



North Carolina Department of Environment and Natural Resources
Division of Waste Management

Beverly Eaves Perdue
Governor

Dexter R. Matthews
Director

Dee Freeman
Secretary

Solid Waste Section

January 04, 2011

Mr. Tim Rogers, Solid Waste Director
460 B South Landfill Road
Dudley, NC 28333

Re: Comments on Permit To Construct Application for Phase 3 (Permit Application)
Wayne County Municipal Solid Waste Landfill (MSWLF)
Wayne County, North Carolina
Permit No. 96-06, Document ID No. (Doc ID) 12580

Dear Mr. Rogers:

On December 22, 2010, the Division of Waste Management (DWM), Solid Waste Section received the revised Permit to Construct Application for Wayne County MSWLF - Phase 3 (Doc ID 12564) which did not include the *Design Hydrogeologic Study*. This Permit Application is replaced the originally permit application (Doc ID 10887) submitted to the DWM in June 2010. Both applications are prepared and submitted by Municipal Engineering Services Co., Inc. (MESCO) in Garner, North Carolina, on behalf of Wayne County.

The Solid Waste Section has completed a review of the engineering related portions of the new Permit Application in accordance with the Solid Waste Management Rule (Rule), 15A NCAC 13B .1600 et seq. Based on the review, the Solid Waste Section has the following comments on the new submittal, and your responses to the comments will expedite the review of the Permit Application. The Solid Waste Section Hydrogeologist will review the *Design Hydrogeologic Study* (Doc 10382) and may request any additional information related to water quality monitoring and hydro-geology in a separate letter upon completion of his or her review.

General

Please use the correct name of the agency – the Division of Waste Management throughout the Permit Application, not Division of Solid Waste or Department. Please conduct a global search throughout this Permit Application and make necessary corrections.

Section 1.0 – Facility Plan

1. (Section 1.2 Landfill Capacity) This Section describes that the Wayne County MSWLF has a total capacity of 7,585,258 cubic yards (cy), consisting of the current in-place waste volume of 1,539,258 cy (Phases 1 & 2) and the remaining available airspace of 6,045,498 cy (remaining Phases 2 and future Phase 3 through Phase 10). The proposed total capacity is

not consistent with the original approved capacity of 5,004,195 cy as described in the Section 1.1.1 of the Permit Application and the existing Permit Condition No. 3 (Part 1, Attachment 2) of Permit to Construct – Phase 2 issued on February 3, 2004. If County plans:

- i. To adopt the originally approved landfill capacity of 5,004,195 cy. County must revise the landfill capacity of each to-be-developed phase in Section 1.2 and the Facility Plan Drawings No. F6/Sheet 8 of 15 through Drawings No. F13/Sheet 15 of 15. Or
- ii. To increase the landfill total capacity from 5,004,195 cy to 7,585,258 cy which results in a permit substantial amendment in accordance with NCGS 130A-294(b1)(1) due to more than 10% quantity of solid waste to be disposed in the Wayne County MSWLF. Pursuant to Rule .1603(a)(1)(E) County must submit a Site Study and conduct a local government approval processes according to the Rules .1617 and .1618 and pay the statutorily required permit fee.

Within 30 calendar days after receiving this letter, Wayne County must inform the DWM of the final decision on the landfill total capacity. Should County fail to timely respond this comment, the Solid Waste Section will reject the Permit Application and return the application document back to Wayne County.

2. (Section 1.1.2) The existing PTO for Phase 2 allows Wayne County MSWLF to receive permitted wastes at an average disposal rate of approximately 450 tons per day based on 312 operating days per year. This approved waste disposal rate is greater than the proposed 402 tons per day as described in this Section. If County intends to maintain the disposal rate of 450 tons per day, please make clear statement in the Section 1.1.2; otherwise, the new rate of 402 tons per day will be specified in the new PTO for Phase 3.
3. (Section 1.4.2) Please address the following concerns:
 - i. The average monthly flow rate and the peak daily value, collected from layer 4 per acre for a five-year period, are inconsistent with the data show in the HELP Model in Section 2.2.3. Please clarify.
 - ii. The values of average head and maximum head on layer 5 per acre for a five-year period are inconsistent with the data show in the HELP Model in Section 2.2.3. Please clarify.
 - iii. The layer 4 is a drainage layer, not the HDPE liner. Please correct this typo.

