Response to the Notice of Disapproval for the Investigation Report for Potrillo and Fence Canyons Aggregate Area, Los Alamos National Laboratory (LANL), EPA ID No: NM0890010515, HWB-LANL-11-043, Dated September 21, 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 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. *Dioxins and furans were detected at several sites at Technical Area (TA) -15 and TA-36. As directed by NMED in the Direction to Modify letter issued for Potrillo and Fence Canyons (April 14, 2011), the Permittees must evaluate the need for additional sampling for dioxins and furans in Potrillo and Fence Canyons. Dioxins and furans were not included in the previous investigations conducted at Potrillo and Fence Canyons.*

LANL Response

1. As directed in NMED's April 14, 2011, direction to modify letter for the revised Potrillo and Fence Canyons investigation report (LANL 2011, 201580.14; NMED 2011, 202186), a work plan for additional investigations of dioxins and furans in Potrillo and Fence Canyons will be prepared. The need for additional investigation of dioxins and furans associated with sites in the Potrillo and Fence Canyons Aggregate Area will be addressed in that work plan.

NMED Comment

2. *For each solid waste management unit (SWMU) and area of concern (AOC) included in the IR, tables are provided that report concentrations of inorganic chemicals detected above background values (BVs), detected organic chemicals, and radionuclides detected or detected above BVs/fallout values (FVs). The BVs are different for each media type (e.g., soil, tuff, sediment) and in general tuff BVs tend to be lower than the soil/fill BVs. While discussing the nature and extent of contamination, the Permittees consider the vertical extent of contamination defined if concentrations decrease with depth at a particular location regardless of whether these values are above or below the media specific BVs. This determination is not always apparent from the manner that the data is presented in the tables.*

   For example at SWMU 15-002, aluminum was detected above the tuff BV at 11,800 mg/kg at location 15-613671 (6-7 ft) but was not detected above the soil BV in two samples collected from shallower depths (0-1- ft and 3-4 ft). Table 6.2-2 only provides the concentration for the tuff sample because it

was detected above the BV; the shallower samples are denoted by a dash which gives the appearance of concentrations increasing with depth. The text states that the vertical extent is defined at this location because the concentrations in shallower samples were greater than the concentrations detected in the deeper samples. This information is not included in the table. Instead the reviewer is directed to compiled data in Appendix G to find detected concentrations for soil samples that were detected below BVs. The data files provided in Appendix G are 56 spreadsheets labeled by event numbers rather than SWMU or AOC numbers. The IR includes 27 SWMUS/AOCs. The reviewer would have to go through all individual files to find a particular data point. It makes the data review process excessively time consuming. The Permittees must provide tables in the same format as the summary tables that include all detected concentrations whether above or below the BVs/FVs. These tables may be submitted only in an electronic format and included in an appendix along with other analytical data.

LANL Response

2. Tables summarizing inorganic chemical concentrations and radionuclide activities at each site (arranged by solid waste management unit [SWMU] or area of concern [AOC]) by depth for each location have been included in Appendix G, as Tables G-1 and G-2, respectively. These tables present all inorganic and radionuclide data for each sample, regardless of whether results are greater or less than background values (BVs) or fallout values (FVs). Comparisons with BVs and FVs are performed for detected analytes in the tables referenced in section 6 of the main text for each location. The all-analysis table in Appendix G has also been revised and is presented as two tables: one for Technical Area 15 (TA-15) and one for TA-36.

SPECIFIC COMMENTS

NMED Comment

1. Section 5.0, Data Review Methodology, page 15:

Permittees Statement: *"For dioxins/furans, if the site data consist exclusively of the hepta- and octa-congeners, then the presence of these congeners does not reflect a release of dioxins and furans from the site. EPA's exposure and human health reassessment of 2,3,7,8-TCDD (tetrachlorodibenzodioxin) (http://www.epa.gov/ncea/pdfs/dioxinlnasreview/pdfs/partl_vol2/dioxin_ptl_vol2ch03_dec2003.pdf) indicates these congeners predominate in rural and urban background soil. EPA further states that concentrations of the hepta- and octa- congeners are generally higher than the tetra-, penta-, and hexa congeners in background soil. The lack of other detected congeners, particularly the penta- and tetra congeners, indicates that a release associated with site activities has not occurred and the observed results are indicative of background conditions. Therefore, no additional sampling and analysis for dioxins/furans are warranted."*

NMED Comment: *NMED acknowledges EPA study, but generalized regional background levels have not been deemed appropriate for use to eliminate a contaminant as potentially site related, rather NMED has always required facilities to collect site specific data. However, additional sampling may not be required if there is a lack of site history to indicate a source for dioxins/furans and there are a minimal number of detections, where all detections are below risk-based levels. The Permittees must collect some background samples to verify their conclusion that these detections are attributable to*

background. There is no background data to evaluate the magnitude of the detections, thus the dioxins and furans must be treated as contaminants of potential concern.

LANL Response

1. The discussion noted above from section 5.0 of the investigation report explains how data were evaluated to determine whether additional sampling and analysis for dioxins/furans are warranted at a site. If only the hepta- and octa- congeners are detected in a few samples, then additional sampling and analysis for dioxins and furans is not warranted. Site-specific evaluations of dioxin and furan data are presented in sections 6.0 and 7.0 for sites in TA-15 and TA-36, respectively. Even if additional sampling is not warranted, dioxins and furans are not eliminated as chemicals of potential concern (COPCs) at a site. The Laboratory intends to include all dioxin and furan congeners in the risk-screening assessments for a site regardless of the type of congener detected.

