Response to the Notice of Disapproval for the Corrective Measures Evaluation Report for Material Disposal Area A, Solid Waste Management Unit 21-014, at Technical Area 21, Los Alamos National Laboratory EPA ID No: NM0890010515, HWB-LANL-08-023, Dated January 28, 2009

INTRODUCTION

To facilitate review of this response, the New Mexico Environment Department's (NMED's) comments are included verbatim. The comments are divided into general and specific categories, as presented in the notice of disapproval. Los Alamos National Laboratory's (LANL's or the Laboratory's) responses follow each NMED comment. This response contains data on radioactive materials, including source, special nuclear, and byproduct material. Information on radioactive materials and radionuclides, including the results of sampling and analysis of radioactive constituents, is voluntarily provided to NMED in accordance with U.S. Department of Energy (DOE) policy.

GENERAL COMMENTS

NMED Comment

1. *The Permittees must evaluate viable remediation technologies based on the criteria set out in Section VII of the March 1, 2005 Consent Order (Order) for their suitability for use at Material Disposal Area (MDA) A and ensure all technologies are evaluated equally. In Table 6.0-1, Results of Technology Threshold Screening for the MDA A Corrective Measure, the Permittees assess the remediation technologies using the threshold criteria and indicate that most of the technologies pass. However, in Section 6.1, Technologies Evaluation, the Permittees dismiss many of the technologies that originally passed the threshold criteria. For example, in situ vitrification meets all of the criteria listed in Table 6.0-1; however, the Permittees state in Section 6.1.1.3, In Situ Vitrification, that it is not a suitable corrective measure alternative for MDA A. The Permittees must ensure that their conclusions are consistent throughout the Report. The Permittees' evaluation process and basis for eliminating technologies is not well explained or supported. The Permittees must revise the Report to provide well-supported evaluations of the technologies and support their decisions.*

LANL Response

1. In developing the corrective measures evaluation (CME) report, the Laboratory reviewed the list of technologies developed by the Federal Remediation Technologies Roundtable (FRTR) (Table 3.2, available at http://www.frtr.gov/matrix2/section1/list-of-tables.html) to identify technologies that are potentially suitable for use at Material Disposal Area (MDA) A. The identified technologies were grouped into Corrective Measures Options (or Remedial Alternatives), as outlined in Section XI.F.9 of the Compliance Order on Consent (Consent Order) to include

   > *…a range of available options including, but not limited to, a no action alternative, institutional controls, engineering controls, in-situ and on-site remediation alternative, complete removal, and any combination of alternatives that would potentially achieve cleanup goals.*

   Section 6 of the CME report will be revised to more clearly describe the identification of technologies using the FRTR, the evaluation of technologies relative to suitability for use at MDA A, and the development of the suitable technologies into viable remedial alternatives. Section 7 will be reorganized to more clearly present the evaluation of the remedial alternatives against the four Threshold Criteria from Section VII.D.4.a of the Consent Order. The evaluation of the alternatives against the five Remedial Alternative Evaluation or Balancing Criteria from Section VII.D.4.b of the Consent Order will be moved to a new section 8.

NMED Comment

2. *Alternatives 1 and 2 include leaving the waste in place with ET covers. In the assessment of these alternatives, the Permittees do not discuss the disadvantages of leaving waste in place. The Permittees must revise the Report to include discussion of both advantages and disadvantages of leaving waste in place for both Alternative 1 and Alternative 2.*

LANL Response

2. Alternatives 1 and 2 leave the solid waste in the central pit and the eastern pits in place. The waste in the General's Tanks is being removed regardless of the alternative chosen.

   The advantages and disadvantages of Alternative 1 were presented in section 7.1 and Alternative 2 in section 7.2 of the submitted CME report. Leaving the waste in the pits is inherent to both Alternatives 1 and 2; therefore, the advantages and disadvantages listed in sections 7.1 and 7.2 already address leaving this waste in place. One additional disadvantage for both—leaving the waste in the pits or removing this waste (Alternatives 1, 2, and 3)—is the uncertainty of what the waste is composed of. However, by characterizing of the waste in the pits using available soil exploration push technology, this disadvantage can be mitigated. The text will be revised accordingly.

   MDA A was categorized as a Hazard Category 2 nuclear facility as a result of the radioactive sludge inventory contained in the General's Tanks (DOE 2003, 087047), not from the solid low-level radioactive waste contained in the eastern and central pits. Based on the current historical knowledge of the waste contained at MDA A, the waste in the General's Tanks is currently the driving source term at the site. If the General's Tanks degrade and release contamination into the environment, modeling performed in Appendix E of the CME report indicates the downward movement of contamination would be significant.

   Additionally, because the waste left in the pit and trenches has not significantly moved into the environment over the past 30 to 70 yr and because modeling performed in Appendix E of the CME report indicates once the existing cover was placed over the waste pit and trenches further downward, movement of contamination is limited because of the lack of available moisture and the contamination at the site will remain within acceptable risk limits for human health or ecological receptors at the site (LANL 2006, 095046). Therefore, leaving the waste in place is not detrimental to future human health or ecological receptors if proper controls are in place for the portion of waste that does remain.

NMED Comment

3. *The Permittees do not adequately discuss the technologies for monitoring, landfill covers, and source removal (pages 31–32, Section 6.2.3, 6.2.4, and 6.2.5). Monitoring technology should include vapor monitoring. The Permittees discuss which cover would be the best cover, but do not discuss the cover technologies. In the discussion of the source removal technology, the Permittees discuss the geometry and volume of the pits, but do not discuss technology for the source removal. The*

Permittees must revise the Report to discuss the technologies related to monitoring, landfill covers, and source removal in greater detail.

LANL Response

3. As presented in section 6.0, further details of the technologies are presented in Appendix C of the CME report. Monitoring technologies were discussed in C-3.1, "Long-Term Monitoring." Landfill covers were discussed in section C-4.0, "Containment Technologies," and source removal was presented in C-6.0, "Excavation, Treatment, Disposal Storage."

   The text will be revised to discuss in greater detail the technologies related to monitoring, landfill covers, and source removal.

NMED Comment

4. *For Alternative 3, complete removal of the waste, the Permittees must propose confirmation sampling following excavation activities. Excavated trenches must be sampled at specific intervals. For example, at MDA B the Permittees are using a systematic-random sampling method along with biased sampling of intervals with evidence of contamination based on field-screening, visual staining, the presence of fractures, or elevated moisture content. The Permittees must revise the Report to include a similar confirmation sampling routine as part of this alternative.*

LANL Response

4. Confirmation sampling will be added to the discussion for Alternative 3, "Waste Removal," and added to the estimated Alternative 3 costs in the CME.

   Confirmation sampling will be performed to determine if adequate cleanup levels have been reached at MDA A. The design of the cleanup confirmation sampling program will be detailed in the final design in the corrective measures implementation (CMI) plan but will be costed in the CME report using a similar approach as used at MDA B.

