

Prepared for:

Burke County Public Works
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**CLOSURE PLAN
FOR THE
JOHN'S RIVER WASTE MANAGEMENT FACILITY
BURKE COUNTY, NORTH CAROLINA
PERMIT NO. 12-03**

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TABLE OF CONTENTS

I.	Closure Activities	1
A.	Closure Plan Time-Frames	2
B.	Waste Inventory	2
C.	Closure of Disposal Units	2
1.	Area to be Capped	2
2.	Cap Design	3
a.	Intermediate Cover and Leveling Course	3
b.	Infiltration Layer	3
c.	Erosion Layer	4
d.	Vegetation	4
3.	Cap Settlement and Stability	5
4.	Drainage and Erosion	5
5.	Freeze/Thaw Effects	6
D.	Control of Waste Decomposition Products	6
1.	Leachate	6
2.	Landfill Gas	7
E.	Control of Surface Runoff	7
II.	Closure Milestones	8
III.	Posting And Baiting	9
IV.	Notification	9
V.	Certification	9

I. CLOSURE ACTIVITIES

Pursuant to the North Carolina Solid Waste Management Rules (15A NCAC 13B .1600), this Closure Plan is submitted as part of the Transition Plan for the John's River Waste Management Facility in Burke County, North Carolina. The landfill began operation in April 1988. It was not designed or constructed with a base liner system or leachate collection and recovery system. Burke County intends to continue receiving waste at the John's River facility until January 1, 1998.

This text describes the proposed closure activities and site modifications and the site characteristics on which they are based. The reader is also referred to the drawings and to the Operation Plan included in the Transition Plan for related discussions. Final site contours are provided on Drawing No. 8; other aspects related to closure including but not limited to phased development, stormwater management, and erosion and sediment control are also illustrated in the Transition Plan Drawings. A draft Construction Quality Assurance (CQA) Plan is included in Appendix I to provide a description of the methods and procedures to be used to monitor installation of the closure cap. Detailed construction drawings, specifications, and contract documents will be prepared in the months prior to closure for use by Burke County Public Works to contract the necessary construction activities.

The facility will be closed in accordance with the requirements of EPA's Subtitle D regulations (40 CFR § 258.60) and Rule .1627 of the North Carolina Solid Waste Management Rules (15A NCAC 13 B). Given the proposed development plan for the landfill, described in detail in the Operation Plan and shown on Drawing Nos. 5 and 6, the entire waste disposal area not previously closed will be capped and closed at the same time.

A. CLOSURE PLAN TIME-FRAMES

Closure of the facility is proposed for January 1, 1998 as required by Rule .1627 (c) (10) (A) governing MSWLF units not designed with a base liner system. An itemized list of closure milestones and a proposed schedule are outlined in Section II of this document. Burke County Public Works will notify the Division that a notice of intent to close the facility has been placed in the operating record prior to beginning of closure of the facility. Given a projected date of January 1, 1998 for the final receipt of wastes, closure activities for the facility are required to begin within 30 days or by January 31, 1998. However, the Burke County Public Works Department will request a 60-day extension so that the start of construction is delayed until after the winter months. Therefore, the anticipated start date for closure construction is March 31, 1998. Closure activities will be completed within 180 days following the beginning of closure of the facility (i.e., before September 27, 1998).

B. WASTE INVENTORY

Based on estimated initial cell contours and the proposed final contours at maximum capacity, the maximum volume available for solid waste disposal is 1,752,950 cubic yards. Using an average waste density of 1,200 pounds per cubic yard and an assumed waste to cover ratio of 4:1, the maximum amount of waste projected to be on site at the time of closure is 1 million tons. Supporting calculations are provided in Appendix II. No solid waste will be removed from the site.

C. CLOSURE OF DISPOSAL UNITS

1. AREA TO BE CAPPED

Given the phased development described in the Operation Plan, the entire waste disposal area will be capped at one time. The slopes on the southern and southwestern sides of

the landfill (approximately 6 acres) have not had waste placed on them since before October 9, 1991 and are not under the present vertical expansion. Given the pyramidlike configuration of the vertical expansion, all filling is taking place inside the 22-acre area bounded by those slopes, as shown on Drawings No. 5, 6 and 8 included with the transition plan. These slopes have received at least two feet of soil cover and are adequately vegetated. However, since the closed and active areas are contiguous, the entire 28-acre waste disposal area located in the southwest corner of the landfill property will receive a final cap (see Drawing No. 8). The final site contours were designed using surface slopes of a minimum of five percent on the top and a maximum of 33 percent for side slopes.

