



North Carolina Department of Environment and Natural Resources

Division of Waste Management

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June 11, 2009

Jerry Blanchard
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P. O. Box 940
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Subject: Revised Corrective Action Plan
Harnett County Dunn-Erwin Landfill
Construction and Demolition Landfill Permit 43-02
Doc ID 6841

Dear Mr. Blanchard:

Mr. Mark Poindexter and I met C.T. Clayton, Sr., P.E., Inc. (CTC) on June 3 at the Solid Waste Section's central office to discuss the Corrective Action Plan for the Dunn-Erwin Landfill (CAP). CTC prepared and submitted the CAP (Doc ID 6840). Described in the CAP is Phytoremediation paired with Enhanced In-Situ Bioremediation (EB) as remedies for groundwater contamination described in the final Assessment of Corrective Measures prepared for *Harnett County Dunn-Erwin Landfill* (ACM)(Doc ID 6472), received December, 2008.

Revision of the CAP is necessary. Foremost unaddressed issues are: (1) properly characterized groundwater contamination; (2) containment of the groundwater contamination; and (3) cost of groundwater contamination remedies. Further evaluation of the proposed remedies can be made when more information about them and their performance is submitted. Specific revisions are listed below. The numbers and titles correspond to sections in the CAP

- 1.2 Either show the plume on the referenced drawing or delete reference to the plume. Contrary to what is stated, "extent of the contamination plume" is not shown.
- 1.2 Correct the section number to "1.3" and describe the site hydrogeology. This information is reportedly in a document entitled, "Assessment of Groundwater Contamination Plume" dated August 25, 2003. However, the SWS does not have that document. The SWS has a report entitled "Statistical Analysis/Evaluation: April 2003" submitted by Ensol Engineering Solutions, but it does not contain a description of site hydrogeology. Therefore, needed is a hydrogeological report for the site.
- 2.2 Include on the list of contaminants of concern (COC's) constituents detected above state groundwater standards since 2002. Also include 1,1-dichloroethane; 1, 2 dichloroethane; 1,4-dichlorobenzene; tetrachloroethylene, trichloroethylene; lead; thallium; vanadium; mercury; benzene; vinyl chloride; and methylene chloride.

- 2.3 Explain the “exposure pathways” of constituents specified in Section 2.2.
- 2.4 Provide a map showing residential wells within 2000 feet of the site. Existence of wells within 2000 can be verified in the field and in state records.
- 2.5 Revise the “risk assessment” list to include COC’s specified in comment 2.2.
- 3.0 See comment for Section 2.2.
- 4.0 Delete the word “successful” from the first sentence, since success of the remedies have not been demonstrated. Also describe the “hydrogeologic conditions of the uppermost aquifer” on which the remedies are based.
- 4.2 Explain how contamination downgradient of phytoremediation areas will be remediated. Referenced Drawings 4 and 5 show phytoremediation in the upgradient portion of the westward migrating plume but not in the downgradient portion. No phytoremediation is shown in the plume migrating north.
- 4.2.1 Specify the quantity of “uncontaminated overburden soils” to be excavated. Also explain how “disadvantages” of phytoremediation will be addressed.
- 4.2.2 Three revisions are necessary. One, correct bulleted statements in which the landfill is described as not having a “continuous source of contamination”. Onsite groundwater contamination reportedly existed since 2002 and is shown to have continually migrated in 2008. Two, correct references to Drawings 3 and 4 in the bulleted statement about excavation. Drawing 3 is labeled “Enhanced In-Situ Bioremediation”, not “Phytoremediation”, and shows no excavation plan. Grading is depicted in Drawing 4, but 6 to 14 feet of excavation is shown instead the stated “4’ of overburden”. The excavation is also proposed in an Erosion and Sedimentation Control Plan reportedly not yet approved by the department’s Land Quality Section (see Section 5.4.2). Explain what alternative remediation will occur if excavation is not approved by that agency and needed depths to the water table cannot be obtained. Three, correct the bulleted statement in which “no public comments” is reported. Identify who in the public meeting “acknowledged” that phytoremediation is “environmentally friendly” and identify who asked, “Who doesn’t like trees?”
- 4.3.2 Four corrections are needed. One, for the same reason given in Section 4.2.2., correct the bulleted statement(s) in which the landfill is described as not having a “continuous source of contamination.” Two, correct the bulleted statement(s) in which Enhanced Bioremediation (EB) reportedly will “control the source(s)” of contamination. Since EB is not proposed to fully span the plumes, it would not control plume migration from its “source”. Three, correct the bulleted statement(s) in which the plume reportedly flows “West and Southwest”. Shown in drawings are two plumes: one flowing north; the other, west. Four, report the number of proposed injections and injection points, and show locations and dimensions of injection wells.

