

**Response to the Notice of Disapproval for the Corrective Measures Evaluation Report, Revision 2,
Material Disposal Area G, Consolidated Unit 54-013(b)-99,
Los Alamos National Laboratory, EPA ID No. NM0890010515, HWB-LANL-08-025,
Dated April 1, 2011**

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, miscellaneous, 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 policy.

GENERAL COMMENTS

NMED Comment

1. Previous NOD

The Permittees did not adequately address many of the comments from the original CME NOD (2010 NOD) dated July 26, 2010. Specifically:

- a. *NMED's General Comment 5. The Permittees have actually provided less information regarding costs in the current revision of the Report than in the previous version. The Permittees have not provided unit costs for any items other than a "Gross Unit Price" per line item, which includes a summation of all labor, materials, subcontractor, equipment and other costs divided by the quantity of units of the particular line item. There are no unit costs provided for labor, materials or equipment. The cost estimates must include unit cost and volume estimates for each line item including hourly rates for personnel and equipment and per-unit volume costs for waste management and restoration. For example, waste removal cost estimates must include the cost of excavation, loading, transport, disposal, backfill and compaction as well as unit equipment costs if not included in the cost (per ton or cubic yard) of moving material. Provide this information in the next revision of the Report. Comment 9 provides more detailed information regarding cost tables and Appendix G (Supporting Information for Cost Estimates for Material Disposal Area G).*
- b. *NMED's General Comment 8. Section XI.F.12 (Design Criteria To Meet Cleanup Objectives) of the Consent Order specifically states, "The Respondents shall present descriptions of the preliminary design for the selected corrective measures in this section. The description shall include appropriate preliminary plans and specifications to effectively illustrate the technology and the anticipated implementation of the remedial option at the subject area. The preliminary design shall include a discussion of the design life of the alternative and provide engineering calculations for proposed remediation systems." While the Permittees have provided some of this information, delaying specification of the preliminary design until the CMI does not allow for an effective evaluation of the alternative. The evaluation of technologies requires a critical evaluation of long-term reliability and effectiveness for the reduction of toxicity, mobility, or volume of contaminants,*

and an evaluation of cost, all of which cannot be accurately completed without the requested information.

- c. NMED's Specific Comment 41. The Permittees' reply was repeated in response to several comments within the 2010 NOD and does not adequately address or respond to the question posed in the comment. Provide the specific criteria within the PACA report that have been used to identify areas with high erosion potential as requested in the 2010 NOD.*
- d. NMED's Specific Comment 42. This response was repeated in response to several comments within the 2010 NOD and does not adequately address or respond to the question posed in the comment. Provide supporting information that documents the assertion that Alternative 2D would be protective for 1000 years as requested in the 2010 NOD.*
- e. NMED's Specific Comment 46. The Permittees did not provide the requested figure. Section XI.F.15 (Figures) of the Consent Order, number 11, specifies, "Figures presenting the locations of existing and proposed remediation systems" shall be included in the CME Report. This figure is therefore mandatory.*
- f. NMED's Specific Comment 55. The Permittees have not provided a brief description of the technical aspects of the RCRA Subtitle C landfill as requested. In order for NMED to properly evaluate the potential alternatives presented, a description of the technical aspects of the alternative is required. Also, include a conceptual siting for the RCRA landfill.*
- g. NMED's Specific Comment 56. The Permittees have not provided the requested figure. The Consent Order (Section IX.F.15.11) specifically states that the figure requested is a requirement of the Report. (See also Comment 1e).*
- h. NMED's Specific Comment 60. The Permittees have not provided a brief description of the technical aspects of the Corrective Action Management Unit (CAMU) as requested. In order for NMED to properly evaluate the potential alternatives presented, a description of the technical aspects of the alternative is required. (See also Comment 1f). Also, include a conceptual siting for the CAMU.*
- i. NMED's Specific Comment 61. The Permittees have not provided the requested figure. The Consent Order (Section IX.F.15.11) specifically states that the figure requested is a requirement of the Report. (See General Comment 1e and 1g).*
- j. NMED Specific Comment 63. In order to adequately and appropriately evaluate technologies and compare them to one another, an accurate preliminary design that follows the CAMU rule is required. Remove the reference to an ET cover from the CAMU description and adjust costs appropriately.*
- k. NMED Specific Comment 71. Section XI.F.13 (Schedule) of the Consent Order states, "...this section shall provide a schedule for submittal of reports and data to the Department, including a schedule for submitting all status reports and preliminary data." The Permittees have not provided the requested schedule of deliverables, "including 30% conceptual (or 60% intermediate) design, pre-final design, and final design."*
- l. NMED's Specific Comment 77. Removing the Conceptual Cover Design Report from the Report and repeatedly asserting the robustness of the PACA does not answer the questions put forth in the comments from NMED. Whether or not the Conceptual Cover Design Report is included,*

either remove reference to the PACA or provide support and references that support the assertions based on the PACA. This applies to Specific Comments 77 – 87 of the 2010 NOD.

Revise the Report to provide appropriate responses to the comments provided in the original NOD.

LANL Response

1. The report has been revised to remove technologies that are not applicable to Material Disposal Area G (MDA G) (section 6). Remedy alternatives applicable to MDA G have been developed, evaluated, and rated against the criteria set forth in Section VII.D.4 of Compliance Order on Consent (the Consent Order) (sections 7 through 9). These revisions, based on NMED's comment, have significantly impacted sections 6 through 10 of the report. Additionally, this overarching change addresses many of NMED's additional comments.

At the corrective measures evaluation (CME) phase, the design for the corrective action project is still conceptual, not detailed, and the cost estimate is considered to be "order of magnitude." Cost estimates are developed with an accuracy range of -30% to +50%. After the final remedy is selected, a more detailed design will be developed, along with a more detailed cost estimate and schedule of activities.

The cost estimates and supporting information (Appendix G) have been revised to address NMED's concerns.

Figures have been updated to represent the corrective action alternatives.

The Resource Conservation and Recovery Act (RCRA) Subtitle C landfill and corrective action management unit are considered to be waste management options, as opposed to treatment technologies for corrective action. Because of the permitting requirements for each, these waste management options were not considered practicable to satisfy the Consent Order corrective action requirements.

NMED Comment

2. Technologies versus Alternatives

The concept of a remediation technology versus a remedy alternative is an overarching issue in this version of the CME. Section VII.D.2 of the 2005 Compliance Order on Consent (Order) states that the Report shall include:

10. An identification and description of a range of remedy alternatives, and

12. A detailed evaluation and rating of each of the remedy alternatives, applying the criteria set forth in Section VII.D.4.

The Permittees have instead provided an identification of a wide range of technologies, many of which are not applicable to MDA G, and have evaluated and rated these technologies against the criteria in Section VII.D.4 of the Order. This is not an effective strategy to ensure the best remedies are selected and does not comply with the requirements of the Order.

A remedy alternative typically includes a combination of various remediation technologies whose combined application will meet the requirements of the criteria set forth in Section VII.D.4 of the Order. While a remedy alternative consisting of a combination of technologies may rate highly against

these criteria, the individual technologies may rate poorly on their own. For example, evaluating and rating a biotic barrier as a remedy alternative instead of as a component of a cover system is not appropriate. The biotic barrier on its own will rate poorly against the criteria, while an engineered cover system that includes a biotic barrier will likely rate highly.

In Section 6.2 (Screening of Technologies), the Permittees include a number of technologies that are not appropriate for MDA G. While it is important to review all viable technologies against site specific criteria, it is not appropriate to include technologies in the screening that are specific to conditions that are not directly relevant to MDA G. For example, electrokinetic and electroacoustic soil treatment technologies are not applicable to MDA G because they are specific to the treatment of soils, which are of minimal concern at MDA G. These technologies should therefore not be included in the screening process or as a part of any remedy alternative. A large amount of effort was spent describing and eliminating 32 different technologies in the screening process. The Consent Order does not require a “laundry list” of all remedial technologies; it simply requires a range of remedy alternatives that are applicable to the site being addressed.

Revise the Report to remove technologies from the screening process that are not applicable to MDA G. Develop remedy alternatives that are applicable to MDA G, and then evaluate and rate these alternatives against the criteria set forth in Section VII.D.4 of the Order. By addressing this overarching issue, the Permittees may minimize the need to address many of the more detailed revision comments herein.

LANL Response

2. The report has been revised to remove technologies not applicable to MDA G (section 6). Remedy alternatives applicable to MDA G have been developed, evaluated, and rated against the criteria set forth in Section VII.D.4 of the Consent Order (sections 7 through 9). These revisions, based on NMED’s comment, have significantly impacted sections 6 through 10 of the report. Additionally, this overarching change addresses many of NMED’s additional comments.

NMED Comment

3. General Lack of Detail

The Report lacks sufficient justification and detail in design that would allow NMED to select and defend a suitable remedy, particularly in Sections 6 through 10 and their related figures and tables. Specific reasoning and rationale in the screening and evaluation of alternatives, and explanations regarding the cost estimates and rankings given in each category of the evaluation are lacking. It is important to provide a basis for all assertions, estimates, and/or assumptions, including specific detail regarding how each alternative will meet the criteria in the Order.

Examples of sections lacking detail include, but are not limited to:

- a. *In Sections 7.3.2.1, 7.3.2.3, 7.3.3.1, and 7.3.3.3 (Protection of Human Health and the Environment and Control of Source and Releases sections for Technologies PS-2 and PS-3a), the Permittees state that these technologies will limit, minimize, reduce or provide protection against “erosion, direct contact, and biointrusion” with no explanation as to how they will accomplish this. In Section B-4.1 (Rooting Depth Study), the Permittees state, “In general, the greatest observed biomass of the roots of all trees, shrubs, and forbs was located in the upper 6 ft of soil.” With no cover (PS-2) or an 18-inch soil cover (PS-3a), there is no control of this 6-ft*

root biomass unit. The Permittees have not demonstrated how these technologies will limit, minimize, reduce or provide protection against “erosion, direct contact, and biointrusion.”

