

CONSTRUCTION DOCUMENTATION CHECKLIST – CHAPTER NR 516

August 2013

Outline of Requirements for Construction Documentation

Refer to Applicable Statutes and Codes for Exact Requirements

GENERAL INFORMATION

Facility name: _____ FID # _____ License/Monitoring # _____

Owner: _____ Consultant: _____

Principal Contact: _____ Principal Contact: _____

Address: _____ Address: _____

Phone: _____ Phone: _____

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)

Legal Note:

This document is intended solely as guidance, and does not contain any mandatory requirements except where requirements found in statute or administrative rule are referenced. This guidance does not establish or affect legal rights or obligations and is not finally determinative of any of the issues addressed. This guidance does not create any rights enforceable by any party in litigation with the State of Wisconsin or the Department of Natural Resources. Any regulatory decisions made by the Department of Natural Resources in any matter addressed by this guidance will be made by applying the governing statutes and administrative rules to the relevant facts.

LANDFILL CONSTRUCTION DOCUMENTATION REPORT REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
NR 500.05 General Submittal requirements.					
(1) Has the adequate review fee specified in s. 520.04(4) been submitted?					
(2) Has a cover letter detailing the desired action been submitted?					
(3) Have 3 paper copies to the Region and one electronic copy been submitted to the department?					

Facility Name: _____

LANDFILL CONSTRUCTION DOCUMENTATION REPORT REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
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(4) Are the report and plan sheets submitted under the seal of a registered professional engineer (PE)?					
Are the appropriate PE and/or registered professional geologist (PG) certification statements included?					
(5) Technical Procedures:					
Were all test procedures specified in the report?					
Were all technical procedures used to investigate the facility current standard procedures?					
Were explanations and reasons given for deviations from the current standard procedures?					
(6) Do all maps, plan sheets, drawings, isometrics, cross-sections, figures, photographs and tables meet the following requirements?					
(a) No larger than 24 inches x 36 inches & no smaller than 8 ½ inches x 11 inches?					
(b) Appropriate scale to show required detail?					
Do visuals meet the following requirements: ___ Numbered. ___ Legends for all symbols. ___ Referenced in the narrative ___ Horizontal & vertical scales. ___ Titled. ___ Drafting and origination dates.					
(d) Were uniform scales used?					
(e) Were north arrows shown?					
(f) Was a USGS datum used as basis for all elevations?					
(g) Do visuals contain a survey grid based upon monuments established in the field and which is referenced to the state plane coordinates?					
(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) Was a table of contents provided listing all sections of the submittal?					

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(8) Was an appendix provided listing the following: ___ Names of all references. ___ All raw data. ___ Testing and sampling procedures. ___ Calculations.					
NR 516.04 General Requirements. The information following is required in the construction documentation report under the requirements of NR 516.					
NR 516.04(1) REPORT PREPARATION.					
<ul style="list-style-type: none"> A report documenting all aspects of construction shall be prepared 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. Note the construction phase being documented and reviewed: _____ 					
<ul style="list-style-type: none"> Approval of a report which documents the construction of any portion of the base of a landfill shall be obtained from the department prior to initiating disposal operations in the newly established area, unless the department does not issue a determination within 60 days after receiving a complete submittal, along with the appropriate review and construction inspection fees specified in ch. NR 520. Note the receipt date of the complete report and fees: ___/___/___ 					
NR 516.04(2) QUALITY ASSURANCE. Construction and closure of all landfills shall comply with the following:					
(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?					

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<ul style="list-style-type: none"> • 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. 					
<ul style="list-style-type: none"> • 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):					
<ul style="list-style-type: none"> • Were there any substitutions of personnel due to substandard performance, vacations or uncontrollable circumstances such as injury, illness, employee termination or resignation? 					
<ul style="list-style-type: none"> • 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? 					
<ul style="list-style-type: none"> • 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? 					
<ul style="list-style-type: none"> • Where justified by the size of the construction project, did multiple registered PEs or qualified technicians perform QA work concurrently? 					
<ul style="list-style-type: none"> • Were there any observed deviations from the approved plans and specifications, including any changes in materials? 					

