Response to the Notice of Disapproval for the Investigation Report for Upper Cañada del Buey Aggregate Area, Los Alamos National Laboratory, EPA ID No. NM0890010515, HWB-LANL-10-087, Dated March 18, 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. *Several sample results for total petroleum hydrocarbons (TPH) Diesel Range Organics (DRO) include the "J" data qualifier. In many cases, data values less than 10 milligrams per kilogram (mg/kg) are flagged; in other cases, they are not. Similarly, several values greater than 100 mg/kg are flagged; others of similar magnitude are not. The qualifier is defined in Table A-3.0 (Data Qualifiers Definitions) and is associated with some degree of uncertainty concerning the estimated numerical value. The discussion in Appendix F (Analytical Programs) indicates assignment of the qualifier for TPH-DRO analyses may be due to low spike recoveries or because detection is between the practical quantitation limit (PQL) and the method detection limit (MDL). Include a brief discussion in Section 4.2.10 (Matrix Spike Samples) of Appendix F of how the assignment of the "J" and"J-" flags are determined, explain why the MDLs and PQLs are unusually high for the presumed method (SW-846, Method 8015C), and otherwise clarify the apparent inconsistent use of data qualifiers.*

LANL Response

1. The total petroleum hydrocarbon (TPH) diesel range organic (DRO) data are qualified using the Laboratory's Standard Operating Procedure (SOP) 5171, Routine Validation of Total Petroleum Hydrocarbons Gasoline Range Organics/Diesel Range Organics Analytical Data (Method 8015B). This procedure conforms to the requirements of U.S. Environmental Protection Agency (EPA) methodologies and the EPA national functional guidelines for organic data review. As noted in NMED's comment, the J-qualifier denotes some degree of uncertainty and/or bias concerning the concentration quantified by the analytical laboratory for a given chemical. This uncertainty is related either to the low-level detection in a sample or to data-quality issues associated with the analysis of the sample. The J-qualifier to the TPH-DRO data for the Upper Cañada del Buey Aggregate Area was used either because the detected concentration is between the quantitation limit and the detection limit (DL) or the matrix spike recoveries were low. In either case, the data are equally as usable as unqualified data. The reasons for the J qualifier are presented in Appendix F (pp. F-8–F-9).

The DLs, quantitation limits, and concentrations reported for some samples are higher because the samples were diluted 5, 10, or 20 times to quantify the TPH-DRO concentrations. The samples were diluted because the concentrations exceeded the limits of the standard curve for low-level TPH-DRO. The undiluted quantitation limits and the DLs were 6.9 mg/kg to 8.4 mg/kg and 2.2 mg/kg to 2.7 mg/kg, respectively. The dilution raised the quantitation limit and the DL for a sample by 5, 10, or 20 times the undiluted samples, and consequently the result fell between the two limits. Regardless of the dilution, the data are validated in the same way, and the J qualifier is applied consistently based on the quantitation and/or data-quality issues associated with the results. Therefore, a result is qualified as J whether the quantitation limit is 7.2 mg/kg or 150 mg/kg because it is between the quantitation limit and the DL. In some samples, the data-quality issue resulted from the matrix spike recovery, and these samples are also qualified as J per SOP-5171. The qualifier was applied regardless of dilution and quantification between the quantitation limit and the DL. No TPH-DRO data were qualified as J–, but some data were qualified as J+. This qualifier was applied because matrix spike recovery was high, again regardless of dilution.

The application of each qualifier (J, J+, U, and UJ) to the TPH-DRO data is discussed in Appendix F. The dilution factors for each sample are presented in the all-analysis tables in Appendix G. The qualifiers do not affect the usability of the data. No revisions to Appendix F are necessary.

NMED Comment

2. *For many of the Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) discussed in the Report, detection limits (DLs) are higher than background values (BVs) at one or more sample locations or sample intervals for various analytes. In many of these cases, the Permittees conclude that no BVs were exceeded. This occurs in discussions of inorganic constituents found in Report sections that concern nature and extent of contamination. The example below is from Section 6.2.4.4, Nature and Extent of Contamination, Inorganic Chemicals, which pertains to SWMU 04-003(a), on page 18:*

> *"Antimony was not detected above BV but had DLs (1.14 to 1.32 mg/kg) above the soil BV (0. 83) mg/kg) and DLs (1.0 to 1.12 mg/kg) above the tuff BV (0.5 mg/kg) in nine samples. Because antimony was not detected above BVs, the lateral and vertical extent of antimony are defined."*

BVs and DLs are not connected to nature and extent determinations; rather, nature and extent determinations are based on whether contaminant concentrations are decreasing or increasing with depth or lateral distance from the suspected source area.

In general, the Permittees attach statements like this to discussions concerning antimony, cadmium, cyanide, mercury, and selenium. Replace the statement with a discussion of the contaminant concentration-based evidence concerning whether or not nature and extent are defined at a given AOC or SWMU.

LANL Response

2. The background values (BVs) and DLs are connected to defining the nature and extent of contamination. Results above BVs or DLs are conservatively interpreted as indicating a release from a site and therefore must be evaluated for extent and potential risk. If a chemical or radionuclide is not detected or is detected below the BV, it is not identified as a chemical of potential concern (COPC) and extent is not an issue. The exception to this rule is inorganic chemicals whose DLs may

exceed the BVs. Historically, the Laboratory has identified these inorganic chemicals as COPCs and has addressed the extent issue relative to whether they are detected or are detected above BVs. A less conservative process would eliminate these inorganic chemicals as COPCs because they are not detected or detected above BVs, and therefore, extent is not an issue. Given the conservative nature of the evaluation, because antimony, cadmium, cyanide, mercury, and selenium were not detected and/or were not detected above BVs (i.e., no release occurred), lateral and vertical extent are defined. Therefore, no revisions are necessary.

NMED Comment

3. *The United States Environmental Protection Agency (EPA) Regional Screening Levels (RSLs) for mercury (inorganic salts) were used as comparison values for the residential and industrial scenarios. An SSL for the construction worker scenario was calculated in accordance with NMED's Technical Background Document (TBD) for Development of Soil Screening Levels, Revision 5.0, Soil Screening Levels using toxicity data from the RSL tables. Clarify whether the analytical results define speciation of mercury, thus justifying the use of the RSLs and toxicity data for mercury salts.*

LANL Response

3. The analytical results, whether for mercury or any other target analyte list metal, are for total metals. No speciation of the inorganic chemicals is done by the analysis. Metals, including mercury, are typically present in soil as inorganic compounds. Divalent inorganic mercury [Hg(II)] is the most common form in the environment and combines with chloride, nitrate, oxide, and sulfate to form mercury salts. These inorganic salts vary in composition and quantity depending upon the soil and area of the country. Analytical methods do not determine which inorganic salt(s) is present, only the total amount of metal in the soil. Mercury and other inorganic chemicals are generally not present in the elemental form unless an actual spill has occurred or they were disposed of; for mercury, the environmental conditions and bacteria are present to convert inorganic mercury to methylmercury. In the case of Upper Cañada del Buey Aggregate Area, mercury is expected to be present as inorganic compounds or salts in the soil based on operational histories at the sites, except for Area of Concern (AOC) C-46-001, which is described as a mercury spill. No mercury was detected above BV at this site. The inorganic mercury soil screening levels (SSLs) in the data tables are appropriate because it is the general form of mercury present in the environment as it corresponds to its natural state.

NMED Comment

4. *For constituents of potential concern (COPCs) with no available NMED SSLs, construction worker SSLs were calculated based on toxicity criteria listed in the RSL tables and NMED TBD SSL input parameters and calculations. The calculated SSLs for the construction worker could not be duplicated by NMED. Provide the spreadsheets or calculation sheets with input parameters and formulae used to calculate the construction worker SSLs.*

LANL Response

4. An Excel spreadsheet has been provided as Attachment 1 of this response (on CD) presenting the calculations of construction worker SSLs used in the Upper Cañada del Buey Aggregate Area report. The values for several chemicals are different from what was originally presented in the report

because of changes in toxicity values and the elimination or addition of pathways based on the latest EPA regional tables. None of these changes affect the results of the risk-screening assessments.