- b. In Sections G-3.4.1 (Assumptions) and G-3.8.1 (Assumptions), the Permittees provide estimates regarding percentages of excavated materials to be processed and disposed of in different manners. For example, bullet 10 of Section G-3.8.1 states, “85% of the MLLW is assumed to need on-site treatment and the remaining 15% is assumed to be shipped off-site. Of the 85% of the MLLW receiving treatment 55% will be cleaned to meet necessary standard to be returned to the excavation at MDA G, and the remaining 30% will be shipped off-site as industrial waste.” The Permittees provide no justification or basis for the estimated percentages of waste streams from the proposed excavations. Also, the description for Section 7.3.8 is not complete without a conceptual siting of the proposed RCRA landfill or CAMU.

Provide considerably more detail regarding the reasoning and rationale in the screening and evaluation of alternatives. Provide explanations specific to the cost estimates and rankings given in each category of the evaluation. Include detail specific to how each alternative will meet the criteria in the Order.

LANL Response

3. As noted in the Laboratory’s response to General Comment 2, sections 6 through 10 of the report have been revised and all of NMED’s concerns have been addressed. These revisions include additional justification and detail for each alternative. Additional reasoning and rationale in the technology screening, alternative evaluation, and alternative ranking process have been provided. Cost estimates and assumptions for each alternative have been revised for clarity and are documented in Appendix G.

NMED Comment

4. Groundwater

- a. Through approval of the Investigation Report (June 8, 2007), and in accordance with Section IV.C.1.e of the Order, NMED determined that the Permittees have completed characterization of contamination in the vadose zone at MDA G. While NMED recognizes that the Permittees have installed recent additions to the well network at Technical Area (TA) 54, the Permittees have not completed characterization of potential groundwater contamination at MDA G. It is crucial that the CME process for waste sites at TA 54 include an accurate description of the groundwater conditions (see Sections VII.D.2 and XI.F.6.b of the Order). This involves presentation of a minimum of four quarters of groundwater data from all wells located in the vicinity of TA 54, in addition to other items. (see also NMED’s September 15, 2010 letter to the Permittees (RE: Clarification of Groundwater Data Requirements [for] Corrective Measures Evaluation Reports (CMEs) at Technical Area 54)). NMED expects that four quarters will be presented by the time it issues its Statement of Basis for its proposed remedy in November 2011.
- b. Assertions claiming an average travel time of several hundred to several thousand years for waterborne contaminants from the surface to the regional aquifer, based on the study by Stauffer et al. 2005, 097432, have been proven inaccurate by the presence of LANL-generated contaminants in the regional aquifer. Theoretical modeling results, especially those that have been proven wrong, provide little if no value to the remedy selection process. Such references should be removed or justified.

- c. *Add well R-55i to the Report and update relevant text, maps, and tables with information for that well. Add wells R-38 and R-53 to the list of wells (currently R-21, R-32 and R-56) that form the upgradient portion of the groundwater monitoring network specific to MDA G. Update relevant text, tables and figures accordingly.*
- d. *When evaluating the nature and extent of groundwater contamination at MDA G, apply screening protocols implemented in Appendix D to all wells, both downgradient and upgradient, that form the groundwater monitoring network specific to MDA G.*
- e. *It is not specified in the Report whether the water-quality data screened to evaluate the presence of contaminants in groundwater was obtained by contract laboratories or by both contract and on-site laboratories. State the origin of water-quality data in relevant tables and text. Include the data produced by both contract and on-site laboratories, if not done so already, in the Report.*
- f. *Update the Report with the latest information on the MDA G groundwater monitoring network, including but not limited to water level measurements, pumping test results, water-quality data, geology and stratigraphy, and other information obtained since this version of the Report. Update relevant text, tables, and figures, including water-table and structure-contour maps, and geologic cross-sections.*

LANL Response

4. The CME report and Appendix D were updated to summarize additional groundwater chemistry data that have been collected and analyzed since the previous CME revision. This analysis includes both upgradient and downgradient wells, including wells R-38, R-53, and R-55i. In addition, the Laboratory updated the CME by using data from all Technical Area 54 (TA-54) wells to describe the site's hydrogeologic conditions in Appendix E, including additional geologic cross-sections. Additional information was also added concerning the origin of the water-quality data. The Laboratory will continue to collect and analyze groundwater samples from the TA-54 wells and will collect a minimum of four samples from each well in November 2011.

The CME report and Appendix C were revised to discuss additional potential transport processes for volatile organic compound (VOC) contamination, especially vapor transport through the Cerros del Rio basalts. The analyses and conclusions have been modified to reflect this discussion.

Text has been added to section 4.0 to clarify that the predicted long travel times apply to contaminants that are dissolved in pore water.

NMED Comment

5. Screening versus Evaluation

The Permittees have not distinguished between "screening" and "evaluation" in the Report. "Screening" should be used to reduce the number of items carried forward for further consideration, while the numerical ranking of alternatives is an "evaluation." While Section 7 provides screening of the alternatives and Section 8 is titled "Evaluation of Alternatives Against Remedial Alternative Evaluation Criteria", in Sections 8.3, 8.3.9 and 8.4.4.6, the Permittees revert to using the term "screening." This also applies to Tables 8.3-1, 8.4-1 and 8.5-1. Revise the Report to more clearly distinguish between "screening" and "evaluation".

LANL Response

5. As noted in the Laboratory's response to General Comment 2, sections 6 through 10 of the report have been revised. Technologies are identified and screened in section 6. Alternatives are developed and screened in section 7. An evaluation of alternatives is provided in section 8. The accompanying tables have been modified as appropriate.

NMED Comment

6. Cover Alternatives

In Sections 7.3.4 (Technology PS-3b: Evapotranspiration Cover), the Permittees do not provide a design basis for the ET covers. This is especially important regarding the cover thickness, which greatly impacts both effectiveness and cost. In general, the preliminary design basis for covers in the Report is inadequate for purposes of a CME and final remedy selection. Minimum technical information required for a soil cover in the Report must include the following preliminary design details:

- a. *Initial grading plan,*
- b. *Minimum and maximum final cover slopes,*
- c. *Final grading and drainage plan,*
- d. *Draft cover materials specifications,*
- e. *Site-specific materials testing for hydraulic parameters,*
- a. *Water balance studies for proposed cover material,*
- g. *Conceptual design for surface admixture for erosion resistance,*
- h. *Erosion modeling over the life of the cover system, and*
- i. *Itemized costs for construction, startup testing, sampling and operation and maintenance (O&M).*

The Permittees' January 4, 2008 "Response to Request for Public Comment – Selection of a Remedy for Corrective Action at Material Disposal Area H, Solid Waste Management Unit 54-004 at Technical Area 54, Los Alamos National Laboratory, Los Alamos, New Mexico" (2008 Public Comment Letter), referenced by EP2007-0760, proposed a revised, or enhanced, ET cover, which incorporates a total of 8-feet of material, including a minimum 2.5-ft thick composite capillary break/biointrusion barrier layer. In contrast to the information provided in the Report, the 2008 Public Comment Letter contains an adequate level of information and design criteria to make a remedy selection.

A 5 ft thick ET cover and SVE were recommended as the preferred alternative for MDA G. The previous version of the Report, Corrective Measures Evaluation Report for Material Disposal Area G, Consolidated Unit 54-013(b)-99, at Technical Area 54, Revision 1, dated September 2009 (CME Rev.1), recommended a 7 ft thick ET cover with a biointrusion barrier and SVE as the preferred alternative. Based on thickness alone, the previously proposed 7 ft ET cover system is more protective than the currently recommended 5 ft ET cover. No justification is provided for the Permittees' new preference for a less protective cover.

The Permittees indicate that the Federal Remediation Technologies Roundtable (FRTR) screening matrix was used to identify the general types of corrective measure technologies. In the FRTR,

“vegetative cover” is synonymous with “ET cover” as alternate cover technology. Not only must consistent terms be used (the term “ET cover” is preferred), but also the term is related to a specified set of performance criteria against which the alternative must be evaluated.

FRTR suggests only two containment technologies: RCRA compliant covers (Subtitle D or C) or alternate/enhanced covers. The 18-inch thick “vegetative cover” layer is deficient in that it does not fulfill the minimum technical requirements for a RCRA Subtitle D solid waste final cover as described in 40 Code of Federal Regulations (CFR) §258.60 (i.e., an 18-inch infiltration layer with maximum 10-5 cm/sec hydraulic conductivity and a six-inch erosion layer that supports plant growth).

The cover technology in the Report is certainly less costly than technologies in CME Rev.1, but it also substantially less protective than the conventional or previously proposed alternate cover technologies which are within the same range of costs. Also, considering the fact that biointrusion is both a primary and secondary release mechanism of the site’s Conceptual Site Model, that biointrusion by gophers has been an issue at other MDAs, and that Section B-4.1 (Rooting Depth Study) specifically states that the majority of biomass of roots exist in the upper 6 ft of soil, the Permittees must evaluate cover designs with a minimum of 6 ft of cover and a biointrusion barrier.

The Permittees must retain several cover components identified as “technologies” in Section 6.2.1.4 (Surface Barriers) that are better described as individual components of an engineered cover system (e.g., compacted clay layer, biointrusion barrier, and flexible membrane liner). While clay desiccation in arid environments is a valid concern, a RCRA Subtitle C final cover with a compacted clay layer component could be designed with a protective layer (such as a geomembrane) to reduce or eliminate desiccation of the compacted clay layer. Concerns with differential settlement can be addressed through design components to provide added strength and reduce damage due to settlement of overlying cover components, including additional stress-bearing layers over the waste shafts or impoundments (e.g., geonet, geotextile, or concrete), use of high-strain geomembrane materials (e.g., linear-low density polyethylene), and waste removal (especially for the relatively shallow pit and impoundments). Internal bearing strength of the waste material, particularly for the pit and impoundments, may require analysis to demonstrate that this material can support an overlying soil cover. The primary function of a Flexible Membrane Liner (FML) is generally not VOC control, but rather to eliminate vertical migration of moisture and contaminants. It is appropriate to state the potential limitations of FML while acknowledging it is an integral component of a multilayer (RCRA) cover. A compliant RCRA Subtitle C cover system must be included in the evaluation of alternatives (i.e., in Section 8.6, Development and Evaluation of Alternatives).

