

Chapter NR 514

PLAN OF OPERATION AND CLOSURE PLANS FOR  
LANDFILLS

NR 514.01	Purpose	NR 514.06	Operations manual and design report
NR 514.02	Applicability	NR 514.07	Closure plans
NR 514.03	Definitions	NR 514.08	Municipal solid waste combustor residue management plans
NR 514.04	Procedural requirements		
NR 514.05	Engineering plans		

**NR 514.01 Purpose.** The purpose of this chapter is to help ensure that efficient, nuisance-free and environmentally acceptable solid waste management procedures are practiced in Wisconsin and to outline the requirements for preparation of plans of operation and closure plans for solid waste facilities. This chapter is adopted under ss. 144.43 to 144.47 and 227.11, Stats.

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

**NR 514.02 Applicability.** (1) Except as otherwise provided, this chapter governs all solid waste disposal facilities as defined in s. 144.43 (5), Stats., except hazardous waste facilities as defined in s. 144.61 (5m), Stats., and regulated under chs. NR 600 to 685, and metallic mining operations as defined in s. 144.81 (5), Stats., and regulated under ch. NR 182.

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

History: Cr. Register, January, 1988, No. 385, eff. 2-6-88; correction in (1) made under s. 13.93 (2m) (b) 7, Stats., Register, May, 1994, No. 461.

**NR 514.03 Definitions.** The terms used in this chapter are defined in s. NR 500.03.

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

**NR 514.04 Procedural requirements.** (1) **GENERAL.** No person may establish or construct a facility for the land disposal of solid waste or expand an existing land disposal facility until a plan of operation has been submitted in accordance with s. NR 500.05 and this chapter and has been approved in writing by the department. No person may establish, construct or close an approved facility for the land disposal of solid waste except in accordance with this chapter, s. NR 506.08 and with the approved plan of operation. No person may submit a plan of operation for a new or expanded solid waste disposal facility prior to the submittal of a feasibility report by that person.

(2) **DATA PRESENTATION.** All plans of operation for land disposal facilities shall contain the complete plans and specifications necessary for the construction, operation, monitoring, closing and long-term care of the facility. Because these documents are to be used for the day-to-day con-

struction, operation and closure of the facility, the information must be presented in a manner that is clear and understandable.

(3) **COMPLETENESS.** Within 30 days after a plan of operation is submitted or, if the plan of operation is submitted with the feasibility report, within 30 days after the department issues notice that the feasibility report is complete, the department shall provide written notification to the applicant and any other person who has filed a written request whether or not the plan of operation is complete. If the submittal is deemed incomplete, the department will specify the information which must be submitted before the plan may be deemed complete. The department will determine if the plan of operation is complete by determining whether or not the minimum requirements of this chapter and the conditions of any feasibility approval have been met. The department may require the applicant to submit additional information after determining that the plan of operation is complete if the department establishes that the plan of operation is insufficient without the additional information.

(4) **REVIEW TIMES.** The department may not approve or disapprove a plan of operation until after the applicant obtains a favorable determination of feasibility for the facility. The department shall either approve or disapprove the plan in writing within 90 days after submission of a complete plan of operation or within 60 days after a favorable determination of feasibility, whichever is later.

(5) **PLAN APPROVAL MODIFICATIONS.** Any proposed changes to the approved plan shall be submitted to and approved by the department prior to implementation.

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

**NR 514.05 Engineering plans.** The plan of operation shall contain a set of engineering plans which are drawn on standard 24 inch by 36 inch plan sheets, unless an alternative size is approved by the department, in accordance with ss. NR 500.05, 504.05, 504.07 and the following requirements. All plan sheets except the title sheet, existing conditions sheet, cross-sections and details sheets shall utilize the existing conditions sheet as a base map.

(1) **TITLE SHEET.** A title sheet shall be included indicating the project title, who prepared the plans, the date the plans were prepared, the applicant for whom the plans were prepared, a table of contents, a map showing the location of the facility within the county or multicounty area, the location of the county or multicounty area within the state and the area to be served.

(2) **EXISTING CONDITIONS.** An existing conditions plan shall be included consisting of a detailed topographic map of the proposed facility and all areas within 1,500 feet of the proposed limits of filling prior to development. The minimum scale shall be 1 inch = 200 feet with a maximum 2 foot contour interval. The contour interval selected shall be sufficiently small to clearly show surface water flow patterns within and around the facility. All elevations shall be related to USGS datum. The plan shall identify and define the following:

(a) Surface waters including intermittent and ephemeral streams and wetlands.

(b) Property boundaries.

