Response to the "Notice of Disapproval for the Investigation Report for Consolidated Units 16-007(a)-99 and 16-008(a)-99 at Technical Area 16, Los Alamos National Laboratory (LANL) EPA ID No: NM0890010515, HWB-LANL-07-038," Dated December 21, 2007

INTRODUCTION

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

SPECIFIC COMMENTS

NMED Comment

1. ***Section 4.2.1, Exploratory Characterization Drilling, page 19:***

   Permittees Statement: *"Figure 4.1-1 shows the locations of the boreholes."*

   NMED Comment: *Borehole locations 16-26642, 16-26648 and 16-26649 are not depicted on the Figure 4.1-1. These locations are also not included in the Table (6.2-1) that lists all samples collected at 16-008(a)-99. Explain why the analytical results for samples collected from these three locations are not included in the IR.*

LANL Response

1. Borehole locations 16-26642, 16-26648, and 16-26649 were the location IDs originally assigned in 2006. The three boreholes at locations 16-26642, 16-26648, and 16-26649 were not drilled in 2006 because of water in the 90s Line Pond. During remobilization in 2007, new location IDs were assigned, and as a result, borehole location 16-26642 is now 16-600938, location 16-26648 is now 16-600935, and location 16-26649 is now 16-600937. Table 4.2-1 has been revised to include the correct borehole location IDs. Figure 4.1-1 and the sampling results tables are correct and do not require revision.

NMED Comment

2. ***Section 7.3.3, Surface Water, page 38:***

   Permittees Statement: *"The following inorganic surface water COPCs have no published surface water standards: ammonia, barium, beryllium, chloride, cyanide, fluoride, iron, lithium, manganese, nitrate, perchlorate, strontium, sulfate, tin, phosphorous, and uranium."*

   NMED Comment: *Table J-6.0-1 of Appendix J lists New Mexico Water Quality Control Commission (NMWQCC) domestic water supply surface water standards for barium and beryllium. The maximum*

detected concentrations of barium (6,700 µg/L and 67,000 µg/L in filtered and unfiltered samples, respectively) exceed the standard (2,000 µg/L) for both filtered and unfiltered samples. The maximum detected concentration of beryllium (32.3 µg/L in unfiltered samples) exceeds the standard (4 µg/L). Revise the text to state that barium and beryllium were detected above their respective cleanup standards in surface water.

LANL Response

2. The text has been revised to state that barium and beryllium were detected above their respective surface water standards. Additionally, antimony, arsenic, cadmium, chromium, lead, mercury, nickel, strontium, and thallium were also detected above their New Mexico Water Quality Control Commission (NMWQCC) domestic water supply surface water standard. Table J-6.0-1 and text in Sections 7.3.3 and J-6.1 have been revised accordingly.

NMED Comment

3. Section 8.0, Recommendations, page 40:

Permittees Statement: *"The surface water in the 90s Line Pond is fully characterized. No further sampling is required and no cleanup recommendation is proposed."*

NMED Comment: *There is widespread residual low level contamination of high explosives, and inorganic and organic chemicals at consolidated unit 16-008(a)-99. The 90s Line Pond receives water from seasonal precipitation as well as storm water runoff from surrounding areas. Water accumulates in the pond and standing water is present in the pond for most of the year. NMED is concerned that this is a source of subsurface contaminant migration. Additionally, since water leaves the pond both by infiltration into the subsurface and by evaporation, this could result in increasing concentrations of contaminants in the pond sediments. The Permittees must propose measures to address this concern in the next phase of investigation to be conducted at the site.*

LANL Response

3. This comment was discussed with NMED representatives during a January 7, 2008, meeting. The results of those discussions are summarized below.

   Seasonal ponded water and the potential for accumulation of sediment in the closed basin of the 90s Line Pond represent a possible concern. The issues include potential ecological risks, potential risks to deeper groundwater, and increases in sediment contaminant concentrations to levels of concern.

