

September 22, 2009

Mr. Ming-Tai Chao, P.E.
Environmental Engineer II
NC DENR - Division of Waste Management
401 Oberlin Road, Suite 150
Raleigh, NC 27605

Fac/Permit/Doc ID#	Date	Doc ID#
<i>J. Chao</i>	9/13/09	DIN 8696



Re: **Halifax County C&D Landfill (Permit No. 42-04)**
Permit Application for Area 1 Continued Operations
Response to Comments

Dear Mr. Chao:

On behalf of Halifax County, Richardson Smith Gardner & Associates, Inc. (RSG) would like to the comments in your letter dated December 22, 2009 (see **attached**), as follows. The comments stated in your letter are repeated below in *italics* and our response follows in **bold**.

Attachment A - Facility and Engineering Plan

1. *(Section 2.3) The Permit application proposes that the maximum annual disposal rate of C&D wastes is 20,000 tons, but the "Notes" in Table 1 states otherwise. Additionally, is there any correlation between the proposed annual disposal rate and the county population growth rate? Please clarify.*

The 20,000 tons per year was simply chosen as a tonnage that would not be exceeded. The facility has exceeded no more than 6,957 tons in one year (FY 2005-06) since C&D operations began in 1998. Setting the maximum tonnage at this level allows for potential fluctuations that may result due to the demolition of a large structure in the County in any one year. The tonnages assumed to estimate the life of each disposal unit are representative of actual tonnages.

2. *(Section 2.6 Equipment Requirements) Please describe the on-site machinery and equipment used for a normal C&DLF operation in a daily basis.*

Section 2.6 has been revised to note that the County currently uses a Terex 370 compactor in their daily operation of the C&D landfill unit. Please find attached a revised version of the Facility and Engineering Plan.

3. *(Section 3.0 Landfill Capacity) The final grade line for the Area 1 C&DLF unit is 362 feet as shown on Drawings S3, S4 & X1; but this section describes the top elevation of the cap is 364 feet. Please clarify.*

Allowing for slope the peak elevation for the landfill will be slightly above elevation 362. Thus, Section 3.0 lists the maximum elevation as "approximately" 364.

4. *(Section 5.1 Final Cover System) The Rule .01627(c)(1) requires the cap has " a permeability less than or equal to the permeability of any base liner system or the in-situ subsoil underlying*

the landfill, or the permeability specified for the final cover in the effective permit, or a permeability no greater than 1.0×10^{-5} cm/sec, whichever is less." What is the permeability of the C&DLF foundation soil – the cap of the closed MSWLF underneath the C&DLF? Please provide the permeability testing results and sample locations relative to the landfill footprint. Additionally, the capping is considered as one of the pivotal components of the proposed corrective action plan to ensure the success of contaminant source control, the alternative soil cap system for the C&DLF consisting geosynthetic material and earthen material may be warranted and proposed in the Closure Plan.

Based on the test results from the MSW landfill closure¹ the average hydraulic conductivity (permeability) of the soil cover under the C&D landfill area is 2.8×10^{-7} cm/sec (results of 15P, 41P, 45P, and 49P). However, due to the expected settlement of the soil cover from the overlying waste placement, it is believed that this layer would currently have a much higher hydraulic conductivity. Based on testing for the future Area 2 C&D landfill unit, undisturbed hydraulic conductivity values of subgrade soils were found to be in the range of 1.6×10^{-5} cm/sec to 2.7×10^{-6} cm/sec. Thus, a hydraulic conductivity of 1×10^{-6} cm/sec for the compacted soil barrier component of the final cover is both reasonably achievable and less than in-situ values of subgrade soils. Specification Section 02250 as well as Section 5.1 of the Facility and Engineering Plan and Section 1.3 of the Closure and Post-Closure Plan have been revised to reflect a minimum hydraulic conductivity value of 1×10^{-6} cm/sec for the compacted soil barrier. Please find attached a revised version of the technical specifications.