NMED Comment

2. Section 6.3.4.1, Soil, Rock, and Sediment Sampling, page 26:

Permittees Statement: *"The landfill boundary was defined and excavated in accordance with the approved work plan (LANL 2009, 106657.8; NMED 2009, 106677). When excavated, the actual boundaries of MDA [Material Disposal Area] N were approximately 170 ft long × 50 ft × 4 to 5 ft deep."*

NMED Comment: *During 2010 investigations, the buried waste at solid waste management unit (SWMU) 15-007(a), was found in an area that was wider and shorter than the area anticipated in the work plan. To collect appropriate data, the proposed sampling locations were modified based on the actual dimensions of the landfill. However, the Permittees did not revise the associated figures to depict the actual landfill boundary so that the modified sampling locations could be evaluated. The manner in which the current figures depict sampling locations indicates that the extent of contamination is not defined for the site. All associated figures must be revised to indicate the actual limits of excavation.*

LANL Response

2. The SWMU boundary previously shown for Material Disposal Area (MDA) N [SWMU 15-007(a)] was based on a plot map provided in the 1990 SWMU report and was found to be inaccurate. The wastes at MDA N were buried within the area defined by the 2010 excavation of the site, and the SWMU boundary has been revised to coincide with the excavation outline. The revised SWMU boundary has been added to Figure 6.3-1 as well as to Plates 2 and 3. As the revised figure shows, the modified sampling locations that lie outside the revised SWMU boundary indicate the extent of contamination is defined for MDA N.

NMED Comment

3. Section 6.7.4.4, Spatial Distribution of Contamination, page 47:

Permittees Statement: *"Contaminant distributions were evaluated primarily to determine the spatial distribution of contaminants, what contaminants have been dispersed, and whether they are migrating off-site. Vertical distribution is not considered for samples collected in drainages downgradient of the site in sediment catchment areas where vertical mixing may occur."*

NMED Comment: *The meaning of this statement is not clear. Since the objective of the investigation was not to determine the full nature and extent of contamination but to evaluate the general spatial distribution of the contaminants and whether contaminants were migrating off site, the vertical extent of contamination must be considered when site investigations are conducted in the future.*

LANL Response

3. The approved investigation work plan (LANL 2009, 106657.8, pp. 23–24; NMED 2009, 106677) states, "The objective of the investigation at SWMU 15-004(f) is not to determine the nature and extent of contamination but rather to identify the areas and depths of soil requiring corrective action." Furthermore, the work plan states, "Samples will be collected from the head of Potrillo Canyon and from the drainage directly downgradient and south of SWMU 15-004(f) to determine if contaminants are migrating from the site."

   The statement referenced in NMED's comment refers to the investigation approach used at SWMU 15-004(f), which was different from the approach used at other sites. For this site, spatial distribution refers to how contaminants are distributed throughout the E-F Firing site, including the mounds. Contaminant dispersal refers to the grid sampling performed at the site to determine how contaminants have been dispersed from firing activities. Off-site migration refers to the sediment sampling done in downgradient drainages to evaluate potential contaminant migration. The latter sampling did not consider vertical extent, although multiple depths were sampled to account for variation of contaminant concentrations with depth in the drainages. These data will be used to prepare corrective measures plans for the entire site, including the mounds. The vertical extent of contamination at SWMU 15-004(f) will be evaluated in the subsequent investigation report.

NMED Comment

4. Section 6.7.4.4, Spatial Distribution of Contamination, Inorganic Chemicals, pages 47-51:

- *A total of 159 samples (97 soil, 50 tuff, and 12 sediment) were analyzed for inorganic chemicals. Table 6.7-2 reports analytical results for inorganic chemicals detected above background values at SWMU 15-004(f). Analytical data for samples collected from locations 15-613385, 15-613386, 15-613387, 15-613388, and 15-613389 were included in the Table 6.7-2, but was not included in the discussion of spatial distribution of contamination. Revise the discussion in the text to include all data.*
- *The Permittees state that barium, cadmium, mercury, potassium, and sodium concentrations decreased with depth at location 15-02182. However, Table 6.7-1 indicates that a sample was collected from only one depth (1.5-2 ft) at location 15-02182. Resolve the discrepancy and revise the text accordingly.*
- *In addition to the locations mentioned in the text, selenium concentrations also increased with depth at locations 15-613384, 15-613386, 15-613387, 15-613388, and 15-613389 and remained the same at location 15-613385 (See Table 6.7-2). Revise the text accordingly.*
- *Zinc concentrations decreased with depth at location 15-02246, not 15-02264. Correct the typographical error.*

LANL Response

4. The paragraphs below address each bulleted item in NMED's comment.

   The approved investigation work plan (LANL 2009, 106657.8, pp. 23-24; NMED 2009, 106677) states, "The objective of the investigation at SWMU 15-004(f) is not to determine the nature and extent of contamination but rather to identify the areas and depths of soil requiring corrective action." Furthermore, the work plan states, "Samples will be collected from the head of Potrillo Canyon and from the drainage directly downgradient and south of SWMU 15-004(f) to determine if contaminants are migrating from the site." Locations 15-613384, 15-613385, 15-613386, 15-613387, 15-613388, and 15-613389 are sediment catchment sampling locations. Discussion of spatial distribution of contamination did not include the vertical extent of contamination for sediment catchment areas because of active sediment mixing in these areas. Discussion of potential off-site migration based on evaluation of drainage samples is included in section 6.7.4.4 in the section titled "Downgradient Sediment Sampling." Future characterization of nature and extent of contamination at the E-F Firing Site will include an assessment of the vertical profile.