One issue to note is that the dermal exposure equation in the NMED guidance (NMED 2009, 108070) is missing the 10^{-6} mg/kg unit conversion factor in the denominator as a multiplier of the oral reference dose. Another issue is that the equation for inhalation in NMED guidance (NMED 2009, 108070) contains the body weight parameter in the denominator, which should not be included in the equation. Refer to the EPA regional equations for comparison.

The data tables in the main text and the screening tables in the risk appendix have been revised to incorporate the updated values. The calculations have also been revised in the risk appendix as appropriate. None of the updated values affect the hazard indexes (HIs) or total excess cancer risks for the sites evaluated.

NMED Comment

5. *The SSLs and toxicity data for butyl benzene[n-] and butyl benzene[sec-] were taken from the USEPA Region 6 (2007) SSL tables and are based on National Center for Environmental Assessment (NCEA) data. NCEA data are no longer appropriate for use in risk assessments as these data have not undergone an extensive peer-review process and are not included in the current hierarchy of toxicological data summarized in the NMED TBD. The Region 6 SSL tables are outdated, and Region 6 currently refers to USEPA Regions 3 or 9 for risk-based, media-specific screening levels. Modify the risk assessment to use the current hierarchy of toxicological data.*

LANL Response

5. The EPA regional screening tables no longer contain any SSLs for n-butylbenzene and sec-butylbenzene. Therefore, the Laboratory has used the SSLs previously provided by EPA Region 6 in 2007 to avoid using a surrogate for risk screening purposes. The current hierarchy of toxicological data refers to provisional peer reviewed toxicity values (PPRTVs) derived by EPA's Superfund Health Risk Technical Support Center (http://hhpprtv.ornl.gov/). As of September 2010, the PPRTV website (http://hhpprtv.ornl.gov/quickview/pprtv.php?chemical=Butylbenzene%2C+n-) provides an oral reference dose (RfD) of 0.05 mg/kg-day for n-butylbenzene but concludes the data are not adequate to derive a chronic toxicity value for sec-butylbenzene. Using the chronic oral RfD, SSLs of 3910 mg/kg, 56,800 mg/kg, 15,500 mg/kg, and 39,600 mg/kg are derived for the residential, industrial, construction worker, and recreational scenarios, respectively. Because SSLs cannot be derived for sec-butylbenzene, the SSLs for n-butylbenzene are used as surrogates in the risk-screening assessments based on structural similarity. Tables I-4.2-20, I-4.2-22, and I-4.2-24 and the associated hazard quotient (HQ) calculations have been revised to incorporate this new set of SSLs. The HIs do not change. Data tables in the report have also been revised to present these SSLs.

SPECIFIC COMMENTS

NMED Comment

6. ***Plates 1, 2, and 3, Inorganic, Organic and Radionuclide Chemicals Detected at SWMUs 46-002, 46-003(b), and 46-009(b):***

   For future Report and Investigation Work Plan (IWP) illustrations that include differently scaled insets on a single figure or plate, all structure numbers common to both illustration types must be included on both illustration types for clarity. Revision of the three plates for this Report is not required.

LANL Response

6. Insets are usually included on maps to illustrate additional details at a larger scale that are shown at the smaller scale of the main map. In such cases, all structure numbers common to both illustration types are shown. In the case of Plates 1, 2, and 3, however, the insets are at a smaller scale than the main map to show the downgradient drainage related to the solid waste management units (SWMUs). Because of the small scale used, all structure numbers could not be shown on the smaller-scale map. As noted in the comment, no revisions to the plates are necessary.

NMED Comment

7. ***SWMU 46-002, Section 7.2.4.4, Nature and Extent of Contamination, Inorganic Chemicals, page 30:***

   ***Permittees' Statement:** "Silver concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of silver are defined."*

   ***NMED Comment:** According to Plate 1 and Table 7.2-2, concentrations of silver did not decrease with depth at sample location 46-611374. Initially, concentrations decreased, but then slightly increased again with increasing depth. A deeper sample may or may not reveal increasing concentrations of silver. Modify the text to indicate that initially concentrations are decreasing but then increase again with depth, and discuss the need to further determine whether the vertical extent of contamination of silver is defined relative to the applicable SSL.*

LANL Response

7. At location 46-611374, silver was detected at 29.7 mg/kg at 0.0–1.0 ft below ground surface (bgs), 1.6 mg/kg at 1.5–2.5 ft bgs, and 2.04 mg/kg at 6.5–7.5 ft bgs. Although the result from 6.5–7.5 ft is slightly higher than the result from 1.5–2.5 ft bgs, both results are over an order of magnitude lower than the result from 0.0–1.0 ft bgs and reflect an overall decrease in concentrations with depth that defines vertical extent of contamination. All three results are more than 2 orders of magnitude less than the industrial SSL and define vertical extent of contamination relative to the applicable SSL. No revisions to the text are necessary.

NMED Comment

8. ***SWMU 46-003(a), Section 7.3.4.4, Nature and Extent of Contamination, Inorganic Chemicals, fifth paragraph, last line and sixth paragraph, penultimate and last sentences, page 34:***

   Permittees' Statement: *"The lateral and vertical extent of nitrate are defined." and, "Selenium concentrations increased with depth at this location and decreased downgradient. The lateral extent of selenium is defined, but the vertical extent is not defined."*

   NMED Comment: *Nitrate concentrations at location ID 46-611268 increased slightly with depth. At ID 46-611271 concentrations were over twice as high in the deepest sample interval (14.5 to 15.5 feet below ground surface [bgs]) compared to the interval above it (9.5 to 10.5 feet bgs). Selenium concentrations did not increase with depth at ID 46-611269; they were the same (2.3 (J+) mg/kg) in both sample intervals. Modify the text to reflect the collected data and include a discussion of the need to further determine whether the vertical extent of contamination of nitrate and selenium is defined.*

LANL Response

8. Detected concentrations of nitrate at location 46-611271 were 3.06 mg/kg at 9.5–10.5 ft bgs and 6.58 mg/kg at 14.5–15.5 ft bgs. As noted in section 7.3.4.4, nitrate at these concentrations is likely to be naturally occurring and representative of background (e.g., the concentrations are less than the mean concentration of 8.1 mg/kg for nitrate in soil at Sigma Mesa reported by Ferenbaugh at al. [1990, 110440]). Thus, the vertical extent of nitrate is defined at this location. No revisions to the text are necessary.

   The text in section 7.3.4.4 has been revised to indicate selenium concentrations did not increase with depth at location 46-611269. In addition to these results, selenium was not detected at the same sampling depths at location 46-610983, which is located 20 ft to the south [this location is associated with SMWU 46-009(a)]. Because the concentrations are unchanged at location 46-611269 and it was not detected at nearby location 46-610983, the vertical extent of selenium is defined. The text in sections 7.3.4.4 has been revised accordingly. It should be noted that the extent of contamination for the site is not defined because the septic tank has not been removed, and samples were not collected at the location of the tank.

NMED Comment

9. ***SWMU 46-003(a), Section 7.3.7, Delayed Site Investigation Rational, last sentence, page 35:***

   Permittees' Statement: *"It is proposed that site characterization and investigation be delayed until active utilities located around the septic tank are removed or rendered inactive."*

   NMED Comment: *Site activities and existing utility configurations at and near this SWMU will likely remain unchanged for an unknown number of years into the future. NMED cannot make any determinations with respect to Corrective Action Complete until the site investigation is complete at this SWMU. No response to this comment is necessary.*

LANL Response

9. Comment noted.

NMED Comment

10. SWMU 46-003(e), Section 7.7.1, Site Description and Operational History, last line, page 47:

> ***Permittees' Statement:*** *"The water layer, sludge, and septic tank were removed and managed as LLW at Area G at [Technical Area] TA-54 (Appendix D)."*
>
> ***NMED Comment:*** *Define the acronym "LLW" in the revised Report.*

LANL Response

10. The acronym "LLW" was defined in the main text of the report in section 3.2.11 (p. 11). However, it was not included in Appendix A. The acronym has been added to Appendix A in the revised report.