- 5.1 For inclusion in the cost estimates covered by financial assurance, provide cost(s) of the “pre-implementation activities” discussed in this section.
- 5.2 Re-evaluate the CAP approach. As proposed neither remediation technology can perform as described. As a “treatment wall” Enhanced In-situ Bioremediation does not fully span plume widths. Consequently, contamination will flow it around it. As treatment of contamination plumes, according to the schedule presented in Figure 1, the earliest benefit of some Phytoremediation would not occur until after 3 years, and Phytoremediation would not be fully implemented until after 5 years. Moreover, Phytoremediation does not fully cover the plume migrating west and none of the plume migrating north. Finally, Phytoremediation reportedly is contingent on an erosion and sedimentation control plan to be approved by another agency. No alternate plan is provided if excavation needed for phytoremediation cannot be achieved if the erosion and sedimentation control plan is not approved by that agency.
- 5.3 Another measure of success is needed. Contamination is already characterized by “daughter compounds” of TCE and PCE; therefore, their presence would not indicate successful remediation. Also unaddressed are other COC’s, such as lead, mercury, and benzene.
- 5.4 See comment in Section 5.2 regarding phytoremediation. Not all of the plume migrating west is addressed and the plume migrating north is not addressed at all.
 - 5.4.1 Explain the contradiction. In this section “a root system of over 10’ deep is described; whereas, in the next section is stated that “the trees will not be able to root much more deeper than 10 feet”.
 - 5.4.2 Five revisions are necessary. One, for inclusion in cost covered by financial assurance, specify the number of trees to be planted and their cost. Two, correct the statement that groundwater averages “9 feet deep”. Drawings 2, 4, and 5 show groundwater depths between 15 and 24 feet where phytoremediation is proposed. Three, regarding root depths, see comment in Section 5.4.1. Four, for inclusion in costs covered by financial assurance, specify the quantity and cost of excavation. Five, provide an alternate plan if the excavation needed for phytoremediation cannot be achieved.
 - 5.4.4 Explain how the basin created by Stage 1 excavation will be drained. On drawing 4 the area is shown graded to elevations between 204 and 208 while surrounding terrain remains between elevations of 210 and 216. No drainage outlet is shown for Stage 1.
 - 5.4.5 Specify the remediation “technique” applied before phytoremediation begins or when it fails.
- 6.2 In the groundwater monitoring plan include existing MW-15, new monitoring wells downgradient of both plumes, and a surfacewater monitoring station near MW-15.
- 8.0 Three revisions are required. One, include a remedy that replaces either of failed proposed remedies instead of relying on just one if the other one fails. Two, show

where additional injections are proposed for Enhanced In-situ Bioremediation. Three, state that “triggering events” for contingency plans are failure to meet state groundwater standards instead of only conclusions obtained from statistical analysis.

- 9.3 For inclusion in costs covered by financial assurance, estimate cost of the maintenance for the period covered by corrective action.
- 10.0 Either in this section or elsewhere, submit a cost estimate for the CAP. Pursuant to Regulation .1628 (d)(1), a “detailed” estimate is required. In the ACM, combined cost of Phytoremediation and Enhanced In-site Bioremediation is \$594,000. However, \$1,300,000 is reported in the letter from the Interim Financial Officer of Harnett County, dated February 10, 2009. Show what increased the cost. Provide an itemized list of construction, operation, and maintenance costs. More information about financial assurance is at the end of this letter.

Tables

- Table 1 Revise the table to include existing MW-15, additional groundwater monitoring wells specified in comment 6.2., and surfacewater monitoring station specified in comment 6.2.

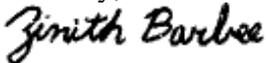
Drawings

- Drawing 1 Update the map to show all on-site wells. Subsequent maps show wells—GP-23, GP-26, etc—that do not appear on this drawing. Also make identification of on-site wells legible.
- Drawing 2 Three revisions are necessary. One, delineate wetland boundaries and 50-foot buffers. Wetlands and buffers are shown on maps in previous reports but not in this CAP. Two, identify the well between MW-15 and PZ-44S and the well near PZ-51. Three, show all the proposed wells listed in Sections 6.1 and 6.2.
- Drawing 3 Four revisions are necessary; One, reduce the scale of the map to show both plumes. Two, extend the line of injection wells to span the plume flowing north. Three, add monitoring wells to monitor the plume migrating north. Four, show the location of GP-38W.
- Drawing 4 Show the stormwater devise(s) draining Stage 1 of the Phytoremediation Plan.
- Drawing 5 Four revisions are necessary. One, provide a table like one on Drawing 4 specifying tree count, area covered, etc. Two, show MW-15. Three, delineate the wetland boundaries and 50-foot buffer. Four, add a fourth surfacewater sampling station near the wetlands.
- Drawing 6 Entitle of the drawing to reflect that excavation is for the Phytoremediation Plan instead of erosion and sedimentation control, and show stormwater device(s) for Stage 1 of the plan.

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The SWS has not received a financial assurance mechanism for the Dunn-Erwin Landfill. In the CAP is a copy of a letter from the Interim Financial Officer of Harnett County, dated February 10, 2009 regarding the financial assurance mechanism. However, an original letter has not been received in the Field Operations Branch. In addition, provide an itemized list for the cost summarized in the financial mechanism. Show that financial assurance is sufficient for all the costs associated with the CAP. In Regulation 15A NCAC 13B .1628 (d)(1)(A) is the specification that the cost estimate be adjusted for inflation. Send the financial assurance mechanism to Ms. Shawn McKee. She can be contacted at 919-508-8512 or at: shawn.mckee@ncdenr.gov.

If you have questions, I can also be reached at 919-508-8401 and at zinth.barbee@ncdenr.gov.

Sincerely,


Zinith Barbee
Project Manager
Solid Waste Section

cc: Mark Poindexter Field Operations Supervisor
Ed Mussler Solid Waste Section
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C. Tyrus Clayton, Jr. C. T. Clayton, Sr., P.E., Inc.
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