Register, May, 1994, No. 461

- (c) The proposed facility boundary.
- (d) The proposed limits of waste filling.
- (e) A facility survey grid and its relationship to the state plane coordinate system.
- (f) Surveying monuments.
- (g) North arrow.
- (h) Residential structures and other buildings.
- (i) Soil boring and well locations.
- (j) Public and private water supply wells as well as irrigation and stock wells.
- (k) Utility lines, access control and other human-made topographic and drainage features.

(3) **SUB-BASE GRADES.** A plan sheet shall be included which indicates either the facility sub-base grades or, if the facility is designed without engineering modifications, the base grades.

(4) **ENGINEERING DESIGN FEATURES.** A separate plan sheet shall be included to depict each major engineering design feature for the entire facility. If the facility will be constructed in phases, the limits of the engineering design features for each phase shall also be presented. For facilities with engineering modifications this plan shall depict the layout and slope of the liner and leachate collection system including pipes, manholes, trenches, berms, lift stations, surface water control structures, pipe cleanouts and other pertinent structures. Invert elevations shall be provided on 100 foot centers and at any changes in grade for all leachate and groundwater collection and transfer systems.

(5) **PHASING.** A series of phasing plan sheets shall be included to show facility development through time. The location of peripheral features such as support buildings, access roads, drainage ditches, sedimentation basins and screening berms shall be indicated on this plan. At a minimum, a separate plan sheet shall be provided for initial facility construction and for each subsequent phase of development or new area where substantial construction is to be performed. These subsequent phasing plan sheets shall present the final filling surfaces in the previous phases of facility development; the limits of clearing, grubbing and topsoil removal; the base grades of the new phase of filling; the anticipated surface contours of soil stockpiles at the time depicted on the plan sheet; and surface water drainage features. Each plan shall include a list of construction items and quantities necessary to prepare the phase of development indicated on the plan.

(6) **WATER TABLE MAPS.** At least 2 water table contour maps shall be presented to indicate high and low water table conditions. All water level elevations for an individual map shall be measured on the same day. The water table maps shall show the location of all wells and the measured water level elevation shall be noted adjacent to each well.

(7) **MONITORING.** A facility monitoring plan shall be included to show the location of the design management zone as determined under s. NR 140.22 and all devices for: the monitoring of leachate quality and quan-

tity; unsaturated zone water quality and flow rate; groundwater quality; surface water quality; and gas production, migration and venting. This plan sheet shall also include a table indicating the devices to be monitored, the proposed parameters and the proposed frequency of monitoring before and during facility development and during the period of long-term care.

(8) **FINAL TOPOGRAPHY.** A final topography plan sheet shall be included to indicate the appearance of the entire facility following closure including surface water drainage features and the location of gas vents. The details necessary to prepare the facility for final closure and long term care shall be included on this plan sheet.

(9) **LONG-TERM CARE.** A long-term care plan sheet shall be included showing the topography of the facility following closure. This plan shall list those items anticipated to be performed during the period of long-term care including the proposed schedule for monitoring and facility maintenance. This information may be included on the final topography plan sheet if clarity is not compromised.

(10) **CROSS-SECTIONS.** A series of cross-sections shall be included to illustrate all important construction features. These cross-sections shall be drawn perpendicular and parallel to the facility baseline through each major phase of development at a maximum distance of 500 feet between cross-sections. For clarity, a number or symbol shall be used to label major soil units instead of extensive shading. The location of the cross-sections shall be illustrated by a reduced scale plan view on each cross-section. Each combined engineering and geologic cross-section shall show:

- (a) Existing grades.
- (b) Sub-base, base and final grades.
- (c) Soil borings and monitoring wells which the section passes through or is adjacent to.
- (d) Soil and bedrock types.
- (e) Stabilized water table contours.
- (f) Leachate collection and monitoring systems.
- (g) Gas venting and monitoring systems.
- (h) Limits of refuse filling.
- (i) Drainage control structures.
- (j) Access roads and ramps on the perimeter of the disposal area and within the active fill area.
- (k) The filling sequence or phasing interfaces, and other facility features.

(11) **DETAILS.** Drawings showing details and typical sections shall be included for surface water drainage control structures; access roads; fencing; final cover and base liner systems; leachate and gas control systems such as pipe bedding, manholes, transfer lines, force mains and storage tanks; leachate transfer lines which extend through the liner; groundwater and unsaturated zone monitoring devices; and buildings and signs. This plan sheet shall include all other construction details such as

leachate and refuse containment berms between subsequent phases of development.

**History:** Cr. Register, January, 1988, No. 385, eff. 2-6-88; correction in (2) (k) made under s. 13.93 (2m) (b) 5, Stats., Register, May, 1994, No. 461.