Revise the Report to remove all references to the vegetative cover technology, and retain compliant conventional and alternate covers, both of which must include a biointrusion barrier component. Include a level of technical information similar to that provided in the aforementioned 2008 Public Comment Letter for MDA H.

LANL Response

6. The revised CME has been updated to include conceptual designs in Appendixes H and I for two containment alternatives, including both a multilayer (RCRA) compliant and alternative evapotranspiration (ET) cover as directed. The new cover alternatives for MDA L were developed to address the remedial action objectives (RAOs) (see section 7). The conceptual designs in Appendixes G and H detail the preliminary design specifications NMED requested. Design details of the selected cover will be finalized in the corrective measures implementation (CMI) plan.

The description of the vegetative cover technology in section 6 was replaced with a soil barrier to eliminate confusion with the ET cover. The soil barrier does not satisfy the new RAO of restricting infiltration and therefore was not retained as a cover alternative.

NMED Comment

7. Soil Vapor Extraction Alternatives

The preliminary design for SVE at MDA G must include, but not necessarily be limited to, the following:

- a. The locations across MDA G that will be targeted,*
- b. The spacing of the extraction wells,*
- c. The stratigraphic zones to be targeted for extraction,*
- d. The depths of the extraction wells, including total depth and depths of screens,*
- e. The number of blowers and ancillary equipment (locations of sample ports and gauges) and the specifications and necessary capabilities for each blower/system (such as flow rates, maximum vacuum, target applied vacuum, target vacuum levels at the anticipated limits of the radius of influence),*
- f. The locations of vapor monitoring wells and the monitoring port depths,*
- g. A discussion of emissions and the need/method for treatment, as well as inclusion in cost estimates,*
- h. A discussion of how the SVE system construction will interface with the rest of the remedial alternative, and*
- i. Itemized costs for construction, startup testing, sampling and operation and maintenance (O&M).*

In addition, it appears the proposed SVE system design is based on inaccurate assumptions. First, Section 3.2 (SVE Pilot Test Summary) of the January 2009 Pilot Test Report for Evaluating Soil-Vapor Extraction at Material Disposal Area G at Technical Area 54, Revision 1 (2008 SVE Report), states that, “[t]he shallow-extraction borehole was constructed to evaluate SVE in the Tshirege Member of the Bandelier Tuff. The borehole was cored and logged from the surface to a total depth (TD) of 182.5 ft bgs. The bottom of the shallow-extraction borehole was grouted up to a depth of 145 ft bgs to avoid shortcircuiting of air-flow through the more permeable Tsankawi Pumice Bed. The top of the borehole was completed with a 10-in.-diameter steel casing from the ground surface to 63 ft bgs, approximately 3 ft into the top of Qbt 1v of the Tshirege Member, resulting in an 82-ft extraction interval within the Tshirege Member from 63 ft to 145 ft bgs (Figure 3.2-2).” However, based on Figure 3.2-2 of the 2008 SVE Report and, more importantly, on comparison of the 2008 reported flow rates and vacuum pressures with the same parameters reported for the 2010 SVE pilot test, the shallow-extraction borehole short-circuited to the Tsankawi Pumice Bed (Qbtt).

Second, Section 5.3.1 (Extraction Well Depth, Diameter, and Extraction Interval) of the May 2010 Report for Supplemental Soil-Vapor Extraction Pilot Test at Material Disposal Area G, Technical Area 54 (2010 SVE Report), states, “[t]he results of the previous numerical simulation of SVE at MDA G (LANL 2009, 105413) showed that extraction from the Qbt 1v and Qbt 1g units would still

remove contaminants from the Qbtt and Qct units. Therefore, the design extraction interval should be in the Qbt 1v and Qbt 1g units." As stated in the February 23, 2011 NOD for the MDA L CME Report, NMED will select a remedy based on conclusions drawn primarily from data, not from models. In any event, the numerical simulations were based on the results of the short-circuited shallow extraction well from the 2008 pilot test. Also, comparison of "calibrated" permeability values in the March 2009 Numerical Analysis of the Soil-Vapor Extraction Test at Material Disposal Area G, Technical Area 54 (2009 SVE Modeling Report) with results of permeability testing during the 2010 pilot test shows that most of the calibrated values are higher than the field tested values, some by an order of magnitude.

Permeability results presented in the 2010 SVE Report indicate that the stratigraphic units proposed for the focus of the SVE system are on the lower end of the range of permeabilities for which SVE has been demonstrated to be effective. This conclusion is supported by the very low flow rates achieved within the Qbt 1g and Qbt 1v units during the 2010 pilot test, even at very high vacuum pressures.

Section 10.1 (Design Approach), under SVE, states, "[t]he results and conclusions of the SVE pilot tests conducted at MDA G in 2008 and 2010 (LANL 2009, 105112; LANL 2010, 109657) determined that SVE is a viable technology for removing VOCs from the subsurface at MDA G. They also determined that the effective extraction [radius of influence] ROI was approximately 150 ft at the vapor-extraction vacuums and flow rates at which the SVE systems were operated." While the results of the pilot tests may have shown that SVE is a viable technology for removing VOCs at MDA G, they did not support a ROI of 150 ft, especially in the stratigraphic units proposed in the preliminary design. The results from the 2010 SVE Report show that there was minimal pressure response at any port depth for any of the applied vacuums in all observation wells in the stratigraphic units proposed for SVE. The 2009 SVE Modeling Report shows that the 150 ft ROI was estimated through the numerical simulation which was based on permeability values assumed to be much higher than what the data support.

Annual or biannual soil gas monitoring is not sufficient during the implementation of SVE. Consider a more frequent monitoring approach for performance monitoring (e.g., biweekly or monthly) during initiation of active SVE. Any future reduction in the frequency of compliance monitoring will be based upon SVE performance results. In the revised Report, adjust the cost estimates accordingly.

LANL Response

7. The soil-vapor extraction (SVE) alternative for MDA G was developed to address the RAOs. A conceptual design for the SVE system, operation, and monitoring has been provided in section 7 and Appendix J of the CME report. The conceptual design discussed in Appendix J details the preliminary design specifications and operation/monitoring frequency and duration requested by NMED. The design and operational details of the selected SVE system will be finalized in the CMI plan.

NMED Comment

8. Rankings

The rankings in Tables 8.3-1 (Screening of Technologies for Pits and Shafts against the Balancing Criteria) and 8.4-1 (Screening of Technologies for Vadose Zone Contamination against the Balancing Criteria), pages 155 - 157, lack supporting information, rendering the decision-making process opaque. While NMED noted many individual discrepancies within the rankings, adherence to Comment 2 of this NOD by the Permittees should render these specific issues moot.

Evaluate each of the remedy alternatives based on the Balancing Criteria and assess the scores for each in a manner consistent with the Balancing Criteria. Provide improved and enhanced reasoning for the rankings in the text associated with each considered alternative in all tables related to ranking of alternatives (e.g., Tables 8.3-1 and 8.4-1).

LANL Response

8. A comparative analysis for each alternative is now provided in section 9 to give a basis for the ratings determined against each of the balancing criteria. The associated Tables 9.1-1 and 9.1-2 have been revised.

NMED Comment

9. Cost Estimates

Attachment G-1 (Detailed Cost Estimate Report) provided in Appendix G does not include sufficient information to enable NMED to effectively review this attachment. Specific examples include, but are not limited to:

- a. *Vegetative Cover - DC - Fence, page 1 of 33: There is no explanation of how labor amounts were estimated, the unit cost of labor, or how the materials and equipment costs were estimated.*
- b. *Vegetative Cover - DC - Project Costs, page 1 of 33, and all subsequent "Project Costs" Sections: Thousands to millions of hours of labor are listed with no explanation of how these estimates were calculated. Also, thousands to millions of hours for "Draft Distributable – Materials" are listed, which then have a total cost under the Materials column. The Permittees provide no explanation of how hours relate to material costs.*
- c. *Vegetative Cover - DC - Project Costs, page 1 of 33, and all subsequent "Project Costs" Sections: The Permittees list a lump sum cost for a subcontractor to provide storm water prevention with no basis or justification.*
- d. *Vegetative Cover – IC - Contingency, page 1 of 33: Contingency rates are provided as a percentage of some other amount. The costs do not correspond to the given percentage of any prior total costs.*
- e. *Vegetative Cover – IOM – Professional Management, page 2 of 33: The Permittees provide no basis for the significant reduction of costs between time periods "years 0-30" and "years 31-100".*
- f. *ET Cover – DOM – Cover Maintenance and Inspections, page 3 of 33: "TDR Monitoring of ET Cover" is not explained or justified in the text, and there is no explanation of what "TDR" means in the Section titled "Acronyms and Abbreviations for Attachment G-1."*
- g. *Excavation, Treatment, Onsite – DC – Shafts – Excavation - PCB, page 5 of 33, and all subsequent Sections that deal with excavation or retrieval of shaft waste: The Permittees break up the costs into Shafts 1-6 with no explanation or definition of what these refer to.*
- h. *Excavation & Overcore, Treatment, Onsite – Excavation - Shafts - PCB, Shaft 1, page 14 of 33, and all other Sections that provide costs for overcore of shafts: The Permittees list three different "Overcoring shaft size" costs for Shaft 1 with no explanation of what these refer to or why Shaft 1 will require three different overcoring sizes.*

- i. *Monitoring Natural Attenuation – DC – Demo, Add/Remove Monitoring Ports, Removal of Monitoring Tubing, page 26 of 33, and subsequent “Removal of Monitoring Tubing” line items: The Permittees list 32 hours under the Quantity and Unit columns, then list 120.3 hours under the Labor Hours column. Also included under these line items are significant equipment costs, nearing three quarters of a million dollars for the Soil Gas Venting and Soil Vapor Extraction Sections. There should be no equipment costs related to “Removal of Monitoring Tubing.”*
- j. *Soil Gas Venting – Direct Cost, VZ – Project Costs, page 29 of 33, and all subsequent “Project Costs” Sections: Personnel costs are repeated. For example, the “Project Manager” is listed as requiring 18,186 hours twice, the “Health and Safety Office – Readiness” is listed as requiring 1,429 hours twice, and the “Health and Safety Officer – Site” is listed as requiring 3,464 hours and then another 10,825 hours. The same personnel are also listed multiple times at the bottom of the page. No basis or justification for these costs is provided.*

Revise the Report to provide explanations, separate labor, materials, equipment and subcontractor costs, and include unit costs for each, not an overall unit cost for each line item. Revise the text of the Report and Appendix G, where appropriate, to include any and all unit costs and assumptions used to develop the cost estimates. Although only a select number of examples are provided above, this information must be provided for each and every line item. Provide attached explanatory text stating all assumptions, estimations, and unit costs for each labor cost, material cost, subcontractor cost, and equipment cost for each line item in this attachment.