5. *(Section 5.1 Final Cover System) What is the proposed final slope at the top of the final cap? Please clarify.*

The slope at the very top of the expansion is designed as 8%. At a minimum, as-built slopes will be 5%. Section 5.1 has been revised to reflect this.

6. *(Section 5.2 & Attachment F) Has the Erosion and Sediment Control Plan been granted an approval from the Division of Land Resources, Section of Land Quality? Please provide the approval letter as a portion of the permit application document. Additionally, the Erosion and Sediment Control Plan is placed in Attachment "F," not Attachment "E". Please correct this typo.*

Now that comments have been received by the Solid Waste Section, the erosion and sediment control plan can be submitted to Land Quality for approval. The typo noted has been corrected.

7. *Please describe leachate management procedures in the event that leachate seeps out of the closed unlined MSWLF overlain by the C&DLF unit –Area 1.*

Section 3.8 has been added to the Operations Manual to describe the procedure for dealing with any leachate seeps.

¹ G.N. Richardson & Associates, Inc. (1998), "Construction Quality Assurance Report, Halifax County Landfill Closure, Halifax County, North Carolina", September 1998.

8. *Please add all applicable physical features including the limits of stream buffer, floodplains, wetlands, cultural resources, etc. to Figure S-1.*

Drawing S1 has been revised to add a 50-foot riparian buffer for streams and surface water features, which is applicable to the site.

Based on recent floodplain mapping, no floodplains exist on the site (reference Note 4 added to Drawing S1). Additionally, there are no mapped wetlands on-site. However, wetlands are expected along/near existing streams.

9. *(Appendix A – Landfill Volume Study; Sheet 4 of 9) Is there any reason why the wastes density changes from 1000 pcy (See Section 3.2) to 1100 pcy? Please clarify.*

The capacity and life calculations have been revised to reflect the evaluation of a survey performed in May 2008, the results of which were not available previously. Based on the recent use of a larger compactor the County is achieving improved density values and, thus, expects Area 1 to last longer than previously projected. Note that, as a result of the survey, the gross volume for Area 1 has been reduced from that previously reported. Applicable tables have been revised accordingly.

10. *(Appendix A – Slope Stability Evaluation) Please also provide the veneer slope stability analysis data to support the final cap design. The soil engineering properties including shear strength, density, internal friction angle used for designing the final soil cover system must be considered as the minimum criteria to select the earthen or synthetic material and be field tested in according to the requirements specified in the Construction Quality Control and Quality Assurance (CQA) Manual and Technical Specifications.*

A veneer stability analysis is not appropriate for the soil cover proposed as the main mode of failure would be erosion - not sliding. Thus, there is no need to specify shear strength parameters for soil layers.

Attachment B – Technical Specifications

11. *Please add the specifications of the components of proposed final cap system including the intermediate cover (the subgrade of soil liner) and landfill gas vent.*

Intermediate cover is placed as part of landfill operations and is, thus, not specified. The Soil Liner specification (Section 02250) requires inspection and proofrolling prior to placement of the Compacted Soil Barrier portion of the final cover. The components of the proposed landfill gas wells are adequately called out on Detail 2/D1.

12. *(Section 02250) Item C.2. describes the specifications for the off-site borrow sources only; what about the on-site borrow sources? The Division believes the proposed soil liner specification needs to be applicable to both on-site and off-site borrow sources. Please clarify.*

Paragraph C.2 of Section 02250 addresses the case where a contractor must demonstrate suitability of an off-site borrow area. For this project, off-site borrow is not likely to be required. The CQA Manual includes conformance testing for all borrow sources.

13. *(Section 02250, Table 2) Based on the data collected from waste industry, the maximum lift thickness in a loose condition is 9 inches, and the maximum lift thickness in final compacted condition is 6-inches. The proposed maximum lift thickness (compacted) is not acceptable. Please revise the criterion accordingly.*

A 6-inch compacted lift is very difficult to achieve when placing a final cover system over waste. In RSG's experience it is appropriate to allow a 9 inch compacted lift in these applications. Note that a thicker lift does not preclude the contractor from achieving compaction criteria throughout the compacted layer.