**NR 514.06 Operations manual and design report.** The plan of operation shall contain an operations manual and design report which, at a minimum, consists of the following information:

(1) **TABLE OF CONTENTS.** The report shall include a table of contents which outlines by section title and page number the discussion required in this section.

(2) **GENERAL INFORMATION.** The report shall identify the facility title; engineering consultants; facility owner, licensee and operator; the location of the facility by quarter-quarter section, township, range, town and county; the proposed area of waste fill; the facility life and disposal capacity; waste contributors including all municipalities and major commercial and industrial customers; waste types and quantities to be disposed; any exemptions requested from the department; and a list of the conditions of facility development as stated in the feasibility determination and the measures incorporated in the plan of operation to address those conditions.

(3) **SPECIFICATIONS.** The report shall include specifications for construction, operation and closure of the facility. These specifications shall include detailed instructions to the facility operator and any contractors for all aspects of construction and operation. References to specifications on the plan sheets shall be described. This may include such information as tank manufacturer installation instructions and pump performance criteria.

(4) **INITIAL FACILITY PREPARATIONS.** The report shall include a discussion of initial preparations and facility construction methods relating to clearing and grubbing, topsoil stripping and other excavations; soil storage and visual screening development; drainage control features; base liner and granular drainage layers; leachate collection and gas venting systems; access roads and entrance area screening and fencing; environmental monitoring device installation and other special design features. This discussion shall propose a schedule of field measurements, photographs to be taken, and sampling and testing procedures to be utilized to verify that the infield conditions encountered were the same as those defined in the feasibility report.

(5) **SOIL TESTING.** The report shall include a proposed testing schedule to document the placement of all general soil fill and backfill, base liner, final cover layers and all venting or drainage layers used in facility development or closure. Construction and documentation shall be in accordance with the requirements of ch. NR 516.

(6) **MONITORING.** The report shall include a proposed groundwater, surface water, gas, unsaturated zone and leachate monitoring program developed in accordance with ch. NR 508 and the specific requirements of the feasibility approval.

(7) **OPERATIONS.** The report shall describe the daily operations including a discussion of the timetable for the phases of facility development; waste types accepted or excluded; typical waste handling techniques and

methods for handling unusual waste types; hours of operation; traffic routing; drainage and erosion control; windy, wet and cold weather disposal operations; fire protection equipment; anticipated staffing requirements; methods for vector, dust and odor control; daily cleanup; direction of filling; salvaging; record keeping; and parking for visitors, users and employes. A listing of the backup equipment available for facility operation with names and telephone numbers where additional equipment may be obtained shall be included in this discussion. The proposed operations shall be in accordance with ch. NR 506 unless an exemption is granted by the department in writing.

(8) **PHASED DEVELOPMENT.** The report shall describe the relationship between facility operations and the development of subsequent phases. This discussion shall define the critical stage of refuse disposal for each phase as it relates to the start of construction of subsequent phases. The purpose of this planning is to ensure that the scheduling of future construction takes into account the short construction season and the capacity remaining in existing phases such that an orderly transition is maintained. In addition, the phasing of facility monitoring, abandonment of fill areas, and the installation and maintenance of gas and leachate control structures shall be discussed.

(9) **CLOSURE.** The report shall include a discussion of the anticipated sequence of the required events for facility closure and a discussion of those actions necessary to prepare the facility for long-term care and final use.

(10) **LONG-TERM CARE.** The report shall include a proposed long-term care schedule describing the procedures to be utilized for the inspection and maintenance of cover vegetation, runoff control structures, refuse or ground surface settlement or siltation, erosion damage, gas and leachate control features, gas, leachate and groundwater monitoring, and other long-term care needs. A final use plan for the facility shall be outlined and discussed.

(11) **WRITTEN AGREEMENTS.** The appendix of the report shall include the following written agreements:

- (a) A draft leachate treatment agreement.
- (b) A signed clay procurement agreement or option for acquisition of the borrow source property for the volumes necessary to construct and close the first major phase of the facility.
- (c) Any miscellaneous agreements such as easements.

(12) **DESIGN CALCULATIONS.** The report shall include and explain all design calculations to facilitate department review and provide the necessary information on financial responsibility for facility closure and long-term care as required by ss. 144.44 and 144.441, Stats., including the following information:

- (a) A discussion of the reasoning and logic behind the design of the major engineering features. Design features such as base grade configuration and relationships to subsurface conditions, anticipated waste types and characteristics, phases of development, traffic routing, liner design, facility monitoring, final capping and other similar design features shall be included in this discussion. Any features related to facility closure and long-term care shall also be discussed.