NMED Comment

11. SWMU 46-003(f), Section 7.9.4.3, Soil, Rock, and Sediment Sampling Analytical Results, Radionuclides, third sentence, page 57:

> ***Permittees' Statement:*** *"Plate 18 shows the spatial distribution of radionuclides detected or detected above BVs/FVs."*
>
> ***NMED Comment:*** *Radionuclide information for this SWMU is provided on Plate 9. Revise the text to include the correct plate reference.*

LANL Response

11. Section 7.9.4.3 describes the soil, rock, and sediment sampling results for SWMU 46-003(g), not SWMU 46-003(f). Plate 9 presents the radionuclides detected or detected above BVs/fallout values (FVs) at SWMU 46-003(f). The reference to Plate 18 for radionuclides detected or detected above BVs/FVs at SWMU 46-003(g) is correct. No revisions to the text or plate are necessary.

NMED Comment

12. SWMU 46-004(a2), Section 7.11.4.4, Nature and Extent of Contamination, Organic Chemicals, fifth paragraph, last sentence, page 66:

> ***Permittees' Statement:*** *"The lateral and vertical extent of these inorganic chemicals are defined.*
>
> ***NMED Comment:*** *"Inorganic" should be "organic."*

LANL Response

12. The last sentence describing the nature and extent of contamination for benzo(a)anthracene, benzo(b)fluoranthene, chrysene, fluoranthene, and pyrene in section 7.11.4.4 has been revised. The sentence now states, "The lateral and vertical extent of these organic chemicals are defined."

NMED Comment

13. ***SWMU 46-004(b), Nature and Extent of Contamination, Organic Chemicals, fourth paragraph, page 69:***

    Provide a brief explanation in the Report text for the relatively high concentrations (10.1 to 25.3 mg/kg) of total petroleum hydrocarbons-diesel range organics (TPH-DRO) and trichloroethylene (11.9 mg/kg), including the assignment of "J" and "J-" qualifiers, respectfully. In the event the qualifiers were assigned by mistake, revise the appropriate column(s) of table 7.12-3 on page 353 as needed.

LANL Response

13. The results of the data assessment and data validation for the Upper Cañada del Buey Aggregate Area analytical results are summarized and discussed in Appendix F. The qualifiers mentioned in the comment do not affect the usability of the data. The relatively higher concentrations of TPH-DRO detected at SWMU 46-004(b) (10.1 mg/kg and 25.3 mg/kg) are assumed to be the concentrations present in the soil at this site as are all of the other detected concentrations (no data were rejected). No issues from the data assessment indicate any problems associated with the quantification of the data. SWMU 46-004(b) was a former alkali-metal cleaning tank and the presence of TPH is consistent with site history. No revisions to the text are necessary.

    The detected concentration of trichloroethene (11.9 mg/kg) is for SWMU 46-004(c) and not SWMU 46-004(b) as indicated in NMED's comment and is presented in Table 7.14-3 (p. 359). It is assumed the trichloroethene detected is from the SWMU, and concentrations decreased with depth at location 46-611622 by 5 orders of magnitude. The J- qualifier is explained in Appendix F, which states the extraction holding time was exceeded by less than 2 times the published method for holding times (p. F-7). No issues from the data assessment indicate any problems associated with the quantification of the data. SWMU 46-004(c) is a dry well that received discharges from industrial sink drains and the presence of trichloroethene is consistent with site history. No revisions to the text are necessary.

NMED Comment

14. ***SWMU 46-004(c), Section 7.14.4.4, Extent of Contamination, Inorganic Chemicals, eighth paragraph, last line, page 77:***

    Permittees' Statement: *"The lateral and vertical extent of silver are defined."*

    NMED Comment: *Silver concentrations at sample location ID 46-611622 (which included samples collected from eight to 24 feet bgs) decreased in sample intervals from eight to 19 feet bgs. Silver concentration then increased in the 23 to 24 feet interval. The vertical extent of silver at this location is not defined. Revise the Report text to reflect the analytical results at this location.*

LANL Response

14. At location 46-611622, silver was detected at 114 mg/kg at 8.0–9.0 ft bgs, 3.78 mg/kg at 13.0–14.0 ft bgs, 3.91 mg/kg at 18.0–19.0 ft bgs, and 16.8 mg/kg at 23.0–24.0 ft bgs. Although the result from the deepest sample is higher than the results from the middle two samples, the reduction from the uppermost sample to the deepest sample is almost 1 order of magnitude. This distribution reflects

an overall decrease in concentration with depth that defines the vertical extent of contamination. No revisions to the text are necessary.

NMED Comment

15. SWMU 46-004(c), Section 7.14.4.4, Nature and Extent of Contamination, Organic Chemicals, pages 77 and 78:

Soil samples from the two sample locations at this SWMU (46-611622 and -611623) contained a considerable variety of volatile and semi-volatile compounds (VOCs and SVOCs) from ground surface to 24 feet bgs. Acetone and Aroclor-1242, -1254, and -1260 either increase or remain at approximately the same concentrations at 24 feet bgs compared to conditions at eight feet bgs. The historical activities at the SWMU as described in the Report do not suggest that organic compounds would been associated with the SWMU. While NMED agrees that the lateral and vertical extent of various organic compounds has been determined for the area north and down-slope of SWMU 46-004(c), additional sampling locations are necessary to determine lateral and vertical extent south, east, and west of the SWMU. A probable source(s) of these compounds will need to be identified by the Permittees. The site description and operational history discussed for SWMU 46-004(b) (which also discharged to the SWMU 46-004(c) dry well) indicates the tank at that SWMU contained either butanol or kerosene; it would nonetheless not seem to be a likely source of the variety of organic compounds found at SWMU 46-004(c). However, the tank was located less that 15 feet west of the dry well and the accuracy of the Permittees' understanding of past activities at SWMU 46-004(b) may be incomplete. Revise the text as needed to address these issues.

LANL Response

15. The vertical extent of contamination for organic chemicals at SWMU 46-004(c) is defined by concentrations showing an overall decrease with depth for the four samples collected at each location. Specifically, the only instance where the highest detected concentration of an organic chemical was in the deepest sample was Aroclor-1242 at location 46-611623. As noted in section 7.14.4.4, vertical extent of Aroclor-1242 is not defined. For all other organic chemicals, the highest detected concentration is above the deepest sample and the concentrations decrease with depth. No revisions to the text or additional sampling for vertical extent is necessary.

    SWMU 46-004(c) was a dry well where liquid wastes were discharged to the subsurface (i.e., at 8 ft bgs). After discharge, liquids infiltrated the subsurface, with the primary driving force in the vertical direction. The sampling approach presented in the approved investigation work plan (LANL 2008, 105038.17; NMED 2008, 103429) was based on this conceptual model of contaminant migration. Samples were collected at the bottom of the dry well and at three deeper depths to assess the vertical extent. An additional sampling location was placed downgradient (north) of the dry well to assess the lateral migration toward the canyon. No additional samples to the east, west, or south are necessary to define lateral extent. As described in section 7.14.4.4, with the exceptions of acetone, Aroclor-1242, and 1,2,4-trimethylbenzene, concentrations of organic chemicals decreased from the sampling location within the dry well to the downgradient sampling location. In the case of the other three chemicals, concentrations at the downgradient location were slightly higher, but lateral extent is defined by additional downgradient samples collected for SWMU 46-006(d) (Plate 11). Based on these results, minimal lateral migration of contamination occurred, and additional sampling to the south, east, and west is not warranted. No revisions to the text or additional sampling for lateral extent are necessary.