   Ecological Risks: A very detailed ecological risk analysis was performed for Cañon de Valle as part of the Resource Conservation and Recovery Act Phase III investigation (LANL 2003, 077965). The results of a terrestrial mammal population study from Cañon de Valle show that the contaminant inventories in Cañon de Valle are not adversely affecting the small-mammal community (LANL 2003, 077965, p. 6-11). The analysis of contaminant body burdens for small mammals shows that the whole-mouse concentrations are well below concentration levels of concern (defined as ecological screening levels [ESLs]) for the Mexican spotted owl (LANL 2003, 077965, p. 6-11). A toxicity test of the sediment and site water from Cañon de Valle indicated no adverse effects for the survival or growth of the test organism, *Chironomus tentans* (LANL 2003, 077965, p. 6-11). Chemical concentrations in Cañon de Valle are similar to those found in the 90s Line Pond, indicating no

potential ecological risks in the 90s Line Pond area. The text in section 7.2.2 has been revised to include a discussion of this issue.

Deep Groundwater: The ponded water and sediment may be a source for intermediate and deep groundwater contamination. Water volumes tend to be small compared to water in Cañon de Valle, and observational evidence (slow drying of pond primarily in summer) indicates that most of the water in the pond evaporates rather than infiltrates. In addition, the ephemeral ponded conditions may promote bioremediation of high explosives in the pond as a result of anaerobic/aerobic cycling. Both the intermediate and regional groundwater contamination will be addressed in the corrective measures evaluation/corrective measures implementation reports for Consolidated Unit 16-021(c)-99 (LANL 2007, 098734). The text in section 7.3.2 has been revised to include a discussion of this issue.

Sediment Accumulation: It is possible that contaminants, particularly metals, may be concentrated in the pond as a result of surface water runoff. The text in section 8.0 has been revised to include a discussion of this issue.

Thus, the following actions are proposed to address NMED's concerns:

- Install best management practices (BMPs) (check dams) in the 90s Line Pond tributary drainages to minimize transport of contaminated sediment from the former building footprint areas into the 90s Line Pond. This action has been added to the recommendations in section 8.
- Collect additional sediment samples within the pond boundary and upstream of the BMPs at periodic intervals (every 5 yr) to evaluate whether contaminant concentrations in sediment are increasing to levels of concern. This action has been added to the recommendations in section 8.
- Install a pressure transducer in the newly installed well to assess the potential recharge dynamics in the perched zone. This action has been added to the recommendations in section 8.

NMED Comment

4. ***Appendix I, Section 1-6.1.1, Inorganic chemicals, page I-17-I-21:***

Permittees Statement, Page I-18: *"The lateral extent of nickel is defined."*

NMED Comment: *Nickel was detected at concentrations (e.g., 104 mg/kg at location 16-26737) greater than the background value (15.4 mg/kg) in the drainage near the confluence with Cañon de Valle. Samples were collected from only one depth and no samples were collected downgradient of this location in the 90s Line drainage. Lateral and vertical extent of nickel in the 90s Line drainage is not defined. Revise the text accordingly.*

Permittees Statement, Page I-19: *"Concentrations decreased with depth at both locations."*

NMED Comment: *At location 16-26687, chromium VI was not detected in the sample collected from a depth of 4.2-6.2 ft, but was detected in the sample collected from 8.0-9.4 ft below ground surface (bgs). The concentrations increased rather than decreased with depth at this location. Revise the text accordingly.*

LANL Response

4. The text in section I-6.1.1 and section 6.2.1.3 has been revised to explain more clearly that the vertical extent of nickel in the 90s Line drainage is not defined.

   The text in sections I-6.1.1 and 6.2.1.3 has been revised to indicate that chromium(VI) concentrations increased rather than decreased with depth at location 16-26687.

