California Regional Water Quality Control Board
Central Coast Region

Terry Tamminen
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Arnold Schwarzenegger
Governor

March 23, 2004

Michael Hoover
Chicago Grade Landfill
2290 Homestead Road
Templeton, CA 93465

Dear Mr. Hoover:

RE: CHICAGO GRADE CLASS III LANDFILL; MODULE 3, 4 AND 5 CONSTRUCTION PLAN COMMENT LETTER

Thank you for submitting the February 24, 2004, "Module 3, 4 and 5 Composite Liner Construction Plan," (Plan) for the Chicago Grade Class III Landfill's (Landfill). The following are our comments on the Plan.

1. Page 5, Section 3.1: We do not agree with minimizing the subgrade scarification, moisture conditioning and recompaction. Given portions of the subgrade excavation work was done during winter months, it is likely the subgrade has experienced erosion and may need scarification, moisture conditioning and recompaction in order to construct a good subgrade for the liner system. Please modify the Plan by removing the reference to "minimal" as it pertains to subgrade scarification, moisture conditioning and recompaction.

2. Page 6, Section 3.3: We do not approve of the sideslope alternative liner design of 80-mil HDPE on subgrade. State Water Resources Control Board Resolution No. 93-62 "Policy for Regulation of Discharge of Municipal Solid Waste," states, in part:

   "Steep Sideslopes Containment systems installed in those portions of an MSW landfill where an engineering analysis shows, and the Regional Board finds, that sideslopes are too steep to permit construction of a stable composite liner that meets the prescriptive standards contained in §§IIIA.1 or 2..."

   "...composite liners represents the most effective approach for reliably containing leachate and landfill gas..."

   The Landfill has provided documentation indicating a stable composite liner can be constructed on the proposed 2:1 slopes that will meet the composite liner prescriptive standards. Alternately, the slope can be flattened in order to assure a stable composite liner design. Therefore, please change the Plan to include a prescriptive composite liner design or provide an equivalent engineered alternative design [e.g., geosynthetic clay liner (GCL) in place of two foot of clay]. Keep in mind that a change in liner system design (e.g., GCL) will require a slope stability analysis based on the new design.

   As stated in our February 27, 2004 letter "Slope Stability Analysis Approval," source materials (i.e., soils excavated for use in clay liner construction) must be constantly and carefully monitored by appropriate personnel to ensure they are consistent with material used in the approved analysis. Failure to carefully monitor source material could result in lower strength values during independent

testing, and potentially could require expensive redesign of the Landfill's Module 3, 4 and 5 in order to identify an acceptable stable slope design.

During a site inspection on March 19, 2004, my staff noted there was no appropriate personnel monitoring the clay liner source materials borrow area. We further observed that the in-situ geologic material in the Module 3 and 4 cut-slope area contained extensive conglomerate beds and lenses interbedded with fine-grained material. Because of the heterogeneity of the source material, special considerations must be implemented (i.e., screening or other remedy) prior to its use of the stockpiled material in constructing the clay liner.

As a side note, we question using textured HDPE at the interface with the geocomposite drainage layer. Such design may transfer stress loads to the liner and potentially cause the liner to tear or be displaced (e.g., pulled from the anchor trench). We have typically seen designs utilizing a smooth surfaced HDPE at the interface with the geocomposite drainage layer (textured side down, at the clay liner interface). Please consider this note in subsequent design submittals.

3. Page 7, Section 3.3: Given the high silt and clay content of the native soils to be used in constructing the operations layer, it will be necessary to demonstrate the geocomposite (geo-web) drainage layer will not clog. We can provide an example (Lewis Road Class III Landfill final cover design) on how to assess the geocomposite (geo-web) drainage layer for clogging.

4. Page 7 Section 3.3: The release response described in this section includes groundwater pumping or placement of subsurface barriers. The cost for these corrective action alternatives are identified in your February 16, 2004 "Updated Cost Estimate for Corrective Action," letter. We concur with your corrective action plan and associated cost estimate.

5. Page 7, Section 3.3.1: We concur with the sealed double ring infiltrometer test contained in Hoover & Associates, January 1996 report. The hydraulic conductivity of the borrow soils used to construct the clay liner must be confirmed and tested by the Construction Quality Assurance (CQA) Officer during construction.

6. Page 11, Section 3.5 and detail "B," "D," and "GE" on Sheet No. 4 of the design drawing: Include in the design (add a detail and specifications) placement of plastic cover with sandbags placed over the liner and leachate collection and removal system (LCRS), or equivalent. Plastic must be of sufficient thickness to withstand ultraviolet exposure and sandbags placed at sufficient intervals to hold the plastic in place under high winds. Our intent is to protect the liner and LCRS from damage and clogging (refer to comment 3 above) in areas that will be exposed for more than one dry season (May to October of each year).

7. Page 12, Section 3.7: Obviously, this design element introduces the potential for leachate to enter the stormwater collection system. Therefore, please provide us with a landfill operation plan that includes discussion on tracking the stormwater/leachate cross connection depicted in Detail "P" on Drawing No. 6. We suggest adding posted signs at each cross connection indicating prior to discharging waste above the signage elevation the LCRS/stormwater cross connection must be capped and the LCRS flanges on the 12" diameter pipe removed and pipes reconnected. We will also add to the Landfill's Monitoring and Reporting Program, under Field Inspections/Standard Observation, a requirement to for checking the cross connection locations.

8. Appendix C, page 8, Section 1.04 Paragraph A: Remove the sentence "The owner will provide assistance as necessary to accomplish the required sampling and testing." This Board has required

the construction quality assurance process, as specified in California Code of Regulations Title 27, to be independent of the owner, design engineer, construction contractor and related subcontractors.