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NR 516.04(3) CERTIFICATION.					
<ul style="list-style-type: none"> 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? 					
<ul style="list-style-type: none"> Does the certification section include the following? <ul style="list-style-type: none"> (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? <ul style="list-style-type: none"> ___ 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? <ul style="list-style-type: none"> 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? Have separate signed statements been included for the following subdivisions? <ul style="list-style-type: none"> 1. For the clay component of a liner or cap? Does the statement specifically address the following: 					

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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?					
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.					

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<p>NR 516.05 Construction of Landfill Areas. In addition to the general information specified in s. NR 516.04(3)(d), reports documenting the construction of all new landfill areas shall contain the following minimum information:</p>					
<p>(1) ENGINEERING PLANS.</p>					
<ul style="list-style-type: none"> Is a set of 24 by 36 inch engineered plan sheets been submitted, unless an alternative size is approved by the department in writing included?: 					
<ul style="list-style-type: none"> Are the plans prepared in accordance with s. NR 500.05? 					
<ul style="list-style-type: none"> Do the plans contain the following information? 					
<p>(a) Is a plan view sheet included documenting the constructed grades for the following prior to liner placement? ___ Sub-base ___ Sidewalls ___ Leachate collection trench undercuts</p>					
<ul style="list-style-type: none"> Is a plan view sheet included documenting all sub-base appurtenances such as? ___ Lysimeters ___ Drain pipes 					
<ul style="list-style-type: none"> Do the grades documentation consist of spot elevations taken on a maximum 50-foot grid system pattern? Note: If a total station or laser equipment is used to set elevations, the elevations may be taken every 50 lineal feet. 					
<ul style="list-style-type: none"> Are the leachate collection trench undercut elevations taken at least every 25 linear feet? 					
<ul style="list-style-type: none"> Are the approved sub-base grades shown for the same area in a clear and legible manner? 					
<p>(b) Are plan view drawings included showing the locations of all the various soil and geomembrane testing performed including the following? ___ Each test location shall be clearly labeled with the appropriate i.d. codes. ___ Plan view drawings clearly showing any areas where removal and recompaction of clay was necessary in order to attain the minimum required specifications.</p>					

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<ul style="list-style-type: none"> • For composite-lined and composite-capped landfills, does the plan view drawing clearly show? <ul style="list-style-type: none"> ___ Geomembrane panel placement. ___ Geomembrane patches and seam repairs. ___ Geomembrane destructive sample locations. <p>Note: Multiple plan views may be shown on a single plan sheet if legibility is not compromised.</p>					
<p>(c) Is a plan sheet documenting the constructed elevations for the linear system included? Does this plan sheet contain the following?</p> <ul style="list-style-type: none"> ___ Spot elevations of base, sidewalls and leachate collection. ___ Documentation of grades with spot elevations on a maximum 50-foot grid pattern trenches. ___ Leachate collection trench elevations taken every 25 linear feet. ___ The approved base grades shall be shown for the same area in a clear and legible manner. <p>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.</p>					
<p>(d) Is a plan review drawing included showing the following?</p> <ul style="list-style-type: none"> ___ The 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. <p>Note: This information may be shown on the plan sheet required in par. (c) if legibility is not compromised.</p>					
<p>(e) Are cross-sections through the constructed area parallel and perpendicular to the base line of the facility including showing the following?</p> <ul style="list-style-type: none"> ___ 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. 					

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<ul style="list-style-type: none"> • Does each cross-section show the following? <ul style="list-style-type: none"> ___ 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. <p>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.</p> 					
<p>(f) Are detail drawings, both plan view and cross-sections, including showing the following?</p> <ul style="list-style-type: none"> ___ 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. 					
<ul style="list-style-type: none"> • At minimum, do the detail drawings show? <ul style="list-style-type: none"> ___ 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. <p>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.</p> 					
<p>(g) Are cross-section details included to illustrate all important construction features such as the following?</p> <ul style="list-style-type: none"> ___ Liner. ___ Lysimeters. ___ Leachate collection trenches and sumps. ___ Sediment control and storm water management systems. 					
<p>(h) Are detail drawings included 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?</p>					

