| Permit No. | Date | Document ID No. |
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| **54-09** | **September 09, 2010** | **11554** |

**From:** Chao, Ming-tai
**Sent:** Thursday, September 09, 2010 4:34 PM
**To:** 'Wayne Sullivan'
**Cc:** 'tmiller@co.lenoir.nc.us'; Mussler, Ed
**Subject:** comments on revised Facility Plan and Engineering Plan, Lenoir County, Permit 54-09
**Attachments:** 9570.pdf

RECEIVED
**September 09, 2010 via an e-mail**
Solid Waste Section
Raleigh Central Office

Wayne: I have completed a review of the above-referenced submittal - revised Facility Plan and Engineering Plan which are received by the Solid Waste Section on August 23, 2010. The comments on the document are stated below:

1. (Section 1.4, Facility Plan revised 8/19/10) Please address the following concerns:
   i. (Section 1.4.1) Please provide the pretreatment permit & approval document from the City of Kinston which must be appended to the permit application.
   ii. (Section 1.4.2) Layer 4 is the drainage net, not HDPE Liner. Please correct this typographic error.
   iii. (Section 1.4.3) The capacity of lagoon is calculated and placed in Section 2.2.4, not in Section 2.1.7. Please correct the typo.

2. (Drawings) Please provide responses to DWM July 21 2010 comment Nos. 101- i, 102, 103-i, & 105.

3. Please provide responses to DWM July 21 2010 comment Nos. 10, 12, & 13 in the revised Engineering Plan. The DWM July 21 2010 comments are attached to this e-mail message.

4. This Engineer Plan has not been signed, dated, and sealed by a professional engineer registered in the State of North Carolina in compliance with Rule .1620(b). Please comply with Rule requirement when the final permit application is submitted.

5. (Sections 2.1.3 & 2.2.8) Please address the following concerns:
   i. Please provide responses to DWM July 21 2010 comment Nos. 25, 26, & 27.
   ii. The assumed maximum waste height of 115 feet is used in the Slope Stability Analysis and Foundation and Settlement calculations. However, the measured maximum waste height is 131 feet based on the final grade of 226 feet and the base grade of 95 feet as shown on Facility Plan Drawing No. CS1/Sheet 10. Please revise the calculations based on the updated data. Your e-mail dated August 20 2010 concluded that Section 2.2.8 has taken into consideration all of the fill and waste when the settlement calculations has been done. I can't agree with your conclusion.
   iii. Section 2.1.3 concludes that the total settlement of the subgrade under the total waste loads is 0.58 feet (or 7 inches). However, Section 2.2.8 does not include any total settlement calculation processes and assumptions. Please provide settlement analysis and calculation.
   iv. Please also provide the differential settlement calculation processes under the estimated maximum waste loads to demonstrate that (a) the designed minimum post-settlement slope of the landfill bottom subgrade is more than or equal to two percent (%) [Rule .1624(b)(7)]is the post-settlement values and that (b) the piping slopes ranging from 0.89% to 4.6 % in the proposed LCRs, as shown on the Engineering Plan Drawing No. E7/Sheet 9 of 15 are the post-settlement values.
   v. The side slope on the south-east side of the final grade for Phase 2 as shown on Drawing E11/Sheet 13 of 15 is approximately 2 (H) to 1(V). Please run slope stability analysis on this interim slope to ensure the side slope can safely stand prior to waste filling into Phase 3 cell.

6. (Section 2.1.6) Please use the correct name of the Division of Waste Management (DWM), not the Division of Solid Waste throughout this Section.

7. (Section 2.1.7) Please change "Department" to the Division of Waste Management.

8. (Section 2.2, on Page 17) This Section concludes that SDR 17 HDPE pipe can handle the loads created by at least 250-ft of waste. However, in Section 2.2.5, the waste height is 200 feet. Please clarify.

9. (Section 2.2.3) I have doubts if the leachate head on the composite liners is less than one foot for proposed LCRs (3-ft native soil protective layer overlying the 250-mil geocomposite) and intends not to make further comments at this time because the County has exhausted the landfill space and paid high costs in operating transfer station to dispose of MSW. But for the record, I reserve my right to challenge the proposed LCRs in the future phase development, if County intends to use the native soil as the protective cover rather than more pervious material overlying the drainage composite.