NMED Comment

5. *Investigation data reveal that the concentrations of several contaminants increase in concentration with depth. For example, toluene increases with depth in borehole (BH) 21-26485; tritium in BH 21-26595 and BH 21-26596; butanone [2-] in BH 21-26484, BH 21-26590; acetone in BH 21-26480, BH 21-26481, BH 21-26482, BH 21-26484, BH 21-26485, BH 21-26588, BH 21-26590, BH 21-26593, BH 21-26595, BH 21-26597. Most of the concentrations, except tritium, are not above industrial screening levels; however, the Permittees must revise the Report to address the migration of contaminants in the subsurface, potential contaminant transport pathways, and vapor monitoring for VOCs.*

LANL Response

5. The report will be revised to discuss the Laboratory's assessment of the migration of contaminants from the waste into the subsurface media, potential contaminant transport pathways, and vapor monitoring for volatile organic compounds (VOCs).

Significant movement of contaminants is unlikely to occur in the future because the low moisture contents measured in the media below the waste and the CME vadose zone modeling provide evidence that once the current cover was placed, the subsurface vadose zone moisture began to decrease toward equilibrium conditions. Before closure of the waste pits and trenches 30 to 70 yr ago, rainwater would have collected in and passed through the waste. As indicated by the modeling presented in Appendix E of the CME report, it is likely that most of the migration of contaminants present in the subsurface occurred when the waste trenches were originally open and exposed to rainwater. See response to General Comment 2. Other potential contaminant pathways, such as fractures, have been found to be of limited significance.

Vapor monitoring for VOCs is described in detail under responses to General Comment 3, General Comment 6, and Specific Comment 4.

The detected concentrations and activities for analytes reported in the investigation report were below industrial screening levels, except for one detection of tritium. Tritium results from a second sampling event did not substantiate the previous tritium results. The Laboratory has committed to installing and monitoring a vapor-monitoring well at the subject location (BH-08).

NMED Comment

6. *The Permittees state in Table 10.0-1, Consent Order Milestones, that installation of a permanent vapor monitoring well at BH-08 is a milestone activity. The Permittees do not mention vapor monitoring as part of any of the corrective measures alternatives. The Permittees repeatedly state that volatile organic compounds (VOCs) are not a concern at MDA A. However, the levels of some VOCs increase with depth, indicating movement of the VOCs in the subsurface. Also, tritium detected in the subsurface at MDA A is a potential source of contamination. The Permittees must propose vapor monitoring in addition to the proposed neutron probes as part of any corrective measures alternative. The Permittees must revise the Report to include vapor monitoring for VOCs and tritium as part of each corrective measures alternative. The vapor monitoring must consist of a monitoring network that includes existing BH-08. The permanent vapor monitoring well at BH-08 is scheduled to be installed by June 2, 2009 with quarterly monitoring continuing after the permanent well is installed. The Permittees must follow the reporting procedures described in accordance with Section XI.D of the Order when reporting the ongoing vapor monitoring at BH-08. The Permittees must also include a cost estimate for the vapor monitoring for each of the alternatives.*

LANL Response

6. The schedule provided in Table 10.0-1 of the CME report includes a line for the installation of the NMED-requested vapor-monitoring well at BH-08 because it is considered part of the additional data needed to support a CMI at MDA A.

   Vapor monitoring is not proposed as a component of the proposed corrective measures alternatives because the need for such monitoring has not been established. In the “Status Report for Supplemental Sampling at Material Disposal Area A, Technical Area 21” (LANL 2007, 100482), the Laboratory specifically recommended not instituting long-term vapor monitoring at MDA A. In the approval with modifications for this report, NMED directed that quarterly monitoring be performed to provide additional data on subsurface contamination (NMED 2008, 100117). NMED subsequently clarified that this monitoring be performed using a vapor-monitoring well constructed at the location of BH-08 because the other boreholes had been plugged and abandoned (NMED 2008, 100962). Further direction was provided to include a schedule for constructing the monitoring well at BH-08 in the CME report. To meet this requirement, the schedule provided in Table 10.0-1 of the CME report includes a line for the installation of a vapor-monitoring well at BH-08. The need for additional long-term vapor monitoring at MDA A will be evaluated following installation of this well and collection of quarterly monitoring data.

Vapor monitoring is not part of the CME potential remedies because based on data available to date, there is insufficient evidence of significant VOCs or tritium at MDA A to warrant carrying vapor monitoring forward as a technology (see response to General Comment 3). If the monitoring of BH-08 identify the need to provide a vapor-monitoring network at MDA A at a future date during remediation, it can be accomplished during the CMI plan/design process and a cost estimate will be provided. If required, vapor monitoring would be necessary for any of the evaluated alternatives and does not affect the remedy selection process.

NMED Comment

7. *Table 2.5-12, Summary of VOCs and Tritium Detected in Pore Gas at MDA A, lists the contaminant concentrations for each constituent. The table lists the depth interval of each sample, but the list is not in order according to depth (e.g., the depths listed for borehole 21-26480 start with the deepest sample and end with the shallowest, some depths are listed in no order at all). The Permittees must present the data in a format that lists the depth intervals of the samples in order from shallowest to deepest for all tables.*

LANL Response

7. The Laboratory will replace Tables 2.5-6 and 2.5-12. All tables will present data in a format that lists the depth intervals of the samples in order from shallowest to deepest.

NMED Comment

8. *On page 226, Table 2.6-1, VOC Pore-Gas Screening Results, the Permittees list the maximum detected concentration and the groundwater screening level in different units. The Permittees must convert the μg/m^3 to μg/L for data comparison. The Permittees must provide conversions in such cases for assessment purposes.*

LANL Response

8. The appropriate unit for pore-gas concentrations is micrograms per cubic meter because the values are for a vapor and not a liquid. The Laboratory will revise Table 2.6-1 of the CME report and present all vapor samples in both micrograms per cubic meter and micrograms per liter as well as clarify/justify the measures used and any conversions.

NMED Comment

9. *The cost estimates presented in Appendices F, G and H are presented in a format that is not easily interpreted and the Permittees do not discuss the cost estimates in detail in the main text. Additionally, cost estimates for vapor monitoring must be added to all cost estimates. The printout of the financial assessment may be used as supporting documentation, but the Permittees must present the data in a clear, concise manner similar to Tables 8.1-1, 8.2-1, 8.3-1, and 8.4-1 in the CME Report for MDA G.*

LANL Response

9. The cost estimates were originally summarized in Table 7.1-1. The cost estimates will also be summarized in tables similar to those submitted in the CME report for MDA G.

   See responses to General Comment 6 and Specific Comment 4 for information on vapor monitoring.

