: _____

LANDFILL CONSTRUCTION DOCUMENTATION REPORT REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
(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?					
(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) Not applicable to construction.					
(b) Not applicable to construction.					

Facility Name: _____

LANDFILL CONSTRUCTION DOCUMENTATION REPORT REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
(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: Check the plan of operation approval for the minimum design slope selected following computation of primary and secondary consolidation settlement beneath the facility.					
(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) Not applicable to construction.					
(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.					
(a) Has the hydraulic performance of the GCL been assessed by use of compatibility testing?					
(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) Not applicable to construction.					
(2) GRADING LAYER.					
If this is a municipal solid waste landfill, does the report document 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 report document a support layer for stabilization, reinforcement and removal of leachate and gas?					
(4) CLAY CAPPING LAYER.					

Facility Name: _____

LANDFILL CONSTRUCTION DOCUMENTATION REPORT REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
__ Does the report document the landfill's two foot clay cap meets the specification of NR 504.06(2)(a) listed below? __ 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 __ Will the clay capping layer be constructed according to NR 504.06(2)(f)?					

Facility Name: _____

LANDFILL CONSTRUCTION DOCUMENTATION REPORT REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
(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 was covered with a geomembrane the same day it is placed and in dry conditions __ 3. GCL was 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 was 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 was placed at all patches and penetrations __ 8. GCL panels are certified needle-free through magnetic and metal detection tests __ 9. GCL was placed in direct contact with a soil barrier layer __ 10. Vehicle traffic on subgrade of GCL and on GCL was 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 was completed in the same construction season as the geosynthetic construction __ 12. Soil barrier layer consisted 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 was 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 was disked to break up clods; clods no greater than 4 inches __ 14. Soil barrier layer was compacted to ensure complete remolding of soil with equipment having a minimum static weight of 30,000 pounds __ 15. Soil barrier layer was compacted to 90% modified or 95% standard Proctor density or greater at a moisture content at or wet of optimum __ 16. Each lift of was 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 was 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					

Facility Name: _____

LANDFILL CONSTRUCTION DOCUMENTATION REPORT REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
(b) For industrial waste landfills that predominantly accept compressible wastes or wastes with high water contents and low strength, was the clay layer replaced with a GCL overlying a minimum one foot sand layer? If yes, does 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, was the clay layer replaced with a GCL overlying a minimum two feet soil barrier layer? If yes, does the soil barrier layer meet the requirement of (a)13 to 17 above and does the upper foot of soil barrier layer meet the requirements of (a)12 above?					
(d) If the lower one foot of the clay layer was 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 was 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					
(6) DRAINAGE ROOTING ZONE LAYER. Does the report document the drainage and rooting zone layer over the geomembrane or the clay cap meets the following requirements:					
__ A minimum thickness of 2.5 feet and is not densely compacted					
(a) Drainage layer is 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					

Facility Name: _____

LANDFILL CONSTRUCTION DOCUMENTATION REPORT REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
(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?					
(2) ACTIVE GAS EXTRACTION AND TREATMENT. Does report document the active gas recovery system 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					

Facility Name: _____

LANDFILL CONSTRUCTION DOCUMENTATION REPORT REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
(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					
NR 506.07(5) LEACHATE COLLECTION SYSTEMS					
(a) Not applicable to construction.					
(b) Not applicable to construction.					
(c) Were the leachate collection lines cleaned with a water jet cleanout device with a maximum pressure of 10,000 pounds per square inch immediately after construction?					
(d) Were the leachate collection lines cleaned with water jet cleanout devices initially after placement of the leachate drain layer using pipe cleaning procedures that insert cleanout devices from each access point to, at a minimum, the toe of the opposite sideslope?					
(e) Was a video camera inspection conducted on all leachate collection pipes after the initial pipe cleaning activities? Was the video camera inspection extended a minimum of 300 feet unto the base grades of each leachate collection line?					
(f) Were all blockages of leachate collection pipes, pipe breaks or any impedances to passage of pipe cleaning equipment investigated, defined and a remediation proposed for review and approval by the department?					
(g) Was a summary report included for each pipe cleaning and each video camera inspection event?					
Did the report summarize any specialty equipment or chemicals used in collection pipe cleaning?					
Did the report include a description of all observations, including recording tape or disk of the video camera inspection?					

Facility Name: _____

LANDFILL CONSTRUCTION DOCUMENTATION REPORT REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
Did the report summarize the investigation of blockages or other difficulties in cleaning pipes?					
Did the report propose remediation if the leachate collection pipes are not restored to function and blockages are not cleared?					
(h) Was a summary report submitted after the removal of dams or barriers used to separate clean water in a prepared cell from solid waste and leachate?					
Did the report document the removal of the separation features and the connection of any separated pipe lengths?					