2. CAP DESIGN

The closure cap, meeting the requirements of Rule .1627 (c), will be constructed as follows:

- a. Intermediate Cover and Leveling Course - Additional local soil will be placed over the existing daily cover to provide a minimum of 12 inches of intermediate cover and a uniform base for construction of the final cap.
- b. Infiltration Layer - An infiltration layer consisting of at least 18 inches of locally available, low permeability soil will be constructed on the existing intermediate cover. The John's River Facility has no bottom liner, and no permeability criteria are specified in the permit; therefore, the permeability criterion for the infiltration layer is less than or equal to that of the in-situ subsoils present, or 0.00001 (1×10^{-5}) cm/sec, whichever is less. According to a hydrogeologic evaluation performed as part of the site plan application, the soils in the vicinity of the waste disposal

area consist of silty sand and sandy silt. Laboratory and field tests indicated permeabilities ranging between 4.8×10^{-4} and 1×10^{-5} cm/sec.

The infiltration layer will be compacted in 6-inch lifts to achieve a hydraulic conductivity not greater than 1×10^{-5} cm/sec on the basis of extensive laboratory testing prior to construction. The pre-construction testing program and the construction quality assurance requirements are described in Section B.3.0 of the CQA Plan enclosed as Appendix I. The enclosed CQA Plan is a draft; it will be finalized prior to closure for inclusion in the construction contract documents.

- c. Erosion Layer - A layer consisting of at least 12 inches of local soil with unspecified permeability will be placed above the infiltration layer. A layer of topsoil or organically amended local soil will be placed above the 12 inches of local soil. This layer of organic soil will be at least 6 inches in thickness. The topsoil and local soil cover will not be compacted to a high degree (say 90 ± 2 percent of Standard Proctor maximum dry density) in order to promote vegetative growth. Soil tests will be conducted prior to seeding operations to determine what, if any, chemical amendments to the soil will be necessary to promote a healthy and vigorous growth of vegetation.
- d. Vegetation - After placement of the organic soil layer, the disturbed area will be seeded with a grass or wildflower vegetative cover. Seeding will be applied in accordance with the "North Carolina Erosion and Sediment Control Planning and Design Manual" and recommendations from the Burke County Agricultural Extension Office. Seeding, mulch, and erosion matting, as necessary, will be applied immediately to disturbed areas to control erosion. By seeding the closed areas with good competent vegetation mixes in a timely manner, potential erosion problems will be minimized. The

vegetative cover will be inspected monthly and an assessment of the vegetative cover will be made. If the inspections indicate that vegetative cover is sparse or nonexistent, revegetation of the affected area will be performed within a reasonable period of time.

3. CAP SETTLEMENT AND STABILITY

Non-uniform settlement is expected in the areas to receive the new cap. Immediate settlement and primary and secondary consolidation of the cap itself should be negligible given its relatively thin cross-section. The primary mechanism of settlement anticipated is waste consolidation due to waste decomposition. According to Daniel et. al., long-term settlement is expected to be 5 to 15 percent over 20 to 30 years; however, expected initial settlement is 5 percent in the first few months following waste placement. A significant amount of waste consolidation will likely have occurred by the time of closure given the age of the cells to be capped (up to approximately 10 years). A stability analysis of the proposed cap indicates more than adequate factors of safety under saturated conditions on the steepest proposed slopes (see Appendix III).

Monthly inspections of the final cover will reveal any substantial displacement of the cap. Should these inspections indicate a loss of function of the cap (ponding, fully penetrating cracks, etc.), then repairs can be initiated. The intended purpose of the closure cap is to reduce infiltration. This function is not expected to deteriorate significantly over the post-closure period.

4. DRAINAGE AND EROSION

Drainage and erosion will be controlled by a combination of drainage ditches, diversion berms, silt ponds or traps, vegetation, and construction practices to enhance the operation and maintenance of this system. Construction and design will be in

accordance with the applicable sections of the "North Carolina Erosion and Sediment Control Planning and Design Manual", and the "U.S. Department of Agriculture Technical Release 55". Drainage will be directed to perimeter ditches, either existing or newly constructed. These ditches will receive runoff from the final cap and will discharge into silt ponds or traps as needed. The design storm for all calculations is the 25-year, 24-hour rainfall event. For drawings and a detailed discussion regarding stormwater management and erosion and sediment control, please refer to the Operation Plan and Transition Plan Drawings found in another section of the Transition Plan.

5. FREEZE/THAW EFFECTS

Based on a published map of frost depths throughout the United States, the anticipated maximum depth of freeze/thaw effects on the site is approximately 10 inches. Since the upper 18 inches (minimum) of final cover soil will not be relied upon to reduce infiltration, the effects of freeze/thaw cycles on the closure cap should not be detrimental to its function.