LANL Response

9. The alternatives in the revised CME were modified based on NMED’s General Comment 2. This resulted in revised cost estimates, which rendered many of the above comments no longer applicable. However, cost estimates and assumptions for each alternative have been revised for clarity, and Tables 8.2-1 through 8.2-3 (previously Table 8.2-3) have been simplified to more clearly show the cost breakdown. Included in the revision is additional explanation regarding the use of RS Means. Revised cost estimates are provided in Appendix G and are summarized in Tables 8.2-1 through 8.2-3.

During the CME phase, the design for the corrective action project is still conceptual, not detailed, and the cost estimate is considered to be “order of magnitude.” Cost estimates are developed with an accuracy range of –30% to +50%. After the final remedy is selected, a more detailed design will be developed, along with a more detailed cost estimate and schedule of activities.

MISCELLANEOUS COMMENTS

NMED Comment

10. *The potential for vapor intrusion into buildings has not been discussed in the conceptual site model (CSM). Include vapor intrusion into buildings in the CSM and evaluate the need for shallow SVE or other remedies to address this risk.*

LANL Response

10. A clarification: Ambient air sampling was performed at MDA L in 2004 to quantify vapor intrusion into buildings within the MDA L footprint and near the site. Because subsurface vapor-phase VOC

concentrations at MDA L exceed those at MDA G, the results from the MDA L analysis yield a conservative estimate of potential vapor intrusion at MDA G. Because measured concentrations were below the threshold limit values and the permissible exposure limits, it was determined that no significant current risk is associated with vapor intrusion into buildings. In addition, decontaminate and decommission (D&D) of all structures during preclosure of MDA G will limit potential future vapor intrusion into buildings. Therefore, an RAO for vapor intrusion was not generated, and shallow SVE is not needed in this situation. This clarification has been added to section 2.4.3.1 and section 4.6.

SPECIFIC COMMENTS

NMED Comment

11. Section 2.3.5, Regional Aquifer Hydrology, pages 8 and 9

Several passages of this section erroneously refer to Figure E-2.2-1. The correct reference is Figure E-2.3-1.

LANL Response

11. The Laboratory concurs. The figure callouts in section 2.3.5 have been revised to refer to the appropriate figures.

NMED Comment

12. Section 2.3.5, Regional Aquifer Hydrology, page 9

Well R-22 is omitted from the list of wells belonging to the regional groundwater monitoring well network downgradient of MDA G. In Section 3.2.5, the Permittees list R-22 as part of that network. Resolve this discrepancy.

LANL Response

12. The Laboratory concurs. R-22 was added to the list of downgradient wells discussed in section 2.3.5.

NMED Comment

13. Section 2.3.5, Regional Aquifer Hydrology, page 9

The Permittees erroneously refer to Table E-2.1-1. The correct reference is Table E-2.1-2.

LANL Response

13. The Laboratory concurs. The table callouts in section 2.3.5 have been revised to refer to the appropriate tables.

NMED Comment

14. Section 2.5, Status of Groundwater Monitoring, pages 14 and 15

List all wells, both upgradient and downgradient, which form the groundwater monitoring network specific to MDA G.

LANL Response

14. The Laboratory concurs. All wells that form the groundwater monitoring network specific to MDA G are identified in section 2.5. In addition, a table has been added showing the monitoring wells specific to MDA G (Table 2.5-1).

NMED Comment

15. Section 3.2.4, Nature and Extent of Vadose Zone Contaminants, page 16

Permittees' Statement: *"The VOC vapor plumes differ across the site in terms of the constituents and concentrations of VOCs of which they are composed (LANL 2010, 108496). An important aspect of vapor migration is that vapors are transported predominantly by vapor-phase diffusion; in the dry environment present at MDA G, this process is faster than migration in the liquid phase."*

NMED Comment: *Vapor transport has been modeled by assuming vapor-phase diffusion through the Bandelier Tuff; adsorption by subsurface moisture has been ignored as a conservative measure. However, diffusion may not adequately model transport through the voids and fractures in the Cerros del Rio basalt, which may be better modeled as advective transport through the flow of subterranean air. Remove this statement or provide an explanation as to how the model addresses this concern.*

LANL Response

15. Text has been added to this section and to Appendix C to explain additional transport processes (such as advective transport) that may occur in the basalt.

NMED Comment

16. Section 3.2.5, Nature and Extent of Groundwater Contaminants, page 18, first paragraph

When discussing the results of screening for contaminants in groundwater wells, make reference to Table 3.3-1.

LANL Response

16. The referenced table has been removed from section 3.2.5. This section, Nature and Extent of Groundwater Contaminants, now references Appendix D where a detailed groundwater evaluation is presented.

NMED Comment

17. Section 4.2, Nature and Extent of Groundwater Contaminants, page 19

Permittees' Statement: Leach rates in covered units are currently expected to be controlled by infiltration rates, which are estimated to be 10 mm/yr or less in paved areas and less than 1 mm/yr in vegetated areas (section 2.2.4).

NMED Comment: The Permittees erroneously refer to Section 2.2.4, which does not exist. The correct reference is Section 2.3.4.

LANL Response

17. The Laboratory concurs. The reference to section 2.2.4 has been changed to section 2.3.4.

NMED Comment

18. Section 5.2, Regulated Units and Solid Waste Management Units, page 24

Permittees' Statement: "Pit 29 and Shafts 124, 145, and 146 are regulated units. Pit 29 is 600 ft long and 30 ft deep and received nonliquid waste. Shaft 124 is 6 ft in diameter and 65 ft deep and was used for disposal of solid radioactive wastes but included approximately 1 ft² of hazardous wastes made up of organic liquids and vials."

NMED Comment: A unit of area (ft²) does not describe a volume. Also, NMED disputes the Permittees' designation and interpretation of regulated units at MDA G.

LANL Response

18. A clarification: The text "1 ft²" has been changed to "1 ft³" to reflect a volumetric measurement.

Although the Laboratory disagrees with NMED's identification of the entire MDA G as a regulated unit, it does agree with NMED that the use of alternative closure for the regulated units at MDA G is appropriate because regulated units are situated among solid waste management units (SWMUs), and both the SWMUs and the regulated units are likely to have contributed to the releases at MDA G. The identification of the regulated units does not change the alternative analysis or the recommended alternative set forth in the CME. The inclusion of the regulated units in the corrective measures process ensures that the corrective action and closure of MDA G will be completed using a comprehensive and integrated approach that is protective of human health and the environment.

NMED Comment

19. Section 5.2.2, Groundwater, page 25

When discussing groundwater quality standards, make reference to Table 5.3-1.

LANL Response

19. The Laboratory concurs. Section 5.3.2 (revised section number for discussion of groundwater) was updated to call out Table 5.3-1. A callout to the table in Table 1.0-1 was also updated.

NMED Comment

20. Section 6.2.1.1, Vertical Barriers, page 28

Permittees' Statement: "Limiting the lateral component of vapor-phase transport of a limited number of volatile contaminants at the site is one potential application for vertical barriers at MDA G. However, modeling indicates that vertical barriers may enhance downward migration of volatile contaminants and, as a result, may have a higher potential to impact groundwater."

NMED Comment: Provide a reference for this modeling and additional validation of this claim.

LANL Response

20. A clarification. Because the vertical barrier technology is most appropriate for shallow groundwater contamination, the referenced text of section 6.2.1.1 has been modified as follows: "Limiting the lateral component of vapor-phase transport of a limited number of volatile contaminants at the site is one potential application for vertical barriers at MDA G. However, this technology has been demonstrated primarily with shallow groundwater contamination, and its applicability for vapor-phase contamination is unproven."

NMED Comment

21. Section 6.2.1.3, Near Surface Horizontal Barriers, Soil-Grout Mix, page 30

Permittees' Statement: "A concrete-grout mixture containing soil or crushed tuff was considered as an alternative to replace a subsurface portion of the existing cover materials over the MDA G pits and shafts. Although this barrier may be safely constructed and has the potential to decrease permeability to water and/or penetrability by plants and animals, this type of barrier does not provide water storage for evapotranspiration."

NMED Comment: Water storage and evapotranspiration is not required if the near-surface grouting prevents surface moisture from contacting the waste. It appears from this statement that the Permittees are pre-determining the need for an ET cover in the technology screening stage. Water storage for evapotranspiration is not an a priori remediation requirement. Revise the document accordingly. Take care to provide the utmost objectivity to the technology screening process.

LANL Response

21. A clarification. As noted in the Laboratory's response to General Comment 2, sections 6 through 10 of the CME have been revised. Additionally, an RAO to prevent the creation of contaminated leachate by restricting the infiltration of water into the waste has been added. The text for section 6.2.1.3 has been revised.