NMED Comment

5. Appendix I, Section 1-6.3.2, Organic Chemicals, page I-29:

Permittees Statement: *"HMX and RDX were detected in both groundwater samples at 281 µg/L and 21 µg/L, respectively (Table I-4.8-1)."*

NMED Comment: *Table I-4.8-1 reports HMX and RDX as being detected at 21 µg/L and 281 µg/L, respectively. Resolve the discrepancy and revise the table or text accordingly.*

LANL Response

5. The text in section I-6.3.2 has been revised to indicate that RDX (research department explosive [also hexahydro-1,3,5-trinitro-1,3,5-triazine]) was detected at 281 µg/L and HMX (high-melting explosive [also 1,3,5,7-tetranitro-1,3,5,7-tetrazocine]) was detected at 21 µg/L.

NMED Comment

6. Appendix J, Section J-2.2, Investigation Sampling and Determination of Chemicals of Potential Concern, page J-4:

NMED Comment: *The discussion on page J-4 indicates that the exposure scenarios addressed in the human health risk evaluation utilized analytical results between 0 and 11 feet bgs. The Permittees must explain how exposure of potential receptors to contamination at depths greater than 11 feet bgs would be prevented (e.g., controls to prevent excavations deeper than 11 feet bgs).*

LANL Response

6. The construction worker and residential scenarios typically assess contamination in the 0–10-ft-depth interval. This depth interval is based on NMED technical guidance (NMED 2006, 092513). The depth interval may be below 10 ft if the sampling interval started less than 10 ft and ended greater than 10 ft. LANL has several processes in place to protect future construction or utility workers from exposure to potential site contamination below 11 ft. Both the excavation permit process and the permits and requirements identification (PR-ID) process ensure that anyone conducting ground-breaking activities in the vicinity of a solid waste management unit or an area of concern is notified about any potential risks and that proper controls are put in place to prevent potential exposures. Contaminant data for sites undergoing construction are evaluated during the safety planning for the construction activity.

NMED Comment

7. Appendix J, Section J-3.3, Exposure Point Concentrations, page J-10:

NMED Comment: *ProUCL 4.0 was used to calculate the majority of the exposure point concentrations (EPCs) used in the human health risk evaluation. However, the ProUCL input and output files were not included with the IR. The Permitttees must submit electronic copies of the ProUCL 4.0 input and output files used in estimating EPCs. This information is needed to review the application of ProUCL 4.0 and confirm the reported results.*

LANL Response

7. Per discussions with NMED representatives on January 8, 2008, this information has not been required or provided as part of previous investigation reports. An electronic copy of the ProUCL input and output files is provided on the CD included with this NOD response.

NMED Comment

8. Appendix J, Section J-4.1, Soil Screening Levels, page J-11:

Permittees Statement: *"For COPCs for which no NMED value is available, EPA Region 6...or EPA Region 9...screening values were used and adjusted to the 1 x 10^{-5} target level."*

NMED Comment: *The text neither identifies the chemicals of potential concern (COPCs) adjusted nor illustrates the calculation method used to make the adjustment. Revise text or Table J-4.1-1 to indicate COPCs for which no NMED screening level was available and that an alternate screening level was taken from another source and adjusted to a 1 x 10^{-5} target risk.*

LANL Response

8. Text indicating how screening values were adjusted has been added to section J-4.1. Sources of screening levels are footnoted in the appropriate tables called out in section J-4.2 (i.e., Tables J-4.2-1, J-4.2-2, J-4.3-3).

NMED Comment

9. Appendix J, Section J-4.3.2, Exposure Evaluation, page J-13:

NMED Comment: *The last paragraph indicates that the EPCs for inorganic COPCs are similar to background concentrations. The Permittees assert that if aluminum and manganese were removed from the hazard index (HI) calculation based on background considerations, the calculated HIs for the construction worker would fall below the NMED target HI of 1.0 for both 16-007(a)-99 and 16-008(a)-99. The text offers no other information supporting this statement. The Permittees must provide quantitative analysis that demonstrates detected concentrations of inorganic COPCs are equivalent to or less than background concentrations.*

LANL Response

9. The text in section J-4.3-2 has been revised to include a comparison of exposure point concentrations (EPCs) for some inorganic chemicals of potential concern (COPCs) to background concentrations to demonstrate the similarity of EPCs to background.