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<p>(i) Are additional plan sheets, patterned after those specified in pars. (a) to (h), included for those facilities designed with the following?</p> <p>___ Multiple liners.</p> <p>___ Groundwater gradient control systems.</p> <p>___ Other nonstandard design features.</p>					
(2) REPORT PREPARATION.					
<ul style="list-style-type: none"> Is the report comprehensive and does it contain a detailed narrative describing the construction of the area in a logical fashion? 					
<ul style="list-style-type: none"> 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? 					
<ul style="list-style-type: none"> Does the documentation for the report include the following information at a minimum? 					
<p>(a) Is an analysis and discussion of all soil and geomembrane testing work performed included?</p>					
<ul style="list-style-type: none"> Are all density and moisture content testing results clearly indicating which Proctor curve or line of optimums is applicable to the soil being compacted included? 					
<ul style="list-style-type: none"> Have any changes in the referenced Proctor curve or line of optimums been identified as to when they occurred and why the change was made? 					
<ul style="list-style-type: none"> Is all raw data from the soil and geomembrane testing performed included in an appendix to the construction documentation report, unless other arrangements were previously approved by the department? 					
<ul style="list-style-type: none"> Is the raw data summarized using a tabulated format? 					
<ul style="list-style-type: none"> Is the make, model, weight and foot length of each piece of equipment used to compact clay included? 					
<p>(b) Is a table containing thicknesses of each layer in the liner system on a 100-foot grid pattern included?</p>					
<p>(c) Is a discussion included of how the leak tests were performed on lysimeters and sideslope riser sumps?</p>					
<ul style="list-style-type: none"> Does this it include a discussion of any problems encountered and how they were resolved? 					
<p>(d) Is documentation of the initial leachate collection pipe cleanout included?</p>					

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<ul style="list-style-type: none"> Is pressure testing of force mains and leachate storage tanks documented? 					
<ul style="list-style-type: none"> Is a description included of all provisions used to seal pipe connections, manhole sections, and leachate storage tanks including protective coatings and corrosion protection? 					
<ul style="list-style-type: none"> Are the manufacturer's recommendations for the installation of all equipment included? 					
<ul style="list-style-type: none"> Are deviations from these recommendations discussed? 					
<p>(e) Are daily summary reports included 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?</p>					
<ul style="list-style-type: none"> Do these summary reports specifically describe practices employed for base grade preparation and acceptance before geomembrane installation and drainage layer placement? Do they include the following? 					
<ol style="list-style-type: none"> Identification and location of geomembrane panels placed, with modifications of the fabrication plan noted? 					
<ol style="list-style-type: none"> Identification of field seams and ends of panels, and results of all destructive and nondestructive field tests of test seams and installed seams? 					
<ol style="list-style-type: none"> Methods and procedural steps taken prior to field seaming of panels? 					
<ol style="list-style-type: none"> Identification of wrinkles that were large enough to double over and were cut out and repaired? 					
<ol style="list-style-type: none"> Identification of repairs and destructive samples and the results of the nondestructive testing of those repairs? 					
<ol style="list-style-type: none"> Amount and location of geotextile and other geosynthetics used in construction of the liner? 					
<ol style="list-style-type: none"> Identification of the sources and product information for manufactured items used in site construction including geosynthetics? 					
<ul style="list-style-type: none"> Identification of all solvents and other sealants used in pipe construction? 					
<ol style="list-style-type: none"> Weather conditions and constraints? 					
<p>(f) Is a series of properly labeled 35 millimeter color prints or prints from digital photographs documenting all major aspects of facility construction included?</p>					

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LANDFILL CONSTRUCTION DOCUMENTATION REPORT REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
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<p>Do the photos contain close-up photographs of the construction process including?</p> <ul style="list-style-type: none"> ___ 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. 					
<ul style="list-style-type: none"> • Do the photos contain panoramic views showing the prepared sub-base and the completed liner before and after granular blanket placement? 					
NR 516.06 Closure of Landfill Areas.					
In addition to the requirements of s. NR 516.04(3), does the construction documentation report for the closure of landfill areas shall contain the following minimum information?					
(1) ENGINEERING PLANS.					
Has a set of 24 by 36 inch engineered plan sheets been submitted, unless an alternative size is approved by the department in writing?					
<p>(a) Is a plan sheet documenting the final refuse grades, including daily and intermediate cover, included?</p>					
<ul style="list-style-type: none"> • Is the documentation of grades with spot elevations taken on a maximum 100-foot grid after grading has been performed to establish uniform slopes? 					
<ul style="list-style-type: none"> • Was documentation of grades for landfills which primarily accept papermill sludge or other low strength wastes performed as follows? <ul style="list-style-type: none"> ___ 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. 					
<p>(b) Is a plan view drawing included for each one-foot thickness of clay or soil barrier layer placed showing the locations of the various testing performed at each test location?</p>					