Section 2.0 – Engineering Plan

4. (Section 2.1.3) Please address the following concerns:
 - i. The minimum vertical separation distances (between subgrade and seasonal high groundwater; between subgrade and long term seasonal high) described in the subsection are different from the data presented in Table 5 of the *Design Hydrogeologic Study* and Drawing No. E13/Sheet 15 of 17. Please clarify.
 - ii. According to the conclusions in Section 2.2.8, the estimated total settlement under the projected waste loads is 18 inches, not 7 inches as described in the Section 2.1.3. Please correct this typo.
 - iii. Around the sump area on the eastside of the Phase 3, the vertical separation distance is approximately 3.5 feet to four feet between subgrade and seasonal high groundwater as

- shown at the cross-section at Station 2+00 on Drawing No. E13/Sheet 15 of 17. This designed landfill subgrade does not meet the requirement stated in Rule .1624(b)(4).
- iv. Has the settlement of the soil strata underneath the landfill, resulting from the wastes loading been considered in the design of landfill base subgrade? When the data in Table 5 of the *Design Hydrogeologic Study* subtracts the estimate settlement of 18 inches, the designed subgrade of the landfill cell around borings P3-3 and P3-13 are less than the minimum four (4) feet separation requirement.

To respond the Comment Nos. 4.iii & 4.iv, County must re-examine the designed landfill cell to ensure that the designed final subgrades of landfill cell meets the requirement stated in Rule .1624(b)(4). Should the landfill base subgrade elevations are changed, County must revise the related information in the Permit Application, such as the total landfill capacity for each to-be-developed phase, tables, figures in the Facility, Engineering, and Operations Plans.

5. (Section 2.2.4 - Initial Calculation on Page 137) The irrelevant information to the Wayne County MSWLF is described in this section, such as the leachate lagoon capacity, calculated amount of leachate from Phase 3 operation by HELP Model, actual leachate generation in the last five years, and the treatment plant receiving leachate generated from the landfill. Please provide the correct facility-specific information.
6. (Section 2.2.8) According to the Figure 2 and the "Project Information" Section, the landfill final grade elevation of 280-ft amsl is inconsistent with that (330-ft amsl) on Facility Plan Drawing No. F12/Sheet 14 of 15. Please address the following concerns resulting from the above-mentioned discrepancy:
 - i. The report based on the information as illustrated on Figure 2 and concluded that "the applied load is approximately 8,185 psf, resulting in estimated settlement on the order of 18 inches." Since the settlement of the soil strata underneath the landfill is one of the crucial factors to determine if the final design landfill subgrade meets the vertical separation requirement stated in Rule .1624(b)(4), settlement analysis for the landfill must consider the loading generated from all phases construction and operation according to the Facility Plans. It is evident that approximately 50-feet of addition waste loading has not been considered in the settlement analysis; therefore, please re-run the analysis according to the landfill final grade elevations (Please also consult the responses to the Comment No. 1 for the information).
 - ii. Please use the estimated settlement amount (from the above-mentioned comment) to (a) design the final grade elevations of the Phase 3 landfill cells (refer to Comment No. 4. Iv.) and (b) to evaluate if the settlement of the foundation soil (both total settlement and differential settlement) will cause or contribute to the failure of the geosynthetic liners or leachate collection systems.
 - iii. Provide the assumptions, references, and calculation processes pertain to the settlement analyses (both total settlement and differential settlement) and the evaluation report stated in the Comment No. 6.ii.
7. (Engineering Plan Figures) Please address the following concerns:

- i. (Drawing No. E2/Sheet 4 of 17) The references of details of silt fence and inlet/outlet protections to Sheet 6 of 17 is incorrect. The correct reference is Sheet 7 of 17. Please correct the typo on the drawing.
- ii. (Drawing No. E6/Sheet 8 of 17 through Drawing No. E8/Sheet 10 of 17 and E13/ Sheet 15 of 17) The designed final grade lines for each layer may be subjected to changes in accordance the responses to the Comment Nos. 1, 4.iv, & 6.i.
- iii. (Drawing No. E14/Sheet 16 of 17) Please provide the typical details of “Typical Pressure Pipe Trench” (force-main lines) and “Leachate System Cleanout” to the drawing.
- iv. (Drawing No. E15/Sheet 17 of 17) The reference of details of permanent anchor trench and cohesive clay liner to Sheet 10 of 15 is incorrect. The correct one is Sheet 16 of 17. Please correct the typo on the drawing.
- v. The size of the reducer, connecting riser and header leachate pipes, is incorrectly specified as 12” X 8” on Drawing No. E9/Sheet 11 of 17; the correct size shall be 24” X 8” as specified on Drawing No. E15/Sheet 17 of 17. Please make necessary correction.

Section 4.0 Construction Quality Assurance (CQA) Plan

8. Since the “project Engineer” is not defined in the Section 4.1, please conduct a global search throughout the Section 4.0 to ensure the name of “Project Engineer” is replacing by “**Engineer,**” “Project Superintendent” is replacing by “**Flexible Membrane Liner Superintendent,**” and “CQA Inspector” is replacing by **Construction Observer.**”
9. (Section 4.1) This CQA Plan shall be prepared for constructing all landfill components described in the Permit Application including final cover systems; therefore, please revise the Contractor’s responsibility by adding “**construction of final cover system and gas venting system**” in the third sentence of the fifth paragraph of this Section.
10. (Sections 4.2.2) Please address the following concerns:
 - i. In the Paragraph (i), what provisions are there to repair the holes after the survey stakes are pulled out of the soil surfaces? Please clarify.
 - ii. In the Paragraph (l), please add” and mixed in the field using either a plug mill or a soil stabilizer.” to the end of the second sentence.
 - iii. In the Paragraphs (h) & (n), should the area requires to be reworked or replaced also be retested? Please clarify.
11. (Section 4.2.3) According to Sections 2.2.6 and 2.2.8 of the Engineering Plan, the interface friction angles between geosynthetic material and earthen material are summarized below:

Material Interface	Interface Angle (degree)	Note
<i>Landfill Base (on a 3 to 1 slope)</i>		
Compacted Clay Liner(CCL) / GCL	25	p. 147
GCL/FML (60-mil HDPE)	21	pp.187 & 196
FML(60-mil HDPE)/Geocomposite Drainage Layer	26	pp.190 &195
Geocomposite Drainage Layer/Protective Soil Layer	26	p. 148

Therefore, please revise the minimum criteria of the interface friction angles listed in Table 1 of Subsection 2.4 (on page 245) accordingly.

12. (Section 4.2.3, Subsection 3.5, on page 249) Please address the following concerns for construction and backfilling of the permanent anchor trenches:
 - i. Specify the earthen material (type & maximum grain size, etc.) and the minimum compaction effort (determined by ASTM D698) for the compacted backfill in the anchor trenches, which is consistent with the compaction effort noted in the “Permanent Anchor Trench Detail” on Drawing No. E14/Sheet 16 of 17.
 - ii. Specify field QC testing methods and frequencies (1 test per xx linear feet) on the compacted backfill in the anchor trenches

13. (Section 4.2.4) Please address the following concerns:
 - i. The first sentence (on page 251) of the last paragraph proposes the 60-mil HDPE liner will be placed in direct contact with moist cohesive soil liner. What about the condition of the alternate liners (18-in-thick CCL and GCL)? Please clarify.
 - ii. Please add the QA/QC testing requirements (testing method, frequency, and minimum passing criteria [26 degree]) of the interface angles between FML (60-mil textured HDPE) and Geocomposite Drainage Layer.