SPECIFIC COMMENTS

NMED Comment

1. Page 4, Section 2.1.7, Summary of Subsurface Utilities, paragraph 6

Permittees' Statement: *"The following sections provide a summary of site information. Further information about the current site conditions at MDA A is presented in detail in the approved investigation work plan (LANL 2006, 095046) and the MDA A IR and supplemental report (LANL 2006, 095046) and the status report for supplemental sampling (LANL 2007, 100482). These three documents describe the site and include information on the disposal units, waste inventories, characterization activities, analytical sampling results, and assessments of potential present-day risks to human health and the environment. The following sections summarize the information about the site."*

NMED Comment: *The Permittees must correct the reference to the Investigation Work Plan for MDA A. The correct reference is LANL 2005, 088052.113. The Permittees must use correct citations for the reference documents.*

LANL Response

1. The Laboratory will provide the correct reference for the investigation work plan.

NMED Comment

2. Page 9, Section 2.5.1, DP Canyon Slope, paragraph 2

Permittees' Statement: *"The distribution of inorganic COPCs was not widespread. Elevated lead concentrations were localized and defined vertically and laterally. Perchlorate and nitrate were detected across the site at low concentrations (less that 0.13 mg/kg and 3.0 mg/kg, respectively), with no discernible distribution trends."*

NMED Comment: *The extent of lead contamination was not defined on the canyon slope: The highest concentration was found in the 1.5-2 foot interval of BH 21-26488. In Appendix I, the slope is projected to host possible recreational activities in the future (Appendix I, page I-6, Section I-2.3, Current and Reasonably Foreseeable Future Land Use, paragraph 3); the concentrations of lead found in soils on the slope exceeds the recreational soil screening level (SSL). The Permittees must revise the Report to discuss the erosion potential of the canyon slope and the risk of exposure. If the risk of exposure to the lead during recreational activities is real, then the Permittees must revise the Report to remove mention of using the canyon slope for recreational activities. The Permittees must, for all corrective measures alternatives, revise the Report to address lead contamination in soils on the slope.*

LANL Response

2. As stated in the MDA A investigation report (LANL 2006, 095046), the extent of lead is defined laterally by lower lead concentrations in surrounding samples and vertically by lead concentrations in surrounding samples similar to background. Because the lead is bounded laterally and unlikely to migrate vertically on the slope (precipitation is more likely to run off down the slope than to pool on the surface and infiltrate the subsurface), further sampling for lead was not warranted. The investigation report was approved (NMED 2007, 095047), and this issue was not commented on during the review and revision process.

   MDA A borders DP Canyon, a shallow tributary canyon to Los Alamos Canyon. In DP and Los Alamos Canyons geomorphic characteristics provide evidence that rock falls are very infrequent and that MDAs more than 50 ft from the cliffs should be considered stable with respect to mass-wasting for periods exceeding 10,000 yr). MDA A is more than 50 ft from the mesa edge, and no cliffs are present. The area leading into DP Canyon is a more gradual vegetated slope that is not prone to landslides or other disturbances that would result in the exposure of buried materials. The long-term record of DP Canyon slope sediment erosion and deposition indicate that remobilization of sediment can occur on time scales of years to thousands of years (Broxton and Eller 1995, 058207). The report will be edited to discuss the erosion potential of the canyon slope.

   In summary, a limited amount of soil cover (several feet) exists over bedrock at the slope. Given the erosion potential described in the above-referenced report, any lead bearing soil that might erode off of the canyon slope would be revealed in surface water samples collected as part of LANL's surface water monitoring plan in the vicinity of MDA A. The monitoring of surface water is not considered specific to MDA A and therefore not included in the long term monitoring and monitoring cost for MDA A.

   Potential exposure and risk are determined based on the reasonable maximum exposure, not the worst case exposure. Therefore, evaluating risk based on the maximum detected concentration is inappropriate. The recreational scenario is assumed to be a surface exposure to a person (child or adult) hiking along the slope. Therefore, the recreational risk was determined based on a 95% upper confidence limit (UCL) of 24 mg/kg for a depth of 0-1 ft, which represents the reasonable maximum exposure along the slope, and is less than the recreational screening level of 560 mg/kg. The recreational use of the DP Canyon slope area does not result in exposure to the lead concentration of 598 mg/kg because it would require the receptor to remain on that spot, after digging 2 ft below the surface, for 1 h/d for 200 d/yr. In addition, the residential risk from lead for the slope is also acceptable in that the reasonable maximum exposure is 284 mg/kg (also a 95% UCL), which is less than the residential screening level of 400 mg/kg. Exposure and risk from the maximum lead concentration under a residential scenario would require a person to remain on that spot for 24 hours and 350 d/yr.

NMED Comment

3. ***a. Page 11, Section 2.5.4, Pore-Water Vapor, paragraph 1***

   Permittees' Statement: *"The maximum detected activity of tritium (1,092,486 pCi/L) was at location 21-26593 at a depth of 34-35 ft south of the eastern disposal pits. An increase in activity was noted from the near-surface sample concentration of 1300 pCi/L at 3 ft to the maximum activity at 34 ft. However, adjacent boreholes (location 21-26595 and 21-26594) located approximately 40-70 ft from location 21-26593 had lower tritium pore-water-vapor activities at the same depth. The deep borehole (location 21-26588), approximately 70 ft from location 21-26593, had substantially lower tritium at TD*

(360ft); here tritium was detected at 1762.9 pCi/L instead of the 1,092,486 pCi/L at location 21-26593. Tritium activity in the deep borehole decreased with depth. Activity also decreased laterally away from locations 21-26593 and 21-26588."

b. Page 14, Section 2.6.4, Tritium, paragraph 2

Permittees' Statement: *"Tritium results from 2007 were over an order of magnitude lower than levels measured in the same locations in 2006. Tritium levels in 2007 ranged from nondetect to 1073.84 pCi/L. Tritium activities either remained relatively consistent or decreased with depth. Concentrations decreased laterally away from the maximum activity measured in 2007 at borehole location 21-26596. The vertical and lateral extent of tritium in pore water vapor are defined at MDA A. The maximum detected level of tritium was approximately 5% of the MCL for tritium. Therefore, the tritium detected in the subsurface of MDA A is not a potential source of groundwater contamination."*

NMED Comment a and b: *There is a large discrepancy between the vapor monitoring data from 2006 and 2007. The Permittees must continue to conduct quarterly monitoring of the tritium levels at MDA A. The Permittees must revise the Report to include vapor monitoring for tritium in all corrective measures alternatives.*

LANL Response

3. The Laboratory recognizes the need for additional data characterizing subsurface tritium contamination at Technical Area 21 (TA-21) and has prepared a subsurface tritium monitoring plan for TA-21. This plan was provided to NMED in July 2008 for informational purposes. As additional data become available, the plan may be modified, and DOE will evaluate the tritium sampling results to determine what additional actions, if any, are needed at MDA A to meet DOE's obligations for radiological protection of workers, the public, and the environment under the Atomic Energy Act. Such actions will be incorporated by DOE into the corrective measure alternative for MDA A selected pursuant to the Consent Order.

   The Laboratory will use available soil exploration push technology to characterize the waste trenches and central pit to evaluate the potential for an ongoing or potential future source of tritium releases at MDA A. Once completed, the decision to add tritium vapor monitoring will be made. The CME report will not be changed to include vapor monitoring for tritium. The decision for adding monitoring will be delayed to the CMI. A discussion of the potential impact of this decision along with the justification for this delay will be added to section 10.