The organic chemicals detected at SWMU 46-004(c) consisted of solvents, components of petroleum products, polychlorinated biphenyls, and plasticizers. The presence of such compounds is consistent with a mechanical laboratory such as the facility that discharged to the dry well [SWMU 46-004(a)] as well as the alkali-metal cleaning tank [SWMU 46-004(b)]. No revisions to the text are necessary.

NMED Comment

16. ***SWMU 46-004(c2), Section 7.15.4.1, Soil, Rock and Sediment Sampling, pages 79 and 80 and Figure 7.11-1, page 274:***

    There is a southwest to northeast trending drainage illustrated on Figure 7.11-1 of the Report and located approximately 80 feet north of the triangle designated as SWMU 46-004(c2). The drainage was not sampled during the 2010 investigation. A possible reason sample locations were not proposed in the September 2008 IWP, Revision 1 for the Aggregate Area, or required by NMED, is that the drainage was not shown on Figure 5.12-1 of the 2008 IWP.

    Since nature and extent evaluation is not complete at this SWMU, the drainage must be evaluated during the future Phase II investigation.

LANL Response

16. As stated in section 7.15.1, the outfall consists of a 4-in.-diameter cast-iron pipe that discharged effluent from floor drains in the north equipment room of building 46-1 to a ditch approximately 50 ft northwest of building 46-1. From the ditch, the effluent flowed to a storm drain culvert that discharged into Cañada del Buey. The southwest-to-northeast trending drainage shown in Figure 7.11-1 of the report did not receive any discharge from SWMU 46-004(c2). All discharge was routed through this culvert to the hillside and did not enter the drainage. No additional sampling is necessary.

NMED Comment

17. ***SWMU 46-004(d), Section 7.16.1.4, Nature and Extent of Contamination, Inorganic Chemicals, sixth paragraph, last line, page 86:***

    Permittees' Statement: *"The lateral and vertical extent of lead are defined."*

    NMED Comment: *The vertical extent of lead is not defined. Lead at sample ID location 46-611560 increases from 23.9 mg/kg in the zero to one foot bgs interval to 26.1 mg/kg in the one to two feet interval and there are no deeper samples reported for this location. Additional evaluation at this location must be proposed in the future Phase II investigation of this SWMU. See Comment 18 below concerning copper, since data from location IDs 46-611558 through 46-611560 are evaluated for SWMU 46-004(d) and (e).*

LANL Response

17. As described in section 7.16.1.4, both detected concentrations of lead at location 46-611560 were below the maximum soil background concentration (28 mg/kg). As described in sections 5.1 and 5.2, because too few samples were available for statistical analysis, results above BV were compared with maximum background concentrations to determine if they were comparable to background. In this case, the results at location 46-611560 are comparable to background, and vertical extent is defined. No revisions are necessary.

The response to Specific Comment 18 discusses the determination of extent for copper.

NMED Comment

18. SWMU 46-004(e), Section 7.16.2.4, Nature and Extent of Contamination, Inorganic Chemicals, sixth paragraph, last line, page 90:

Permittees' Statement: *"Copper concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of copper are defined."*

NMED Comment: *The vertical extent of copper is not defined. Copper at location ID 46-611561 increases from 102 mg/kg in the 17.5 to 18.5 bgs interval, and increased to 126 mg/kg in the 22.5 to 23.5 feet interval. There were no deeper samples reported for this location. Additional evaluation at this location must be proposed in the Phase II IWP for this SWMU.*

LANL Response

18. At location 46-611561, copper was detected at 1650 mg/kg at 7.5–8.5 ft bgs, 228 mg/kg at 12.5–13.5 ft bgs, 102 mg/kg at 17.5–18.5 ft bgs, and 126 mg/kg at 22.5–23.5 ft bgs. Although the result from 22.5–23.5 ft bgs is slightly above the result from 17.5–18.5 ft bgs, both results are over an order of magnitude lower than the result from 7.5–8.5 ft bgs and indicate an overall decrease in concentrations with depth that defines the vertical extent of contamination. No revisions or additional sampling for copper is necessary.

NMED Comment

19. SWMU 46-004(g), Section 7.17.3.4, Nature and Extent of Contamination, Organic Chemicals, pages 102 and 103:

Selected text must be reviewed by the Permittees and edited as appropriate. For location IDs 46-611444, -611445, and -611446 certain organic compounds are increasing with depth, contrary to what is described in the Report. While the concentrations are very low in all cases, and further investigation at these locations is likely unnecessary, the text must be revised to accurately reflect site conditions. This comment may also affect the list of constituents found in the Summary of Nature and Extent portion of Section 7.17.3.4.

LANL Response

19. Section 7.17.3.4 accurately describes how the concentration of dibenz(a,h)anthracene increased with depth at location 46-611445 and how concentrations of acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene increased with depth at location 46-611446. Section 7.17.3.4 notes that vertical extent is not defined for these organic chemicals. The only other organic chemicals whose reported concentrations increased with depth at locations 46-611444, 46-611445, or 46-611446 were benzo(g,h,i)perylene, methylene chloride, toluene, and 1,3-xylene+1,4-xylene at location 46-611444; toluene at location 46-611445; and acenapthylene, dibenzofuran, and di-n-butylphthalate at location 46-611446. As noted in section 7.17.3.4, all detected concentrations of these organic chemicals at these locations were below the estimated quantitation limits (EQLs); therefore, vertical extent is defined. No revisions to the text are necessary.

NMED Comment

20. ***AOC C-46-003, Section 7.18.4.4, Nature and Extent of Contamination, Organic Chemicals, page 113:***

    Selected text must be reviewed by the Permittees and edited as appropriate. For location ID 46-611022, three organic compounds are increasing with depth, contrary to what is described in the Report. While the concentrations are very low in all cases, and further investigation at these locations is likely unnecessary, the text must be revised to accurately reflect site conditions. This comment may also affect the list of constituents found in the Summary of Nature and Extent portion of Section 7.18.4.4.

LANL Response

20. Although NMED's comment refers to AOC C-46-003, section 7.18.4.4 discusses AOC 46-004(e2), and location 46-611022 is associated with AOC 46-004(e2). Therefore, the Laboratory assumes NMED's comment is directed to AOC 46-004(e2). NMED's comment does not identify the three organic chemicals that increase with depth at location 46-611022, so it is not possible to confirm this statement. Table 7.18-3 lists the 28 organic chemicals detected at location 46-611022, and the only organic chemical whose reported concentration increased with depth is 1,1,1-trichloroethane. As discussed in section 7.18.4.4, 1,1,1-trichloroethane was detected below the EQL in the deeper sample at this location, and vertical extent is defined. No revisions to the text are necessary.

