

TA 21

State of New Mexico  
**ENVIRONMENT DEPARTMENT**



**BILL RICHARDSON**  
GOVERNOR

*Hazardous Waste Bureau*  
2905 Rodeo Park Drive East, Building 1  
Santa Fe, New Mexico 87505-6303  
Telephone (505) 428-2500  
Fax (505) 428-2567  
www.nmenv.state.nm.us



**RON CURRY**  
SECRETARY

**CERTIFIED MAIL**  
**RETURN RECEIPT REQUESTED**

May 8, 2006

David Gregory  
Federal Project Director  
Los Alamos Site Office  
Department of Energy  
528 35<sup>th</sup> Street, Mail Stop A316  
Los Alamos, NM 87544

David McInroy  
Remediation Services Deputy Project Director  
Los Alamos National Laboratory  
P.O. Box 1663, Mail Stop MS M992  
Los Alamos, NM 87545

**RE: NOTICE OF DISAPPROVAL**  
**INVESTIGATION REPORT FOR MATERIAL DISPOSAL AREA U,**  
**CONSOLIDATED UNIT 21-017(a)-99, AT TECHNICAL AREA 21,**  
**LOS ALAMOS NATIONAL LABORATORY (LANL)**  
**EPA ID #NM0890010515**  
**HWB-LANL-06-006**

Dear Messrs. Gregory and McInroy:

The New Mexico Environment Department (NMED) is in receipt of the Department of Energy and the Regents of the University of California's (collectively, the "Permittees") *Investigation Report for Material Disposal Area U, Consolidated Unit 21-017(a)-99, at Technical Area 21* (Report) dated February 2006 and referenced by LA-UR-05-9564/ER2006-0923. NMED has reviewed this document and hereby issues this Notice of Disapproval (NOD).

**General Comments:**

1. The Permittees must present data in tables by 'location ID' and then by 'depth' in descending order so that all samples for a particular location are grouped together. For example, Table 6.3-4, "Inorganic Chemicals above BV in Tuff at MDA U", is sorted by 'Media'. The table lists 6 samples for location ID 21-24772 on page 65, 2 samples on page 66, and 3 samples on page 67. (Revise text and tables where appropriate.)



10960

2. NMED does not consider sloughing to be an acceptable reason for not collecting a pore-gas sample at the total depth (TD) of a borehole. If sloughing occurs, the Permittees must clean out the borehole and collect a pore-gas sample at the TD of the borehole or at the NMED approved depth interval.

**Specific Comments:**

**1. Section 3.2.3 Pore-Gas Sampling, page 10, paragraph 2:**

**Permittees' Statement:** "Two depth intervals were sampled in each of the nine boreholes at MDA U: one at TD (or the deepest sample that could be collected after sloughing of the borehole) and one at the approximate base of the absorption beds, representing the contact between bedrock tuff and absorption bed fill material."

**NMED Comment:** The Permittees did not collect a pore-gas sample at the TD of the borehole, as specified in the approved work plan. One of the key objectives of the work plan – to determine vertical and horizontal extent of vapor phase contamination – was therefore not accomplished. Pore-gas samples were obtained at the 'open depth' of the borehole not the TD because of sloughing. In order to define the vertical extent of subsurface vapor contamination and to comply with the approved work plan, the Permittees must collect a pore-gas sample at the TD of all boreholes at MDA U. Additionally, the Permittees must extend the boreholes 25 ft below the deepest detected contamination in accordance with Section IX.B.2.b.i of the Order. The Permittees must include the results of the sampling in the response to this NOD.

**2. Section 4.4 Subsurface Conditions, Cerro Toledo Interval and Otowi Intervals, page 15, paragraph 2:**

**Permittees' Statement:** "The purpose of drilling into Otowi Member was to finalize site characterization and to gain a more thorough understanding of the Cerro Toledo interval underlying MDA U."

**NMED Comment:** The Permittees did not meet the above objective because a pore-gas sample was not obtained from the Cerro Toledo interval (See specific comment 2). According to Figure 4.4-2, the Cerro Toledo interval was encountered during drilling activities from 327 ft to 351 ft below ground surface (bgs) in BH-04. According to Table 3.2-3 the bottom pore-gas sampling interval in BH-04 was 293-294 ft. The Permittees did not accomplish the objective of obtaining a pore-gas sample at the TD of the deep borehole; therefore, the Permittees must return to the site and collect a pore-gas sample from the Cerro Toledo interval as required in the approved work plan to characterize vapor phase contaminants in the Cerro Toledo interval.

**3. Section 7.1 Summary of the Investigation Activities, page 22, bullet 1:**

**Permittees' Statement:** "The vertical extent of tritium in both tuff and pore-gas samples has been defined. Tritium was not detected in tuff samples from any of the boreholes drilled around MDA U in 2005. Tritium was detected in the deepest borehole, drilled in the center of MDA U, at values ranging from 0.06 to 0.3 pCi/g."