NMED Comment

4. Page 13, Section 2.6.2, VOCs, paragraph 3

Permittees' Statement: *"Distribution of the nine most prevalent compounds in the boreholes with maximum concentrations indicated concentrations decreased with depth for five of the compounds [...] remained unchanged for two of the compounds [...], and increased with depth for two of the compounds (acetone and trichloroethene)."*

NMED Comment: *The increase in the concentration of acetone and trichloroethene with depth indicates contaminant migration due to moisture flux. Fractures may be a pathway for contaminant migration through the tuff since fractures with roots were observed in BH 21-28485 and BH 21-26590. The Permittees must revise the Report to address the increase of VOCs with depth for each of the corrective measure alternatives.*

LANL Response

4. The increase of acetone and trichloroethene concentrations with depth refers to the results from boreholes 21-26481 (total depth [TD] 46 ft), 21-26593 (TD 115 ft), and 21-26596 (TD 35 ft) where the highest concentration of acetone and/or trichloroethene for the borehole was detected in the deepest sample. Increases in VOC concentrations with depth may occur near the surface, and the results from the deepest borehole (21-26588, TD 360 ft) are most appropriate for evaluating vertical extent and assessing the potential for migration to groundwater. The concentration of acetone in the sample collected from TD in borehole 21-26588 was the lowest of all samples collected from this borehole, and trichloroethene was not detected in the TD sample. Thus, while concentrations in shallower boreholes may increase with depth, concentrations for the site as a whole, as characterized by borehole 21-26588, decrease with depth. The investigation report evaluated the fractures and found the fractures were, in general, discontinuous, filled with clay, and did not exhibit elevated levels of contamination relative to the surrounding media. The Laboratory will present a fracture assessment in the CME report.

NMED Comment

5. ***Page 20, Section 3.4.5, Groundwater, paragraph 6.***

   Permittees' Statement: *"The regional aquifer is approximately 1265 ft bgs at MDA A (Figure 3.4-2). Because groundwater was not encountered beneath MDA A during the 2006 investigation to a depth of 360 ft bgs, groundwater is not a medium of concern at MDA A."*

   NMED Comment: *Groundwater is a medium of concern at MDA A regardless of whether or not it was encountered during investigation activities at MDA A. In accordance with Section VII.D of the Order, the Permittees must address potential contaminant migration to groundwater.*

LANL Response

5. The potential for migration of contaminants to groundwater via transport by water was addressed with the modeling presented in Appendix E of the CME report. The modeling evaluation demonstrated a low potential for migration of contaminants to the regional aquifer over the next 1000 yr. Section 3.4.5 of the CME report will be revised to refer to the results of the modeling presented in Appendix E.

   Proposed pit and trench investigation sampling using available soil exploration push technology will address the potential for future migration of VOC vapors to groundwater (see responses to General Comment 6 and Specific Comment 4).

NMED Comment

6. ***Page 21, 4.2.1, Contaminant Transport Pathways, paragraph 3***

   Permittees' Statement: *"Contaminants released from the disposed waste may be redistributed with and beyond the site by the following primary transport pathways:*

   - *vapor-phase transport of volatile chemicals (VOCs and tritium) into the surrounding unsaturated zone with potential for transport to the regional aquifer*
   - *vapor-phase transport of volatile chemicals (VOCs and tritium) into the atmosphere*

- *surface-water transport of contaminated surface soils as eroded sediment to adjacent canyons by runoff*
- *airborne transport of small particulates brought to the surface by biointrusion or erosion;*
- *unsaturated transport of contaminants with infiltrating water through the thick (1200-ft) unsaturated zone*
- *saturated-zone transport of contaminants, if contaminants reach the regional aquifer*
- *biointrusion transport via plant roots and burrowing animals"*

NMED Comment: *Section VII.D.2, item 7, of the Order states that the CME Report must include: "[a]n identification and description of contaminant migration pathways." Pathways such as pipeline trenches, abandoned shafts, fractures, and paleochannels represent potential pathways for increased contaminant migration. The Permittees must revise the Report to address all potential contaminant pathways.*

LANL Response

6. The following will be added to the report as additional pathways:

   - unsaturated transport of contaminants with infiltrating water through the vertical shafts or pits at the site
   - unsaturated transport of contaminants with infiltrating water through the fractures at the site
   - unsaturated transport of contaminants with infiltrating water through the pipeline trenches north of the site (acid waste and electrical lines)
   - surface-water transport of contaminated surface soils as eroded sediment to adjacent DP Canyon through the possible paleochannel north of the site

NMED Comment

7. Page 25, Section 5.1.4, Pore Gas, paragraph 2

Permittees' Statement: *"Equation 5-2 was used to screen the VOC pore-gas data for the supplemental investigation at MDA A. The screening was performed using the maximum detected value from the deepest stratigraphic unit sampled, which is the Otowi Member of the Bandelier Tuff. Data from the deepest unit were used in screening because this unit is closest to the regional aquifer. Thirty-one VOCs having MCLs, NMWQCC standards, and/or HHMSSLs were detected (LANL 2006, 095046, Appendix I, p. 1-45). These results show the SV is below 1 in every case. Based on these screening results, the VOCs detected in subsurface pore gas at MDA A do not presently appear to be a potential source of groundwater contamination. Therefore, the corrective measure alternatives do not address VOCs in pore gas."*

NMED Comment: *See General Comment number 4.*

LANL Response

7. The Laboratory assumes that the NMED comment refers to Specific Comment 4 and General Comment 6, which refer to the vertical distribution of contaminants rather than to General Comment 4, which refers to confirmation sampling. See responses to Specific Comment 4 and General Comment 6.

NMED Comment

8. Page 25, Section 5.2.1, Threshold Criteria

Permittees' Statement: *"This screening process was applied to eight corrective measure alternatives as detailed in section 7."*

NMED Comment: *The three chosen corrective measure alternatives are detailed in Section 7 and the rest of the corrective measure alternatives are described in Section 6. The screening process the Permittees used to reduce the eight options to three is not discussed adequately. The Permittees failed to discuss or explain in the Report how alternatives were eliminated or retained through the initial screening process. See General Comment number 1. NMED is therefore unable to evaluate whether or not the screening process was conducted properly and whether alternatives were appropriately eliminated or retained. The Permittees must revise the Report, where appropriate, to justify why the remedy alternatives were eliminated and describe the screening process in detail.*

LANL Response

8. See response to General Comment 1.

NMED Comment

9. Page 26, Section 5.2.2, Balancing Criteria, paragraph 2

Permittees' Statement: *"These criteria closely overlap with the evaluation criteria described in Section XI.F.9 of the Consent Order. Therefore, these criteria were combined with the evaluation criteria in section 5.2.3. The combined criteria were used to evaluate three corrective measure alternatives that passed the initial screening in section 6. This evaluation is discussed in section 7."*

NMED Comment: *Section XI.F.9 of the Order describes the identification of the corrective measures options for a CME Report, not the requirements for evaluating corrective measure options. The threshold criteria and the balancing criteria must be evaluated separately. The Permittees must adhere to the evaluation criteria outlined in Section VII of the Order and revise the Report to follow the criteria.*

LANL Response

9. See the Laboratory's response to General Comment 1. The Laboratory will adhere to the evaluation criteria outlined in Sections VII.D.2 through VII.D.6 of the Consent Order in revising the report.

