



April 14, 2010

DCN: NMED-2010-11

Mr. David Cobrain
Hazardous Waste Bureau
2905 Rodeo Park Dr. E/Bldg 1
Santa Fe, NM 87505

RE: Draft Technical Evaluation of the Sandia National Laboratories/New Mexico, Environmental Restoration Project, Mixed Waste Landfill Corrective Measures Implementation Report, dated January 2010.

Dear Mr. Cobrain:

Attached please find technical review comments on the "Sandia National Laboratories/New Mexico, Environmental Restoration Project, Mixed Waste Landfill Corrective Measures Implementation Report", dated January 2010.

The referenced report sufficiently describes the construction of the Mixed Waste Landfill (MWL) Evapotranspirative (ET) Cover system. In general, it is evident that the field team paid attention to quality measures, including testing and inspection. The 2009 construction team is commended for their re-working and re-testing of the upper portion of the subgrade layer to ensure conformance of the overall cover with specifications. Also, the test area approach for the biointrusion barrier installation provided a proactive solution to a potential constructability concern. We recognize the additional cover volume used (i.e., increase in footprint area and greater total height) as described in the report, and agree that the constructed cover adequately complies with the design (with changes as noted) and performance objectives.

However, there are some questions regarding the documentable quality of the constructed cover. Issues that require additional clarification are addressed in the attached comments.

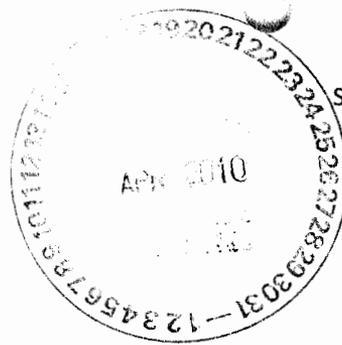
If you or any of your staff have questions, please contact me at (801) 451-2864 or via email at paigewalton@msn.com.

Thank you,

Paige Walton
AQS Senior Scientist and Project Lead

Enclosure

cc: Joel Workman, AQS (electronic)
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**Draft Technical Review Comments on the Sandia National Laboratories/New Mexico,
Environmental Restoration Project, Mixed Waste Landfill Corrective Measures Implementation
Report,
January 2010**

1. **Construction Quality Assurance (CQA) During Subgrade Layer Construction.** The Corrective Measures Implementation (CMI) Report, Section 2.2, second paragraph, first sentence states: “During the 2006 Subgrade Construction phase, the CQA [Construction Quality Assurance] Team was responsible for all CQC [Construction Quality Control] data and CQA documentation requirements.” Similarly, the first paragraph of Section 2.6 of the Appendix A CQA Report states the following: “The CQA personnel roles and responsibilities were generally the same for both the 2006 and 2009 construction phases. However, some differences reflect a more robust CQC and CQA program for the 2009 ET [Evapotranspiration] Cover Construction phase (i.e., construction of the Biointrusion, Native Soil, and Topsoil Layers).” The subsequent paragraph states that “During the 2006 Subgrade Construction phase, the CQA Team was responsible for all CQC laboratory testing (i.e., Standard Proctor, Gradation, and Classification soil data), field testing (i.e., in-place density and moisture testing), as well as associated oversight of the testing laboratory.”

In reality, the “more robust” quality assurance / quality control (QA/QC) implementation during the 2009 construction phase was actually more compliant than the 2006 Subgrade Layer construction, since the project requirements for independent QA testing of the Subgrade Layer were evidently not completed in 2006. For example, Paragraph 3.3.4 (6) of the Section 02200 Earthwork specification (Corrective Measures Implementation Plan [CMIP], Appendix A) indicates that “the Contractor shall perform field-testing of the compacted fill” and “the Contractor shall submit test results to the CQA Engineer and Operator for approval....” Section 3.4.1 of this specification states, “the Contractor shall be responsible for the performance of all pre-acceptance and quality control testing.” However, the fourth bullet of Section 2.6.2 of the CQA Plan (Appendix B of the CMIP) states that “CQA testing will be conducted at a frequency of at least 5 percent (%) of that done by the Construction Contractor,” which refers to testing by CQA Inspection personnel. Similarly, Section 5.1.2.3 of the CQA Plan state that “testing shall be performed at a minimum frequency of 5% of that done by the Construction Contractor” for the Subgrade Layer.

With regards to this issue, we note reference to a different CQA Plan (May 2006; *not recently reviewed*) for the Subgrade Layer construction, but contend that a different CQA Plan should not diminish the project requirements of 5% CQA field testing for Subgrade Layer compaction and moisture content tests. Neither NMED conditional approval for the CMIP (Bearzi, December 2008), nor subsequent submittals (i.e., the CMIP replacement pages; Davis February 2009) recognized a different CQA plan for the Subgrade Layer construction.

Therefore, the failure of Sandia National Laboratory/New Mexico (SNL/NM) to provide QC testing of the Subgrade Layer by the Contractor, and 5% independent QA testing by CQA personnel, should be documented as a nonconformance. However, we recognize and applaud the efforts of the 2009 Contractor and CQA staff to re-condition, re-compact, and re-test (as well as re-survey) the upper surface of the Subgrade Layer during the subsequent 2009 construction phase.

Similar language is presented in the third paragraph of Section 4.0 of the CQA Report, where it is stated that “In general, CQC and CQA data and documentation can be collected by either the Construction Team or the CQA Team or a combination of both.” According to the CMIP Specifications and CQA Plan, this statement is not correct. Following resolution of this comment

(i.e., documentation of the nonconformance), please revise appropriate portions of the CMI Report and the Appendix A CQA Report accordingly.