NMED Comment

22. Section 6.2.1.4, Surface Barriers, Biotic Barriers, page 32

Permittees' Statement: "Installation of horizontal barriers constructed of cobble-sized rocks or pea gravel inhibits deeprooting plants and discourages burrowing animals."

NMED Comment: Pea gravel is unlikely to impede burrowing animals. Angular cobbles with a minimum diameter of 4 to 6 inches would be adequate. Revise the Report to eliminate “pea gravel” as a biotic barrier material, or provide justification for its inclusion.

LANL Response

22. The Laboratory concurs. As noted in the Laboratory’s response to General Comment 2, sections 6 through 10 of the report have been revised. The text for the biointrusion barriers in section 6.2.1.4 has been revised to include additional justification.

NMED Comment

23. Section 6.2.1.4, Surface Barriers, Concrete Cap, page 32

Permittees’ Statement: “Moisture trapped under the cap may induce transport of contaminants to the groundwater.”

NMED Comment: Reference the basis for the statements that indicate that a low permeability layer will retain moisture under the layer and enhance the downward migration of VOCs. Cover technologies by themselves do not directly address VOC contamination in the vadose zone; it is therefore not appropriate to eliminate these technologies solely for this reason. However, if this concern can be validated, it may be applied as balancing criteria in Section 8. Describe the functions and relative benefits or disadvantages of individual cover components, but retain both a conventional and alternate cover technology for further evaluation.

LANL Response

23. A clarification. As noted in the Laboratory’s response to General Comment 2, sections 6 through 10 of the report have been revised. Additionally, an RAO to prevent the creation of contaminated leachate by restricting the infiltration of water into the waste has been added. The text for section 6.2.1.4 has been revised. The alternatives considered in section 7 of the revised report include a conventional cover (a multilayer [RCRA] cover) and an alternate cover (an ET cover).

NMED Comment

24. Section 6.2.2.3, Physical Treatment Technologies, Jet Grouting, page 36

Permittees’ Statement: “The waste material in the pits and shafts ranges from 8 ft to 65 ft bgs. Use of high pressure at the shallower depths could be hazardous to workers and a breach of the pits and/or shafts.”

NMED Comment: The justification for eliminating this technology is not well supported since nearly any technology provides some hazard to workers. Provide additional justification such as the potential to adversely affect waste forms, similar to the justification for Dynamic Compaction.

LANL Response

24. The Laboratory concurs. As noted in the Laboratory’s response to General Comment 2, sections 6 through 10 of the report have been revised. The text for what is now section 6.2.2.4, Physical

Treatment Technologies, has been revised to include additional justification as to why the jet-grouting technology was not retained.

NMED Comment

25. Section 6.2.4.5, Thermal Treatment Technologies, Thermal Destruction, page 42

Permittees' Statement: "This technology was not retained for further consideration because it has no additional benefit over thermal desorption."

NMED Comment: Given that there is no destruction of the contaminant waste stream and secondary treatment would be required with thermal desorption, thermal destruction would appear to have additional benefits. Revise this section of the Report to address this issue or remove it from consideration, as the technology is not feasible for the site and, therefore, should not be evaluated.

LANL Response

25. A clarification. As noted in the Laboratory's response to General Comment 2, sections 6 through 10 of the report have been revised. The text in section 6.2.4, Ex Situ Treatment Technologies, has been revised to exclude discussion of the thermal destruction and thermal desorption technologies because they are not applicable to MDA G (per NMED's instruction in General Comment 1).

NMED Comment

26. Section 7.2, Corrective Measures Threshold Screening Criteria, #2 attain media cleanup standards, page 46

Permittees' Statement: "The applicable cleanup standards developed in accordance with Section VIII of the Consent Order are presented in section 5.1."

NMED Comment: The referenced section, Section 5.1, is entitled "Permitted and Interim-Status Container Storage Units" and does not contain the information specified. Table 5.3-1 lists regulatory criteria and cleanup levels. Revise the Report to reconcile these issues.

LANL Response

26. The Laboratory concurs. The report has been corrected to refer back to revised section 5.3.

NMED Comment

27. Section 7.3.1.5, Summary, page 47

Permittees' Statement: "Although the no-action technology does not meet any of the threshold criteria, it is carried forward for comparison purposes in evaluating the other technologies."

NMED Comment: Section 7.3.1.4 (Compliance with Applicable Waste Management Standards), states, "No wastes will be generated under the no-action technology; therefore, this technology complies with applicable state and federal waste management standards." Resolve these contradictory statements.

LANL Response

27. The Laboratory concurs. As noted in the Laboratory's response to General Comment 2, sections 6 through 10 of the report have been revised. The text in section 7.3.1.5 has been revised to indicate that no-action alternative does not meet all the threshold criteria.

NMED Comment

28. Sections 7.3.6, Technology PS-4a: Excavation of Pits and Shafts with On-Site Disposal in CAMU or RCRA Unit, bullet #8, page 53

Permittees' Statement: "[C]losing the on-site disposal unit and constructing a vegetated soil or ET cover over the disposal unit;"

NMED Comment: An ET, vegetative, or other alternate cover is not appropriate for the disposal unit in this alternative; it appears an alternative cover is presumed. A Corrective Action Management Unit (CAMU) compliant or standard RCRA Subtitle C cover must be evaluated for the on-site disposal unit. This comment also applies to Appendix G, page G-7. Construction of a CAMU/RCRA cell should not necessitate an ET cover. Revise the Report to address these issues.

LANL Response

28. A clarification. As noted in the Laboratory's response to General Comment 2, sections 6 through 10 of the report have been revised. Because the corrective action management unit (CAMU) technology was not retained as an applicable technology in section 6.2.2, all references to the CAMU technology were removed from the text in section 7.0.

NMED Comment

29. Section 7.3.10.5, Summary, page 59

Permittees' Statement: "When used in combination, the ex situ treatment technologies of thermal desorption and macroencapsulation are the preferred technologies. They meet the threshold screening criteria and are retained for further evaluation."

NMED Comment: The Permittees state that these two technologies are "preferred," but do not indicate whether these technologies were the assumption used for the cost estimates. Clarify what the assumed treatment technologies are for the purpose of evaluation based on cost.

LANL Response

29. A clarification. As noted in the Laboratory response to General Comment 2, sections 6 through 10 of the report have been revised. Because the thermal desorption and macroencapsulation technologies were not retained as applicable technologies in section 6, all references to these technologies were removed from the text in section 7.

NMED Comment

30. Section 8.3.3.1, Long-Term Reliability and Effectiveness, page 68

Permittees' Statement: "ET covers have been proven effective in the arid and semiarid environments of the southwestern United States, (Dwyer et al. 2000, 069673, p. 24; LANL 2005, 089332, p. 25)."

NMED Comment: The Dwyer et al. reference is a Sandia National Laboratory document that is not directly applicable to LANL because of differences in climate. The LANL (2005) document refers to a Corrective Measures Study report for MDA H where grout-encapsulation of disposal shafts, followed by an ET cover, was the preferred alternative. Neither of these references provides direct support of the ET cover concept at MDA G. Revise the Report to consider this information.

LANL Response

30. A clarification. As noted in the Laboratory's response to General Comment 2, sections 6 through 10 of the report have been revised to provide additional information in support of the ET cover as part of the Laboratory's preferred alternative. Additionally, Appendix I (Conceptual ET Cover Design) provides supporting information in support of the ET cover alternative.

NMED Comment

31. Section 9.1, Selection of Recommended Corrective Measure, page 80

Permittees' Statement: "The ET cover would be placed over the pits and shafts, as shown in Figure 7.3-1. Twenty SVE boreholes will then be installed to facilitate active extraction of vapor-phase VOCs from the vadose zone. The ROI for each extraction borehole conservatively assumes 150 ft from the point of extraction. The 20 boreholes will be spaced laterally to provide coverage of the highest concentrations (approximately 10 times the screening values for TCA and TCE—see section 3.2.4 and Appendix C) of overlapping VOC plumes shown in Figure 2.4-2 and Figures C-3.1-1 through C-3.1-5 (Appendix C)."

NMED Comment: The Permittees reference Figure 2.4-2 as illustrating the overlapping VOC plumes. However, Figure 2.4-2 shows the layout of the 2008 SVE pilot test. NMED assumes that the reference should point to Figure 2.4-1.

LANL Response

31. The Laboratory concurs. Figure references throughout the document have been reviewed and edited as applicable.

NMED Comment

32. Section 10.3, General Operation and Maintenance Requirements, page 84

Permittees' Statement: "The SVE system will be operated as described in Appendix H."

NMED Comment: Appendix H describes pore gas monitoring, not SVE operation and maintenance.

LANL Response

32. The Laboratory concurs. Appendix J, not Appendix H, provides information on SVE operation and maintenance and includes a long-term vapor-monitoring plan. Section 10.3 has been revised to reference the correct Appendix (Appendix J).

NMED Comment

33. Section 10.5.3, Health and Safety Requirements, page 85

Permittees' Statement: "A site-specific health and safety plan will be prepared to describe the health and safety requirements to be followed during construction of the MDA G cover, construction of the SVE-monitoring system, O&M activities, and monitoring activities."

NMED Comment: The Permittees make no mention of health and safety plan requirements for installation of the SVE boreholes and SVE equipment. Include these activities in the health and safety requirements.

LANL Response

33. The Laboratory concurs. The text has been revised to state, "construction and installation of the SVE boreholes and system."

NMED Comment

34. Section 11.0, Schedule for Completion of Activities, page 85

Permittees' Statement: "The Consent Order requires that a schedule for completion of activities be submitted in the CME report. Activities leading to completion of the remedy includes planning, design, and construction of the ET cover; operation of the SVE system and installation and testing of monitoring systems."

