

**Response to the Notice of Disapproval for the  
Threemile Canyon Aggregate Area Investigation Report,  
Los Alamos National Laboratory, EPA ID #NM0890010515, HWB-LANL-10-049,  
Dated October 4, 2010**

**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 COMMENT**

**NMED Comment**

1. *Numerous inconsistencies were noted between the text and the corresponding data tables. For example, the Permittees stated that the concentration of barium increased with depth at locations 12-610670, 12-610701, and 12-610787. In fact, concentrations of barium also increased with depth at locations 12-610647, 12-610650, 12-610654, 12-610671, and 12-610694 (see Table 4.2-2). Similarly, chromium concentrations increased with depth at locations 12-610650, 12-610668, 12-610670, 12-610697, and 12-610701 in addition to the locations mentioned in the text (see Table 4.2-2). The Permittees must conduct a thorough review of the entire document and resolve the discrepancies between the text and the data tables.*

**LANL Response**

1. The entire report has been reviewed to identify discrepancies between text and corresponding data tables. Text has been revised, where appropriate, to include all locations where extent is not defined. Text has also been added to the discussions to clarify why, in some cases, extent is defined when the data in the tables may appear to indicate otherwise.

The resolution of the discrepancies referred to in NMED's comment does not change the extent evaluation results in that the vertical extent is not defined despite some instances where increasing concentrations are not specifically mentioned in the original report. Where extent is not defined and additional sampling is recommended, the data need to be reviewed again when the Phase II investigation work plan is prepared. At that time, the data for all sampling locations will be evaluated to determine where additional sampling is required to define vertical and/or lateral extent.

## SPECIFIC COMMENTS

### NMED Comment

**1. Section 4.1, Background of Former TA-12, page 10:**

**Permittees' Statement:** "Most of former TA-12 was incorporated inside the boundary of TA-67 and the remaining area was incorporated into TA-67, and the remaining area was incorporated into TA-15".

**NMED Comments:** The Permittees must revise the statement to clarify that former TA-12 was incorporated into TA-15 and TA-67.

### LANL Response

1. The text in section 4.1, third paragraph, has been revised to read as follows: "Most of former TA-12 is within the boundary of TA-67 and the remaining area is within the boundary of TA-15."

### NMED Comment

- 2. Section 4.2.1.4, Nature and Extent of Soil and Rock Contamination, page 15:** Barium was detected above background values (BVs) in the drainage sampling locations (i.e., 12-610670 and 12-610671). However, the lateral extent of barium is defined in the drainage because it was not detected in samples collected downgradient of these locations. The Permittees must clarify and revise the text accordingly.

### LANL Response

2. Locations 12-610670 and 12-610671 are not in a well-defined drainage, as stated in the text cited, but are upgradient of the drainage locations. The text in section 4.2.1.4 has been revised to state that barium was detected above the background value (BV) at locations 12-610670 and 12-610671 but was not detected above BV in drainage locations downgradient of those locations. Therefore, the lateral extent of barium is defined in the drainage.

### NMED Comment

- 3. Section 6.1.2, Subsurface Conditions, page 49:** The Permittees state that structures 15-264, 15-265, 15-61, 15-62, 15-147, and 15-282 are shown on Figure 6.1-1. NMED could not locate these structures on Figure 6.1-1. The Permittees must revise the figure to depict these structures or clearly indicate where they can be found.

### LANL Response

3. Figure 6.1-1 has been revised to include labels for structures 15-264, 15-265, 15-61, 15-62, 15-147, and 15-282.

#### **NMED Comment**

- 4. Section 6.3, AOC 15-004(d), Firing Platforms, page 51:** *The Permittees state that engineering drawings demonstrate that AOC 15-004(d) is a duplicate of SWMU 15-004(a). In Section 6.3.3.1, the Permittees propose that full characterization of AOC 15-004(d) be delayed because it lies entirely within the boundary of SWMU 15-004(a), which is deferred per Table IV-2 of the 2005 Consent Order. While AOC 15-004 (d) lies within the boundaries of SWMU 15-004(a), is not the same unit. The Permittees must revise the text to clarify that that these two sites are not duplicates; they are collocated, so full characterization is deferred for both sites.*

#### **LANL Response**

- The text in section 6.3 has been revised to delete the statement that Area of Concern (AOC) 15-004(d) is a duplicate of Solid Waste Management Unit (SWMU) 15-004(a). Text has been added to indicate that because the two sites are collocated and SWMU 15-004(a) is deferred, full characterization of AOC 15-004(d) is also deferred.