NMED Comment

10. Page 26, Section 5.2.3, Evaluation Criteria, paragraph one

Permittees' Statement: *"Section XI.F.10 of the Consent Order required the evaluation of corrective measure alternatives based on the following: 1) applicability 2) technical practicability 3) effectiveness 4) implementability 5) human health and ecological protectiveness 6) cost"*

NMED Comment: *Section XI.F.10 of the Order is meant to be used as an outline for the Report. Section VII.D.4.b of the Order describes the evaluation criteria for the corrective measures and should be used as the reference for evaluation of the remedy alternatives. The Permittees must ensure that they adhere to the evaluation criteria identified in Sections VII.D.4.i through VII.D.4.v of the Order.*

LANL Response

10. As indicated in the Laboratory's responses to General Comment 1, the Laboratory will adhere to the evaluation criteria outlined in Sections VII.D.2 through VII.D.6 of the Consent Order in revising the report. Specifically, the Laboratory will utilize the evaluation criteria specified in Sections VII.D.4.b.i through VII.4.b.v in section 8.0 where the alternatives will be screened against the balancing criteria.

NMED Comment

11. Page 26, Section 5.2.4, Selection Criteria, paragraph one

Permittees' Statement: *"Based on the evaluation of the three final corrective measure alternatives, one alternative was selected as the recommended corrective measure alternative. Compliance of this alternative with a final set of criteria described in Section XI.F.11 of the Consent Order is detailed in section 8 of this report. The criteria used in the description of the final selection were as follows: 1) achieve cleanup objectives in a timely manner 2) protect human health and ecological receptors 3) control or eliminate the sources of contamination 4) control migration of released contaminants 5) manage remediation waste in accordance with state and federal regulations."*

NMED Comment: *See Specific Comment number 10 above.*

LANL Response

11. See the Laboratory's responses to General Comment 1.

NMED Comment

12. Page 27, Section 5.4, Hazardous Waste Regulations

Permittees' Statement: *"A waste management plan is not included in this report because the selected remedy is not expected to generate any appreciable waste streams."*

NMED Comment: *In Section 8.2.5, Manage Remediation Waste in Accordance with State and Federal Regulations, the Permittees state, "[t]he existing ET covers (Alternatives 1 and 2) monitoring system installations may generate small quantities of low-level chemical and radiologically contaminated drill cuttings that would require handling and disposal as investigation-derived waste." The Permittees must submit a waste disposal and develop a hazardous waste management plan for* *any corrective measure action chosen since any corrective measure will create waste (e.g., drilling of neutron probe holes and vapor monitoring holes). The type of contaminants in the pits is not known with any certainty and hazardous waste may be present. The Permittees must treat all soil as hazardous until proven otherwise.*

LANL Response

12. A small amount of waste would be generated if Alternative 2 is selected. The Laboratory will include a waste management plan as an appendix to the revised report.

NMED Comment

13. Page 28, Section 6.1.1.1, In Situ Grouting

Permittees' Statement: *"In situ grouting for macroencapsulation is dismissed for use as a corrective measure relative to the disposal pits because the waste form is such that there may not be continuous void spaces available to accept the grout at would result is a partially encapsulated mass that would be ineffective in isolating the waste from the environment. However, this screening technology is suitable for use on the General's Tanks waste because of the small residual volume of waste within the large void space of each tank. An engineering feasibility test was performed on a surrogate waste using similar geometry as anticipated for the General's Tanks (AEA 2004, 102711). The results of the test indicate the waste remaining in the tanks can successfully be encapsulated. Further bench-scale tests are required to demonstrate the performance of the grouted material on the actual waste contained in the tanks. Uncertainty remains regarding the ability of the 70-plus-year-old tanks to withstand the mixing process without leaking."*

NMED Comment: *The condition of the General's Tanks could be an issue when pumping out the waste heel (all alternatives) and removing the tanks (alternative 3). The Permittees must address the condition of the General's Tanks and their ability to withstand pumping and removal of the waste. The Permittees must propose contingencies should the tanks be unable to withstand partial or complete waste removal.*

LANL Response

13. How the waste will be removed depends on the studies performed to determine the characteristics of the General's Tanks contents (Table 10.0-1). Part of this characterization effort will include defining the methodology most suitable for removal of the tank heel as a precursor to final design and implementation of the remedy and will account for the condition of the tanks. Potential conditions of the General's Tanks are discussed further in section 6.2.2.

NMED Comment

14. Page 29, Section 6.1.1.3, In Situ Vitrification

Permittees' Statement: *"In situ vitrification has been successfully used to turn soil and rock masses into glass monoliths. The application of the technology to the wastes found at MDA A is not considered practical for the following reasons. A demonstration was conducted at MDA V (LANL 2003, 080923) absorption beds (crushed tuff, gravel, cobbles, and boulders plus underlying tuff bedrock) with the resulting melt material having small metal inclusions but otherwise successfully encapsulating the radioactivity and other contaminants in a durable glass material. However,* *application of this technology to waste disposal pits would likely be unsuccessful. Large metal objects present in the melt would like result in pools of metal in and below the melt. Cardboard and other flammable materials could result in small fires. The resulting emissions of carbon monoxide and carbon dioxide would require additional treatment. The power consumption to treat a mass the size of MDA A would be very large. The resulting glass would resemble obsidian rock and might be used as a resource in the future for human activities. For these reasons, in situ melting is eliminated."*

NMED Comment: *Most problems with vitrification as a potential remedy can be mitigated in the field: off-gas systems are part of the in situ vitrification (ISV) process; dynamic disruption has proven effective in controlling problems with sealed containers and voids. Danger from small fires may be negligible, because the vitrification is in situ and underground. However, because only a few studies have been done with vitrification in waste pits, it is difficult to say whether or not vitrification would be successful at MDA A compared to the cost of the technology. Future use of the vitrified soil and rock by humans could be controlled. Even if the Permittees believe that humans would use the obsidian-like vitrified soil and rock in the future, leaving the waste in place would present a similar exposure problem for future residents, especially if institutional and long-term access controls break down. The Permittees must revise the Report to follow the evaluation criteria discussed in General Comment 1 and Specific Comments 8 and 10 and provide better explanations for dismissal of this technology as a corrective measure alternative.*

LANL Response

14. Table 3.2 (Federal Facilities Roundtable Remediation Technologies Screening Matrix and Reference Guide Federal Remediation Technologies Roundtable [June 2008, www.frtr.gov/scrntools.htm]) lists in situ vitrification (In Situ Thermal Treatment, section 4.10 Thermal Treatment) as performing below average in the areas for treatment train (the technology would require a complex treatment train and it will generate excessive waste), operation and maintenance (O&M) (high degree of O&M intensity), capital expenditures (high degree of capital investment), and the treatment of inorganics and explosives. Other limitations that this technology presents appear in Appendix C, section C-5-1 (In Situ Vitrification) of the submitted report. The Laboratory believes these additional justifications (which will be included in the revised report), coupled with the five original justifications that appeared in section 6.1.1.3 of the report, provide the rationale for screening out in situ vitrification as a technology for use at MDA A.