   Location 15-02182 has been removed from the results that previously indicated contaminant concentrations decreased with depth at this location and has been added to the list of single samples collected.

   Locations 15-613384, 15-613386, 15-613387, 15-613388, and 15-613389 are sediment catchment sampling locations. As stated in the text, discussion of spatial distribution of contamination did not include the vertical extent of contamination for sediment catchment areas because of active sediment mixing in these areas. Therefore, these locations are not discussed in the spatial distribution of contamination for E-F Firing Site. (See response to bullet 1 of NMED Comment 4.)

   The typographical error has been corrected.

NMED Comment

5. Section 6.7.4.4, Spatial Distribution of Contamination, Radionuclides, pages 51-52:

- *A total of 141 samples (79 soil, 50 tuff, and 12 sediment) were analyzed for isotopic uranium. Table 6.7-4 reports analytical results for radionuclides detected or detected above background/fallout values at SWMU 15-004(f). Analytical data for samples collected from locations 15-613385, 15-613386, 15-613387, 15-613388, and 15-613389 in the drainage were not included in the discussion of spatial distribution of contamination. Revise the discussion to include all data.*
- *According to the text, 18 samples from 18 locations were analyzed for gamma-emitting radionuclides. Table 6.7-1 also indicates that 18 samples were analyzed by gamma spectroscopy. However, Table 6.7-4 indicates that only two samples from two locations were analyzed for cesium-137. In addition, the text states that cesium-137 activities decreased with depth and downgradient in Potrillo Canyon Reach PO-I. Since samples were collected only from one depth it would not be possible for the Permittees to determine that cesium-137 activity decreased with depth. Resolve the discrepancies and revise the text accordingly.*

LANL Response

5. The paragraphs below address the bulleted items in NMED's comment.

   Locations 15-613385, 15-613386, 15-613387, 15-613388, and 15-613389 are sediment catchment sampling locations in the drainage downgradient of SWMU 15-004(f), which were sampled to determine if contaminants are migrating from the site and are therefore not discussed in the section that describes the spatial distribution of contamination for the E-F Firing Site. (See response to bullet 1 of NMED Comment 4.)

   Cesium-137 was detected at only two locations at depths where FVs do not apply (>1 ft below ground surface [bgs]) (Table 6.7-4). All other detected concentrations were present at depth intervals of less than 1 ft bgs, and activities within that depth interval are less than the FV for cesium-137. As a result, these cesium-137 results were not included in Table 6.7-4. The vertical extent of contamination in the drainages downgradient of SWMU 15-004(f) will be evaluated in the subsequent investigation report.

NMED Comment

6. Section 6.8.1, Site Description and Operational History, page 54:

The text states that SWMU 15-008(a) consists of two small surface disposal areas located on the edge of Potrillo Canyon directly south of SWMU 15-004(f). Figure 6.8-1 indicates that one surface disposal area is located directly south and one is located east of SWMU 15-004(f). Resolve the discrepancy and revise the IR accordingly.

LANL Response

6. The text has been modified to correctly describe the location of both components of SWMU 15-008(a).

NMED Comment

7. Section 6.8.2, Relationship to Other SWMUs and AOCs, page 55:

Permittees Statement: *"SWMU 15-008(a) is located south of the three inactive firing points (D, E, and F) of SWMU 15-004(f) and northwest of AOCs 15-008(f) and 36-004(3)."*

NMED Comment: *SWMU 15-008(a) is located northwest of AOCs 15-008(f) and 36-004(e), not 36-004(3). Correct the typographical error.*

LANL Response

7. The typographical error has been corrected in the text.

NMED Comment

8. Section 6.8.4.3, Soil, Rock, and Sediment Sampling Analytical Results, page 56:

Plates 7, 8, and 9 depict the spatial distribution of inorganic chemicals, organic chemicals, and radionuclides detected or detected above background/fallout values, respectively. The inset in the

plates, showing details of SWMU 15-008(a), incorrectly depicts location of Firing Point F as Firing Point D (See Figure 6.7-1). Revise Plates 6, 7, and 8 to correctly label Firing Point F in the inset.

LANL Response

8. Plates 7, 8, and 9 (not Plate 6 as indicated in the comment) have been revised to correctly label Firing Point F in the inset.

NMED Comment

9. Section 6.8.4.4, Nature and Extent of Contamination, Inorganic Chemicals, page 59:

At SWMU 15-008(a), perchlorate concentrations increased with depth in samples collected from locations 15-613409, 15-613412, and 15-613414, rather than decreased as stated in the text. At these locations, perchlorate was not detected in soil samples (0-1 ft), but was detected in tuff samples collected from either 1-2 ft or 2-3 ft (See Table 6.8-2). Revise the text accordingly.

LANL Response

9. At locations 15-613409, 15-613412, and 15-613414, perchlorate was not detected in a shallow surface sample (0–1 ft bgs) and was detected below estimated quantitation limits (EQLs) in a subsurface sample (1–2 ft or 3–4 ft bgs). In all cases, the detection limit (DL) of the shallow sample was approximately 10 times greater than the detected value in the deeper sample. Because perchlorate was detected only below EQLs, the extent of perchlorate is defined. The text in section 6.8.4.4 has been revised accordingly.