**NMED Comment:** NMED concurs that the extent of tritium contamination in tuff has been defined. However, vapor phase tritium contamination has not been defined. See specific comments #1 and 2.

**4. Section 7.1 Summary of the Investigation Activities, page 22:**

**Permittees' Statement:** "The results of the analytical sampling indicate the vertical and lateral extent of inorganic chemicals, radionuclides, and organic chemicals have been adequately defined at MDA U."

**NMED Comment:** NMED concurs that the extent of tritium contamination in tuff has been defined. However, vapor phase tritium contamination has not been defined. See specific comments #1 and 2.

**5. Section 8.0 Recommendations, page 24:**

**Permittees' Statement:** "For these reasons, neither additional corrective action nor further characterization is warranted at MDA U. The laboratory proposes that the three SWMUs within the MDA U boundary [SWMUs 21-017(a), 21-017(b), and 21-017(c)] be designated as "Complete with Controls," the control being the maintenance of the land as industrial."

**NMED Comment:** See specific comment #1. The Permittees have recommended that the land be designated for industrial use. However, the future use of the site is unknown. For this reason, the Permittees must evaluate the construction worker scenario as part of the human health portion of the risk assessment. Additionally, the "Complete with Controls" designation not only is premature at this time, but also must be formally requested. The designation cannot be requested and granted by means of the Investigation Report or other documentation other than a permit modification or No Further Action (NFA) request. (Revise text to reflect this change where appropriate.)

**6. Appendix B Sections B-2.2 to B-2.4, pages B-4 to B-6:**

**NMED Comment:** The Permittees refer to Sections E-2.2 and E-2.3 consistently throughout Sections B-2.2 – B-2.4. However, Sections E-2.2 and E-2.3 are not included in Appendix E. The Permittees must revise the text to reference the appropriate sections.

**7. Appendix B Section B-3.2.2 Radionuclides, Tuff and Absorption Bed Samples, page B-9, paragraph 5:**

**Permittees' Statement:** "Based on the low concentrations of tritium detected within the absorption beds and subsurface at MDA U, MDA U is not a significant source of tritium contamination, and the vertical extent of tritium has been defined."

**NMED Comment:** See specific comments #1 and 2.

**8. Appendix B, Table B-2.2-1, Frequency of Radionuclides Detected above BVs/FVs or Detected at MDA U, page B-73:**

**NMED Comment:** For some of the radionuclides, the table indicates that background data were not applicable. For example, in Table B-2.2-1, tritium was detected in 71 of 79 soil samples, however, the BV is listed as n/a. The Permittees must provide a rationale for why background data were not applicable for some radionuclides.

**9. Appendix C Section C-9.0 Deviations from the Approved Work Plan, page c-8:**

**NMED Comment:** The Permittees must include the alternate pore-gas sampling interval as a deviation from the approved work plan. It is understood that sloughing was the reason for alternate pore-gas sampling intervals; however, this explanation must also be included in the deviations section of the Report. (Revise text to reflect this change where appropriate.)

**10. Appendix H Risk Assessments:**

**NMED Comment:** The results of the risk assessment indicate that this site meets the risk-based criteria only for a non-intrusive industrial worker. As such, the report should clearly indicate that the site does not meet the criteria for No Further Action (unrestricted use), as residential risk levels could not be met. The report also indicates that volatile organic compounds (VOCs) are present in subsurface soil. The soil screening levels for an industrial worker do not include an evaluation of VOC buildup in indoor air. As an analysis of the risks associated with the inhalation of VOCs volatilized into indoor air was not conducted, the land use at the site must also be limited to outdoor exposure only. (Revise text to reflect this change where appropriate.)

**11. Appendix H Risk Assessments:**

**NMED Comment:** In reviewing the tables summarizing the hazard quotients (HQs) for the human health risk assessment, it is noted that a HQ was calculated for lead and that this HQ was incorporated into the hazard index (HI). This is incorrect methodology. Lead is evaluated relating soil lead intake to blood level concentrations. As such, lead should be evaluated individually and a HQ should not be calculated for this constituent. Please revise the risk table to remove the calculation of a HQ for lead and revise all subsequent HIs.

**12. Appendix H, Section H-2.2, Sampling Results and Determination of Chemicals of Potential Concern, page H-2, paragraph 5:**

**Permittees' Statement:** "No radionuclides were retained as COPECs."

**NMED Comment:** The Permittees state that no radionuclides were retained as Chemicals of Potential Ecological Concern (COPECs). However, several radiological constituents were identified in the 0-1 foot soil interval for the industrial scenario. As the ecological soil interval applied in the assessment was 0-5 feet below ground surface, it is not clear why the text indicates that radionuclides identified in the 0-1 foot interval were dropped from the analysis. Further, in reviewing the tables associated with the ecological risk, it appears that radionuclides were included. The Permittees must provide acceptable rationale for the discrepancy between the text and the ecological risk assessment.