14. (Section 4.2.5) Please address the following concerns:
 - i. (Paragraph (c) – Destructive Testing, on page 259) Please add the specification of “the tensiometer that has a constant separation rate of 2.0 inch per minute for peel and shear” to this subparagraph (2) Procedure for Destructive Testing.
 - ii. (Paragraph (d) – Quality Assurance Laboratory Testing, on page 260) The repair procedure must address the repair procedures pertaining to the FML underlain by the alternate liner # 2 (CCL and GCL) conditions. Please clarify

15. (Section 4.2.6) Please add the QA/QC testing requirements (testing method, frequency, and minimum passing criteria [26 degree]) of the interface angles between Geocomposite Drainage Layer and 3-ft-thick protective soil cover.

16. (Section 4.2.7) Please provide the QA/QC testing methods and frequency on the stone surround perforated collection piping to ensure that the stone column has a minimum hydraulic conductivity of 0.1 cm/sec or 0.04 inch/sec consistent with LCRs design in the Section 2.2.4 (on page 139) of the Engineering Plan.

17. (Section 4.2.10, on Page 269) Please address the following concerns:
 - i. In the Paragraph (i), what provisions are there to repair the holes after the survey stakes are pulled out of the soil surfaces? Please clarify.
 - ii. In the Paragraph (m) please add “such as tire ruts” to the end of the last sentence in consistent with the Section 4.2.2 (m).
 - iii. In the Paragraphs (h) & (n), should the area requires to be reworked or replaced also be retested? Please clarify.

18. (Section 4.2.11) Please address the following concerns:

- i. (Paragraph 1 (c) – Verification, on page 272) The CQA testing properties and frequencies shall be consistent with Section 4.2.4. Therefore, add the following paragraph to the Section 4.2.11.(1) Paragraph (c):
The Engineer will remove a sample from 1 out of 4 rolls delivered to the site and have a third party lab test for thickness, density, carbon black content & dispersion, and all tensile properties. The lab will have been accredited by the Geosynthetic Accreditation Institute (GAI).
- ii. (Paragraph 2 (c) – Method of Deployment, subparagraph (c), on page 272) Specify deployment and installation of the FML panels follow the manufacturer’s recommendations and sound and accepted engineering practices.
- iii. (Paragraph 5 (b) - Sample Procedures, on page 274) Add the specification of “the tensiometer that has a constant separation rate of 2.0 inch per minute for peel and shear” to the first step.

19. (Section 4.2.11) With respect to the testing of interface friction angles between the components consisting of the final cover system, the technical specification must be prepared and describe: testing methods and frequencies, and the minimum interface friction angles between:

- i. The 24-inch-thick Protective Soil Cover and the 250-mil-double-bounded drainage composite.
- ii. The 250-mil-double-bounded drainage composite and the 40-mil LLDPE.
- iii. The 40-mil LLDPE and the 18-inch-thick compacted clay liner

The specified minimum interface friction angles must be equal to or exceeding those designed values concluded from the Section 2.2.9 in the Engineering Plan.

Section 5.0 – Operations Plan

20. Please address the following concerns and make necessary corrections:

- i. The reference for the Explosive Gas Control Plan is incorrect in the ninth paragraph (Section 5.1 on page 289). The Explosive Gas Control Plan is located in Section 5.4 – Appendix II.
- ii. Since the Section 5.3 -Appendix I describes the Waste Screening and Inspection Plan, the reference of the Appendix I analyte for groundwater and surface water sampling in Section 5.3 (the fifth paragraph, Section 5.1 on page 290) of the Operations Plan is incorrect. Please provide the correct reference.
- iii. Please delete “Section 5.4-Appendix II” from the subparagraph b of the Part 2 (Cover Material Requirements) of Section 5.2, which is not relevant to the cover material requirements.
- iv. The reference for the Explosive Gas Control Plan is incorrect in the subparagraph b of the Part 4 (Explosive Gas Control) of Section 5.2. The Explosive Gas Control Plan is located in Section 5.4 – Appendix II.
- v. According to the Engineering Plan in the Permit Application, the leachate generated from the County’s MSWLF is treated in the City of Goldsboro wastewater treatment plant.

Kinston wastewater treatment plant stated in the subparagraph d of the Part 12 (Leachate Management Plan) of Section 5.2 is likely a typo.