NMED Comment: The Permittees make no mention of planning, design and construction of the SVE boreholes or the SVE system. Include these elements in the schedule for completion of activities.

LANL Response

34. The Laboratory concurs. The text has been revised to state, "planning, design, installation, testing, and operation of the SVE system and monitoring systems."

NMED Comment

35. Section 11.0, Schedule for Completion of Activities, page 86, bullet 7

Permittees' Statement: "Active SVE and pore-gas monitoring will occur as discussed in Appendix H and presented in Table 11.0-1."

NMED Comment: Appendix H and Table 11.0-1 only discuss pore gas monitoring, not active SVE.

LANL Response

35. The Laboratory concurs Appendix J, not Appendix H, provides information on SVE. Table 11.0-1 has been removed from the document because the tentative milestones are discussed in section 11.

NMED Comment

36. Figure 2.3-3, TA-54 groundwater monitoring network, page 99

Revise the figure to make a distinction between regional and intermediate wells.

LANL Response

36. The Laboratory concurs. Figure 2.3-3 has been revised to distinguish between regional and intermediate wells.

NMED Comment

37. Figure 2.4-4, MDA G pore-gas monitoring borehole locations, page 103

The Permittees have shown contour lines on the figure, but have not specified the contour interval.

LANL Response

37. The Laboratory concurs. Figure 2.4-4 has been revised to specify the contour intervals.

NMED Comment

38. Figure 4.0-1, Hydrogeologic conceptual site model for Area G, page 105

Permittees' Statement: In "Vapor Phase Transport" box, "Diffusion of volatile chemicals accounts for their observed distribution in the unsaturated zone."

NMED Comment: Vapor monitoring has been conducted only within the Bandelier Tuff; conformance of VOCs distribution in the underlying basalt to a diffusion model therefore cannot be verified at this time. Revise the text of the Report to add "...observed distribution in the unsaturated zone of the Bandelier Tuff."

LANL Response

38. The Laboratory concurs. The recommended change has been made to the figure.

NMED Comment

39. Figure 7.3-1, Cover site map, page 108

The 10-ft and 100-ft contour lines are indistinguishable from one another.

LANL Response

39. The Laboratory concurs. The figure has been revised to distinguish more easily between the 10-ft and 100-ft contour intervals.

NMED Comment

40. Table 3.3-1, Statistical Summary of Analytes Detected Above Screening Levels in Groundwater Samples from MDA G Monitoring Network Wells through October 2010, page 139

- a. *Specify in the Table caption whether the table represents all analytical data collected since well construction or data collected within a specific timeframe.*
- b. *Include data for all wells, both upgradient and downgradient (including well R-22), that form the groundwater monitoring network specific to MDA G. (See also Comment 4)*
- c. *List all organic analytes that were detected below their respective Practical Quantitation Limits (PQLs) if the PQLs were above the corresponding screening levels.*
- d. *For the naturally-occurring general inorganics, metals and radionuclides, list all analytes that were detected above the screening levels defined as the first-tier screening levels in Section D-3.0. Also, separately list all analytes that were detected above the screening levels defined as the second-tier screening levels in Section D-3.0.*

LANL Response

40. The Laboratory concurs. The table has been revised to reflect NMED's recommended changes in a-d.

NMED Comment

41. Table 5.3-1, Summary of Regulatory Criteria and Cleanup Levels, page 140

The regulatory criteria listed in the Table for groundwater are incomplete. Update the Table to include all regulatory criteria described in Section 5.2.2.

LANL Response

41. The Laboratory concurs. Table 5.3-1 has been revised to reflect the regulatory criteria described in section 5.3-2 (formerly section 5.2-2).

NMED Comment

42. Table 6.3-1, Summary of Technologies Retained for Further Evaluation at MDA G, page 140

In the footnotes of Table 6.3-1, footnote c is missing an "x" and the "=". Compare with footnotes a and b. Also, the table does not include the off-site or on-site disposal alternatives.

LANL Response

42. A clarification: As noted in the Laboratory's response to General Comment 2, sections 6 through 10 of the report have been revised. As a result, the referenced table has been deleted.

NMED Comment

43. Table 8.2-1, Comparison of Retained Corrective Measure Technologies by Area, page 149

In Table 8.2-1, rows VZ-2a (Monitored natural attenuation) and VZ-2b (Soil-gas venting), the Permittees indicate that SVE duration for these technologies will be 30 years. There is no SVE associated with natural attenuation or soil-gas venting. Correct this discrepancy. Also, footnotes c and d should indicate that these are "estimated" time frames. Include "estimated" in footnotes c and d.

LANL Response

43. A clarification: As noted in the Laboratory's response to General Comment 2, sections 6 through 10 of the report have been revised. As a result, the referenced table has been deleted.

NMED Comment

44. Table 8.2-2, Explanation of Ranking System Used for Evaluating Remedial Technology Evaluation Criteria, page 150

Permittees: Column entitled Reduction of Toxicity, Mobility, or Volume.

NMED Comment: The Permittees place greater value on reduction of mobility and toxicity than on reduction of volume. This is not a valid usage of the criteria stated in Section VII.D.4.b of the Order, which states that, at paragraph 4.b.ii, "Respondents shall give preference to [the] remedy that uses treatment to more completely and permanently reduce the toxicity, mobility and volume of contaminants." Revise the ranking system to value the reduction of mobility, toxicity, and volume equally and to weigh evaluation based on treatment that "more completely and permanently reduces" them.

LANL Response

44. A clarification. As noted in the Laboratory's response to General Comment 2, sections 6 through 10 of the report have been revised. As a result, the referenced table has been deleted and replaced by Table 9.1-1, which provides the revised rating system. Table 9.1-1 has been revised to rate reduction of toxicity, mobility, and volume equally.

NMED Comment

45. Section B-3.1, 2005 Activities, paragraph 3, page B-3

Permittees' Statement: "The soil and tuff sampling results indicated a number of inorganic and organic chemicals (Plates 2 and 3, respectively) were detected at trace levels beneath the former disposal units and were consistent with the results obtained during the Phase I RFI. The only organic compounds detected in core samples were trace levels of several dioxin and furan congeners. The inorganic chemicals detected above BVs did not show any discernable patterns or trends and did not indicate a release from the historical subsurface waste units at MDA G."

NMED Comment: *The Permittees state that inorganic and organic chemicals are shown on Plates 2 and 3, respectively. However, the inorganic results are shown on Plate B-1 and organic results are shown on Plate B-2. Also, in the last statement of the paragraph, the Permittees conclude that the data “did not indicate a release.” The data do not support this conclusion. Remove this statement from the Report or justify the conclusion.*

LANL Response

45. The Laboratory concurs. The plate numbers have been changed to Plate B-1 and Plate B-2. A clarification: The last sentence of the paragraph has been changed from “did not show any discernable patterns or trends and did not indicate a release” to “did not show any discernable patterns or trends to indicate a release.”

NMED Comment

46. Section B-3.1, 2005 Activities, paragraph 4, page B-3

Permittees’ Statement: *“Naturally occurring and anthropogenic radionuclides were confirmed at levels above BVs in soil and rock samples collected beneath MDA G. The anthropogenic radionuclides detected sporadically across the site included americium-241, plutonium-238, plutonium-239, and strontium-90. Naturally occurring radionuclides detected above BVs included thorium isotopes, uranium-234, uranium-235, and uranium-238. Naturally occurring radionuclides were detected at concentrations within the natural variability in the subsurface tuff (Plate 3).”*

NMED Comment: *The Plate reference should refer to Plate B-3 which does not contain information supporting the assertion. Such conclusions must be supported with the range of background values for subsurface tuff, or removed from the Report.*

LANL Response

46. The Laboratory concurs. The plate reference has been changed to B-3. The sentence “Naturally occurring radionuclides were detected at concentrations within the natural variability in the subsurface tuff” has been removed from the text.

NMED Comment

47. Table B-3.1-4, Gravimetric Moisture Content and Matric Potential in Samples Collected from MDA G at BH 54-25423, page B-46

The abbreviation Tcb in the Matrix column, for Cerros del Rio Volcanic Series, is incorrect. The correct abbreviation is Tb4.

LANL Response

47. The Laboratory concurs. The symbol has been corrected.

NMED Comment

48. Section C-4.0, Vapor Transport at MDA G, page C-9

Permittees' Statement: "It is uncertain if diffusion through the low-porosity, fractured Cerros del Rio basalt will be uniform or follow preferential pathways. Open, interconnected air pathways probably occur between the top of the Cerros del Rio volcanic series and the regional aquifer beneath MDA G."

NMED Comment: This observation supports the suggestion that advective flow, instead of diffusion, may control VOC migration in the Cerros del Rio basalt. Revise the Report to discuss this issue. (See also Comment 15).

LANL Response

48. The report, including main text and Appendix C, have been revised to acknowledge that VOC vapors may be transported by both advective flow and diffusion in the basalt.

NMED Comment

49. Figures C-3.1-3, East-west cross-section through interpolated vapor plume for TCA at MDA G based on fourth quarter FY2009 data and C-3.1-4, East-west cross-section through interpolated vapor plume for TCE at MDA G based on fourth quarter FY2009 data, pages C-16 and C-17

In both figures, the Permittees provide a cross-section from A to A'. The line A-A' is not defined on Figures C-3.1-1 and C-3.1-2.

LANL Response

49. The Laboratory concurs. The A-A' line has been defined on the appropriate figures.

NMED Comment

50. Figure C-3.1-4, East-west cross-section through interpolated vapor plume for TCE at MDA G based on fourth quarter FY2009 data, page C-17

Permittees' Statement: "Note: The color scheme for concentrations reflects multiples of the Henry's Law based vapor phase screening value of 42,300- $\mu\text{g}/\text{m}^3$."

NMED Comment: The Permittees have used the Henry's Law based vapor phase screening value for 1,1,1-TCA instead of TCE. Revise the Report accordingly.