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	Y	N	NA		
<ul style="list-style-type: none"> If multiple plan views are presented on a single engineering plan sheet, is legibility compromised? 					
<p>(c) Is a plan view drawing included showing the location of the following?</p> <ul style="list-style-type: none"> ___ Geomembrane tests. ___ Geomembrane panel layout. ___ Geomembrane patches and seam repairs. ___ Geomembrane destructive samples. 					
<p>(d) Is a plan sheet included documenting the constructed final cap grades prior to topsoil placement on a maximum 100-foot grid?</p>					
<ul style="list-style-type: none"> Are the approved final cap grades shown for the same area in a clear and legible manner? 					
<ul style="list-style-type: none"> For areas less than 4 acres, is a 50-foot grid is used? 					
<p>(e) Is a plan sheet included documenting the following?</p> <ul style="list-style-type: none"> ___ The 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. ___ The location of the anti-seep collar around pipes exiting the waste. 					
<p>(f) Are cross-sections through the closed area included which are constructed parallel and perpendicular to the base line of the landfill?</p>					
<ul style="list-style-type: none"> Is there a minimum of 4 cross-sections, 2 in each direction? 					
<ul style="list-style-type: none"> Does each of the cross-sections show all surficial and subsurface features encountered including the following? <ul style="list-style-type: none"> ___ Gas extraction wells or vents. ___ Leachate lines. ___ Other landfill structures. 					
<ul style="list-style-type: none"> Is each cross-section tied into the grades of adjacent previously filled areas? 					
<ul style="list-style-type: none"> At a minimum, does each cross-section show actual sub-base grades, base grades, final refuse grades, and final topsoil grades? 					

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(g) Are detail drawings, plan view and cross-section, included 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) Are cross section details included illustrating all important construction features of the final cover, drainage systems for gas condensate, and sediment control and storm water management structures?					
(i) Are detail drawings included 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.					
<ul style="list-style-type: none"> Has a comprehensive report been prepared containing a detailed narrative describing the closure of the area in a logical fashion? 					
<ul style="list-style-type: none"> Is particular emphasis placed on any deviations from the approved plans? 					
<ul style="list-style-type: none"> Does this report also include the following information at a minimum? 					
(a) Is an analysis and discussion included of all soil and geomembrane and other geosynthetics testing work performed?					
<ul style="list-style-type: none"> Do all density and moisture content testing results clearly indicate which Proctor curve or line of optimums is applicable to the soil being compacted? 					
<ul style="list-style-type: none"> Are any changes in the referenced Proctor curve or line of optimums identified as to when they occurred and why the change was made? 					
<ul style="list-style-type: none"> Is all raw data from the soil, geomembrane and other geosynthetics testing performed included in an appendix to the closure documentation report, unless other arrangements were previously approved by the department? 					
<ul style="list-style-type: none"> Is the raw data summarized using a tabulated format? 					
<ul style="list-style-type: none"> Is the make, model, weight and foot length of each piece of equipment used to compact clay included? 					

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(b) Is a table included containing thicknesses of each layer in the cover system on a 100-foot grid pattern?					
<ul style="list-style-type: none"> When determining soil thickness by using surveying information, does the table contains elevations before and after soil layer placement on the 100-foot grid? 					
<ul style="list-style-type: none"> For areas less than 4 acres, is a 50-foot grid used? 					
<ul style="list-style-type: none"> As an alternative to the survey method, is soil thickness controlled using settlement plates and grade stakes? 					
<ul style="list-style-type: none"> If so, is the clay thickness established on a 100-foot grid using auger borings? 					
<ul style="list-style-type: none"> If so, were the 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) Is 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) Are daily summary reports included for each day that installation of geomembrane or other geosynthetics is either attempted or accomplished for composite-capped landfills and contains the information required in s. NR 516.05(2)(c)?					
(f) Are the rates and types of fertilizer, seed and mulch applied, as well as liming requirements and actual rate of application included?					