NMED Comment

21. ***SWMU 46-004(p), Section 7.22.4.4, Nature and Extent of Contamination, Inorganic Chemicals, second paragraph, last three sentences, page 129:***

    Permittees' Statement: *"The maximum concentration of 0.227 mg/kg was detected at location 46-611627 from 25.0–26.0 ft bgs. Cesium concentrations were consistent with depth (from 10.0 to 26.0 ft bgs) and laterally. The lateral and vertical extent of cesium are defined."*

    NMED Comment: *Based on the results for the two sample locations at the SWMU, cesium is still increasing in the deepest sample interval (25 to 26 feet bgs) at both locations, indicating vertical extent is not defined at this SWMU. Lateral extent is not defined, based on results for either location. If the Permittees are considering the cesium results for sample locations associated with nearby SWMU 46-007 as part of the lateral extent determination (and the Report text does not confirm this), lateral extent for cesium is also not defined by data from location IDs 46-611754 through 46-6117558. Vertical extent for cesium (and several other metals) has also not been determined at SWMU 46-007. Revise the Report to reflect actual site conditions.*

LANL Response

21. The statement in section 7.22.4.4 that cesium concentrations were consistent vertically and laterally refers to the overall variability of the cesium data. There is no background data set for cesium at the Laboratory and, therefore, BV and/or statistical comparisons cannot be used to determine whether extent is defined. As a result, the variability of the cesium data was used as an indication of whether the detected concentrations appeared to represent natural variability or a release from the site. Cesium concentrations at SMWU 46-004(p) ranged from 0.104 mg/kg to 0.227 mg/kg (i.e., detected concentrations varied by a factor of 2.2). For comparison, the background concentrations of

potassium and sodium (which are chemically similar to cesium) in tuff range from 250 mg/kg to 4720 mg/kg and 130 mg/kg to 7700 mg/kg, respectively (LANL 1998, 059730, p. 39). Therefore, the variability of the detected concentrations of cesium is much less than the variability of background levels of potassium and sodium in tuff. Because of the relatively low variability of the cesium data (i.e., the consistent concentrations), lateral and vertical extent of cesium are defined. The text in section 7.22.4.4 has been revised to better describe the basis for concluding that extent of cesium is defined.

NMED Comment

22. SWMU 46-004(p), Section 7.22.5, Summary of Human Health Risk, page 130:

While cesium concentrations in soil are quite low at this SWMU, text must be added to the Report that considers potential groundwater impacts from cesium in light of the nature of past operations, particularly the historical use of the dry well.

LANL Response

22. Historical information on the use of cesium in building 46-1 indicates the quantities of cesium used were very small and, therefore, were not likely to result in potential impacts to groundwater. The worst-case estimate of the total amount of cesium required to be removed from the experimental apparatus is 180 g (Michelotti and Erickson 1992, 054783.77). Most of this cesium was reacted with a butanol-kerosene mixture and disposed of at the SWMU 46-007 outfall. Solid cesium not treated in this manner was disposed of at the SWMU 46-004(p) dry well. Solid cesium disposed of at the pit would react with moisture and carbon dioxide in the air to form cesium carbonate. Based on the low inventory of cesium disposed of at this site, the great depth to groundwater (more than 1000 ft), and the dilution and attenuation that would occur during transport over this distance, migration to groundwater is not a complete pathway. The text in section 7.22.1 has been revised to provide additional information on the estimated inventory of cesium disposed of at this site.

NMED Comment

23. SWMU 46-004(q), Section 7.23.4.4, Nature and Extent of Contamination, Radionuclides, first paragraph, page 134:

Permittees' Statement: *"Cesium-137 was detected in two soil samples at two locations. The maximum activity of 0.591 [pico curies per gram] pCi/g was detected at location 46-611504 from 0.0–1.0 ft bgs, which is below the soil FV (1.65 pCi/g). Cesium-137 activities decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of cesium-137 are defined."*

NMED Comment: *The two cesium-137 detections shown on Plate 15 and summarized in Table 7.23-4 were at location ID 46-611501 (0.119 pCi/g, one to two feet interval) and location ID 46-611504 (0.33 pCi/g, one to two feet interval). The discussion does not match the information in the plate or table. If the data on the plate and in the table are correct, vertical extent is not defined at either location ID. Review the text, plate, and table, and revise as needed for consistency. Revise the extent discussion, if appropriate. Resolution of this comment may also require revision of the Summary of Nature and Extent portion of the discussion at the end of the section. Note also that the pCi/g acronym is not defined in the Appendix A listings, or in footnotes to the table; it is defined on the plates.*

LANL Response

23. At location 46-611501, cesium-137 activities decreased from 0.425 pCi/g at 0.0–1.0 ft bgs to 0.119 pCi/g at 1.0–2.0 ft bgs. At location 46-611504, cesium-137 activities decreased from 0.591 pCi/g at 0.0–1.0 ft bgs to 0.33 pCi/g at 1.0–2.0 ft bgs. The results for the samples collected at 0.0–1.0 ft bgs are not presented in Table 7.23-4 or shown on Plate 15 because they are from surface soil samples and are less than the cesium-137 soil FV (1.65 pCi/g). They are, however, included in Appendix G. Because cesium-137 activities decreased with depth at these locations, vertical extent is defined. The text in section 7.23.4.4 has been revised to present the detected concentrations below the soil FV at both locations.

    Common units of measure such as pCi/g and mg/kg are not defined in text, figures, and tables. The plates have been revised to remove the definitions.

NMED Comment

24. ***SWMU 46-004(r), Section 7.24.4.4, Nature and Extent of Contamination, Inorganic Chemicals, first paragraph, last line, page 136:***

    Permittees' Statement: *"The lateral and vertical extent of cadmium are defined."*

    NMED Comment: *The highest cadmium concentration is in the deepest sample interval collected at location ID 46-612231. Cadmium vertical extent is not defined at that location. Revise the Report to reflect site conditions at this SWMU.*

LANL Response

24. As described in the response to Specific Comment 25, the determination of vertical extent at location 46-612231 is not relevant because of the intervals sampled. Therefore, the text in section 7.24.4.4 has been revised to remove all references to vertical extent. It should be noted, however, that although the higher cadmium concentration was in the deeper sample at location 46-612231, both results were below the maximum soil background concentration for cadmium (2.6 mg/kg).

NMED Comment

25. ***SWMU 46-004(r), Section 7.24.4.4, Nature and Extent of Contamination, Organic Chemicals, first paragraph, last two lines, page 137:***

    Permittees' Statement: *"Because of the small incremental depth intervals sampled, the concentrations did not change substantially with depth. The lateral and vertical extent of these organic chemicals are defined."*

    NMED Comment: *Several of the polycyclic aromatic hydrocarbons (PAHs) and VOCs discussed in this paragraph increased in concentration with depth, while others decreased. In both cases, the magnitude of change in either direction is slight. There is sufficient uncertainty in concentration trends for both PAHs and VOCs that additional subsurface evaluation is necessary at this location as part of the future Phase II activities planned for this SWMU.*

LANL Response

25. The proposed sampling for SWMU 46-004(r) in the approved investigation work plan (LANL 2008, 105038; NMED 2008, 103429) called for samples to be collected from one location within the storm drain at intervals of 0.0–1.0 ft bgs and 1.0–2.0 ft bgs. However, the material in the storm drain, which had been deposited over time, was found to be only 0.5 ft thick, and the storm drain was lined with concrete. Because the approved work plan called for sampling at two depths, samples were collected at intervals of 0.0–0.25 ft bgs and 0.25–0.50 ft bgs even though the deposited material does not represent different layers of environmental media. Because the storm drain is lined with concrete, it is not possible to sample deeper. This deviation is described in Appendix B, section B-10.0, of the investigation report.

    Section 7.24.4.1 has been revised to explain the reason for the sample intervals at this site. Section 7.24.4.4 has been revised to note that evaluation of vertical extent is not relevant for samples collected from the storm drain. Sections 7.24.5, 7.24.6, 7.29.5, and 7.29.6 have been revised to indicate that human health and ecological risk screening at this site and collocated SWMU 46-004(w) will be performed as part of the Phase II investigation. Sections 9.1.2, 9.2.1, 9.2.2, and 10.1, the Executive Summary, Table 9.1-1, and Appendix I have also been revised to reflect the status of extent of contamination.

NMED Comment

26. ***SWMU 46-004(t), Section 7.26.4.3, Soil, Rock, and Sediment Sampling Analytical Results, page 142 and Appendix B, Section B-10.0, Deviations From the Work Plan, page B-9:***

    Although collection of soil samples from below the drain line associated with this SWMU was discussed in the approved IWP, methods to be used to locate the line were not discussed. Include a discussion, either in this Report Section or in Appendix B, that explains why a hand auger was used instead of a backhoe to locate the drain line. This line is relatively long (approximately 490 feet as illustrated on Plate 7) and there is some uncertainty concerning where the 2010 sample locations were placed relative to the actual location of the line. Also, propose in the Phase II IWP, to use a backhoe to locate the line and verify that the 2010 sample locations were placed to adequately determine potential impacts associated with various segments of the line. Alternatively if there are underground utility concerns, non-invasive geophysical techniques may be proposed to locate the line.