**13. Appendix H, Section H-3.0, Conceptual Site Model, page H-3, paragraph 2:**

**Permittees' Statement:** "Migration of contamination to groundwater through the vadose zone is unlikely given the distance to groundwater at the site."

**NMED Comment:** Distance to groundwater is not the only factor that must be considered when evaluating fate and transport of contaminants in the vadose zone. Other factors such as chemical concentration, chemical mobility, porosity, and infiltration rates, must also be considered. As such, sufficient justification that contaminants could not migrate to groundwater has not been provided. The risk assessment should include an evaluation of the associated concentrations against soil screening levels (SSLs) for migration to groundwater based upon a dilution attenuation factor (DAF) of 20. The Permittees must revise the risk assessment to include an analysis against these SSLs (DAF 20).

**14. Appendix H, Section H-5.1.2.3, Toxicity Assessment, page H-7, paragraph 7:**

**Permittees' Statement:** "Radium-223, radon-219, and thorium-227 have no published SALs. Exclusion of these COPCs from the screening evaluation could potentially underestimate the dose."

**NMED Comment:** In reviewing the Environmental Protection Agency's (EPA) Preliminary Remediation Goal (PRG) calculator for radionuclides ([http://epa-prgs.ornl.gov/radionuclides/prg\\_search.shtml](http://epa-prgs.ornl.gov/radionuclides/prg_search.shtml)), PRGs were available for these isotopes. Using the outdoor worker scenario, a conservative assumption, and default input values, the following PRGs were obtained:

- Radium-223: 27 pCi/g,
- Radon-219: 1.34E8 pCi/g, and
- Thorium-227: 194 pCi/g.

The maximum detected values for radium-223 (3.82 pCi/g), radon-219 (1.8 pCi/g), and thorium-227 (4.41 pCi/g) are well below the EPA PRGs and, therefore there is no concern that excluding these isotopes affects the results of the risk assessment. However, the report should be modified to clarify that while the Permittees may not have developed SALs for these radioisotopes, other screening levels, such as the EPA PRGs, exist and that these PRGs should have been used in the assessment. (Revise text to reflect this change where appropriate.)

**15. Appendix H, Table H-4.3-3, Representative Concentrations for Ecological Risk, pages H-32 to H-34:**

**NMED Comment:** Aluminum is listed on this table as a constituent for the ecological risk assessment. However, in reviewing the tables with the ecological toxicity reference values and associated hazard quotient calculations, aluminum is not included. It is assumed that aluminum was eliminated from the ecological analysis due to the pH of soil at MDA U. As stated in the United States Environmental Protection Agency's (USEPA) Ecological Soil Screening Level Workgroup (July 10, 2000), "Potential ecological risks associated with aluminum in soils are identified based on the measured soil pH. Aluminum is identified as a chemical of concern only for those soils with a soil pH of less than 5.5." However, the text (Appendix H) does not discuss the rationale for eliminating aluminum from the assessment. The Permittees must specify the soil pH at MDA U and discuss why aluminum was eliminated from the ecological assessment. (Revise text to reflect this change where appropriate.)

**16. Appendix H Table H-5.1-3, Comparison to Screening Levels for Radionuclides for the Industrial Scenario, page H-37:**

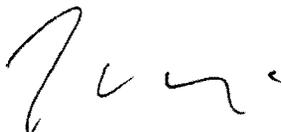
**NMED Comment:** In Section 7.3.1, Human Health Risk Screening Assessment, the total dose and equivalent total risk for radionuclides are provided for the industrial use scenario only. For comparison purposes, the Permittees must also provide the total risk for radionuclides for the residential and construction worker scenarios. The Permittees must include this information in tables that provide screening evaluation for radionuclides (*e.g.*, Tables H-5.1-3 and H-5.1-6).

Messrs. Gregory and McInroy  
May 8, 2006  
Page 7

The Permittees must respond to all comments, submit revised text and replacement pages (where directed), complete additional sampling as directed in the original approved work plan, and report analytical results within 120 days of receipt of this letter. As part of the response letter that accompanies the revised text and/or replacement pages and analytical results, the Permittees shall include a table that details where all revisions have been made to the Report and that cross-references NMED's numbered comments. All submittals (including maps) must be in the form of two paper copies and one electronic copy in accordance with Section XI.A of the March 1, 2005 Consent Order (Order).

Should you have any questions, please contact Kathryn Chamberlain at (505) 428-2546.

Sincerely,



James P. Bearzi  
Chief  
Hazardous Waste Bureau

JPB:kc

cc: D. Goering, NMED HWB  
K. Chamberlain, NMED HWB  
S. Yanicak, NMED DOE OB, MS J993  
J. Ordaz, DOE LASO, MS A316  
L. King, EPA 6PD-N  
K. Hargis, LANL RRES/DO, MS M591  
N. Quintana, LANL E/ER, MS M992  
file: Reading and LANL TA-21 '06 [21-017(a)-99: 21-017(a), 21-017(b), 21-017(c)]