NMED Comment

10. Section 6.9.4.4, Nature and Extent of Contamination, Inorganic Chemicals, page 64:

At AOC 15-005(b), perchlorate concentrations increased with depth in samples collected from location 15-613253, not decreased as stated in the text. Perchlorate was not detected in the sample collected from 0-1 ft, but was detected in the sample collected from 4-5 ft (See Table 6.9-2) indicating the concentration increased with depth. Revise the text accordingly.

LANL Response

10. At location 15-613253, perchlorate was not detected in a shallow surface sample (0–1 ft bgs) and was detected below the EQL in a subsurface sample (4–5 ft bgs). The DL of the shallow sample (0.0054 mg/kg) was greater than the detected value in the deeper sample (0.0033 mg/kg). Because perchlorate was detected only below EQLs, the extent of perchlorate is defined. The text in section 6.9.4.4 has been revised accordingly.

NMED Comment

11. Section 6.11.2, Relationship to Other SWMUs and AOCs, page 66:

AOC C-36-006(e) is located southeast of AOC 15-008(f), not AOC C-36-006 as stated. Correct the typographical error.

LANL Response

11. The typographical error has been corrected in the text.

NMED Comment

12. Section 6.11.4.4, Spatial Distribution of Contamination, Inorganic Chemicals, page 69:

Permittees Statement: *"Selenium has a high frequency (90%) of nondetects in the Potrillo and Fence canyons investigations data set, and DLs for these samples are above the BV, making it difficult to evaluate the sources, concentrations, and distribution of selenium. Average selenium concentrations in fine facies sediment are above the BV in all reaches. Although these averages are affected by the high frequency of nondetects and elevated DLs, the spatial pattern of selenium does not indicate a release (LANL 2010, 111507)."*

NMED Comment: *The detection limits (DLs) for selenium in samples collected from Potrillo and Fence Canyons are above the background values. The Permittees did not provide any explanation for the elevated detection limits (DLs) for selenium. The Permittees must retain selenium as a COPC for inclusion in risk assessments. The above statement is repeated several times throughout the document and this comment is applicable to all such statements.*

LANL Response

12. The current DLs for selenium are sometimes higher than BVs because BVs were developed using an analytical method (graphite furnace atomic absorption) having a lower DL than the method currently used (inductively coupled plasma mass spectrometry). The occurrence DLs above BVs, however, is not a basis for eliminating chemicals as COPCs (see section 5.1). Selenium is retained as a COPC at all sites where the DLs are above BVs and will be evaluated when the risk assessment is performed.

NMED Comment

13. Section 6.11.4.4, Spatial Distribution of Contamination, Radionuclides, page 70:

Permittees Statement: *"Uranium-234 activities in the drainage downgradient of AOC 15-008(f); however, uranium-234 was detected above the sediment BV at 3.61 pCi/g at location 15-61363 at the bottom of the drainage."*

NMED Comment: *The above statement is not correct. The Permittees may have intended to state "Uranium-234 activities in the drainage decreased downgradient of AOC 15-008(f); however, uranium-234 was detected above the sediment BV at 3.61 pCi/g at location 15-61363 at the bottom of the drainage." Revise the text to clarify the spatial distribution of uranium-234.*

LANL Response

13. The text has been revised to indicate uranium-234 activities decreased in the drainage downgradient of AOC 15-008(f). Also, the location identification at the bottom of the drainage has been corrected to 15-613263.

NMED Comment

14. Section 6.11.4.4, Spatial Distribution of Contamination, Summary of Contaminant Distribution, page 71:

Permittees Statement: *"Concentrations of detected inorganic chemicals and organic chemicals decreased in the drainages downgradient of AOC 15-008(f) and were not detected or not detected above BVs in samples collected from the bottom of the drainage below the site."*

NMED Comment: *Selenium was detected above the BV at location 15-613263, which is located at the bottom of the drainage. Similarly, benzoic acid and toluene were detected at location 15-613262, which is also located at the bottom of the drainage. Revise the statement accordingly.*

LANL Response

14. Selenium concentrations decreased downgradient from location 15-613263 to 15-613262, and concentrations of toluene and benzoic acid were below the EQLs. The text in the section titled "Summary of Contaminant Distribution" has been revised to state, "Concentrations of detected inorganic and organic chemicals decreased in the drainages downgradient of AOC 15-008(f) or were below EQLs."

NMED Comment

15. Section 6.12.4.4, Nature and Extent of Contamination, pages 74-76:

The samples were inadvertently collected from below the ground surface instead of below the structures and drainlines. The approved investigation work plan required samples to be collected below the structures and drainlines. The Permittees appropriately did not include the analytical results for those samples in the IR. However, the Permittees used historical data and the analytical results of samples collected in the drainage to discuss the nature and extent of contamination at SWMU 15-009(e). Statements are made repeatedly throughout this section that vertical and lateral extent of several chemicals is defined, which are misleading because of the incomplete data set used to make these determinations. The discussion on nature and extent of contamination is premature when the complete data set is not available. NMED has not reviewed this section. The Permittees must revise the IR and delete the discussion on nature and extent and include it in the upcoming Phase II investigation report when sampling is complete at the site.

LANL Response

15. Text has been added to section 6.12.4.4 to indicate that nature and extent are discussed for data collected to date for SWMU 15-009(e) but that nature and extent are not defined for the site. The Phase II investigation work plan will propose collecting the appropriate samples to determine nature and extent at SWMU 15-009(e). The following text has been added to section 6.12.4.4: "Data from the Phase II investigation will be evaluated with data from the Phase I investigation to determine if nature and extent are defined. The results will be presented in the Phase II investigation report."