D. CONTROL OF WASTE DECOMPOSITION PRODUCTS

1. LEACHATE

A three-foot soil cover will be constructed in accordance with Rule .1627(c)(1) to reduce infiltration of rainfall into the final waste cell and reduce erosion by sustaining native plant growth. By reducing infiltration, the final cover will reduce the quantity of leachate generated at the facility. This is expected to reduce the migration of leachate into the groundwater.

Groundwater monitoring wells located around the perimeter of the closed area will provide monitoring points for determining the presence, if any, of contamination in groundwater moving from the site. Groundwater monitoring and remedial/corrective

action will be performed according to Rules .1633 through .1637 as required by the site findings. Refer to the Water Quality Monitoring Plan in another section of the Transition Plan for details.

Provisions will also be made during closure construction activities to divert any leachate seeps present at the site to facilities, either temporary or permanent, for collection and storage prior to removal and transport to a local POTW for treatment.

2. LANDFILL GAS

Landfill gas will be intercepted by stone columns as it migrates laterally beneath the cap, then will be passively released to the atmosphere via gas vents installed through the soil cap. Combustible gas monitoring will be performed quarterly at permanent gas detection probes installed as needed around the waste boundary and in on-site structures. Refer to the Landfill Gas Monitoring section of the Operation Plan for a detailed description of the program. Refer to Drawing No. 4 - Site Monitoring Plan for gas detection probe locations and other monitoring points, Drawing No. 8 - Final Contours for the gas vent locations, and Drawing No. 10 for construction details of the gas detection probes and gas vents.

E. CONTROL OF SURFACE RUNOFF

A layer of soil supporting vegetative cover will control erosion of the new soil cover system. Surface runoff from the area disturbed during construction will enter perimeter ditching. The perimeter ditching will convey surface runoff as needed to silt ponds or traps designed for removal of sediment prior to discharge into the receiving drainageways. All erosion/sediment control structures have been designed to control runoff from a 25-year, 24-hour storm event. See the Erosion and Sediment Control section of the Transition Plan for a complete description.

II. CLOSURE MILESTONES

The following approximate closure milestones are proposed for use in tracking the progress of closure activities. A detailed schedule will be established prior to construction and included with the contract documents. The proposed closure milestones and schedule are shown in Table 1.

Table 1.

Proposed Closure Milestones and Schedule

Milestone	Proposed Schedule
Construction of erosion and sediment control structures	Completed in 1994
Testing of borrow sources	May - Aug, 1987
Last receipt of waste	January 1, 1998
Final grading	March, 1998
Placement of soil cap	April - June, 1998
Final inspection of cap by P.E.	July, 1998
Construction of stormwater controls	July, 1998
Seeding and mulching	August 1998
Establishment of vegetative cover	Aug - Oct 1998
Submittal of closure certification	August, 1998
Preparation of survey plat	Aug - Sept 1998
Recordation of deed notation	September 1998

Refer to the Proposed Project Schedule bar graph in Appendix IV.

III. POSTING AND BAITING

At least one sign will remain posted at the entrance to the facility notifying all persons of the facility closing. Additionally, a notice prohibiting further receipt of waste materials will remain posted at the entrance to the facility. The site will be secured through the use of gates equipped with locks, fencing, and/or natural barriers. The site will be baited for rodent and vector control before final closure is initiated.

IV. NOTIFICATION

Once closure is complete, a survey plat will be prepared by a registered land surveyor indicating the location and dimensions of landfill disposal areas, groundwater monitoring well and gas probe locations, and restrictions on future disturbance of the site. A notation will be recorded on the deed to the facility property to notify any potential purchaser of the property that the land has been used to dispose of solid waste and its use is restricted under the Division-approved Closure Plan as required by Rule .1627(c)(8). Copies of the deed notations as recorded will be placed in the Operating Record and forwarded to the Division.

V. CERTIFICATION

Upon completion of closure of the site, a licensed professional engineer acting on behalf of the owner will submit a Certification of Closure to the Division. This Certification will state that the site was closed in accordance with the applicable solid waste regulations and laws as required by Rule .1627(c)(7).

IV. POSTING AND BAITING

At least one sign will remain posted at the entrance to the facility closing. Additionally, a notice of closing will remain posted at the entrance to the facility through the use of gates equipped with locks. The facility will be baited for rodent and vector control before the closure is complete.

V. NOTIFICATION

When the closure is complete, a survey will be conducted to determine the location and dimensions of the closure. The location of the closure will be recorded on the site map. A notation will be recorded on the site map of the location of the closure. The location of the closure will be recorded on the site map. The location of the closure will be recorded on the site map.

VI. MONITORING

The location of the closure will be monitored for rodent and vector activity. The location of the closure will be monitored for rodent and vector activity. The location of the closure will be monitored for rodent and vector activity.