14. *(Section 02250, Table 2) Please add the minimum values of soil density and friction angle and shear strength of soil liner to the specification in accordance to the results of slope stability analysis in Appendix A of Attachment A. Please also add test frequency (Number of test per lift per acre) to Table 2. This comment is also applicable to the specifications for subgrade for soil liner and vegetative soil layer (Section 02258).*

Please see the response to Comment 10 above.

15. *(Section 02720) Item D.3 specifies the excavation and backfilling of pipe trench shall follow the Section 02222 – Excavation and Section 02223 – Embankment. The Section 02222 – Excavation is not provided in Attachment A. Please provide the Section 02222 – Excavation.*

Section 02222, Excavation, has been added to the specifications for clarity. There is only minimal excavation required on this project, perhaps for drainage piping. Please find attached a revised version of the technical specifications.

16. *(Section 02271) Item D.2 specifies the riprap placement will be conducted in accordance with NCDOT Section 868, Riprap. But NCDOT specification does not mention the riprap placement methods which can either dumped and placed by machine or dumped and placed by hand. The unit cost for each of the two placement methods is quite different; therefore, the riprap placement method needs to be clearly described.*

Rip rap is typically placed by machine. However, some rip rap typically requires adjustment by hand after machine placement. In any case, no real effect on project cost is expected. Thus, no change to the specification is provided.

Attachment C – Construction Quality Assurance Manual

17. *(Section 1.2.4) The resolution of discrepancies needs to be documented and reported in the CQA certification report. Please add this requirement to this section.*

Where discrepancies affect the permitted design, a design clarification and/or modification will be prepared as described in Section 2.6 of the CQA Manual.

18. *(Section 4.0) What is the basis for the CQA Engineer to verify and approve the constructed soil liner subgrade if there is no specification for the soil liner subgrade in Attachment B? Please clarify.*

Subgrade preparation for the Soil Liner is covered by Paragraph D.4 of specification Section 02250.

19. *(Section 4.5.1) Specification Items G and I are not applicable to the proposed final soil cap system. Please clarify.*

These paragraphs have been deleted. Please find attached a revised version of Section 4.0 of the CQA Manual.

20. *(Table 4.3) The proposed CQA testing frequency for hydraulic conductivity (ASTM D 5084) of soil liner is 80,000 square feet per lift. This proposed testing frequency is less than the waste industry standard of 1 test per lift per acre. Please clarify.*

Table 4.3 has been revised to require hydraulic conductivity testing every 40,000 ft² per lift. Please find attached a revised version of Section 4.0 of the CQA Manual.

Attachment D – Operations Plan

21. *(Section 1.3) Please describe the training qualification of the landfill attendant who is on duty at all times when the facility is open for public use in accordance with Rule .0542(j)(2).*

Section 1.3 of the Operations Manual has been revised to reference Section 1.9 (Personnel Requirements). Please find attached a revised version of the facility Operations Manual.

22. *What provisions are there to comply with a State Implementation Plan (SIP) and management of open burning at landfill facility according to Rule .0542(i)(1) & (2), respectively?*

Section 1.6.1 has been revised to clearly state that no open burning will be allowed.

23. *(Section 1.11) Please add that "a notation of the date and time of the cover placement must be recorded in the operating record as specified in Rule .0542(n)" to the Record Keeping Program.*

Section 1.11 has been revised in its entirety and includes this requirement.

24. *(Section 2.4) Please provide the waste screening forms in Appendices A & B.*

There was only an Appendix A (Waste Screening Form) to this document. Please see the revised Operations Manual for a copy of this appendix.

25. *(Section 2.4) What provisions are there to prevent person(s) from conducting repeat violation?*

At the discretion of the County, repeat violators may be banned from using the landfill.