LANL Response

50. The Laboratory concurs. The figures supporting Appendix C have been revised.

NMED Comment

51. Table C-3.1-1, Total Contaminant Mass (kg) of TCA and TCE Exceeding 10 Times the Tier I Vapor-Phase SL, page C-20

The Permittees have miscalculated the Total for TCA (i.e., 195+16≠210).

LANL Response

51. The Laboratory concurs. The total for 1,1,1-trichloroethane (TCA) has been revised to 211.

NMED Comment

52. Section D-2.0, Geochemical Performance of Monitoring Wells, pages D-1 and D-2

Reevaluate the representativeness of water-quality data from monitoring wells at MDA G using the criteria specified in the NMED's March 2011 letter Approval with Modification, 2010 Interim Facility-Wide Groundwater Monitoring Plan.

LANL Response

52. The Laboratory concurs. The Laboratory follows a protocol for evaluating the geochemical performance of monitoring wells that is based on criteria specified in the NMED's March 2011 letter Approval with Modification for the 2010 Interim Facility-Wide Groundwater Monitoring Plan. This evaluation is presented in Appendix D and uses geochemical trends to evaluate the reliability of water-quality data.

NMED Comment

53. Section D-3.0, Screening Protocol and Results, page D-3, #1

Groundwater background values for MDA G must be based on analyte concentrations in an upgradient portion of the groundwater monitoring network specific to MDA G and in those downgradient, or off-gradient, MDA G wells that do not show contamination. For the naturally-occurring analytes that do not have numerical background values that are based on UTLs, use the lowest PQLs achievable by the most recent EPA and industry-accepted extraction and analytical methods as the first-tier screening levels.

LANL Response

53. A clarification. The Laboratory concurs with NMED's first comment; however, implementation is deferred until newly completed wells have reequilibrated to predrilling geochemistry. Presently, area-specific monitoring group background values are not available, and background values from the Groundwater Background Investigation Report, Revision 3, are used as screening levels in Appendix D. The reliability assessment in Appendix D summarizes the status of upgradient wells and downgradient, or off-gradient, MDA G wells that are candidates for defining area-specific background values.

A clarification: The Laboratory concurs that screening levels are needed for those analytes that do not have numerical background values based on upper tolerance limits (UTLs). However, implementation is deferred until the most recent Groundwater Background Investigation Report has been updated in response to NMED's July 2011 letter of Approval with Modification for the Groundwater Background

Investigation Report, Revision 4, particularly for the cases in which the data do not meet the statistical criteria for UTL calculations. Screening levels for these analytes will be established in accordance with U.S. Environmental Protection Agency (EPA) guidance.

NMED Comment

54. Section D-3.0, Screening Protocol and Results, page D-3, #2, 3rd bullet

The screening protocol described in Section D-3.0 is inconsistent with the screening protocol presented in Section 5.2.2, which states, "If there is no NMED tap water screening level, the Laboratory will use EPA regional tap water screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm), adjusted to the 10⁻⁵ risk for carcinogens. Use the screening protocol presented in Section 5.2.2 uniformly.

LANL Response

54. A clarification. The screening protocol for groundwater (section 5.3.2) has been revised to be consistent with that used in the current Interim Facility-Wide Groundwater Monitoring Plan and has been implemented uniformly in Appendix D.

NMED Comment

55. Section D-3.2, Inorganic COPC Detections, page D-5, 1st bullet

Permittees' Statement: *"The R-23 analytical result in which the concentration of total dissolved solids (2900 mg/L) exceeds one-half of the lowest applicable standard (one-half standard = 500 mg/L) appears to be an analytical reporting error because such a high concentration is inconsistent with concentrations reported for individual dissolved constituents, none of which are out of line with the overall stable geochemical trends at this well."*

NMED Comment: *The concentration of total dissolved solids in R-23 (2900 mg/L) exceeds the standard of 1000 mg/L. Make the appropriate correction.*

LANL Response

55. The Laboratory concurs. Appendix D has been revised to make this correction.

NMED Comment

56. Section D-3.2, Inorganic COPC Detections, pages D-5 and D-6

Discuss detections of radionuclides other than tritium in groundwater monitoring wells specific to MDA G. If there were no detections of radionuclides (other than tritium) above background levels, state so. If there were detections, either include these detections in appropriate tables in Appendix D or create separate tables for radionuclides.

LANL Response

56. A clarification. For informational purposes, Appendix D now includes a separate table (Table D-4.3-3) summarizing detections of radionuclides in groundwater monitoring wells at TA-54, including those specific to MDA G.

NMED Comment

57. Section D-3.3, Tritium Detections, page D-6

Permittees' Statement: "None of the tritium activities measured in the monitoring wells exceed the EPA MCL of 20,000 pCi/L."

NMED Comment: The Permittees incorrectly list 20,000 pCi/L as the EPA MCL for tritium. This concentration is an average annual concentration of tritium assumed to produce a dose of 4 mrem/year, which is the EPA MCL for beta particle and photon radioactivity. If two or more radionuclides are present, the sum of their annual dose from beta particle and photon radioactivity must not exceed the MCL of 4 mrem/year. Therefore, if tritium coexists with other beta- and/or photon-producing radionuclides, the allowable tritium concentration will be less than 20,000 pCi/L. Revise this statement accordingly.

LANL Response

57. A clarification. The statement has been deleted, and no reference to a tritium maximum contaminant level has made.

NMED Comment

58. Tables D-3.0-1 through D-3.0-6b, pages D-17 through D-47

For each Table, specify in the Table caption whether the Table represents all analytical data collected since well construction or data collected within a specific timeframe.

LANL Response

58. The Laboratory concurs. Table titles have been edited to specify the time frame of the analytical data included in the table.

NMED Comment

59. Table D-3.0-1, Statistical Summary of Organic Analytes and High Explosives Detected in Groundwater Samples Collected from Wells R-23, R-23i, R-39, R-41, R-49, R-55, and R-57, through October 31, 2010, page D-17

The PQL for methylene chloride in the Table (10 µg/L) is different from the same PQL in the 2010 Interim Facility-Wide Groundwater Monitoring Plan, EP2010-0231 (5 µg/L). Reconcile this discrepancy.

LANL Response

59. The Laboratory concurs. The discrepancy has been reconciled. No correction is needed to this table in Appendix D because the practical quantification limit (PQL) in the 2010 Interim Facility-Wide Groundwater Monitoring Plan (5 µg/L) is in error.

NMED Comment

60. Tables D-3.0-3 and D-3.0-4, pages D-26 through D-40

Provide PQLs for all analytes in the Tables.

LANL Response

60. The Laboratory concurs. Tables D-4.2-1 and D-4.3-1 are revised to include PQLs for all analytes listed.

NMED Comment

61. Tables D-3.0-5a through D-3.0-6b, pages D-41 through D-47

Change the table captions from “Sampling Events . . .” to “Number of Sampling Events . . .”

LANL Response

61. The Laboratory concurs. Table captions (for Tables D-4.2-2 and D-4.3-2) have been edited as requested.

NMED Comment

62. Table D-3.0-7, Average and Maximum Tritium Activities in Groundwater Collected from Monitoring Network Wells Specific to MDA G, through October 2010, page D-48

Define the acronym “MDA” in the column header.

LANL Response

62. The Laboratory concurs. Table D-3.0-7 has been replaced with Table D-4.3-3, and the acronym “MDA” is not used in the table.

NMED Comment

63. Section E-2.1, Regional Aquifer Monitoring Wells near MDA G, page E-9

Correct section numbering in Appendix E. There is another Section E-2.1, Regional Aquifer Water-Table Maps, on page E-15. In addition, Section E-2.0, Summary, on page E-14 comes after Section E-2.1, Regional Aquifer Monitoring Wells near MDA G. Revise the Appendix accordingly.

LANL Response

63. The Laboratory concurs. Section numbering throughout Appendix E was corrected.

NMED Comment

64. Section E-2.1, Regional Aquifer Monitoring Wells near MDA G, pages E-12 and E-14

Provide numerical values for barometric efficiency for each screen at R-55 and R-57.

LANL Response

64. The Laboratory concurs. Barometric efficiencies for each screen at R-55 and R-57 have been added to the text discussing these wells in section E-3.1 (renumbered from E-2.1) and in Table E-3.1-4.

NMED Comment

65. Section E-2.0, Summary, page E-15

Permittees' Statement: "The design of these wells includes at least one well screen that is placed in relatively high permeable sediments in close proximity to the regional water table (section E-2.1.1)."

NMED Comment: Section E-2.1.1 does not exist. Revise the Appendix accordingly.

LANL Response

65. Section numbers and callouts throughout Appendix E have been corrected.

NMED Comment

66. Section E-2.0, Summary, page E-15

Permittees' Statement: "Hydrogeologic data also suggest that the screened regional-aquifer zones at the monitoring wells near MDA G are either unconfined or partially confined."

NMED Comment: This statement is contradicted by information in Table E-2.1-1 that lists four screens with confined conditions for existing wells near MDA G.

LANL Response

66. The Laboratory concurs. Text has been corrected to say that the measured water levels at the regional monitoring wells around MDA G represent unconfined, partially confined, or confined hydrogeologic conditions.

NMED Comment

67. Section E-2.0, Summary, page E-15

Permittees' Statement: "The cross-well hydraulic responses between R-57, R-49, and R-39 during the performed pumping tests demonstrate that the well screens are in good hydraulic communication with the aquifer and will be expected to provide early detection of potential contaminants originating from MDA G."

NMED Comment: Hydraulic responses during pumping tests were noticed between R-57 screen 2, R-39, and R-49 screen 2, all of which are located within unconsolidated Totavi and Puye sediments.

There was no hydraulic communication with or between the upper screens at R-49 and R-57, which are located within the Cerros del Rio volcanics. The potential contaminants present at MDA G below the Cerros del Rio volcanics are expected to be detected by the well screens located within the unconsolidated Totavi and Puye sediments. However, these well screens might not detect potential early-stage contamination that occurs in regional aquifer closer to the water table, within the Cerros del Rio volcanics. Revise this statement to consider these factors.