9. Appendix C, page 9, Section 2.02, paragraph B: Please change the 25 percent by weight retained on a No. 4 sieve to less than 20 percent. This change is consistent with Dr. David Daniel's recommendation cited in Appendix A page 2, under "Recommended Soil Properties.

10. Appendix C, page 18, Table 02621-1: We recently observed slope failure due to peel strength of geofabric laminated to a geogrid. Apparently, the specification for the geocomposite drainage layer was not sufficient to address delamination defects. We suggest adding a provision in the specification limiting delamination defects.

Please note, the following comments include language regarding construction quality assurance and liner design that is consistent with requirements used at other landfills within this Regional Board's jurisdiction:

11. Appendix D, page 8, under "CQA Officer": We want to assure the independence of the CQA process. Therefore, please add the following language under the CQA Officer section:

    - "The CQA Officer administers the quality assurance program. CQA procedures and reports must be reviewed by the CQA Officer for compliance with the project CQA Plan.
    - "The CQA Officer has authority to identify deficiencies and implement corrective action to the CQA Plan."
    - "The CQA Officer has discretion on work progress based on compliance with the approved construction plans and specifications."

12. Appendix D, page 8, under "CQA Monitor," first sentence: Again, we want to assure the independence of the CQA process. Therefore, please remove the words "...represents the owner..." In it place, please add "...as an agent and under the immediate supervision of the CQA Officer is responsible for..." Also, reinforce the connection between the CQA Monitor and CQA Officer by adding "The CQA Monitor reports directly to the CQA Officer."

13. Appendix D, page 16, Table 2: Please include interface shear testing (ASTM D5321). Also, please include the "Fill Placement and Compaction" table, refer to Table 0220-3 on page 02200-10/page 15 of Appendix C.

14. Appendix D, Page 17: Please add a section on geosynthetic subgrade preparation. Some suggested inspection language is as follows:
    - Verify that material source is suitable for the subgrade, is free of organic and oversized materials, and meets the grading requirements of the technical specifications.
    - Verify that grade control construction staking is performed prior to work.
    - Verify that rounded, sub-angular or sharp rocks greater than 0.5-inches in diameter and other debris that could damage the overlying geosynthetic materials are removed from the surface of the subgrade. Verify that the subgrade is free of irregularities and is steel drum rolled smooth prior to the placement of any geosynthetic material.
    - Verify that the final surface provides continuous and intimate contact with the overlying geosynthetic.
    - Verify that any soft or yielding area of the subgrade is adequately excavated and replaced with engineered fill in accordance with the specifications for engineered fill material.

- Coordinate with the Contractor to perform subgrade verification surveys upon completion of the subgrade preparation. Verify corrective action measures as determined by the verification surveys.

Similarly, please add a section on compacted subgrade. Some suggested inspection language is as follows:

- Verify that material sources are suitable for compacted subgrade.
- Verify that grade control construction staking is performed before work.
- Verify moisture content and unit weight of each lift during placement and compaction of soil used in construction of compacted subgrade.
- Perform tests at testing frequencies specified Table 2, under Section 4.3 "Construction Testing," in the "Module 3, 4 and 5 Composite Liner and LCRS Construction Quality Assurance Manual."

Also, please include a section on anchor trenching. Some suggested inspection language is as follows:

- Verify that construction staking is performed before work and that survey bench marks with elevations are secured outside the work area.
- Verify that anchor trenches are excavated in accordance with the dimensional cross-sections and design elevations shown on the drawings.
- Verify profile surveys conducted by the Contractor during trenching operations.

15. Appendix D, page 23, under "Field Seaming," last paragraph, first sentence: Please add after "...twice each day,..." the following "...beginning and mid point..."
16. Appendix D, page 26, under "Destructive Seam Testing": Please change the frequency of testing to at least one test per 500 lineal feet, but the CQA Officer can specify less frequent testing, not to less than one in 1,500 lineal feet, if seams are consistently meeting specifications.

17. Please clarify the liner/LCRS construction sequence. Is the slope liner to be placed during one construction phase or will the liner be sequenced as the waste progresses up the slope? Please develop an 5-year plan sheet showing how the fill sequence and liner design will progress on an annual basis as it moves up the 2:1 slope.

18. Detail "B", Sheet No. 4: Refer to comment 2 above. Also, it would be helpful to include a call out for Detail B on Sheet No. 1.

19. Details "C" and "E" on Sheet No. 4 of the design drawing: We recommend modifying the transition between unlined Module 1 and Module 3 as follows: 1) Clearly show that the leachate collection piping is located within five feet of the toe of Module 3's slope; 2) Grade the bench at 5% from toe of Module 3 slope to the Leachate collection piping; 3) The drain rock rapped in geofabric must daylight at the top of the operations layer; 4) Starting at the interface of Module 1 and Module 3, grade the bench at 5% back to the leachate collection piping.

20. Details "D" and "GE" on Sheet No. 4 of the design drawing: The detail for anchoring the synthetic liner is unacceptable. Please modify the detail based on the industry standard. Please review the following web site for an acceptable anchor trench details:

    http://www.gseworld.com/Literature/DetailDrawings/PDF/AnchorTrenchs.pdf

    We recommend increasing the bench slope (sloped to the inside) from 1% to 5% or greater. Our intent is to increase the leachate collection (and stormwater prior to waste reaching the bench) in piping located along the benches. The drain rock rapped in geofabric must daylights at the top of the operations layer.

21. Details "P" and "GE" on Sheet No. 6 of the design drawing: Refer to comment 7.

If you have questions, please call **Frank DeMarco at 805-542-4638** or John Robertson at 805-542-4630.

Sincerely,

FOR Roger W. Briggs
Executive Officer

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