21. There is a discrepancy of the required schedule for restoring the vegetative ground cover and control erosion between Section 5.1 (2nd paragraph on Page 290) and Section 5.2 (the subparagraph b of the Part 7 – Erosion and Sedimentation Control Requirements on Page 294). Please clarify.
22. The landfill gas collection and control system (LFGCCs) and landfill gas to energy project (LFGTE) are installed and operating at the Wayne County MSWLF. Please address the following concerns:
 - i. Provide the as-built drawings to show the layout of the existing gas extraction locations, identifications and survey coordinates of extraction wells and control valves, the header line runs and sizes, the locations of condensate/leachate lockouts or sumps, and the location of flare station.
 - ii. Please describe the condensate/leachate handling and management plan.
 - iii. Because the LFGCCs and LFGTE are regulated by air quality permits issued by the NC Division of Air Quality, please briefly describe the permit type and submit a copy of the valid permit appended to the Operations Plan.
 - iv. Because the LFGCCs and LFGTE are operated during the active-life span of the MSWLF, the Operations Plan needs to describe the routine inspection, repair, and maintenance requirements for the system, the system operator qualification and training (such as SWANA's "Landfill Gas System Operation and Maintenance" training courses), and fire prevention.
 - v. Please describe how the operation of LFGCCs is coordinated with daily operations of the MSWLF.

Section 6.0 – Closure Plan

23. In Section 6.1, the estimate of the maximum inventory of waste ever on-site over the active life to date of the landfill facility is 1,626,907 cubic yards; however, this volume is in consistent with the one described in Section 1.2 of the Facility Plan. Please clarify.
24. (Section 6.3) In the Paragraphs (h) & (n), should the area requires to be reworked or replaced also be retested? Please clarify.
25. (Section 6.6) The material specification of the drainage composite stated in Section 6.6 (Geonet thickness of 220 mils) is inconsistent with that (Geonet thickness of 250 mils) stated in Section 4.2.13 and drawings. Additionally, please specify the weight of geotextile (6, 8 or 10 oz/yd²) of the selected geocomposite. Please clarify.
26. (Section 6.8) please address the following concerns:
 - i. The Labor Costs (Cost Item No. 7) of \$200,000 dollars are the same amounts for closing a 20-acre site in a nearby county. Since the Wayne County MSWLF, encompassing the 65 acres is subjected to closure; the labor costs for the planned closure activities are

- likely be higher than those for closing a 20-acre site. Please revise the labor costs and final total costs.
- ii. According to Engineering Plan Drawing No. E11/Sheet 13 of 17, County has and will install a total of approximately 62 gas extraction wells. The wells in the end their service will be converted to gas vents as shown on Drawing No. E12/Sheet 14 of 17. Therefore, for the Cost Item No. 10, the number of wells shall be 62, not 10. Please revise the cost accordingly.
 - iii. The costs for Engineering and QA/QC of the liners and Certification Report of \$200,000 dollars are the same amounts for closing a 20-acre site in a nearby county. Since the Wayne County MSWLF, encompassing the 65 acres is subjected to closure; the Cost Item No. 11 for the QA/QC test shall be higher than those for closing a 20-acre site. Please revise the costs accordingly.

Section 7.0 – Post-Closure Plan

27. (Section 7.2) Please address the following concerns on the cost estimates

- i. Please add costs for inspection and maintenance of the security fence, signs, access roads, and vegetation (including mowing) and costs for engineering & certification report.
- ii. There are 16 groundwater monitoring wells, not 12 wells subject to semi-annually sampling requirements according to the Ground and Surface Water sampling and analysis Plan in Appendix E of the *Design Hydrogeologic Study*. Please revise the costs associated with water quality monitoring in the post-closure period.

Within 30 calendar days after receiving this letter, Wayne County must submit DWM the completed written responses and the hard copy of the portions of the Permit Application which are subjected to change and one completed electronic copy of the submittal (the responses letter and the completed new permit application). The Solid Waste Section appreciates your efforts and cooperation in this matter. If you have any permitting questions, please contact me at (919) 508- 8507.

Sincerely,



Ming-Tai Chao, P.E.
Environmental Engineer II
Permitting Branch, Solid Waste Section

cc:

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