10. (Section 2.2.4, on Pages 125 & 126) Please verify and confirm the total length of leachate trench/piping length, 4146 feet or 4156 feet? And recheck the final results, which may not be correct due to the incorrect input data.

11. (Section 2.2.4, on Page 125) Should the porosity of the rock/stone pack be considered in the calculation of "horizontal flow in rock? Please clarify.

12. (Section 2.2.4, on Pages 127-128 & Section 2.2.9, on Page 139) Please address the following concerns of drainage net and geotextile:
    i. Pursuant to Rule .1624(b)(13)(A0(ii), please conduct the filter design for the drainage layer in both bottom cell and final cover to ensure the selected geocomposite (final cover component) and geotextile (bottom cell) material meet the permeability criteria, retention criteria, and long-term service criteria (mitigation of clogging).
    ii. For item i, the filter design to select the proper geotextile that wraps the leachate piping enveloped by granular material inside the drainage trenches shall be done to ensure that the LCRs will not be silted up when the cell is inactive [an approach required for the stormwater & leachate controls for inactive cell (Rule .1625(b)(1)(D))]. I will not request the filter design if County will use geosynthetic material to cover the entire inactive cell (including side slopes) and pump out the collect rainwater on top of the cover to the stormwater conveyance structures/measures. But the approaches to implement this stormwater separation must be address in detail in the Operations Plan and drawings.
    iii. Please provide references and/or research literatures to support the statement made in the "Drainage Net and Geotextile" that leachate that would flow thru the protective cover will not be carrying sediments because it will not have the scouring velocity to do so.
    iv. Please provide detail calculation processes to show how the values of "Peak daily flow from HELP Model" - 97,749 gallons (on page 128) and 2498 ft3/acre (on page 139) are generated.
    v. The concerns of calculating transmissivity of the geocomposite material (on pages 128 and 139): must address (a) flow condition thru the geocomposite material on side slopes – 3 (H) to 1(V) in the bottom cell and 4 (H) to 1 (V) on the final cover in addition to those at the cell bottom and top deck (b) the safety factors recommended by GRI – GC8, "Standard Guide for Determination of Allowable Flow Rate of a Drainage Geocomposite."

13. (Section 2.2.5) The assumed density of waste material in the Section 2.2.8 (70 pcf) is inconsistent with that in Section 2.2.5 (60 pcf). Please clarify.

14. (Section 2.2.6, on Page 135) The calculated result is incorrect. According to the calculation process that T= 137.70 * [(30.63) * (-0.03) - 0.52]; then T = 137.70 *[-0.92 - 0.52] by simplification of the calculation; then T = - 198.14 #/in. Please recheck the calculation processes.

15. (Section 2.2.6, on Page 136) The Section assumes that the smooth 60-mil HDPE liner is used for one of the components of the base liner system. But the specifications and engineering plan drawings indicate the "**double textured**" 60-mil HDPE is selected for this project. Please correct the typo. If the engineering parameters present in Section 2.2.6 are of the smooth 60-mil HDPE liner, please revise the data and re-calculate the self-weight stress of the **double textured** 60-mil HDPE liner during construction.

16. Veneer slope stability calculations.
    i. Please provide a copy of the CETCO Design Manual –Technical Notes 5 & 6 for reference (I have not received the document that you promised in the e-mail dated 8/30/2010).
    ii. Please provide veneer slope stability calculations for the final cover system. I would like to recommend the methods developed by Dr. Koerner R.M. and Soong, T.Y. (1996 & 1997).
    iii. For the designing of the base liner and the final cover system, the interface friction angles (geosynthetic material/soil and geosynthetic material/ geosynthetic material) must be consistent throughout the entire calculations. The inconsistent values are used throughout the Section 2.2.6.

For example – inconsistent critical interface angle of liner system:

| Location | Internal friction angles (degree) | Material |
|---|---|---|
| Page 135 | 26 | The critical mobilize interface angle of liner |
| Page 136 | 17 | critical interface angle of liner system |

    iv. The minimum or critical <u>internal</u> friction angles must be determined for both the base liner system and final cover system which will be tested according to ASTM methods and specified in the CQA plan.