#### **NMED Comment**

- 5. Section 6.6.1.3, Site Contamination, Organic Chemicals, page 66:** *The text states that sampling locations and detected concentrations for organic chemicals are shown in Figure 6.6-3. The caption for Figure 6.6-3 indicates that it depicts organic chemicals detected at AOC 15-008(g); however, the figure shows sampling locations for SWMU 15-009(b), and not for AOC 15-008(g). The Permittees must revise the figure to present detected concentrations of organic chemicals at AOC 15-008(g).*

#### **LANL Response**

- Figure 6.6-3 has been revised to show the sampling locations and detected concentrations of organic chemicals at AOC 15-008(g).

#### **NMED Comment**

- 6. Section 6.7.1.1, Historical Releases, page 68:** *The discussion in this section references SWMU 15-007(c), not SWMU 15-008(b). The Permittees must correct the error.*

#### **LANL Response**

- The text has been revised to refer to SWMU 15-007(c).

#### **NMED Comment**

- 7. Section 6.7.2.3, Site Contamination, Soil and Rock Sampling, page 73:** *SWMU 15-007(d) and SWMU 15-007(c) are similar in nature; both consist of a 130 ft deep shaft that was used to conduct underground explosive tests. Lead shot was found on the surface at both of these sites. Appendix F (Investigation-Derived Waste Management) includes discussion on disposition of lead shot recovered from SWMU 15-007(c) but not SWMU 15-007(d). It is not clear if lead shot was removed from the surface of SWMU 15-007(d) as part of the 2009-2010 investigation. The Permittees must clarify whether or not lead shot was removed from both sites, or provide justification for not removing it at SWMU 15-007(d).*

At SWMU 15-007(c), 44 samples were collected from 22 locations at two depths (0-0.5 ft and 1-2 ft), in addition to 39 samples collected from the three 180 ft boreholes. However, no samples were collected from 0-0.5 ft and 1-2 ft depths at SWMU 15-007(d) as proposed in the approved work plan. Samples were only collected at depth from the 180 ft boreholes at SWMU 15-007(d). Results of the investigations conducted at SWMU 15-007(c) are indicative of releases of inorganic chemicals at the surface. The Permittees must propose to collect additional samples from a minimum of two depths (0-0.5 ft and 0-1 ft) to define the nature and extent of contamination at SWMU 15-007(d) during the next phase of investigations.

## LANL Response

7. Lead shot was removed from the pad and soil at SWMU 15-007(c), in accordance with the approved investigation work plan, which stated, "Visible lead shot will be removed from the concrete pad and surrounding area and disposed of at an appropriate waste facility" (LANL 2008, 105673; NMED 2008, 104256). The work plan did not direct lead shot be removed from SWMU 15-007(d), and therefore, lead shot was not removed from SWMU 15-007(d). Section 9.2, Remedial Activities, states that lead shot will be removed at Consolidated Unit 15-007(c)-00. The details of the remedial activities will be included in the Phase II investigation work plan.

The approved investigation work plan did not specify collecting samples at the 0–0.5 ft and 1–2 ft depths at SMWU 15-007(d) (see section 6.7.2.3, pp. 31–32, and Table 4.0-1, p. 99, of the work plan). These depths were to be collected at 24 grid locations at SWMU 15-007(c) (see section 6.7.1.3, p. 31, of investigation work plan). Samples were collected as planned at SWMU 15-007(c), with the exception of 2 of the 24 planned locations, which were inadvertently not collected, as stated in the discussion of deviations from the work plan in Appendix B (section B-8.0).