26. *(Sections 2.5.1 & 3.3) The Operations Plan needs to address the maintenance of access road condition [Rule .0542(j)(3)].*

Section 2.5.1 has been revised accordingly.

27. *(Section 2.5.2) What provisions are there to confine wastes which is subject to be blown by the wind and to management the windblown solid wastes at site? [Rule .0543(g)(3)].*

Due to the nature of the waste typically disposed, windblown waste has not been a significant problem. As stated in Section 2.5.2 (third paragraph), the size of the working face is kept to a minimum to minimize the potential for windblown waste. Of course, any windblown waste is picked up as needed by County staff.

28. *(Sections 2.7 through 2.9) Please provide the information of the recycler(s), including contact info, company name, the quantity of recyclable waste removed from the landfill per month, who contracts with Halifax County to handle and manage the recyclable wastes at the C&DLF facility.*

The County currently contracts with United Salvage and Auto, Inc. of Halifax for pickup of white goods and scrap metal. Also, the County contracts with Central Carolina Tire of Cameron for pickup of used tires. Amounts of these materials varies. As the vendors may change over time, specific names of vendors/contractors have been left out of the text.

29. *Please describe leachate management procedures in the event that leachate seeps out of the closed unlined MSWLF overlain by the C&DLF unit.*

Please see the response to Comment 7.

30. *(Section 3.3) Please provide the Water Quality Monitoring Plan as a portion of the permit application document.*

The Water Quality Monitoring plan was provided as an appendix to the Corrective Action Plan. Please refer to Attachment H Appendix B.

31. *(Section 3.4) The Application proposes that methane monitoring program is not required for on-site facility structure, but the Section 3.4.3 describe the contingency plan for the structures in the event that that explosive gas levels exceed the allowable limits. If the routine monitoring is not conducted at the interior of building or structure, how do the operators or landfill employees know when the explosive gas levels exceed the allowable limits, and when the proposed contingency plan shall be implemented? Please clarify.*

Section 3.4.3 includes a generic plan for structures and could be implemented in case the County placed an enclosed structure in the vicinity of the landfill. No structures currently exist in the vicinity of the landfill.

32. *(Section 3.6) The hydrated drywall or sheetrock wastes will generate odor problem at some C&DLF according to the Division compliance/audit database. If the spent drywall or sheetrock wastes are allowed to be disposed of at the proposed C&DLF unit, the Operations Plan needs to address the measures to control odors. Please clarify.*

Odor has historically not been a problem at this landfill due to limited quantities of drywall being disposed at any one time. However, Section 3.6 has been revised to state that the County will provide additional cover over wastes, such as drywall, which appear to be

creating odor problems.

33. *(Section 3.7) Please discuss the sources of water to be used for dust control.*

Section 3.7 has been revised to state that the source of water used is from one of the site sediment basins.

Attachment D – Closure Plan

34. *(Section 1.3 on page 1.0-2, Figure D1 & Attachments A & B) The Closure Plan proposes that "the final cover system will be placed on prepared intermediate cover at a maximum slope of 4H: 1 V." Figure D1 did not show the proposed intermediate cover. The CQA Plan and Technical Specifications did not include the specification for intermediate cover. Please make necessary correction.*

Detail 1/D1 has been revised to show a 12 inch layer of intermediate cover placed on top of the waste as part of operations. Please see the attached revised Drawing D1.

35. *(Section 1.3 on page 1.0-2 & Table 3.1) The cost estimate for closure activities includes a cost of \$12,400 for "site preparation." Is this cost item related to construction of intermediate cover as the subgrade of soil clay liner? Please clarify.*

The site preparation line item is for stripping of existing vegetation and general grading of the intermediate cover prior to placement of the final cover system.