NMED Comment

15. Page 31, Section 6.2.3, Monitoring Technologies, paragraph 1

Permittees' Statement: *"The time periods applicable to monitoring and maintenance for MDA A following completion of the corrective action are presented in Table 6.2-1. There are a broad range of monitoring technologies available for monitoring present or former inactive waste disposal areas. Detailed monitoring options will be specific to the technologies used for a selected corrective measure. The broad range of monitoring options include cover and waste unit monitoring over time to determine moisture migration into and out of the cap, monitoring the vadose zone below the waste, and no monitoring if wastes are no longer present."*

NMED Comment: *In Table 6.2-1 the Permittees list monitoring and maintenance for 30 years after complete removal. The Permittees must clarify what the monitoring and maintenance will entail if complete removal is chosen as the corrective action. Additionally, the Permittees must address vapor monitoring in this section.*

LANL Response

15. No monitoring will be required because no waste will remain, and remaining contamination in the subsurface media will be below acceptable risk-screening levels. Implementation of Alternative 3 (if selected) will result in a closure verified by confirmation sampling. Table 6.2-1 presents the regulatory maintenance and monitoring period requirements applicable to each alternative.

    Vapor monitoring has been addressed in the responses to Specific Comment 4 and General Comment 6.

NMED Comment

16. Page 31, Section 6.2.3, Monitoring Technologies, paragraph 2

Permittees' Statement: *"ET caps are proven technology and do not require monitoring to demonstrate the technical effectiveness. Because contaminant migration is controlled from the disposal pits into the vadose zone below MDA A and above the regional or perched aquifer (not identified as present to the depth drilled in the remedial investigation) by the downward movement of moisture present in the bedrock, monitoring for potential contaminants is not necessary. The effectiveness of the remediation can be monitored by determining the change in moisture content below the waste over time. If the waste is removed, no monitoring is required."*

NMED Comment: *While the Permittees' modeling shows VOCs are not a concern at MDA A, the monitoring results from the 2006 and 2007 show inconsistencies in detected VOC and tritium concentration. The variability of the field results makes it necessary for vapor monitoring to be a part of any corrective measure alternative for MDA A. Furthermore, NMED does not agree with the statement that, "ET caps are proven technology and do not require monitoring to demonstrate the technical effectiveness." ET caps perform well in arid and semi-arid climates, however Los Alamos is a wetter environment and snow is especially bad for ET covers. ET covers are proven to leak, thus must be monitored. The Permittees' must propose vapor monitoring locations (including BH-08) as part of the monitoring technology for MDA A. See General Comment number 6.*

LANL Response

16. Evapotranspiration (ET) covers are a proven technology. ET covers have been monitored more than any other cover technology (http://cluin.org/products/altcovers/) and have provided continued evidence that they are an excellent choice for many site closures (http://www.clu-in.org/download/remed/epa542f03015.pdf-search='evapotranspiration epa fact sheet). Although cover systems that meet the RCRA design criteria have typically received little to no monitoring, this minimal monitoring has shown they have significant problems, such as barrier layer degradation and flaws in geosynthetic membranes as well as increased VOC detection in groundwater due to the installation of impermeable cover systems. Dwyer (2003, 097902) showed that ET cover systems in New Mexico actually outperform prescriptive technologies.

    Monitoring of an alternative earthen cover system on a Superfund site near Farmington, New Mexico, has shown that after maturation of the site vegetation and cover system, there is no flux through the cover. NMED along with U.S. Environmental Protection Agency Region 6 are the regulatory authorities at the site and have access to this data.

    ET covers are designed to store infiltrated water, including snowmelt, until that water can be removed via the combination of transpiration and surface evaporation, collectively referred to as ET. This is predicated on the assumption that the climate demand for water at this site is higher than the actual supply of water. Potential evapotranspiration (PET) is a quantification of a site's demand for water. Dwyer et al. (2007, 096232) present a detailed explanation of this topic. The supply of water is generally via precipitation. Figure 1 depicts the monthly comparison of PET versus precipitation for Los Alamos, New Mexico. It can be seen that for every month of the year, the demand for water is significantly higher than its supply. Therefore, Los Alamos is an excellent environment for deployment of an ET cover.

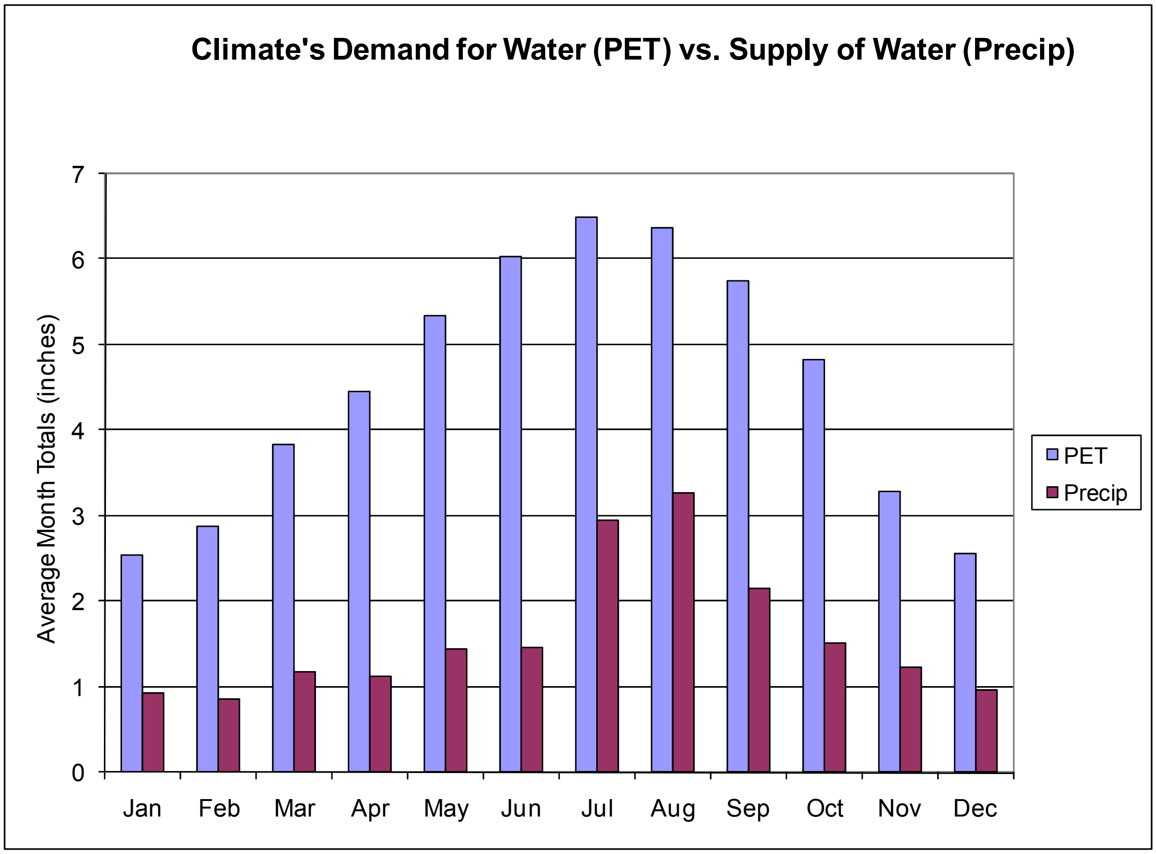

Figure 1 Climate's demand for water (PET) versus supply of water (precipitation)

The cover profile will be designed per steps detailed in Dwyer et al. (2007, 096232) that uses the combination of unsaturated modeling, applicable field data, and natural analogs to develop a conservative cover profile that should effectively isolate the underlying waste from the environment for an extended period of time. Furthermore, because the site contains some radionuclides, an ET cover system composed of earthen materials with unlimited longevity is preferred, compared with geosynthetics with limited effective life.