NMED Comment

16. Section 6.13.4.4, Nature and Extent of Contamination, pages 79-81:

At SWMU 15-010(a), the investigation work plan assumed that the septic tank had been previously filled with sand and left in place. However, during the 2010 investigations the septic tank was not found and it was concluded that it had been previously removed. Areas of disturbed soil and tuff also indicated that the tank had been removed between 1995 and 2010. During Phase II RCRA Facility Investigation, conducted in 1997, tuff samples were collected from a depth interval of 8-9.5 ft below ground surface (bgs). The data from 1997 investigation indicated the presence of organic chemicals and also inorganic chemicals above BVs. However, during 2010 investigations, instead of collecting tuff samples from deeper intervals to define the vertical extent of contamination, the Permittees collected only fill samples from depth intervals of 4-5 ft, 6-7 ft, 7-8 ft, and 9-9.5 ft with the exception of one tuff sample collected from a depth of 7-8 ft at location 15-613431. The fill samples were most likely collected from imported backfill that is not representative of the site soils or tuff. The Permittees must collect two additional samples from each proposed location from depth intervals greater than the previous sampling depth of 8-9.5 ft bgs, to define the vertical extent of contamination. All samples must be analyzed for the suite proposed in the approved work plan.

It is not clear from the text whether the Permittees were able to locate the outfall area. The approved work plan proposed sampling beneath the inlet drainlines and in the outfall area. Apparently samples were not collected from beneath the locations of former drainlines or outfall area. The Permittees must determine the location and depth of former inlet drainlines and collect samples from locations beneath the former drainlines and from outfall area as proposed in the approved work plan. All samples must be tested for the analytical suite proposed in the work plan. Revise the IR accordingly.

LANL Response

16. Text has been added to section 6.13.4.4 to indicate that nature and extent are discussed for data collected to date for SWMU 15-010(a) but that nature and extent are not defined for the site.

    Although engineering drawings were examined, the area was surveyed, and the locations where the inlet and outlet drainlines would have been located were sampled, the outfall area was never located during the Phase I investigation. The outfall was believed to have been removed in 1992. An additional survey will be conducted during the Phase II investigation to try and locate the outfall, and the Phase II investigation work plan will include the appropriate data collection to determine the nature and extent of contamination at SWMU 15-010(a). The following text has been added to section 6.13.4.4: “Data from the Phase II investigation will be evaluated with data from the Phase I investigation to determine if nature and extent are defined. The results will be presented in the Phase II investigation report.”

NMED Comment

17. Section 6.14.4.4, Nature and Extent of Contamination, pages 83-84:

As part of defining the lateral extent of contamination at AOC C-15-004, the Permittees used data obtained from SWMU 15-009(e), located southeast of the site. Figure 6.12-1 indicates that samples collected in the drainage for SWMU 15-009(e) were collected from locations that are upgradient of the pathway where contaminants would have likely migrated from AOC C-15-004. The Permittees must clarify which sampling locations at SWMU 15-009(e) were considered appropriate to define the lateral

extent for AOC C-15-004 and reevaluate whether the lateral extent of contamination is defined for AOC C-15-004 or additional sampling is necessary. Revise the IR accordingly.

LANL Response

17. The text has been revised to indicate the data to define lateral extent at AOC C-15-004 were collected from downgradient location 15-613384, which is associated with SWMU 15-004(f), rather than from SWMU 15-009(e). Data from SWMU 15-009(e) were not used to define extent for AOC C-15-004.

NMED Comment

18. Section 6.15.4.4, Nature and Extent of Contamination, Inorganic Chemicals, page 87:

Permittees Statement: *"Barium was detected above the tuff BV (46 mg/kg) in five samples at five locations. The maximum concentration of 129 mg/kg was detected above BV at location 15-613302 from 2-3 ft bgs. Barium concentrations decreased with depth at these locations because the concentrations in the shallower samples were below the soil BV but above the concentrations in the deeper tuff samples (see section 5.0 and Appendix G) and increased to the south and downgradient at location 15-613300. The vertical extent of barium is defined, but the lateral extent is not defined."*

NMED Comment: *Barium concentrations decreased to the south, rather than increased as stated at AOC C-15-005. Barium was detected at concentrations of 129 mg/kg and 113 mg/kg at locations 15-613302 and 15-613303, respectively. Barium was detected at a downgradient location 15-613300 at 89.5 mg/kg. Revise the text accordingly.*

LANL Response

18. The text has been revised to indicate a decrease in barium concentrations to the south and downgradient of AOC C-15-005 and to indicate the lateral extent of barium is defined.

NMED Comment

19. Section 6.15.4.4, Nature and Extent of Contamination, Organic Chemicals, page 89:

Permittees Statement: *"Fluoranthene concentrations decreased with depth at location 15-613301, were below EQL at locations 15-613298 and 15-613303, and decreased to the south and downgradient at location 15-613303."*

NMED Comment: *The downgradient location from sample locations 15-613298 and 15-613303 is 15-613300, not 15-613303. Revise the text accordingly.*

LANL Response

19. The text has been revised to indicate the correct sampling location.

NMED Comment

20. Section 7.2.4.4, Spatial Distribution of Contamination, Organic Chemicals, page 98:

At SWMU 36-001, the maximum concentrations for several dioxin and furan congeners were detected at location 36-613727 (5 ft-6.5 ft bgs). However, for several of these congeners, concentrations (although lower than the samples collected from the 5 ft-6.5 ft depth interval) increased in samples collected from 13.5 ft-15 ft bgs as compared to samples collected from 10 ft-11.5 ft bgs at these sampling locations, indicating an increasing trend. In addition, all the samples were collected from the fill material. The Permittees were not able to implement the proposed remediation activities at the site because of cited potential health and safety risks. Instead additional characterization of the site was conducted during 2010 investigations. The Permittees proposed to excavate the disposal trenches, and dispose of the removed waste. As proposed in the work plan, the Permittees must collect samples from two depths (0-1 ft and 4-5 ft) beneath the bottom of the excavation and include dioxin and furan analysis in the analytical suite to define the vertical extent of contamination.