36. *(Section 1.4 and Figure S4) Please describe the number of landfill gas perimeter wells and/or passive gas vents are currently installed in the C&DLF unit and the closed MSWLF, and how many are proposed to be installed in the closed period.*

Section 1.4 has been revised accordingly. Please find attached a revised version of the Closure and Post-Closure Plan.

37. *(Section 1.4 and Table 3.1) Does the unit cost for Landfill Gas System in Table 3.1 cover expense for installing passive gas vents and gas collection system (piping, trench, flare, blower, etc.) mentioned in Section 1.4? Please clarify.*

An active collection system is not presently being considered at this site but could be a future alternate if deemed economically in the best interest of the County. The cost estimate just reflects wells which would be passively vented.

38. *(Section 1.5.2, the last sentence on Page 1.0-3) The Closure Plan proposes to use sediment removed from surface water system as daily or intermediate cover. The question is how the removed sediment can be disposed of at the closed landfill. Please clarify.*

This statement covers the case where there is an active landfill unit on-site (i.e. the Area 2 unit once Area 1 is closed). It is understood that sediment cannot be disposed of in a closed landfill.

39. *(Section 1.6) Please add the closure notification requirements in accordance with Rule .0543(c)(4) to the proposed Closure Plan.*

Section 1.6 has been revised accordingly.

40. *(Section 1.7) Please describe (i) where to record a notation on the deed and (ii) the requirement of informing the Division upon completion of placing notation on of deed of landfill facility property.*

Section 1.7 has been revised to indicate that deed notations will be recorded with the County Register of Deeds and that the DWM will be notified.

41. *(Drawing D1) The cap system shown on the detail of "Typical landfill Gas Well" is not the proposed soil cap system. Please revise the drawing accordingly.*

This detail has been revised accordingly for clarification. Please see the attached revised Drawing D1.

42. *(Table 3.1) Is there a "shrinkage factor" used to calculate the quantity of soil cap system components? What is the assumption of the soil sources - from the on-site or off-site borrow sources? Please clarify.*

The quantities shown are in-place quantities. It is expected that all soil will come from current or future borrow areas located on site.

Post-Closure Plan

43. *(Section 2.3) Please add maintenance requirements for the access road to all monitoring points. The costs for road maintenance need to include in the cost estimate Table 3.2.*

Section 2.3 has been revised accordingly. Table 3.2 has been also revised to add cost for the maintenance of access roads.

44. *(Section 2.4.2) Please describe the requirements for mowing, re-vegetation, and fertilization (See cost items in Table 3.2) to encourage the growth and establish healthy vegetation on the final cover during the post-closure period.*

Specification Section 02930 (Revegetation) covers the establishment of vegetation at the time of closure. Section 2.4.2 has been revised to reflect vegetative requirements also.

45. *Please describe the leachate management procedures in the event that leachate seeps out of the closed unlined MSWLF overlain by the C&DLF unit -Area 1 during the 30-year post-closure care period.*

Section 2.4.7 has been added to include procedures for dealing with leachate seeps.

46. *(Section 2.4.4) Please describe the maintenance requirements for the on-site sedimentation pond (Sediment Basin No.1).*

Section 2.4.4 has been revised to reflect that all basins must be cleaned out when sediment reaches design cleanout levels.

47. *(Section 2.4.6) Please provide the Water quality Monitoring Plan as a portion of the permit application document.*

Please see the response to Comment 30.

48. *(Table 3.2) Please verify the total cost for semi-annual groundwater & surface water monitoring & reporting; the dollar amount is incorrect if the quantity and unit cost are correct. Additionally, the number of wells and monitoring points need to be determined in accordance with the approved Water Quality Monitoring Plan; and there is no "assumed" number for this cost item.*

Table 3.2 has been revised to reflect the exact number of current monitoring locations and to better reflect current costs. Thus, the post-closure cost has actually been reduced.

49. *(Table 3.2) The Quantity for the cost item – Methane Monitoring & Reporting shall be two (2) if the total cost for this item is correct. Please make necessary correction.*

Table 3.2 has been revised accordingly.