LANL Response

26. Potholing with a hand auger was performed at locations 46-611277 and 46-611278 because of concerns with underground utilities at these locations. A backhoe was used to locate the drainline where it exits building 46-88 (location 46-611276). Because the drainline could not be located and its presence and depth confirmed at locations 46-611277 and 46-611278, additional investigation is necessary. Following additional subsurface utility screening, a backhoe will be used to locate the drainline at these locations during the Phase II investigation. Section 7.26.4.1 has been revised to note that the presence of the drainline was not confirmed at these two locations. Section 10.1 has been revised to recommend exposing the drainline using a backhoe and resampling at the locations, if necessary. Appendix B, section B-10.0, has been revised to describe why potholing with a hand auger was used.

NMED Comment

27. ***SWMU 46-005, Section 7.33.4.4, Nature and Extent of Contamination, Inorganic Chemicals, second paragraph, last line, page 172:***

    Permittees' Statement: *"The lateral and vertical extent of beryllium are defined."*

    NMED Comment: *The vertical extent of beryllium is not defined at one location. At location ID 46-611637 beryllium was not detected in the upper one foot interval but was reported at 2.7 mg/kg in the three to four foot depth interval. Revise the text accordingly.*

LANL Response

27. At location 46-611637, beryllium was detected at 1.3 mg/kg (less than the soil BV of 1.83 mg/kg) at 0.0–1.0 ft bgs and 2.7 mg/kg at 3.0–4.0 ft bgs. As explained in section 7.33.4.4, the results of the statistical tests indicated that the site concentrations of beryllium in soil were not different from background concentrations of beryllium in soil. As explained in sections 5.1 and 5.2, extent is defined if site concentrations are not different from background concentrations. No revisions to the text are necessary.

NMED Comment

28. ***SWMU 46-006(b), Section 7.35.4.4, Nature and Extent of Contamination, Inorganic Chemicals, page 178:***

    Permittees' Statement: *"Chromium was detected above the tuff BV (7.14 mg/kg) in one sample at a maximum concentration of 10.7 mg/kg. Chromium concentrations were below the maximum tuff background concentration (13 mg/kg) (Figure H-47). The lateral and vertical extent of chromium are defined."*

    NMED Comment: *The chromium detection was present in the two to three feet interval at location ID 46-611371 and deeper samples were not collected. The upper one foot increment at the same location was non-detect, indicating the vertical extent of chromium is not defined at that location. Revise the text accordingly.*

LANL Response

28. At location 46-611371, chromium was detected at 6.4 mg/kg (below the soil BV) at 0.0–1.0 ft bgs and 10.7 mg/kg at 2.0–3.0 ft bgs. As described in section 7.35.4.4, the concentration of chromium at the deeper sample at location 46-611371 is below the maximum background concentration for chromium in Qbt 2, 3, 4 (13 mg/kg). As discussed in sections 5.1 and 5.2, because too few samples were available for statistical analysis, the results above BV were compared with the maximum background concentrations to determine if they were comparable to background. In this case, the result at location 46-611371 is comparable to background and vertical extent is defined. No revisions to the text are necessary.

NMED Comment

29. ***SWMU 46-006(b), Section 7.35.4.4, Nature and Extent of Contamination, Organic Chemicals, page 179:***

    Permittees' Statement: *"Acetone was detected in one soil sample at a concentration of 0.00241 mg/kg at location 46-611371 from 1.0–2.0 ft bgs. Acetone concentrations were below the EQL and decreased downgradient. The lateral and vertical extent of acetone are defined."*

    NMED Comment: *This is inconsistent with Table 7.35-3 and Plate 5 which indicate that acetone was not detected from one to two feet bgs but was detected from two to three feet bgs. Therefore, the concentration of acetone is increasing with increasing depth indicating that the vertical extent of acetone contamination is not defined. Modify the text to include the correct depths at which acetone was detected or modify the table and plate information if the text is correct. Indicate whether or not further evaluation at this location is necessary. Revise the Summary of Nature and Extent portion of the section, if appropriate.*

LANL Response

29. The text in section 7.35.4.4 incorrectly states that the detected concentration of acetone at location 46-611371 was from the interval of 1.0–2.0 ft bgs, instead of 2.0–3.0 ft bgs. As described in section 7.35.4.4, this concentration of acetone was less than the EQL. Therefore, vertical extent is defined. The text has been revised to correct the reported sampling depth. No revisions regarding extent are necessary.

NMED Comment

30. ***SWMU 46-008(b), Section 7.42.4.4, Nature and Extent of Contamination, Inorganic Samples, first paragraph, third sentence, page 209:***

    Permittees' Statement: *"The maximum [antimony] concentration of 1.29 mg/kg was detected at location 46-611203 from 2.0–3.0 ft bgs."*

    NMED Comment: *According to Table 7.42-2 and Plate 22, the highest antimony concentration (1.29 mg/kg) was detected at location ID 46-611203 from zero to one foot bgs. Revise the text to resolve the discrepancy.*

LANL Response

30. The text in section 7.42.4.4 incorrectly states that the maximum concentration of antimony at location 46-611203 is at the interval of 2.0–3.0 ft bgs, instead of 0.0–1.0 ft bgs. The text has been revised to present the correct sampling depth.

NMED Comment

31. ***SWMU 46-008(b), Section 7.42.4.4, Nature and Extent of Contamination, Inorganic Samples, fourth paragraph, page 210:***

    Permittees' Statement: *"Selenium was detected above the tuff BV (0.3 mg/kg) in one sample at a concentration of 0.61 mg/kg at location 46-611200 from 2.0–3.0 ft bgs. Selenium was detected at a concentration of 1.09 mg/kg, which is below the soil BV (1.52 mg/kg), from 0.0–1.0 ft bgs at this* *location and decreased with depth at this location. Selenium concentrations decreased downgradient. The lateral and vertical extent of selenium are defined."*

NMED Comment: *According to Table 7.42-2 and Plate 22, selenium was detected only at one location (ID 46-611200 at 0.61 (J) mg/kg). That concentration was reported for the two to three feet bgs interval, indicating selenium's vertical extent is not defined at that location. Review the text, table, and plate, and revise as needed for consistency.*

LANL Response

31. The text in section 7.42.4.4 incorrectly states that selenium was detected at 1.09 mg/kg at location 46-611200 at 0.0–1.0 ft bgs. Selenium was not detected in the sample from 0.0–1.0 ft bgs and the DL was 1.09 mg/kg. Therefore, the concentrations of selenium increased with depth at this location, and vertical extent is not defined. The text in sections 7.42.4.4 and 9.1.2 has been revised accordingly.

NMED Comment

32. SWMU 46-008(b), Section 7.42.4.4, Nature and Extent of Contamination, Organic Samples, first full paragraph, last sentence, page 211:

Permittees' Statement: *"The lateral and vertical extent of TPH-DRO are defined."*

NMED Comment: *According to Table 7.42-3 and Plate 23, TPH-DRO was present at location ID 46-611201 (3.64 (J) mg/kg) in the two to three feet bgs interval indicating vertical extent is not defined at that location. The vertical extent of TPH-DRO at this location must be addressed in the Phase II IWP.*

LANL Response

32. At location 46-611201, TPH-DRO was not detected at the interval of 0.0–1.0 ft bgs but was detected at 3.64 mg/kg at 2.0–3.0 ft bgs. As indicated in section 7.42.4.4, this result was below the EQL. Because the only concentration of TPH-DRO at this location was below the EQL, vertical extent is defined. No revisions to the text are necessary.