LANL Response

20. Comment noted. Section 9.1.2, p. 141, of the investigation report states, “The Laboratory recommends implementing the remediation approach proposed in the approved investigation work plan.…” Samples will be collected from the appropriate depth intervals beneath the excavation, as noted in the approved investigation work plan, and will include an analysis of dioxins and furans during the Phase II investigation. This proposed sampling and analysis will be described in the Phase II investigation work plan. No revision to the text in section 7.2.4.4 is necessary.

NMED Comment

21. Section 7.3.4.4, Nature and Extent of Contamination, pages 101-102:

The samples were inadvertently collected from below the ground surface instead of below the structures and drainlines. The approved investigation work plan required samples to be collected below the structures and drainlines. The Permittees appropriately did not include the analytical results for those samples in the IR. However, the Permittees used analytical results from samples collected at or below the outfall to discuss the nature and extent of contamination at SWMU 36-003(b). The text repeatedly states that the vertical and lateral extent is defined for several chemicals, which is incorrect because incomplete data set was used to make these determinations. The discussion on the nature and extent of contamination is premature without the complete data set. NMED has not reviewed this section. The discussion on nature and extent must be postponed until sampling is complete at the site.

LANL Response

21. Samples collected at or below the outfall are used to discuss the nature and extent of contamination at SWMU 36-003(b) in the drainage only and not below structures and drainlines. Samples below the structures and drainlines at SWMU 36-003(b) will be collected during the Phase II investigation and will be discussed in the Phase II investigation report. The Phase II investigation work plan will include the appropriate data collection to determine the nature and extent of contamination at SWMU 36-003(b). The following text has been added to section 7.3.4.4: “Data from the Phase II investigation will be evaluated with data from the Phase I investigation to determine if nature and

extent are defined. The results will be presented in the Phase II investigation report." The Phase II investigation will evaluate all sampling results.

NMED Comment

22. Section 7.4.4.4, Spatial Distribution of Contamination, Organic Chemicals, page 105:

The text states that "[a]s discussed in section 5.0, the presence of only hepta- and octa- congeners indicates a release has not occurred. Therefore, no additional sampling and analysis for dioxins and furans are warranted at this site." However, Table 7.4-3 indicates that in addition to hepta- and octa-congeners, hexa- congeners were also detected at AOC 36-004(a). Resolve the discrepancy and revise the text accordingly.

LANL Response

22. The only individual dioxin and furan congeners detected at AOC 36-004(a) were hepta- and octa-congeners. The results for total congeners (e.g., hexachlorodibenzodioxins [total]) reported in Table 7.4-3 are artifacts of the analytical method and are not representative of individual dioxin and furan congener detections or concentrations. It is standard practice for analytical laboratories to provide totals data unless requested not to do so. The discussion of nature and extent and the risk assessments have consistently addressed the individual congeners only because these data represent analytes present in the environment. The discussion of nature and extent is valid in reporting the only individual congeners detected were hepta- and octa- congeners and these congeners are indicative of, and consistent with, globally persistent concentrations rather than with source releases. Therefore, no revision to the text in section 7.4.4.4 is necessary.

NMED Comment

23. Section 7.5.4.4, Nature and Extent of Contamination, Organic Chemicals, page 110:

The text states that "As discussed in section 5.0, the presence of only hepta- and octa- congeners indicates a release has not occurred. Therefore, no additional sampling and analysis for dioxins and furans are warranted at this site." However, Table 7.5-3 indicates that in addition to hepta- and octa-congeners, tetra-, penta-, and hexa-congeners were also detected at SWMU 36-006. Resolve the discrepancy and revise the text accordingly.

LANL Response

23. The only individual dioxin and furan congeners detected at SWMU 36-006 were hepta- and octa-congeners. The results for total congeners (e.g., tetrachlorodibenzodioxins [total]) reported in Table 7.5-3 are artifacts of the analytical method and are not representative of individual dioxin and furan congener detections or concentrations. It is standard practice for analytical laboratories to provide totals data unless requested not to do so. The discussion of nature and extent and the risk assessments have consistently addressed the individual congeners only because these data represent analytes present in the environment. The discussion of nature and extent is valid in reporting the only individual congeners detected were hepta- and octa- congeners and these congeners are indicative of, and consistent with, globally persistent concentrations rather than with source releases. Therefore, no revision to the text in section 7.5.4.4 is necessary.

NMED Comment

24. Section 7.6.4.4, Nature and Extent of Contamination, Inorganic Chemicals, page 113:

AOC 36-004(b), selenium was detected at 1.1 mg/kg at location 15-613267 at the bottom of the drainage, not 15-613263. Revise the text accordingly.