Additional characterization sampling and lead shot removal are recommended in sections 9.1 and 9.2 of the investigation report. These activities will be described in the Phase II investigation work plan and will include sampling the two grid locations that were not sampled.

Text has been added to section 6.7.1.3 to state that lead shot was removed from SWMU 15-007(c) and that additional lead shot likely remains in soil at the site. The report recommends removing lead shot from SWMUs 15-007(c) and 15-007(d) as part of Phase II investigation and remediation activities.

## NMED Comment

8. **Section 6.7.2.4, Nature and Extent of Soil and Rock Contamination, page 75:** *The Permittees make contradictory statements in their discussion of nature and extent of radionuclide contamination: "The concentrations of tritium decreased with depth at both boreholes. The vertical extent of tritium is not defined" and "The lateral extent of tritium is defined because the concentrations of tritium increased laterally from location 15-610818 at SWMU 15-007(c)." The Permittees must revise the text to clarify why the vertical extent of tritium is considered not defined when the concentrations decrease with depth in both the boreholes and lateral extent is considered defined when concentrations are increasing laterally. The Permittees must also correct the typographical error; the discussion in this section is about SWMU 15-007(d), not SWMU 15-007(c).*

## LANL Response

8. The text of 6.7.2.4 has been revised to state the following: "The vertical extent of tritium is defined. The lateral extent of tritium is not defined because the concentrations of tritium in the deeper samples at locations 15-610819 and 15-610820 increased laterally compared with the concentrations at upgradient location 15-610818 at SWMU 15-007(c)."

The reference to SWMU 15-007(c) is not a typographical error but a statement regarding concentrations of tritium at SWMU 15-007(d) compared with concentrations at the nearest upgradient location (15-610818) within SWMU 15-007(c) to define extent.

## NMED Comment

9. **Section 6.10.3.3, Soil and Rock Sample Analytical Results, page 85:** *The text indicates that Table 6.10-3 presents the detected organic chemicals at SWMU 15-009(h). Although the caption for the Table 6.10-3 reads 'Organic Chemicals Detected at SWMU 15-009(h)', the table presents results for radionuclides instead of organic chemicals. Similarly, Table 6.10-4 that is supposed to present results for radionuclides reports results for organic chemicals. The table content and captions appear to be reversed. The Permittees must revise Tables 6.10-3 and 6.10-4 accordingly.*

## LANL Response

9. Tables 6.10-3 and 6.10-4 have been moved so that they are under the correct table titles.

## NMED Comment

10. **Section 8.1, Nature and Extent of Contamination, pages 120-121:** *Several discrepancies were noted between the conclusions and the discussion of nature and extent for individual SWMUs/AOCs. For example, the text in Section 4.2.1.4 (pages 16 and 17) indicated that the vertical and lateral extent of nickel is not defined at SWMU 12-001(a); however, the text in this section concluded that lateral extent of nickel is defined. Similarly, the conclusions contradict previous statements in the text. For example, at AOC 12-004(a), the vertical extent of cadmium is defined and the vertical extent of calcium is not defined (page 26). The vertical extent of mercury is not defined at SWMU 15-008(b) (page 62). The Permittees must review the entire Report to ensure that conclusions drawn at the end are in agreement with the previous discussions of nature and extent. The Permittees must make appropriate revisions to the Report.*

## LANL Response

10. The text in section 8.1 has been revised to correct discrepancies between section 8.1 and earlier sections regarding the extent of contamination. Specifically, the following revisions were made.
  - In section 8.1.1: Nickel was added to the list of analytes for which lateral extent is not defined at Consolidated Unit 12-001(a)-99. Cadmium and vanadium were deleted and calcium was added to the list of analytes for which vertical extent is not defined at AOC 12-004(a). Copper was deleted from the list of analytes for which vertical extent is not defined at AOC C-12-004.