The Laboratory has provided data that show VOCs and tritium are not a significant risk at the site; consequently, monitoring is not required. Refer to response to General Comment 3. However, the monitoring of the cover system's water balance will provide valuable information. Refer to the response to General Comment 3.

NMED Comment

17. Page 35, Section 6.3.3, Alternative 3, Source / Waste Removal, paragraph 8

Permittees' Statement: *"The northward slope to the site allows an excavation to be made for the waste that daylights into DP canyon. A minor (less than 2ft) backfill thickness to support vegetation in the bottom of the excavation will be placed. The bottom will be contoured in a swale of less than 0.5% to drain outward to DP Canyon."*

NMED Statement: *The Permittees discuss waste that daylights into DP Canyon for Alternative 3, but do not mention the canyon in their discussion of other alternatives. The Permittees must clarify what they mean by "waste that daylights," identify the waste, identify the area on a map and explain why this waste should not be immediately removed. The Permittees must address the canyon contaminants in terms of cleanup for all corrective measure alternatives.*

LANL Response

17. The text is incorrect as written: the phrase "daylights into DP Canyon" should modify "excavation" rather than "waste." Actual waste does not "daylight" into DP Canyon. The excavation was designed to allow surface water to drain from the excavation into the canyon without the use of extensive backfill.

    The investigation report described contaminants on and near the DP Canyon slope. The recreational scenario risk screening assessment, performed using contaminant data from the slope area, found no unacceptable risks or hazards to human or ecological health for contaminants remaining on the slope. Therefore, cleanup on the slope is not required for any of the corrective measures alternatives. The CME report will be revised for clarification.

NMED Comment

18. Page 48, Alternative 3, Section 7.3.2, Technical Practicability

Permittees' Statement: *"In the long-term, the performance, reliability, and minimization of hazards at the site are optimal because no waste remains at MDA A. This alternative does, however, present short-term considerations. The large volume of material to be transported for off-site disposal may impact the practicability of this alternative. The estimated volume of material, both waste and contaminated soil contained in and around the disposal units to be excavated and transported is 28,700 yd^3 and does not account for the bulking factor upon removal. This estimate assumes that a portion of the overburden is not contaminated and will be used for backfill cover of the excavation. Because the waste is probably similar to that at MDA B (expected to be heterogeneous debris, soil, and mixed contaminated media), with similar uncertainty as to waste type, the excavation will be similarly conducted in a ventilated enclosure to mitigate off-site releases of dust and contaminants."*

NMED Comment: *Complete waste removal is planned for MDA B, a larger site at TA-21 with similar waste, and is therefore likely a feasible remedy for MDA A. Removal of the waste at MDA B can be used to help plan the removal of waste from MDA A. The schedule for removal at MDA A can be integrated into the schedule of MDA B and the same equipment can be used. The advantages (e.g. reduced short-term residual risks, establishment of more natural conditions, reduced long-term risks, little if any long-term monitoring and maintenance) of complete removal should be contrasted with the disadvantages (e.g. cost, increased short-term exposure risks). The amount of waste to be removed at MDA A is 28,700yd^3 (pit volume, plus contaminated soil around the pits), less than the* *amount approved for removal at MDA B (38,607yd^3). The amount of waste removed from the pits should not significantly affect the practicability of this alternative at least compared to MDA B. The Permittees must revise the Report to discuss the potential of complete removal with a comparison to the planned removal at MDA B.*

LANL Response

18. The planned removal at MDA B is described in the MDA B work plan. The excavation of waste at MDA B will be performed as an interim measure as defined in the Consent Order. The CME process as presented in the Consent Order is independent of action that has been or may be taken at other sites. Part of the reason for selecting removal of MDA B was the proximity of potentially unstable chemical wastes to the existing businesses along DP Road. The same hazard has not been identified at MDA A.

    The advantages and disadvantages associated with the potential implementation of Alternative 3 are adequately identified and evaluated because these criteria were inherently embedded within the ranking and scoring process associated with the selection of Alternative 2 in the previously submitted report. If reevaluation of alternatives based on NMED's Specific Comment 11 results in a different outcome, the CME report will be appropriately modified.

NMED Comment

19. Page 49, Section 7.3.3, Effectiveness

Permittees' Statement: *"This alternative is least effective of the three in short-term at mitigating the impact of contamination. Disturbance and excavation of the disposal units increase the possibility of accidental release of hazards and/or radioactive materials. The possibility of release upon disturbance of the units containing unknown waste materials increases the short-term risk and dose from dispersal of contamination."*

NMED Comment: *NMED disagrees. The units containing unknown waste materials also increase the risk and uncertainties of leaving the waste in place. Short-term risks can be mitigated by using the administrative and engineering safety controls discussed in the Report. The Permittees must revise the Report to discuss the effectiveness of this alternative with the uncertainty of the waste inventory and mitigating factors for safety in mind.*

LANL Response

19. Alternative 3 is most effective in mitigating the long-term impact of contamination but has the highest short-term risks. The Laboratory agrees that short-term risks can be mitigated; however, any mitigation activities associated with short-term risks do not completely eliminate these risks. In addition, it is not possible to entirely mitigate the transportation risks associated with waste disposal. The risks become apparent in the comparison of the risk assessment results for each alternative as presented in the "Final Site-Wide Environmental Impact Statement for Continued Operation of Los Alamos National Laboratory, Los Alamos, New Mexico" (DOE 2008, 102731) and summarized in section 6.0 of the CME report. In summary, the short-term risks associated with the implementation of Alternative 3 remain inherently higher than the short-term risks that would be associated with the implementation of either of the other two alternatives.

A discussion of the effectiveness of Alternative 3 relative to the uncertainty of the waste inventory including any mitigating factors for safety will be added.