NMED Comment

33. SWMU 46-008(d), Section 7.43.4.4, Nature and Extent of Contamination, Inorganic Samples, first paragraph, last sentence, page 214:

Permittees' Statement: *"The lateral and vertical extent of chromium are defined."*

NMED Comment: *According to Table 7.43-2 and Plate 7, the two highest chromium concentrations are present in the deepest sample intervals at location IDs 46-611343 and 46-611347 indicating chromium vertical extent is not defined at those locations. Vertical extent at this location must be addressed in the Phase II IWP.*

LANL Response

33. As described in section 7.43.4.4, the two concentrations of chromium in Qbt 3 (7.46 mg/kg at location 46-611343 and 8.91 mg/kg at location 46-611347) were below the maximum background concentration for chromium in Qbt 2, 3, 4 (13 mg/kg). As described in sections 5.1 and 5.2, because too few samples were available for statistical analysis, results above BV were compared with the maximum background concentrations to determine if they were comparable to background. In this case, the results at locations 46-611343 and 46-611347 are comparable to background, and vertical extent is defined. No revisions to the text are necessary.

NMED Comment

34. SWMU 46-008(d), Section 7.43.4.4, Nature and Extent of Contamination, Inorganic Samples, third paragraph, last sentence, page 214:

Permittees' Statement: *"The lateral and vertical extent of lead are defined."*

NMED Comment: *According to Table 7.43-2 and Plate 7, the highest lead concentration is present in the deepest sample interval at location ID 46-611343, indicating lead vertical extent is not defined at that location. Vertical extent at this location must be addressed in the Phase II IWP.*

LANL Response

34. As described in section 7.43.4.4, the concentration of lead (14 mg/kg) at location 46-611343 is below the maximum background concentration for lead in Qbt 2, 3, 4 (15.5 mg/kg). As discussed in sections 5.1 and 5.2, because too few samples for statistical analysis were available, results above BV were compared with the maximum background concentrations to determine if they were comparable to background. In this case, the result at location 46-611343 is comparable to background, and vertical extent is defined. No revisions to the text are necessary.

NMED Comment

35. SWMU 46-008(g), Section 7.46.4.4, Nature and Extent of Contamination, Radionuclides, first two sentences, page 228:

Permittees' Statement: *"Cesium-137 was detected in one soil sample at one location. The maximum activity of 0.594 pCi/g was detected at location 46-611752 from 0.0–1.0 ft bgs, which is below the soil FV (1.65 pCi/g)."*

NMED Comment: *According to Table 7.46-4, the highest cesium-137 concentration (0.155 pCi/g) was in the deepest sample interval at location ID 46-611752. Note that the value shown on Plate 9 is 0.154 pCi/g. Review the pertinent analytical information and make the necessary revisions to the text, table, or plate for consistency.*

LANL Response

35. At location 46-611752, cesium-137 activities decreased from 0.594 pCi/g at 0.0–1.0 ft bgs to 0.155 pCi/g at 2.0–3.0 ft bgs. The result for the sample collected at 0.0–1.0 ft bgs is not presented in Table 7.46-4 or shown on Plate 9 because it is from a surface soil sample and is less than the cesium-137 soil FV (1.65 pCi/g). It is, however, included in Appendix G. Because cesium-137 activities decreased with depth at this location, vertical extent is defined. The text in section 7.46.4.4

has been revised to clarify that cesium-137 was detected in two samples at this location and activities decreased with depth.

Plate 9 correctly presents the cesium-137 activity of 0.155 pCi/g at location 46-611752 at 2.0–3.0 ft bgs. The Laboratory assumes the value of 0.154 pCi/g referred to in NMED's comment is actually the result for location 46-611279 [SWMU 46-004(t)] at the interval of 2.0–3.0 ft bgs, which is also shown on Plate 9. No revisions to the plate are necessary.

NMED Comment

36. SWMU 46-009(b), Section 7.48.1, Site Description and Operational History, first sentence, page 234:

Permittees' Statement: *"SWMU 46-009(b) is a surface disposal area located approximately 325 southeast of building 46-77 at TA-46 (Figure 7.2-1)."*

NMED Comment: *Add units to the distance measurement.*

LANL Response

36. The sentence in section 7.48.1 has been revised to add the missing unit of measure (feet).

NMED Comment

37. SWMU 46-009(b), Section 7.48.4.4, Nature and Extent of Contamination, Organic Chemicals, third paragraph, last sentence, page 237:

Permittees' Statement: *"The lateral extent of chloromethane is not defined, but vertical extent is defined."*

NMED Comment: *Chloromethane was detected in only one sample from one location at a very low concentration (0.00307 (J+) mg/kg). The horizontal extent of chloromethane is defined at this SWMU.*

LANL Response

37. The text in sections 7.48.4.4 and 9.1.2 has been revised to indicate that lateral extent is defined for chloromethane.

NMED Comment

38. SWMU 52-001(d), Section 10.2, Recommendations for Corrective Action, last paragraph, page 251:

NMED agrees that additional corrective actions at this SWMU are not necessary. The Permittees may submit a request for a Certificate of Completion.

LANL Response

38. Comment noted.

NMED Comment

39. Table F-1.0-1, Inorganic Chemical, Organic Chemical, and Radionuclide Analytical Methods for Samples Collected in the Upper Cañada del Buey Aggregate Area, page F-13:

The table does not include a listing indicating what analytical method(s) were used for analyses of TPH-DRO. Revise the table to include the information.

LANL Response

39. Table F-1.0-1 has been revised to include the analytical method for TPH-DRO.

NMED Comment

40. Table F-1.0-1, Inorganic Chemical, Organic Chemical, and Radionuclide Analytical Methods for Samples Collected in the Upper Cañada del Buey Aggregate Area, page F-13:

The table indicates EPA Method TO-15 was used for analyses of VOCs. Method TO-15 is typically used for canister-based analyses of air samples. The scope of work outlined in the Report does not indicate that air was sampled during the investigation. Revise the table as appropriate.

LANL Response

40. EPA Method TO-15 has been removed from Table F-1.0-1 because this analysis was not performed during the investigation.

NMED Comment

41. Section I-5.3.5, SWMU 46-006(g), page I-20:

The text states that the hazard indices (HIs) were greater than 1.0 for the robin and deer mouse at SWMU 46-006(g). However, according to Table I-5.3-9, the plant (24) and montane shrew (6) receptors also had HIs greater than one. Revise the text to state that the plant and montane shrew receptors also had HIs greater than one.

LANL Response

41. Text in section I-5.3.5 has been revised to state the plant and montane shrew receptors also have HIs greater than 1.

NMED Comment

42. Section I-5.4.4, Comparison with Background Concentrations, pages I-21 and I-22:

This part of the Report presents a discussion of comparing exposure point concentrations (EPCs) (i.e., upper confidence limits) to background datasets, concluding that site concentrations are not substantially different from background concentrations. As a result, several inorganic constituents of potential ecological concern (COPECs) were eliminated from further analysis in the ecological risk assessment. It is incorrect to eliminate COPECs from further consideration based on comparing upper confidence limits (UCLs) with background comparison values. Comparisons of site concentrations with background values were already conducted and discussed previously in the

Report, and resulted in the identification of COPECs. Furthermore, background values are used for point-to-point comparisons and because the UCL is not a point estimate, it cannot be used as an estimate of an individual site observation for comparison to background threshold values. Delete the discussion in Section I-5.4.4 and delete corresponding Tables I-5.4-1, I-5.4-2, I-5.4-3, and I-5.4-4. Include the inorganics that were eliminated as COPECs in the refined ecological risk assessment.

LANL Response

42. The uncertainty analysis discusses aspects of the conservative risk-screening process that over- or underestimate potential risk to receptors and thereby affect site decisions. In the case of the ecological risk-screening assessments, one uncertainty related to the exposure of receptors to chemicals of potential ecological concern (COPEC) concentrations that is not likely to result in adverse impacts is discussed in section I-5.4.4. This overestimation of risk from receptors exposed either to naturally occurring levels or to exposure that cannot be distinguished from naturally occurring levels is described and put in the context of whether an increased risk to receptors exists. Therefore, the discussion and analysis are appropriate when determining whether or not COPECs are contributing to potential risk at a site.