(b) A discussion of all calculations, such as refuse to cover balance computations, base liner and final covering soils materials needs related to available borrow soil volumes, stockpile sizing estimates, estimates of runoff, infiltration and leachate collection and leakage volumes shall be included. All calculations shall be summarized with the detailed equations presented in the appendix of the report. References to the appropriate plan sheets, from which variables are obtained for these calculations shall be included in these summaries.

(13) **FINANCIAL RESPONSIBILITY ANALYSIS.** A detailed analysis in accordance with ch. NR 520 shall be made of the financial responsibility for long-term care from the time of facility closure to termination of the owner's responsibility. This shall include an itemized cost estimate for phased and final facility closure and long-term care. All assumptions used in developing the cost estimates shall be justified.

(14) **CONTINGENCY PLAN.** The report shall contain a comprehensive plan of action to be taken in the event that gas migration is detected. This plan shall include but not be limited to, analysis of the significance of the data, more frequent sampling, installation of additional gas probes, additional monitoring parameters and a discussion of potential alternatives to protect public health and welfare and to correct any gas migration problems.

(15) **APPENDIX.** An appendix shall be included which lists the references used and includes any additional data not previously presented, supplemental design calculations, material specifications, operating agreements such as draft leachate treatment agreements or signed soil borrow agreements, documents related to long-term care funding and other appropriate information.

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

**NR 514.07 Closure plans.** (1) **APPLICABILITY.** Closure plans may be required by the department for solid waste disposal facilities which do not have an approved plan of operation under s. 144.44 (3), Stats. Closure plans shall present the complete plans and engineering analysis necessary for evaluation of the design, operation, monitoring, closing and post closure care of the facility. These closure plans shall address all the requirements of s. NR 506.08. The department may require that the plans address any or all of the information contained in chs. NR 504, 508, 512, 514 and 516.

(2) **ENGINEERING PLANS.** The engineering plans necessary for department review of facility closure shall be prepared on standard 24 inch by 36 inch plan sheets in accordance with ss. NR 500.05, 504.07 and the following requirements unless an exemption is granted by the department in writing:

(a) A title sheet shall be included indicating the facility title, who prepared the plans, the date the plans were prepared, the facility owner and operator for whom the plans were prepared, a table of contents, a map showing the location of the facility within the county or multicounty area, the location of the county or multicounty area within the state, the area currently served by the facility and the previous service area if different from the area currently served.

(b) An existing conditions plan shall be included indicating the conditions at the facility at the time of plan preparation. This plan shall in-

clude a detailed topographic survey of the facility and the area within at least 500 feet from the limits of fill. This area may need to be extended to show significant surface water drainage features. At a minimum, the scale of this plan shall be 1 inch = 200 feet with a maximum 2 foot topographic contour interval. All elevations shall be related to USGS datum. The plan shall identify and define the following: the existing and final limits of waste placement, the facility and adjacent property boundaries, the facility survey grid and its relationship to the state plane coordinate system, north arrow, surveying monument locations, surface water drainage channels, residential buildings and other structures, soil boring and well locations, public and private water supply wells, and other human-made topographic and drainage features.

(c) A water table map shall be included to show horizontal gradients at the facility. This map shall be based on data from monitoring wells which have been installed to meet the requirements of s. NR 508.20. All water elevations shall be measured on the same day. This map shall show all wells and the measured water level elevations at each well. The contour interval shall be sufficiently small to adequately show flow directions but no greater than 5 feet. The existing conditions plan sheet shall be used as a base map.

(d) A final topography plan sheet shall be submitted indicating the appearance of the entire facility following closure. The final waste limits and surface water drainage patterns shall be included on this plan sheet. This plan shall include the details and list of construction items and quantities necessary to prepare the facility for post closure care.

(e) A series of cross sections drawn perpendicular and parallel to the facility baseline at a maximum distance of 500 feet between cross sections to illustrate all important topographic and geologic features shall be submitted. The location of the cross sections shall be illustrated by a reduced scale plan view on each cross section plan sheet. Each cross section shall show existing contours, estimated base grades of waste disposal, the proposed final grades, soil borings and monitoring wells which the section passes through or is adjacent to, soil and bedrock types and stabilized water table contours. For clarity, a number or symbol shall be used to label major soil units instead of extensive shading.

(f) A facility monitoring plan sheet shall be submitted to show the location of all environmental monitoring devices. At a minimum, this plan shall include proposed locations for the monitoring of gas production, venting and migration; surface water and groundwater quality and levels; and leachate quality and levels. This plan sheet shall also indicate the location of the design management zone and include a table indicating the parameters to be monitored, and the frequency of monitoring. The plan shall show the topography of the facility following closure and define the anticipated schedule for facility maintenance.