NMED Comment

10. Appendix J, Section J-4.4, Interpretation, page J-15:

NMED Comment: *The interpretation of the human health risk evaluation for Consolidated Unit 16-007(a)-99 notes that the HI for the construction worker scenario (reported as 8.7 in Section J-4.3.2, Exposure Evaluation) was above the NMED target HI of 1.0. The discussion further notes that the HI is reduced to approximately 1.0 "...based on the uncertainty analysis..." presented in Section J-4.3. While Section J-4.3 identifies and discusses various sources of uncertainty inherent in the human health risk evaluation, sufficient information to support a decrease in the calculated HI is not provided, nor is sufficient information furnished in Section J-4.4. Revise the interpretation of the HI for the construction worker at Consolidated Unit 16-007(a)-99 to either include or reference the location, of a quantitative analysis, based on site data, demonstrating that the EPCs for aluminum and manganese are the same as the approved background concentrations. If such a presentation cannot be provided, present the HI of 8.7 for the construction worker as a final result of the human health risk analysis.*

The interpretation of the human health risk evaluation for Consolidated Unit 16-008(a)-99 notes that the HI for the construction worker (reported as 3.8 in Section J-4.3.2, Exposure Evaluation) was above the NMED target HI of 1.0. The discussion further notes that the HI is reduced to approximately 0.2 "...based on the uncertainty analysis..." presented in Section J-4.3. While Section J-4.3 identifies and discusses various sources of uncertainty inherent in the human health risk evaluation, sufficient information to support a decrease in the calculated HI is not provided, nor is sufficient information furnished in Section J-4.4. Revise the interpretation of the HI for the construction worker at Consolidated Unit 16-008(a)-99 to either include or reference the location, of a quantitative analysis demonstrating that the EPCs for aluminum and manganese are the same as the approved background concentrations. If this cannot be provided, present the HI of 3.8 for the construction worker as a final result of the human health risk analysis.

LANL Response

10. The text in section J-4.4 has been revised for both consolidated units to refer to section J-4.3.2 of the uncertainty analysis for a quantitative analysis demonstrating that the EPCs for inorganic COPCs are within the range of background concentrations. See the response to specific comment 9.

NMED Comment

11. Appendix J, Section J-5.0, Ecological Risk Screening Evaluations, page J-15; and J-5.5.6 Population Area Use Factors, page J-21:

NMED Comment: *Terrestrial receptors were the focus of the entire ecological risk screening effort to determine site ecological risk conditions. However, the risk conclusions do not thoroughly describe any receptor-specific lines of evidence that assess realistic considerations typically described within the risk characterization (e.g., exposure pathway completeness to subsurface soil, size of area in relation to habitat or home range). The only receptor-specific considerations used in the IR are the use of population area use factors (AUFs) as part of the hazard quotient (HQ) process. However, there is no supporting narrative within the text that integrates these lines of evidence into the risk characterization. The Permittees must include a summary risk characterization for each receptor evaluated. These summary descriptions should describe the realistic exposure settings, the uncertainties identified in the characterization process, and a summary of any risk concerns.*

LANL Response

11. The ecological risk screening evaluations (section J-5.0) are organized and presented consistently with previous risk screening assessments. Per the January 7, 2008, discussion with NMED representatives, the summary risk characterizations requested in the comment have not been required in previous investigation reports and are not necessary to conclude that no potential ecological risk is present. Each receptor and chemical of potential ecological concern (COPEC) is evaluated in the hazard index (HI) analysis, and the results are presented in the tables and text. Specific receptors are discussed if the HIs are above 1.0, as is the case in section J-5.5.6. The receptors and screening methods are as described in LANL guidance (LANL 2004, 087630), which has been approved by NMED and is consistent with Consent Order requirements. The current level of discussion has been acceptable to NMED for the ecological risk screening evaluations in numerous reports.