LANL Response

67. The text described above is no longer included in Appendix E. However, the second to the last paragraph of section 2.3.5 of the main text states that the regional wells downgradient of MDA G are constructed so that “the uppermost screen is placed as close to the water table as possible to monitor the first arrival of contaminants in the aquifer. In the multiscreen wells, the lower screen(s) is placed in deep permeable aquifer sediments to monitor the primary groundwater pathways downgradient of the facility.” Therefore, the Laboratory believes the uppermost screens are capable of detecting early-stage contamination.

NMED Comment

68. Section E-2.3, Preliminary Water-Table Map Based on July–September 2010 Data, pages E-17 and E-18

Permittees’ Statement: *“In the area directly beneath MDA G, the regional water table is located within the Cerros del Rio lavas (Figure E-2.3-1).”*

NMED Comments: *The Permittees refer to Figure E-2.3-1. The correct reference is Figure E-1.1-8.*

The Permittees acknowledge uncertainties regarding the direction of groundwater flow near the northeast corner of MDA G and the level of hydraulic connectivity between well R-41 and the rest of the regional aquifer. The water table map in Figure E-2.3-1, which represents one of conceptual models of groundwater flow near MDA G, implies that groundwater pathways from the northern part of MDA G will not be monitored by any of the existing wells downgradient of MDA G. In addition, if well R-41 is not hydraulically connected to the regional aquifer and the water table map in Figure E-2.3-1 represents actual groundwater flow regime, most of potential groundwater contaminants from MDA G might escape detection.

Additional information on groundwater flow directions and hydrogeology near the northeast corner of MDA G is necessary to assure reliable groundwater monitoring for MDA G and to determine the functionality of well R-41. Present a work plan for the installation of one or more regional aquifer monitoring wells near the northeast corner of MDA G, with a focus on verifying geology, hydraulic properties and groundwater flow direction in that area, and on complementing the existing monitoring well network. The work plan must be submitted to NMED in accordance with the dates provided at the end of this NOD.

LANL Response

68. Section and figure numbers have been corrected throughout Appendix E.

An analysis of the adequacy of the groundwater monitoring network around MDA G was conducted and is presented in Appendix E. Additionally, NMED’s letter dated, August 19, 2011, suspended the requirement for submittal of a drilling work plan for a groundwater monitoring well northeast of MDA G.

The letter went on to state that NMED would reevaluate the need for the well following review of the CME report.

NMED Comment

69. Figure E-1.1-1, Map showing location of perched-intermediate and regional wells (red circles) in the vicinity of TA-54, page E-23

Create an additional cross-section, tracing east-west and crossing through wells R-32 and R-55. Include this cross-section as a new figure in Attachment E.

LANL Response

69. The Laboratory concurs. A new cross-section (F-F') has been included in Appendix E as Figure E-2.1-7.

NMED Comment

70. Figure E-1.1-5, Alkali-silica diagram showing chemical classification of Cerros del Rio volcanic rocks in the vicinity of TA-54. Gray arrow shows the eruption sequence from oldest to youngest rocks, page E-27

The gray arrow described in the Figure caption is missing.

LANL Response

70. The Laboratory concurs. The gray arrow has been included in renumbered Figure E-2.1-9.

NMED Comment

71. Figure E-1.1-6, Structure contour map for the base of Cerros del Rio volcanic rocks in the vicinity of TA-54, page E-28

The 5700 ft contour line for the base of Cerros del Rio volcanics (Tb4) near well R-39 is not in agreement with the contact elevation at well R-39. In addition, the structure contour map of the base of Tb4 does not correspond to the base of Tb4 on the geologic cross-section in Figure E-1.1-4. Revise the Report to reconcile these discrepancies.

LANL Response

71. The Laboratory concurs. Figures throughout Appendix E were corrected so that contour lines and contact elevations are consistent throughout the figures. The cross-sections (Figures E-2.1-2 through E-2.1-8) and structure contour map for the base of the Cerros del Rio volcanic series (Tb4 and Tvt2b) (Figure E-2.1-10) in Appendix E are created from the same geologic framework model and are now consistent. Small differences between the cross-sections and structure contours occur when wells are projected a short distance to the cross-sections.

NMED Comment

72. Figure E-1.1-7, Structure contour map for the top of Cerros del Rio volcanic rocks in the vicinity of TA-54, page E-29

This Figure shows three different numerical values for the contact elevation of the top of Tb4 at well R-39. Revise the figure to remove the erroneous numbers and correct the contour lines if required.

LANL Response

72. The Laboratory concurs. Figure E-2.1-11 (formerly E-1.1-7) was corrected to include only one contact elevation for the top of Tb4 at well R-39 and R-22. The cross-sections (Figures E-2.1-2 through E-2.1-8) and structure contour map for the top of the Cerros del Rio volcanic series (Tb4 and Tvt2b) (Figure E-2.1-11) in Appendix E are created from the same geologic framework model and are now consistent. Small differences between the cross-sections and structure contours occur when wells are projected a short distance to the cross-sections.

NMED Comment

73. Figure E-1.1-8, Hydrostratigraphy at the regional water table and estimated thickness of Cerros del Rio lavas beneath the regional water table, page E-30

The figure shows Tschicoma dacite flow (Tvt2b) at the regional water table beneath the southeast end of TA-54. This information is inconsistent with other geologic maps, cross-sections and text in the Report, all of which consistently shows or describes Tb4 at that location. Reconcile the discrepancy.

LANL Response

73. The Laboratory concurs. Figures throughout Appendix E were corrected so that geologic information is consistent throughout the figures.

Figure E-2.1-8 is now Figure E-2.1-12 in the revised document. Figure E-2.1-12 shows both compositional groups of Cerros del Rio lavas (i.e., Tb4 and Tvt2b). Clarifying text was added to Appendix E, section E-2.1 stating "The lava flows range in composition from basalt to dacite, with the more silicic rock types (dacites) occurring at the base of the volcanic pile (oldest units) and less evolved flows (tholeiites and alkali basalts) at the top (youngest units) (Figure E-2.1-9). The more mafic portions of the Cerros del Rio volcanic series (compositions ranging from basalt through trachyandesite in Figure E-2.1-9) are labeled Tb4 on the geologic cross-sections (Figures E-2.1-2 to E-2.1-8). Dacite lavas form a compositionally distinct volcanic feature near the east end of TA-54 and are labeled Tvt2b on the cross-sections (Figures E-2.1-2 and E-2.1-8)."

NMED Comment

74. Table E-2.1-1, Hydrogeologic Characteristics of the Monitoring Wells in the Area Near MDA G, page E-33

Correct discrepancies between this table and the text in Section E-2.1 (pages E-9 to E-14). For example, hydrodynamic conditions for screens R-21 and R-41#2 are described in the table as confined and unconfined, respectively, while the same conditions are described in Section E-2.1 as unconfined or partially confined for R-21 and confined or unconfined for R-41#2. Also, the footnote under the Table appears to be related to Table E-2.1-2.

LANL Response

74. Discrepancies between Table E-3.1-1 (formerly Table E-2.1-1) and the text regarding conditions at screens in R-21 and R-41 have been corrected.

NMED Comment

75. Table E-2.1-2, Water-Level Transients Observed in the Regional Monitoring Wells Near TA-54, page E-34

Amend the Table caption to state that the table represents data in response to pumping of supply wells PM-2 and PM-4.

LANL Response

75. The table title was amended to state the responses are the result of the pumping of supply wells PM-2 and PM-4.

NMED Comment

76. Sections G-3.2.1, bullet #7, page G-3, G-3.3.1, bullet #6, page G-4, G-3.4.1, bullet #8, page G-7, and G-3.6.1, bullet #31, page G-12

Permittees' Statement: "It will take up to 24 mo to complete readiness reviews and construction of the cover, and the cover will be irrigated for 1 yr to establish vegetation."

NMED Comment: Costs for comparison of technology alternatives must be based on the specifications outlined in Section 10.0, Design Criteria to Meet Cleanup Objectives. In Section 10.3 (General Operation and Maintenance Requirements), page 84, the Permittees state, "[i]rrigation is needed during the 2 yr following construction to aid in the germination and establishment of the vegetative cover." Revise the cost estimates for the vegetative cover to match the design criteria and ensure that all assumptions used for estimating costs match the design specifications outlined in the text of the Report.

LANL Response

76. A clarification. As noted in the Laboratory's response to General Comment 2, sections 6 through 10 of the report have been revised. As a result, the cost estimates and assumptions have been reviewed and revised for consistency and to reflect the set of alternatives presented in sections 7 and 8.

NMED Comment

77. Sections G-3.4.1, Assumptions, page G-5, bullets #5 and #6 and G-3.8.1, Assumptions, page G-14, bullets #5 and #6

Permittees' Statement: "Facility cost estimates are scaled based on capital costs for the Hanford Site Environmental Restoration Disposal Facility (ERDF)."

*"Total capital costs for ERDF are estimated to be approximately \$6B and assume a waste production rate of approximately 3000 yd³/day. Assuming MDA G waste analysis, segregation, size-reduction, and treatment facilities will process approximately 902,815 yd³ (waste) / 30 yr * 250 work days/yr =*

*120 yd³/d. This is approximately 4% of the throughput needed for ERDF. Using this value, the facility capital cost is estimated to be \$6B * 4% = \$240M.”*

NMED Comment: *The Permittees’ method of computing costs for this technology is questionable. Scaling the total cost of a six billion dollar project down based on a waste processing estimate of less than five percent of the original project’s waste production rate is not logical. Revise the Report to present a more reasonable basis for the costs associated with this technology.*

LANL Response

77. A clarification. As noted in the Laboratory response to General Comment 2, sections 6 through 10 of the report have been revised. As a result, the cost estimates and assumptions have been reviewed and revised for consistency and to reflect the set of alternatives presented in sections 7 and 8.