- In section 8.1.3: Uranium was deleted from the list of analytes for which lateral extent is not defined at AOC 15-005(c). Uranium-238 was deleted from the list of analytes for which lateral extent is not defined, and mercury was added to the list of analytes for which vertical extent is not defined at SWMU 15-008(b). Manganese was added to the list of analytes for which vertical extent is not defined at SWMU 15-007(c) and SWMU 15-007(d). Aluminum was added to the list of analytes for which vertical extent is not defined at AOC 15-014(h).
- In section 8.1.4: Acetone, 4-isopropyltoluene, toluene, and Aroclor-1254 were added to the list of analytes for which the vertical extent is not defined at SWMU C-36-008. Cesium-137 was deleted from the list of analytes for which the vertical extent is not defined at SWMU C-36-003.

#### **NMED Comment**

##### **11. Plate 26, Inorganic Chemicals Detected or Detected above BVs at SWMU 36-008 and**

**SWMU C-36-003:** *The detected concentrations of inorganic chemicals reported for sampling location 36-601824 (RE36-10-8279, 0-0.5 ft) are incorrect. Two sets of data are reported for one sample. The Permittees must revise the figure to report applicable data for sample RE36-10-8279. In addition, the Permittees must indicate sampling location 36-610584 in the figure which is currently hidden by the inset on the Plate.*

#### **LANL Response**

11. Plate 26 has been revised to present the correct data for sample RE36-10-8279 at location 36-601824, and to show location ID 36-610584.

#### **REFERENCES**

LANL (Los Alamos National Laboratory), October 2008. "Investigation Work Plan for Threemile Canyon Aggregate Area, Revision 1," Los Alamos National Laboratory document LA-UR-08-6727, Los Alamos, New Mexico. (LANL 2008, 105673)

NMED (New Mexico Environment Department), November 20, 2008. "Approval with Modifications for Investigation Work Plan for Threemile Canyon Aggregate Area, Revision 1," New Mexico Environment Department letter to D. Gregory (DOE-LASO) and D. McInroy (LANL) from J.P. Bearzi (NMED-HWB), Santa Fe, New Mexico. (NMED 2008, 104256)

### Cross-Reference of NMED NOD Comments and Revisions to Threemile Canyon Aggregate Investigation Report

NMED NOD Comment No.	Summary of NOD Comment Requirement	Section(s)/Page(s) in Original Report	Section(s)/Page(s) in Revised Report	Nature of Revision
<b>General Comment</b>				
1	Conduct thorough review of entire document to resolve discrepancies between the text and the data tables (see Table 4.2-2).	Entire document	<p>Sections 4.2.1.4, 4.3.3.4, 4.4.3.4, 4.5.3.4, 6.3.3.4, 6.5.1.4, 6.7.1.4, 6.11.3.4, 6.12.3.4, 7.4.3.4, 7.5.3.4, 8.1.1, 8.1.3, and 8.1.4</p> <p>Sections 4.2.1.4, 4.3.3.4, 4.5.3.4, 4.6.3.4, 4.7.3.4, 4.8.3.4, 6.3.3.4, 6.5.1.4, 6.6.1.4, 6.7.1.4, 6.8.3.4, 6.9.3.4, 6.10.3.4, 6.11.3.4, 6.12.3.4, 7.2.3.4, 7.3.3.4, 7.4.3.4, and 7.5.3.4</p>	<p>Reviewed entire document and corrected discrepancies where necessary. Revised text to include all locations where concentrations increased with depth or vertical extent is not defined. Revised text as needed to add or delete analytes for which extent is not defined. Revised list of analytes in summary sections to agree with changes in nature and extent sections.</p> <p>Added text to explain why vertical extent is defined despite the appearance of increasing concentrations with depth: either (1) concentration decreased with depth, but lower background value (BV) in deeper sample means only the deeper sample is above BV, or (2) concentrations increased slightly or remained relatively constant, but all sample concentrations were less than the maximum background concentration.</p>
<b>Specific Comments</b>				
1	Revise statement to clarify that former Technical Area 12 (TA-12) was incorporated into TA-15 and TA-67	Section 4.1, p. 10	Section 4.1	Revised third paragraph of section 4.1 to state the following: "Most of former TA-12 is within the boundary of TA-67 and the remaining area is within the boundary of TA-15."
2	Clarify and revise the text to indicate the lateral extent of barium is defined downgradient in the drainage.	Section 4.2.1.4, p. 15	Section 4.2.1.4	Revised text to indicate barium was detected above the BV at locations 12-610670 and 12-610671 but was not detected above BV downgradient of those locations. Therefore, lateral extent of barium is defined in the drainage.