LANL Response

24. The text has been revised to correct the location.

NMED Comment

25. Section 7.7.4.4, Nature and Extent of Contamination, Organic Chemicals, page 118:

The text states that "As discussed in section 5.0, the presence of only hepta- and octa- congeners indicates a release has not occurred. Therefore, no additional sampling and analysis for dioxins and furans are warranted at this site." However, Table 7.7-3 indicates that in addition to hepta- and octa-congeners, hexachlorodibenzodioxins were also detected at AOC 36-004(c). Resolve the discrepancy and revise the text accordingly.

LANL Response

25. The only individual dioxin and furan congeners detected at AOC 36-004(c) were hepta- and octa-congeners. Results for total congeners (e.g., hexachlorodibenzodioxins [total]) reported in Table 7.7-3 are artifacts of the analytical method and are not representative of individual dioxin and furan congener detections or concentrations. It is standard practice for analytical laboratories to provide totals data unless requested not to do so. The discussion of nature and extent and the risk assessments have consistently addressed the individual congeners only because these data represent analytes present in the environment. The discussion of nature and extent is valid in reporting the only individual congeners detected were hepta- and octa- congeners and these congeners are indicative of and consistent with globally persistent concentrations rather than with source releases. Therefore, no revision to the text in section 7.7.4.4 is necessary.

NMED Comment

26. Section 7.8.4.4, Spatial Distribution of Contamination, Radionuclides, page 124:

Cesium-137 was detected in five samples at four locations (See Figure 7.8-4). Table 7.8-4 did not report results for sediment samples collected at locations 15-613503 and 15-613504. Revise Table 7.8-4 to include samples collected from locations 15-613503 and 15-613504.

LANL Response

26. Cesium-137 results for samples collected at locations 15-613503 and 15-613504 were not detected or were not detected above the sediment FV (0.9 pCi/g) for cesium-137. No other radionuclides were detected at these locations. There is no depth limit on comparing fallout radionuclides or background values for sediment as there is for soil. Therefore, the results are not reported in Table 7.8-4 and have been deleted from Figure 7.8-4. No revision to Table 7.8-4 is necessary.

NMED Comment

27. Section 7.10.4, Site Contamination, page 127:

Permittees Statement: *"During the 2010 implementation of the approved work plan, cultural resource issues were raised by Laboratory archaeologists, causing work activities to be suspended. The Laboratory was aware of cultural resources located at SWMU 36-005; however, additional archaeological sites were discovered during a site visit by Laboratory archaeologists (English 2010, 111797). It was determined that full clearance by the State Historical Preservation Office to collect samples (and remove debris) may not be possible, and the review process to reach this determination would extend beyond due date of the investigation report. An alternate sampling approach was proposed that included three transects across the slope downgradient of the site. This alternative sampling approach was successfully implemented (see section 7.10.4-1 and deviations in Appendix B)."*

NMED Comment: *The Permittees were not able to conduct sampling in accordance with the approved work plan because of cultural resource issues and the time constraints to meet the due date for submittal of the IR. The discussion on nature and extent of contamination, based on alternate sampling, concluded that the vertical extent of several inorganic and organic chemicals is not defined and additional sampling was recommended. However, the Permittees did not propose to obtain clearance from the State Historical Preservation Office to collect samples from sampling locations proposed in the approved IWP, to complete the nature and extent determination at SWMU 36-005. The screening level data obtained during Phase I and Phase II RCRA Facility Investigations indicated that inorganic, organic chemicals and radionuclides were present in samples collected from locations that could not be sampled during 2010 investigations. In the approved IWP, 54 samples were proposed to be collected from previously sampled locations and also new locations that were selected based on the detection of various contaminants. The Permittee must obtain appropriate clearance and collect samples from locations proposed in the approved IWP to complete characterization of the site.*

LANL Response

27. The Laboratory's Cultural Resources Team is tasked with the responsibility of assisting the DOE Los Alamos Site Office (LASO) with meeting DOE historical preservation compliance mandates for "avoidance of impacts to significant cultural resources" under LASO's current programmatic agreement with the New Mexico State Historic Preservation Officer. As discussed with NMED, sensitive archaeological sites were identified by the Cultural Resources Team within the boundary of SWMU 36-005 just before the 2010 investigation and sampling near any of the archaeological sites was not possible (English 2010, 111797). Although sampling within the archaeological sites was not possible, the presence of the archaeological sites limits future land use and effectively controls exposure to whatever residual contamination might be present at this SWMU.

    Based on these considerations, the Laboratory proposed to NMED, and subsequently implemented, an alternate approach for characterizing the SWMU without the need to disturb the archaeological sites (English 2010, 111797). Those sampling locations proposed in the approved investigation work plan that could be accessed without impacting the archaeological sites were sampled, along with new locations downgradient of the archaeological sites. The results of the Phase I investigation indicate the SWMU is not a significant source of contamination and reflect little or no transport from this SWMU. Therefore, samples will not be collected from the remaining locations presented in the approved investigation work plan, which are situated within the archaeological sites. Additional

samples will be collected from deeper depth intervals at locations along the previously sampled transects downgradient of the SWMU to define vertical extent during the Phase II investigation.

NMED Comment

28. Section 7.12.4.3, Soil, Rock, and Sediment Sampling Analytical Results, Radionuclides, page 133:

Ten samples (eight soil and two sediment) were analyzed for isotopic uranium and gamma-emitting radionuclides at AOC C-36-006(e), not nine (See Table 7.12-1). Revise the text accordingly.