Facility Name: _____

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	Y	N	NA		
<p>(g) Is a series of properly labeled 35 millimeter color prints or prints from digital photography documenting all major aspects of facility construction including the following:</p> <ul style="list-style-type: none"> ___ Panoramic views of the closed area. ___ Close-up photographs of the construction process and completed engineering structures including: <ul style="list-style-type: none"> ___ Gas extraction wells or vents ___ Blower and flare stations ___ Cleanout ports ___ Drainage blanket placement ___ Manholes, gas condensate tanks and other pertinent structures 					
<p>NR 516.07 Soil and Geomembrane Testing Requirements. Testing shall be performed during the construction and closure of any landfill areas. At a minimum, does this testing include the following:</p>					
<p>(1) LINER SYSTEM AND FINAL COVER SYSTEM CONSTRUCTION.</p>					
<p>For all compacted clay soil construction, were the following tests performed?</p>					
<p>(a) Dry density and as-placed moisture content determined on an approximate 100-foot grid pattern for each one-foot thickness of clay placed?</p>					
<ul style="list-style-type: none"> • The grid pattern is offset on each subsequent layer of tests? 					
<ul style="list-style-type: none"> • 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? 					
<p>(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?</p>					
<ul style="list-style-type: none"> • At least 5 points were established on each curve? 					
<ul style="list-style-type: none"> • At least 2 curves were included for each analysis, if a line of optimums analysis was performed? 					
<ul style="list-style-type: none"> • 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? 					

Facility Name: _____

LANDFILL CONSTRUCTION DOCUMENTATION REPORT REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
<ul style="list-style-type: none"> 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? 					
<p>(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 .002 millimeter particle size, moisture content and dry density?</p>					
<ul style="list-style-type: none"> 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? <p>NOTE: The department may require that a portion of the hydraulic conductivity testing for liner documentation be performed using leachate.</p> <ul style="list-style-type: none"> 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?					
<p>(a) Dry density and as-placed moisture content determined on an approximate 100-foot grid pattern for each one-foot thickness of clay placed?</p>					
<ul style="list-style-type: none"> The grid pattern is offset on each subsequent layer of tests? 					
<ul style="list-style-type: none"> 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? 					
<p>(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?</p>					
<ul style="list-style-type: none"> At least 5 points were established on each curve? 					
<ul style="list-style-type: none"> At least 2 curves were included for each analysis, if a line of optimums analysis was performed? 					
<ul style="list-style-type: none"> 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? 					

Facility Name: _____

LANDFILL CONSTRUCTION DOCUMENTATION REPORT REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
<ul style="list-style-type: none"> 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?					
<ul style="list-style-type: none"> 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?					
<ul style="list-style-type: none"> 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?					
<ul style="list-style-type: none"> Did the tensile properties include strength and elongation in yield and break? 					
<ul style="list-style-type: none"> 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?					
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) Were pre-qualification tests for geomembrane fusion and extrusion welding machines conducted by a minimum of 1 pre-qualification seams run per welding machine at the start up 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?					

Facility Name: _____

LANDFILL CONSTRUCTION DOCUMENTATION REPORT REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
<ul style="list-style-type: none"> 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? 					
<ul style="list-style-type: none"> Was 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? 					
<ul style="list-style-type: none"> Was a portion of each pre-qualification specimen tested in the field for acceptable tensile strength? 					
<ul style="list-style-type: none"> Are 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? 					
<p>(c) Was constructed geomembrane seam testing and sampling completed by or observed by the quality assurance engineer or qualified technician?</p>					
<p>1. Was 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?</p>					
<p>2. Were 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?</p>					
<ul style="list-style-type: none"> For landfills conducting leak location testing, were 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? 					
<ul style="list-style-type: none"> Was 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? 					
<ul style="list-style-type: none"> Did the quality assurance engineer or qualified technician choose the location of the destructive seam samples? 					
<p>3. Were destructive samples taken from at least one end of each fusion weld greater than 100 feet long?</p>					
<ul style="list-style-type: none"> Were samples subjected to a minimum of one field test each in shear and peel mode? 					