NMED Comment

20. Page 49, Alternative 3, Section 7.3.4, Implementability

Permittees' Statement: *"Implementation of this alternative requires: conducting a hazardous waste categorization and hazard analysis to identify requirements associated with unknown wastes materials"*

NMED Comment: *The identification of requirements has been performed at MDA B, which has similar waste streams as MDA A, and can therefore be used as guidance. The Permittees must use information gathered from waste categorization during operations at MDA B to inform the waste categorization at MDA A, should the excavation alternative be selected.*

LANL Response

20. The Laboratory understands this comment and agrees; however, the statement as written is correct. No revisions to the report are warranted.

NMED Comment

21. Page 52, Section 8.2.4, Control Migration of Released Contaminants

Permittees' Statement: *"The current site conditions are such that contamination of soils and bedrock outside the waste pits meets industrial screening levels. Therefore, one alternative is not better than the other for controlling or mitigating already released contaminants. As presented in Appendix E, modeling indicates little potential for a groundwater pathway to exist at MDA A. Once the waste in the General's Tanks is removed the potential for future migration of contaminants to the surrounding bedrock will be removed. Modeling indicates near steady state conditions have been established below the existing cover and that increases in moisture content necessary for additional contaminants to migrate from the waste will not occur."*

NMED Comment: *Modeling may indicate a low potential for a groundwater pathway to exist at MDA A; however, this is not necessarily the case. Removing the General's Tanks removes a portion of the source, but there is potential for future migration of contaminants from the eastern and central pits if the proposed cap fails. In addition, there is field evidence which suggests that moisture migration in the vadose zone is facilitating the migration of contaminants. See Specific Comment number 4. The Permittees must revise the Report to discuss how recent field data was applied to the evaluation of potential remedy alternatives.*

LANL Response

21. Recent field data were taken into account during the screening and ranking of Alternative 3 in the report. In this ranking, Alternative 3 received a better score for toxicity reduction due to the removal of the waste. The report will be revised to discuss how recent field data were applied to the evaluation of potential remedy alternatives.

The current data as well as the modeling presented in Appendix E of the CME report support an argument that past moisture migration in the vadose zone has facilitated the migration of contaminants in the bedrock media below the waste. However, there is no reason to believe that significant movement of contaminants is currently occurring. Before closure of the waste pits and trenches, water would have collected and been concentrated in the waste. It is likely that most of the migration of contaminants present in the subsurface occurred when the waste trenches were originally open and exposed to rainfall. Following closure, the ET cover would prevent significant amounts of precipitation from entering the waste and ultimately transporting contaminants into the bedrock below the waste.

The MDA A investigation report (LANL 2006, 095046) shows no significant releases. In addition, the risk assessment performed in support of the investigation report concluded that no potential for unacceptable risk/dose to human health exists for the decision scenarios used (industrial for MDA A and recreational for the DP Canyon slope).

NMED Comment

22. Page 59, Section 9.7, Long-Term Monitoring Requirements, paragraph 1

Permittees' Statement: *"Groundwater monitoring of the regional aquifer beneath MDA A will be consolidated with the Laboratory-wide groundwater-monitoring program. No additional groundwater-monitoring wells are proposed. The vadose zone will be monitored for 30 yr using neutron probes in the proposed boreholes shown in Figure-6.3-1. The use of neutron access holes allows the monitoring of moisture content changes below the cover system, an indicator of the cover system performance. Because contaminant transport at MDA A is driven by moisture flux below the waste units, an increase in moisture would indicate a downward movement of contaminants. The neutron access holes will be located close to the eastern waste units where there is a higher potential for chemical wastes and uncontrolled disposal practices, and they will extend approximately 20 ft below the maximum depth of contamination (LANL 2006, 095046)."*

NMED Comment: *The vadose zone monitoring locations must cover a broader area than the proposed locations and include monitoring of the central pit. The Permittees must add or change the locations of the neutron probe boreholes to monitor a larger area of the site. Additionally, neutron probes are not adequate as the sole mechanism for monitoring the vadose zone at MDA A. Long-term monitoring must include vapor monitoring as required by the Order, particularly at sites where waste is left in place. The Permittees also must further discuss groundwater monitoring. The Permittees must revise the Report accordingly, see General Comment number 6.*

LANL Response

22. The Laboratory will revise the report to further discuss vadose zone monitoring that will serve as the early-detection monitoring for performance of the selected remedy for MDA A. Groundwater monitoring is also being conducted for the group of MDAs at TA-21 with existing and new wells in accordance with the NMED-approved "Los Alamos and Pueblo Canyons Groundwater Monitoring Well Network Evaluation and Recommendations, Revision 1" (LANL 2008, 101330). In addition, the revised report the Laboratory will identify additional neutron probe boreholes to monitor a larger portion of the site. Vapor monitoring is addressed in the Laboratory's responses to Specific Comment 4 and General Comment 6.

NMED Comment

23. Page I-6, Section I-2.3, Current and Reasonably Foreseeable Future Land Use, paragraphs 2 and 3

Permittees' Statement: *"Historically, MDA A has been used for industrial purposes. Current land use for the MDA A site is industrial; the area is fenced and access control is maintained by the Laboratory. It is expected that the land use will remain industrial in the reasonably foreseeable future.*

MDA A is located on DP Mesa, near the commercial district of Los Alamos and separated from the DP Canyon slope by the paved North Perimeter Road. The DP Canyon slope north of MDA A is currently undeveloped and is covered by natural vegetation. It is expected that the canyon slope will remain undeveloped. Potential future land use could include recreational activities, such as hiking, bird watching, or children playing (extended backyard scenario)."

NMED Comment: *The land at MDA A may be transferred to Los Alamos County since it represents a potential for land development, particularly considering its close proximity to an established commercial district. In this case, the land use must be unrestricted for commercial zoning by Los Alamos County and possibly also residential use. On page 27, Section 5.3, DOE Directives and Criteria for Radioactive Waste and Radiation Protection of the Public and the Environment, paragraph 2, the Permittees state, "[b]ecause the primary radionuclides at MDA A are plutonium and americium, both with significant half lives, DOE or its successor will need to maintain institutional control of the site indefinitely, unless the radionuclide inventory is removed." Therefore, it would be in the Permittees' best interest to consider complete removal of the inventory at MDA A. The Permittees must revise the text to discuss additional possibilities for future land use.*

The Permittees state in Section 6.3.3, Alternative 3, Source / Waste Removal, "waste that daylights" into the canyon. The Permittees must clarify the meaning of "daylights" especially in the context of recreational activities on the canyon slope. See Specific Comment number 17.

LANL Response

23. At present, the reasonably foreseeable land uses for the MDA A site are industrial (a waste disposal site) regardless of the future land use for the rest of the mesa top or the canyon slope. As an additional control, a 300-ft-wide buffer zone, as measured from the edge of the cover, will separate the disposal site from the rest of the mesa top and canyon slope. No other uses are under consideration and are not discussed in the CME report. Therefore, no revision to the CME report is warranted.

    With respect to residual radionuclide inventories, any alternative, regardless of land use, must meet requirements for radiological protection of the public under DOE Order 5400.5. DOE is legally responsible for ensuring these requirements are met and will impose long-term radiological controls consistent with the actual land use and residual radionuclide inventory.

    Also, see the response to Specific Comment 17 for clarification on "waste that daylights" into the canyon.

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