NMED NOD Comment No.	Summary of NOD Comment Requirement	Section(s)/Page(s) in Original Report	Section(s)/Page(s) in Revised Report	Nature of Revision
3	Revise Figure 6.1-1 to show structures 15-264, 15-265, 15-61, 15-62, 15-147, and 15-282.	Section 6.1.2, p. 49	Figure 6.1-1	Revised Figure 6.1-1 to show the locations of structures 15-264, 15-265, 15-61, 15-62, 15-147, and 15-282.
4	Revise text to clarify that Area of Concern (AOC) 15-004(d) and Solid Waste Management Unit (SWMU) 15-004(a) are collocated but are not duplicates of each other.	Section 6.3, p. 51	Section 6.3	Deleted statement that AOC 15-004(d) is a duplicate of SWMU 15-004(a). Revised text to state that because they are collocated and SWMU 15-004(a) is deferred, full characterization of AOC 15-004(d) is also deferred.
5	Revise Figure 6.6-3 to show correct sampling locations for AOC 15-008(g) and organic chemical concentrations at AOC 15-008(g).	Section 6.6.1.3, p. 66	Figure 6.6-3	Revised Figure 6.6-3 to present the sampling locations and detected concentrations of organic chemicals at AOC 15-008(g).
6	The discussion in this section references SWMU 15-007(c), not SWMU 15-008(b); correct the error.	Section 6.7.1.1, p. 68	Section 6.7.1.1	Revised text to correct references to SWMU.
7	Clarify whether lead shot was removed from both sites, SWMU 15-007(d) and SWMU 15-007(c), or provide justification for not removing it from SWMU 15-007(d). Propose to collect additional samples from a minimum of two depths at SWMU 15-007(d) during the next phase of investigations.	Section 6.7.2.3, p. 73	Section 6.7.1.3	Added text to section 6.7.1.3 to clarify lead shot was removed from SWMU 15-007(c). Lead shot was not removed from SWMU 15-007(d) because it was not directed by the approved work plan. Additional sampling and additional lead shot removal were recommended for both SWMUs in sections 9.1 and 9.2.
8	Clarify text about lateral and vertical extent of tritium. Correct typo: discussion is about SWMU 15-007(d), not SWMU 15-007(c).	Section 6.7.2.4, p. 75	Section 6.7.2.4	Revised text to state the vertical extent of tritium is defined because concentrations decreased with depth in both boreholes. The lateral extent of tritium is not defined because the concentrations of tritium at depth in both locations represent increases relative to location 15-610818, which is in SWMU 15-007(c). The reference to SWMU 15-007(c) in this context is not a typographical error.

NMED NOD Comment No.	Summary of NOD Comment Requirement	Section(s)/Page(s) in Original Report	Section(s)/Page(s) in Revised Report	Nature of Revision
9	Correct Tables 6.10-3 and 6.10-4 to match captions.	Section 6.10.3.3, p. 85	Tables 6.10-3 and 6.10-4	Moved organic chemical and radionuclide tables so that they are under the correct table titles.
10	Review the report to ensure that conclusions drawn at the end are in agreement with discussions of nature and extent. Make appropriate revisions to the report.	Section 8.1, pp. 120–121	Sections 8.1.1, 8.1.3, and 8.1.4	Revised text to reflect changes made to nature and extent discussions (see General Comment 1).
11	Revise Plate 26 to report correct/applicable data for sample RE36-10-8279; indicate sampling location 36-610584, which is currently hidden by the inset on the plate.	Plate 26	Plate 26	Revised Plate 26 to present the correct data for sample RE36-10-8279 at location 36-601824 and to show the ID number for location 36-610584.