NMED Comment

12. Appendix J, Section J-5.0, Scoping Evaluation, Page J-16; and J-5.3, Assessment Endpoints, page J-17:

NMED Comment: *Each of these subsections should provide a concise statement describing the status of any threatened and endangered species associated with the sites. It is unclear if any such species are present within or adjacent to the sites evaluated. Provide a summary of the threatened and endangered species status, appropriate assessment endpoints, if needed, and any supporting habitat maps that depict critical information describing their occurrence.*

LANL Response

12. At Technical Area (TA) 16, the only threatened and endangered species is the Mexican spotted owl. The primary habitat for the Mexican spotted owl is forested canyons and not the open mesa top habitat found at Consolidated Units 16-007(a)-99 and 16-008(a)-99. Text has been added to Section J-5.2 and Attachment J-1. Habitat maps are not provided because of the sensitive nature of the location (LANL's ecology group does not provide such maps to the general public because of concerns over disturbance to threatened and endangered species).

NMED Comment

13. Section J-5.5.6, Population Area Use Factors, pages J-21 and J-21:

NMED Comment: *There are summary statements within each Consolidated Unit assessment noting that plant observations support the findings of no risk to this community. It is unclear if field observations and scientific studies were conducted to measure on-site phytotoxicity conditions. Please revise each of these subsections to provide the supporting field observation information or scientific studies that support the no risk conclusions for plants.*

LANL Response

13. A visit and walkover of the site was performed as part of the ecological scoping for each site (Attachment J-1). Field observations were made and recorded on the ecological scoping checklist. No adverse effects to vegetation were observed. Text has been added to section J-5.2, Scoping

Evaluation, section J-5.5.6, Population Area Use Factors, and Attachment J-1 (the ecological scoping checklist) stating that no effects on plants were observed.

NMED Comment

14. Section 6.0, Surface and Groundwater Comparison, pages J-24 through J-25:

***NMED Comment**: This section provides an assessment of surface water and groundwater risk conditions by comparing sample results to applicable criteria. This section relies, in part, upon the use of standards protective of aquatic life. However, per the ecological risk screening approaches, aquatic life was not identified as being a suitable receptor population. The Permittees must review the text within this subsection and revise, if appropriate, the stated assumptions that aquatic life is not considered a receptor group of concern and that the use of the criteria within this section is strictly a tool to identify any chemicals requiring further evaluation.*

LANL Response

14. Section J-5.2, p. J-16, states that aquatic receptors were not evaluated because no permanent aquatic communities are present at any of the sites. The comparisons of surface water and groundwater data to standards are required by the Consent Order and are strictly a tool to identify chemicals exceeding the appropriate water-quality standards.

NMED Comment

15. Appendix J, Table J-2.2-4, Exposure Point Concentrations for Consolidated Unit 16-008(a)-99 for the industrial Scenario (0-2 ft bgs depth), page J-39:

***NMED Comment:** Cadmium was retained as a chemical of potential concern (COPC) for soil, fill, and tuff in Sections I-4.1.1, I-4.1.2 and Table I-2.0-1of Appendix I, but was not included in the Table J-2.2-4. The detection limits for cadmium in samples collected for 16-008(a)-99 were above the background values. Revise Table J-2.2-4 and associated risk evaluation tables to include cadmium.*

LANL Response

15. Cadmium was inadvertently omitted as a COPC. Cadmium has been added to the risk screening evaluations for all scenarios and ecological risk for Consolidated Unit 16-008(a)-99. Changes resulting from this addition have been incorporated in the revised report.