17. The comments on LCRs. The leachate lines layout must provide easy egress / ingress for the periodical cleanup of LCRs piping and operating the video camera for final inspection and verification.
    i. Increasing the lateral piping size to 8-inches, rather than 6-inches. Several landfill facilities in the State of North Carolina have experienced problems for tools or equipment in and out of the piping size of 6-inches in diameter due to very limited room for operating and maneuvering the tools or equipment. The diameter of piping and fitting at the welded joint areas has been reduced due to the improper welding processes, which result in the piping inaccessible for the cleanup tools.
    ii. Adding cleanout at each end of the leachate piping (both trunk and lateral pipes) adjacent to the haul road. Add cleanout at one end or both ends of the trunk lines toward the sumps is not enough because the lateral pipes are not accessible without their owned cleanouts. Please add cleanouts to all piping which can be accessed at haul road on Engineering Plan Drawing E7/Sheet 9 of 15 and Facility Plan Drawing F3/ Sheet 5 of 10.

Please contact me if you have any questions on the comments.

Best regards,

Ming-Tai Chao, P.E.
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## Chao, Ming-tai

**From:** Chao, Ming-tai
**Sent:** Monday, August 30, 2010 10:42 AM
**To:** 'Wayne Sullivan'
**Cc:** Mussler, Ed; 'tmiller@co.lenoir.nc.us'
**Subject:** RE: Revisions to the Lenoir PTC

Wayne: I am half-way completing a review of the new submittal. I got two small projects need my commitments last week and will try to complete the review ASAP.

Regarding the veneer slopes, the ones in the landfill cells are not my major concern because they will be filled by wastes in a relatively short duration, and buttressing will provide some resistance in the toe area. The major concerns are the final cover system which will be last for at least 30-years and significantly influenced by the uncontrollable weather patterns and other factors. I understood the situations that you are facing (Geosynthetic material manufactories love to sell you their products but may not help you to touch the hot button – slope and unstable soil conditions. Been there and got burnt before) but please check around some other methods for the purpose of comparison; after all, slope stability analysis 101 is the fraction angle shall not less than the slope angle (angle of repose). I believe the method developed by Dr. Koerner and his Ph.D. student T.Y. Soong in 2003 and published in *Geosynthetics International* dated 12/2005 is more popular one and adopted by the waste industries and consulting professionals recently. Of course this is my personal suggestion, you and your Designing Engineers (P.E.s) are the persons have the absolute right and responsibility to use/defend the method(s) to your projects.

If you can please send me a copy of the CETCO manual that is used for this project.

By the way, MESCO has not responded the comments for the following facilities:

Green County C&DLF; Permit # 40-02, last comment issued 07/01/2010

Lenoir County C&DLF; Permit # 54-03, last comment issued **10/30/2009**

Wayne County C&DLF; Permit # 96-01, last comment issued 07/19/2010

If my memory serves me right, I recalls the total gross capacity issue has been resolved in the meetings while we met in the landfills last month.

Please let me know the status of the C&D on top of the MSWLF. If you need my assistance please feel free to contact me.

Best regards,

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**From: Wayne Sullivan [mailto:wsullivan@mesco.com]**
**Sent: Friday, August 20, 2010 10:31 AM**
**To: Chao, Ming-tai**
**Cc: Tom Miller; thollowe@co.lenoir.nc.us**
**Subject: Revisions to the Lenoir PTC**

**Ming,**

**We have sent to you the revisions to the facility plan that you requested and revisions to the Engineering Plan. You should receive the revisions today. We did not included the pre-treatment agreement** with Kinston but can email it to you. Also, we still have to get final erosion control permit.

We did not revise two sections and they are section 2.2.7 because we used the CETCO manual and it does take in consideration of buttressing. The formulas and data used are from the manual. We have contacted CETCO concerning the manual and they have not been able to reproduce it. Regardless, we have used this material on 3:1 slopes for several years and it has never slid down a slope during construction. As a matter of fact, it is very hard to move on a slope if it is not position properly from up slope. I can also send you the CETCO manual we used.

Also, We did not have the settlement and slope calculations, Section 2.2.8 redone because they do take into consideration all of the fill and waste when the settlement calculations is being done.

We have changed the leachate collection system as we have discussed.

Thanks,

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