Facility Name: _____

LANDFILL CONSTRUCTION DOCUMENTATION REPORT REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
4. Were field shear and peel tests of geomembrane seams and geomembranes performed using standardized specimen sizes in tensile testing machines?					
<ul style="list-style-type: none"> Was the 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? 					
<ul style="list-style-type: none"> Were the tensile testing machines accompanied by documentation for calibration conducted within 3 months of the start of geomembrane installation? 					
<ul style="list-style-type: none"> Were geomembrane samples prepared for field analyses by use of templates and cutting tools that prepare uniformly sized samples? 					
5. Did field and laboratory shear and peel testing of geomembrane seam samples tests include a minimum of 5 peel tests and 5 shear tests?					
<ul style="list-style-type: none"> Were fusion welds tested on both sides of the air channel track? 					
<ul style="list-style-type: none"> Were 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? 					
(d) Was leak location testing of the installed geomembrane completed by or observed by the quality assurance engineer or qualified technician?					
<ul style="list-style-type: none"> Was leak location testing conducted after the leachate collection layer has been placed on the base grades and lower half of the sideslopes? 					
<ul style="list-style-type: none"> Was documentation of the testing method included describing the testing procedures and photo documentation? 					
<ul style="list-style-type: none"> Was 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.					
<ul style="list-style-type: none"> Was testing performed on the GCL and soil barrier layer? At a minimum, did this testing include: 					
(a) Did testing of the GCL material delivered to the site include the following, unless documentation is provided for testing performed by the GCL manufacturer prior to shipping panels to the landfill?					

Facility Name: _____

LANDFILL CONSTRUCTION DOCUMENTATION REPORT REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
<ul style="list-style-type: none"> Was 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? 					
<ul style="list-style-type: none"> Were 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? 					
<ul style="list-style-type: none"> Were index flux tested using ASTM-D6496-99 at a rate of one test per 100,000 ft2 of GCL installed? 					
<ul style="list-style-type: none"> Was bentonite recovered from GCL sample tested for free swell at a rate of one test per 100,000 ft2 of GCL installed? 					
(b) Was testing of the soil barrier layer conducted as follows?					
<ul style="list-style-type: none"> Were dry density and as-placed moisture content determined on an approximate 100-foot grid pattern for each one-foot thickness of soil placed? 					
<ul style="list-style-type: none"> Was the grid pattern offset on each subsequent layer of tests? 					
<ul style="list-style-type: none"> Were 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? 					
<ul style="list-style-type: none"> Was 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? 					
<ul style="list-style-type: none"> Were at least 5 points established on each curve? 					
<ul style="list-style-type: none"> If a line of optimums analysis was performed, were at least 2 curves included for each analysis? 					
<ul style="list-style-type: none"> Was 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? 					
<ul style="list-style-type: none"> If apparent changes in soil quality were observed during soil placement, was 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?					

Facility Name: _____

LANDFILL CONSTRUCTION DOCUMENTATION REPORT REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
(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 was 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?					
(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.					
• Was the sampled tested at the anticipated field density?					
• Was the moisture content and density of each sample recorded?					
• If required by the department, were 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, were 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 were conducted?					
• Bedding for solid wall piping associated with transfer of leachate, groundwater or lysimeter fluids were 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, was the following testing performed? __Chemical durability testing of the material when exposed to leachate and __Laboratory hydraulic conductivity testing were performed?					

Facility Name: _____

LANDFILL CONSTRUCTION DOCUMENTATION REPORT REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
(5) FINAL COVER.					
During construction of the final cover system, were the following tests performed?					
<p>(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?</p> <ul style="list-style-type: none"> The source and composition of the support layer was documented by a description of the materials used in the support layer? 					
<p>(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?</p>					
<p>(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?</p>					
NR 516.08 Testing Requirements for Landfills with Extended Collection Lines					
(1) REQUIREMENTS:					
<ul style="list-style-type: none"> 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:					
<ul style="list-style-type: none"> 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: <p>(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.</p>					

Facility Name: _____

LANDFILL CONSTRUCTION DOCUMENTATION REPORT REQUIREMENTS	COMPLETE?			LOCATION	COMMENTS
	Y	N	NA		
(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:					
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.					
<ul style="list-style-type: none"> 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. 					
Per NR 506.07(5) LEACHATE COLLECTION SYSTEMS					
(a) Not applicable to construction documentation.					
(b) Not applicable to construction documentation					
(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?					

Facility Name: _____

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

Signature

Date