2. **Hydraulic Conductivity Testing.** CQA Report, Section 4.3.1, Saturated Hydraulic Conductivity (ASTM Method D5856-95 [2007]): We agree with the technical validity of the testing approach for hydraulic conductivity, and concur that the results meet the performance specification of 4.6×10^{-4} centimeters per second (cm/s) or less. However, the sampling and testing approach did not conform to the project Specifications, and a design change (Table 14) was not provided. It is evident that the Specifications in the CMIP intended for collection of *in situ* samples from the cover for hydraulic conductivity testing, rather than remolded samples (as was performed). Specifically, Paragraph 3.3.6(6) of the Section 02200 Earthwork specification states (regarding the Native Soil Layer):

Samples shall be obtained by means of a thin-walled sample tube or equivalent sampling device in a manner that minimizes disturbance to the lift and in the direction perpendicular to the plane of compaction. Samples shall be sealed and carefully stored to prevent drying during storage and transport. Hydraulic conductivity testing shall be performed in the laboratory according to ASTM specifications for rigid wall testing.

Clearly the intent of the specification was not remolded samples, although we recognize some lack of clarity because the ASTM method was not specified, and because the term “rigid wall” was used in the Specifications.

See also the June 16, 2009 Quality Resolution Meeting minutes discussion of ASTM D-5084 flexible wall sample (undisturbed) vs. ASTM D-5856 rigid wall (remolded sample) hydraulic conductivity testing. Further, it is not clear what test methods were used for the hydraulic conductivity results that were reported in the CMIP. We request that SNL/NM re-evaluate the hydraulic conductivity requirements and testing performed, and provide documentation of the design change or (if appropriate) nonconformance. Please also revise appropriate portions of the CMI Report and the Appendix A CQA Report accordingly.

3. **Equipment Lists.** CQA Report, Section 5.2.1, 2nd paragraph and bullet list: Please provide a more detailed equipment list for the 2006 Subgrade Layer work. Note the detail provided in Table 13 for the 2009 construction phase; make and model number of the 2006 earthwork equipment (or other indication of size) should be provided at a minimum. As an example illustrating this need, CQA Report Table 14, first line, states that a smaller roller was used for landfill surface compaction than specified; however, there are no details of the actual equipment used in 2006.
4. **Stockpiled Volume of Native Soil.** CQA Report, Section 5.4, second paragraph, third sentence reads as follows: “Soil fill stockpiled at the Borrow Pit in 2006 based on CMIP estimates was not sufficient to complete construction of the Native Soil and Topsoil Layers.” Suggest changing this sentence to read: “The quantity of soil fill stockpiled at the Borrow Pit...” to prevent any confusion regarding the sufficiency of quality of the stockpiled material, which was adequate for soil fill.
5. **Engineering Certification.** CQA Report, Section 9: It seems odd that the certification of the subgrade is dated August 31, 2007, but also states that their original MKM Engineers, Inc. CQA Report “has been incorporated into this report,” which appears to refer to the current 2010 CQA Report. Please clarify. It may be more appropriate to include a copy of the original CQA Engineer subgrade certification, without modifying it to conform to the format of the current report. We note also that the 2009 CQA Engineer certified both the Subgrade Layer and the overlying ET Cover, which is appropriate given the re-testing of the Subgrade surface and oversight of the ET Cover construction.

6. **Hydraulic Conductivity Table.** CQA Report, Table 8, 4th column: Suggest changing the title of the 4th column to “Sample” Compaction (to avoid confusion with in-place cover compaction) to better describe that the hydraulic conductivity tests were performed on samples that were remolded in the laboratory. With the current column heading, one might make the erroneous assumption that 90 percent compaction was not achieved at all test locations on the cover. Also, Footnote 1, change “Minimum” to “Maximum” with regards to the specified comparison criteria for hydraulic conductivity results.
7. **Disposition of Grubbed Vegetation.** Volume 2 of the CQA report, Attachment 1, Record of Meeting for June 5, 2006: item 9 indicated “grubbed vegetation may contain tritium, and will be mulched and stored for placement with topsoil at a later time”. Was the grubbed vegetation that was removed from the MWL surface in 2006 tested? Did it contain tritium, and what was the disposition of this material? Note the October 2, 2006 Record of Meeting, Item 2 which indicates “shredded brush will be stored for future reuse in covered containers.” However, the material is not mentioned in the February 12, 2007 minutes which indicated the project would be mothballed and stabilized due to approval delays. The following statement is made in the CQA Report (Section 5.1, second paragraph, third sentence), but no backup was provided in the attachments: “The vegetation removed from the existing MWL surface and the perimeter area was shredded and containerized for future disposition. The material was sampled for radiological contamination and approved for reuse.” Please provide additional clarification and supporting documentation of the management and disposition of the grubbed vegetation material in 2006, for closure of this issue.
8. **Monitoring Well Extension.** CQA Report, Attachment 8, Figure 2-5, center of figure: “PVC Slip Coupling w/ Stainless Steel Screens” should read “PVC Slip Coupling w/Stainless Steel Screws”.

Also in Attachment 8, Section 3, first bullet provides justification of the “double anchored” well resulting from not demolishing the original well pad. We request that SNL/NM carefully monitor and observe the upper 10 feet of the interior casing during future sample events, to ensure that this arrangement does not result in damage to the well casing from potential settlement of underlying waste.