Also related to the Post-Closure Plan, Sections 2.5 and 2.6 of the Closure and Post-Closure Plan have been revised. Please refer to the revised plan, which is provided as an attachment.

Attachment J - Local Government Approval Documentation

50. *Please provide the copy of return receipts which are the proof that the written notifications of the June 2, 2008 public meeting have been sent to all property owners sharing a common borders with the landfill property[Rule 0.536(c)(11)(C)].*

Attachment J has been revised to include the requested documentation. Please find attached a revised version of Attachment J.

Please contact me at your earliest convenience with any questions or comments which you may have on this submittal or any further questions or comments you may have on this application.

Mr. Ming-Tai Chao, P.E.
September 22, 2009
Page 10 of 10

Sincerely,
Richardson Smith Gardner & Associates, Inc.



Pieter K. Scheer, P.E.
Principal, Project Manager
pieter@rsgengineers.com



Attachments: NC DWM Letter - December 22, 2008
Revised Facility & Engineering Plan
Revised Technical Specifications
Revised CQA Manual - Section 4.0
Revised Operations Manual
Revised Closure and Post-Closure Plan
Revised Attachment J (Local Government Approval Documentation)
Revised Drawing S1
Revised Drawing D1

cc: Larry Garriss, Halifax County



North Carolina Department of Environment and Natural Resources

Dexter R. Matthews, Director

Division of Waste Management

Michael F. Easley, Governor
William G. Ross Jr., Secretary

SOLID WASTE SECTION

August 08, 2008

Mr. Larry Garriss, Supervisor
Solid Waste Operations & Maintenance
Halifax County C&DLF
P.O. Box 70
Halifax, North Carolina 27839

Subject: Completeness Determination for a
Construction and Demolition Landfill (C&DLF) Unit on top of closed MSWLF – Phase 1
Halifax County C&DLF
Permit No. 42-04, Halifax County, Document ID Number 5482

Dear Mr. Garriss:

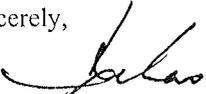
On July 1, 2008 the Division of Waste Management (Division) received your permit application for continued operation. The report is entitled:

- *Permit Application for Halifax County C&D Landfill (Permit 42-04) Area 1 Continued Operations, Halifax, North Carolina.* Prepared by Richardson Smith Gardner & Associates (RSG). Prepared for Halifax County Department of Public Utilities. Dated June 2008. Document ID Number 5072.

The Division has performed a review of your application for a determination of completeness. Your application has been determined to be complete within the context of N.C.G.S. 130A-295.8(e). A determination of completeness means that the application includes required components, but does not mean that the components provide all the information that is required for the Division to make a decision on the application.

The next step is for the Division to review the submittal for compliance with the Solid Waste Management Rules (the Rules), 15A NCAC 13B .0547(4). Under N.C.G.S. 150B-3, when an applicant makes a timely and sufficient application for insurance or renewal of a permit, the existing permit does not expire until a final decision on the application is made by the Division. Therefore, until the final decision is made, Halifax County is authorized to continue operating your C&DLF on top of a closed MSW Landfill – Phase 1 in accordance with your most recent Solid Waste Permit dated December 22, 2006, and the Rules, 15A NCAC 13B. Halifax County C&DLF must also continue the groundwater assessment and/or correction program in accordance with Rules 15A NCAC 13B .1634 - .1637. Should you have any questions regarding this matter you may contact me at (919) 508-8507.

Sincerely,


Ming-Tai Chao, P.E.
Environmental Engineer II

cc: Pieter K. Scheer, P.E., RSG
Donna Wilson, Environmental Engineer
Ed Mussler, Permitting Branch Supervisor
Zinith Barbee, Hydrogeologist
✓ Dennis Shackelford, Eastern District Supervisor
Mary Whaley, Environmental Specialist
Central Files
via e-mail