NMED Comment

16. Appendix J, Table J-4.2-11, Comparison of Noncarcinogenic COPCs to SSLs for the Construction Worker Scenario at Consolidated Unit 16-008(a)-99, page J-71:

***NMED Comment:** Table J-4.2-11 lists a Construction Worker Soil Screening Level (SSL) of 2.33E+04 milligrams per kilogram (mg/kg) for di-n-octylphthalate. According to footnote g, the value is for a surrogate, di-n-butylphthalate. However, Table J-4.2-9, Comparison of Noncarcinogenic COPCs to SSLs for the Industrial Scenario at Consolidated Unit 16-008(a)-99, lists a value of 2.5E+04 mg/kg which is based on the value available in the EPA Region 9 PRG Table. Revise footnote g of Table J-4.2.-11 to explain why a surrogate was used instead of the value listed in Table J-4.2-9 for di-n-octylphthalate.*

LANL Response

16. Because NMED and U.S. Environmental Protection Agency (EPA) Region 6 do not have soil screening levels (SSLs) for di-n-octyl phthalate, EPA Region 9 screening values were used for the residential and industrial (outdoor worker) scenarios. EPA Region 9, however, does not provide SSLs for the construction worker scenario. As a result, di-n-butylphthalate, which does have a construction worker SSL from NMED guidance, was used as a surrogate for di-n-octyl phthalate for this scenario. The footnote to Table J-4.2-11 has been modified to clarify the use of this surrogate.

NMED Comment

17. Appendix J, Table J-6.0-1, Comparison of Chemical Concentrations with Water Quality Standards for 90s Line Pond Surface Water at 90s Line, page J-90:

NMED Comment: *According to text in Section 7.3.3, mercury exceeded the NMWQCC surface water wildlife habitat standard and lead exceeded the NMWQCC surface water livestock standard. Both mercury and lead should have been included in the Table J-6.0-1. Revise the table to include both mercury and lead.*

LANL Response

17. Table J-6.0-1 has been revised to include mercury and lead as well as other constituents. See also the response to specific comment 2.

NMED Comment

18. Plate 3, Inorganic Chemicals detected above BVs at Consolidated Unit 16-008(a)-99:

NMED Comment: *According to the approved work plan (March 2005), the Permittees should have collected three samples near the previous sampling location 16-02377. However, the figure depicts only one 2006-2007 sampling location (i.e., 16-26676). Explain why only one sample was collected instead of three, as proposed.*

Four shallow boreholes were proposed for 90s Line Pond (depicted by orange squares in Figure 4.2-1b of the 2005 Workplan). The borehole that should have been drilled at the southwestern edge of pond is not depicted in the figure. Please clarify if the borehole was drilled, and if samples were collected at this location.

LANL Response

18. All three locations near 16-02377 were sampled. Section C-2.3.3 in Appendix C has been revised to include details of borehole relocation. Two locations (16-26675 west of the drainage and 16-26677 east of the drainage) were moved approximately 35 ft to the southwest because ponderosa pine trees and a fence blocked drill rig access to these locations. The locations remain on the west and east side of the former drainage, as the work plan prescribed. Location 16-26676 was sampled in the bottom of the drainage.

    The borehole at the southwestern edge of the pond was relocated to the northeast (location 16-600936) to target the lowest area of the pond where more infiltration was suspected to occur.

REFERENCES

LANL (Los Alamos National Laboratory), September 2003. "Phase III RFI Report for Solid Waste Management Unit 16-021(c)-99," Los Alamos National Laboratory document LA-UR-03-5248, Los Alamos, New Mexico. (LANL 2003, 077965)

LANL (Los Alamos National Laboratory), December 2004. "Screening-Level Ecological Risk Assessment Methods, Revision 2," Los Alamos National Laboratory document LA-UR-04-8246, Los Alamos, New Mexico. (LANL 2004, 087630)

LANL (Los Alamos National Laboratory), August 2007. "Corrective Measures Evaluation Report, Intermediate and Regional Groundwater, Consolidated Unit 16-021(c)-99," Los Alamos National Laboratory document LA-UR-07-5426, Los Alamos, New Mexico. (LANL 2007, 098734)

NMED (New Mexico Environment Department), June 2006. "Technical Background Document for Development of Soil Screening Levels, Revision 4.0, Volume 1, Tier 1: Soil Screening Guidance Technical Background Document," New Mexico Environment Department, Hazardous Waste Bureau and Ground Water Quality Bureau Voluntary Remediation Program, Santa Fe, New Mexico. (NMED 2006, 092513)