LANL Response

28. The sample count has been corrected in the text.

NMED Comment

29. Appendix B, B-5.1, Surface and Subsurface Sampling Methods, page B-3:

The Permittees have not provided sufficient detail of sampling methods for NMED to evaluate whether appropriate methods were used to collect samples for volatile organic compounds (VOCs) analysis. Table B-1.0-1, indicates that sample material was transferred from the auger bucket to a stainless steel bowl before the various required sample containers were filled. Transferring the sample material to a bowl before containerizing samples likely resulted in loss of VOCs, if present.

As required by the section IX.A of the Consent Order, the Permittees must describe the methods in sufficient detail that were used to collect samples for VOCs. The methods used to collect the samples from the sampling device, the procedures used to transfer the samples to sampling containers, the types of sample containers used, how the sample containers were filled to eliminate headspace, and the method of storage for the sample containers must be described in detail. Methods used to collect samples for different media such as soil, sediment, and tuff, must be described separately. The Permittees must describe every step of sample collection so NMED can determine whether the VOC data presented in the IR is defensible. Similar comments have been provided for Upper and Lower Sandia Canyon documents.

LANL Response

29. Surface and subsurface samples were collected using either hand-auger or spade-and-scoop methods. No drilling characterization was conducted during the 2010 investigation. Samples for volatile organic compound (VOC) analysis were collected immediately to minimize loss of subsurface VOCs during the sample collection process. Containers for VOC samples were filled as completely as possible, leaving no or minimal headspace, and sealed with a Teflon-lined cap. Appendix B, section B-5.1, and Table B-1.0-1 have been revised to provide additional details on collection of VOC samples for analysis. The description is specific to the sampling method rather than to the media (e.g., soil samples are collected using the spade-and-scoop method in the same manner as sediment samples).

NMED Comment

30. Appendix B, B-11.0, Deviations from the Work Plan, Bullet 5, page B-9:

Permittees Statement: *The approved investigation work plan required four samples to be collected from two depths at two locations along the tank inlet drainline at SWMU 15-009(e). All six samples were inadvertently collected from 0-1 ft bgs and 3-4 ft bgs, not below the drainline.*

NMED Comment: *All four samples were inadvertently collected from 0-1 ft and 3-4 ft below ground surface instead of from locations beneath the drainline, not six as stated. Correct the typographical error.*

LANL Response

30. The number of samples collected has been corrected in the text.

NMED Comment

31. Appendix B, Table B-11.0-1, page B-34:

At AOC C-36-006(e), samples collected from location 15-613313 were not analyzed for cyanide and perchlorate, rather than VOCs and pesticides as stated in the text (See Section B-11.0). Revise the table to indicate that additional samples will be collected during Phase II investigation for cyanide and perchlorate analyses to rectify this omission.

LANL Response

31. No characterization sampling was proposed for AOC C-36-006(e) in the approved investigation work plan (LANL 2009, 106657.8; NMED 2009, 106677). The approved work plan proposed sampling in sediment catchment areas in the drainages downgradient of the site to determine if contaminants are migrating from the site, not to determine the vertical extent of contamination. AOC C-36-006(e) is encompassed by the I-J Firing Site, which is deferred per Table IV-2 of the Compliance Order on Consent. Therefore, AOC C-36-006(e) will not be included in the Potrillo and Fence Canyons Aggregate Area Phase II investigation. Table B-11.0-1 has been revised to include cyanide and perchlorate analyses for location 15-613313 during the Phase II investigation.

NMED Comment

32. Appendix C, C-1.0, Introduction, page C-1:

Permittees Statement: *Areas of contamination were approved for the investigation and remediation of Solid Waste Management Units (SWMUs) 15-007(a), 15-008(a), 36-001, and 36-006 within Technical Area 15 (TA-15) and TA-36 (LANL 2010, 110838) and granted for SMWUs 15-007(a), 36-001, and 36-006 (NMED 2010, 110953).*

NMED Comment: *The Permittees' requested approval for five areas of contamination (i.e., SWMUs 15-007(a), 15-008(a), 15-010(a), 36-001, and 36-006) for remediation and investigation actions at Potrillo and Fence Canyon aggregate area on September 29, 2010. On October 7, 2010, NMED approved area of contamination designation for only three of the five sites (i.e., SWMUs 15-007(a), 36-001, and 36-006). An area of contamination designation was not approved for*

SWMU 15-008(a). Resolve the discrepancy and clarify whether wastes were staged at SWMU 15-008(a) after NMED disapproved the area of contamination designation.

LANL Response

32. The text has been revised to identify SWMUs 15-007(a), 36-001, and 36-006 as those sites where an area of contamination designation was requested and was granted. The reference to SWMU 15-008(a) has been removed from the text because waste from this site was characterized as nonhazardous low-level waste, containerized and accumulated in a designated waste accumulation area with secondary containment, and disposed of at TA-54 in accordance with Standard Operating Procedure 5238, Characterization and Management of Environmental Program Waste. Similarly, an area of contamination was not needed for SWMU 15-010(e), and this site was not discussed in Appendix C.

REFERENCES

English, J., December 14, 2010. Communication Record Form. Personal communication between J. English (LANL), and D. Cobrain (NMED-HWB), Los Alamos, New Mexico. (LANL 2010, 111797)

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LANL (Los Alamos National Laboratory), March 2011. "Investigation Report for Potrillo and Fence Canyons, Revision 1," Los Alamos National Laboratory document LA-UR-11-1820, Los Alamos, New Mexico. (LANL 2011, 201580.14)

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