(g) Drawings of details and typical sections shall be submitted indicating surface water drainage control structures, gas venting systems, access roads, fencing and final cover systems and other details necessary to demonstrate the ability to complete facility closure and maintain the facility as designed after closure.

(3) **DESIGN REPORT.** A closure design report shall be submitted which, at a minimum, includes the following information:



(a) A table of contents which shows the organization of the discussion required in this section.

(b) The facility title; engineering consultants; facility owner, licensee and operator; the location of the facility by quarter-quarter section, township, range, town and county; the amount and area of waste filling; the municipalities and industries served; the waste types and quantities disposed; surveying controls and adjacent land use.

(c) The existing surface topography and groundwater conditions at the facility shall be described in this report. This description shall include at a minimum a discussion of current operational practices and grades, the underlying soil types, the estimated base of waste disposal, the relation of the waste disposal limits to the local water table elevation, the volume and type of wastes in place, the volume and type of wastes proposed for disposal through facility closure and the potential for the waste to biologically decompose and generate gas. The discussion shall also evaluate and discuss all existing monitoring data. Particular attention shall be given to any attainment or exceedances of the groundwater standards contained in ch. NR 140 and the potential for gas migration.

(d) If any existing or anticipated non-compliance with the requirements of s. NR 504.04 are identified in the discussion of par. (c), the closure report shall present a proposal to prevent the non-compliance or return the facility to compliance.

(e) The proposed details of final facility closure regarding final cover system design as it affects surface water drainage, leachate and gas production and control shall be described in the closure design report. This discussion shall include a testing program to document all closure construction in accordance with ch. NR 516.

(f) A description of the logic of the monitoring plan proposal as required by sub. (2) (f).

History: Cr. Register, January, 1988, No. 385, eff. 2-6-88; correction in (2) (b) made under s. 13.93 (2m) (b) 5, Stats., Register, May, 1994, No. 461.

#### NR 514.08 Municipal solid waste combustor residue management plans.

(1) **GENERAL.** No person may establish, construct or operate a facility for the land disposal of municipal solid waste combustor residue or expand an existing facility for the land disposal of municipal solid waste combustor residue until a management plan has been submitted in accordance with s. NR 500.05 and this chapter and has been approved in writing by the department. The facility shall also have an approved plan of operation in accordance with ss. NR 514.04 to 514.06. The department may approve residue management plans for facilities which have approved plans which are substantially equivalent to the requirements of ss. NR 514.04 to 514.06. Any facility which accepts municipal solid waste combustor residue prior to June 1, 1992 and which continues to accept residues after January 1, 1992, shall submit a residue management plan in accordance with this section for review and approval no later than 3 months after June 1, 1992. No person may establish, construct, operate or close a facility for the land disposal of municipal solid waste combustor residue except in accordance with this chapter, ss. NR 504.08 and 506.15 and with the approved plan of operation.

(2) **RESIDUE SOURCES.** (a) All management plans for the land disposal of municipal solid waste combustor residue shall contain the name and

location of the proposed sources and the expected volume from each source of municipal solid waste combustor residue to be accepted.

(b) All management plans for the land disposal of municipal solid waste combustor residue shall evaluate the results of the testing requirements of s. NR 502.14 (8) and any trends in the results from previous testing periods to determine the need for any changes to the proposed facility design or operation.

(3) **ENGINEERING PLAN.** The management plan shall contain a set of engineering plans which are drawn on standard 24 inch by 36 inch plan sheets, unless an alternative size is approved by the department, in accordance with ss. NR 500.05, 504.05, 504.07 and 504.08. The plan sheets shall specifically address the design requirements of s. NR 504.08 and include plan views, cross-sections and details as necessary to illustrate the applicable design features, including the composite liner and leachate collection system. Phasing plan sheets shall also be included to show facility development through time.

(4) **OPERATION MANUAL AND DESIGN REPORT.** The management plan shall contain an operations manual and design report which describes the daily operations including a discussion of the timetable for the phases of facility development; waste types accepted or excluded; typical waste handling techniques and methods for handling unusual waste types; hours of operation; traffic routing; drainage and erosion control; windy, wet and cold weather disposal operations; methods for dust control; and direction of filling. Methods to maintain compliance with the requirements of s. NR 506.15 shall also be described.

(5) **MONITORING.** The management plan shall include a proposed groundwater, unsaturated zone and leachate monitoring program which complies with the requirements of s. NR 508.04 (5).

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