    The comparison to background concentrations in section I-5.4.4 of the uncertainty analysis does not eliminate COPECs from further consideration based on a comparison of upper confidence limits (UCLs) with BVs that are upper tolerance limits (UTLs). The EPCs (either the UCL, the maximum detected concentration, or the maximum DL) are compared with the background concentrations measured in samples of soil and tuff from uncontaminated areas of the Pajarito Plateau or the BV if it is a DL value (not a calculated concentration) (LANL 1998, 059730). This uncertainty discussion and analysis presented in section I-5.4.4 are not related to whether an inorganic chemical was detected above background and is a COPC but rather whether COPCs identified and retained as COPECs represent a potential risk to receptors at the concentration designed to represent exposure at the site. Furthermore, the presence of a concentration or concentrations above the BV(s) that resulted in the identification of a COPC does not mean the level of exposure from the COPC poses an increased risk.

    The EPCs represented by the maximum detected concentrations or the maximum DLs are a deliberate overestimate of the exposure (and therefore the risk). If the EPC is the same as, or cannot be distinguished from, exposure to naturally occurring levels, then the risk to receptors (if present) is no different than would result from exposure to naturally occurring levels, that is, whatever risk may be potentially present is the same as that found in uncontaminated areas of the Pajarito Plateau. If the EPC is a UCL, then the concentration represents a reasonable estimate of the concentration the receptor is likely to come in contact with over time. If the reasonable estimate of the exposure concentration cannot be distinguished from exposure to naturally occurring levels, then any risk to receptors also cannot be distinguished from risk that may be from naturally occurring levels, that is, the potential risk from uncontaminated areas. For example, if the UCL is 8.3 mg/kg for copper and the measured background concentrations range from 0.25 mg/kg to 16 mg/kg for soil and 0.25 mg/kg to 6.2 mg/kg for tuff, the exposure to copper across the site is the same as if the receptor were exposed to a naturally occurring level of copper. In addition, because the UCL for copper background concentrations is 6.4 mg/kg and the UCL for site concentrations is 8.3 mg/kg, the difference in the potential risk associated with these concentrations is negligible (if any risk exists at all). Thus, risk from copper to ecological receptors cannot be distinguished from, or does not incrementally increase above, that associated with naturally occurring levels, making any further assessment of copper unnecessary. If, on the other hand, the EPC for copper is 117 mg/kg, exposure across the site is above naturally occurring levels of copper and may pose a potential risk to ecological receptors. In this case, further assessment of copper is conducted to determine if a potential risk exists at this mean exposure level.

Each of the sites evaluated in the Upper Cañada del Buey Aggregate Area is discussed below with respect to NMED's comment and the comparisons with background that were conducted during the investigation.

For SWMU 46-002, antimony was not evaluated further because the EPC was the maximum detected concentration (in soil), and this concentration was below the soil BV (0.83 mg/kg). Thus, no increased risk above that associated with naturally occurring levels results from the exposure to antimony at this SWMU. All other COPECs were evaluated further.

For SWMU 46-004(m), copper, mercury, and selenium were not evaluated further based on the rationale presented above: that is, EPCs represented by either the UCL or the maximum DL cannot be distinguished from exposure to naturally occurring levels so no increased risk to receptors exists. The EPCs (UCLs) for copper and mercury are 8.281 mg/kg and 0.0513 mg/kg, respectively, and are the same as the measured background concentrations (0.25 mg/kg to 16 mg/kg in soil and 0.25 mg/kg to 6.2 mg/kg in tuff for copper, and a BV of 0.1 mg/kg based on a DL for mercury). In addition, the copper concentrations in soil were not statistically different from soil background concentrations, and only one mercury concentration was detected above the BV (0.1 mg/kg compared with 0.119 mg/kg). The EPC for selenium is the reported maximum DL that falls within the range of soil background concentrations (0.1 mg/kg to 1.7 mg/kg). Thus, no increased risk above that associated with naturally occurring levels results from the exposure to copper, mercury, and selenium at this SWMU. Antimony and zinc were evaluated further. In the cases of selenium and antimony, no concentrations were detected.

For SWMU 46-006(b), antimony was not evaluated further because the EPC was the maximum detected concentration (in soil), and this concentration was below the soil BV (0.83 mg/kg). The EPC for selenium is the reported maximum DL that falls within the range of soil background concentrations (0.1 mg/kg to 1.7 mg/kg). No detected concentrations of selenium and no detected concentrations above the antimony BV were reported. Thus, no increased risk above that associated with naturally occurring levels results from the exposure to antimony and selenium at this SWMU. No other COPECs were identified.

For SWMU 46-006(g), the EPCs for antimony and selenium are the reported maximum DLs that fall either slightly above the maximum background concentration for antimony (1.1 [U] mg/kg versus 1 mg/kg) or is within the range of soil background concentrations for selenium (0.1 mg/kg to 1.7 mg/kg). In either case, no concentrations were detected. Thus, no increased risk above that associated with naturally occurring levels results from the exposure to antimony and selenium at this SWMU. No other COPECs were identified at this SWMU.

Based on the clarification of the analyses presented herein, the text in section I-5.4.4 has not been deleted but has been revised to explain the basis for not evaluating some inorganic COPECs further for risk. Because the uncertainty discussions remain, deletion of Tables I-5.4-1, I-5.4-2, I-5.4-3, and I-5.4-4 in the risk appendix is not warranted. The tables have been revised for consistency.

NMED Comment

43. Table I-2.2-4, EPCs for SWMU 46-004(m) for the Industrial Scenario, page I-44:

> *The EPC for tetrachloroethene (0.0141 mg/kg) for the industrial scenario at SWMU 46-004(m) is based on the maximum detected concentration and is inconsistent with the maximum detected concentration of 0.000432 mg/kg presented in Table 7.21-3. It is noted that the greater value was used as the EPC and does not affect the results of the risk assessment. Clarify this inconsistency and update any subsequent calculations that would be affected.*

LANL Response

43. Table I-2.2-4 has been revised to present the correct EPC for tetrachloroethene (0.000432 mg/kg). The concentration is correct in Table 7.21-3. Table I-4.2-10 has been revised to include the EPC of 0.000432 mg/kg, and the cancer risk was recalculated. This revision does not change the total cancer risk.

NMED Comment

44. Table I-2.2-4, EPCs for SWMU 46-004(m) for the Industrial Scenario, page I-44:

> *The EPC for xylene[1,3-]+xylene[1,4-] (0.00259 mg/kg) for the industrial scenario at SWMU 46-004(m) is based on the maximum detected concentration and is inconsistent with the maximum detected concentration of 0.000358 mg/kg presented on Table 7.21-3. It is noted that the greater value was used as the EPC and does not affect the results of the risk assessment. Clarify this inconsistency and update any subsequent calculations that would be affected.*

LANL Response

44. Table I-2.2-4 has been revised to present the correct EPC for xylene[1,3-]+xylene[1,4-] (0.000358 mg/kg). The concentration is correct in Table 7.21-3. Table I-4.2-11 has been revised to include the EPC of 0.000358 mg/kg, and the HQ was recalculated. This revision does not change the HI.

NMED Comment

45. Table I-2.2-9, EPCs for SWMU 46-006(b) for the Construction Worker and Residential Scenarios, page I-54:

> *The EPC of 0.00545 mg/kg for butylbenzene[n-] is based on a maximum detected concentration and is inconsistent with the maximum detected concentration of 0.000545 mg/kg on Table 7.35-3. Although the EPC that was used is more conservative than the maximum detected concentration and would not affect the results of the risk assessment, revise Table I-2.2-9 to include the correct maximum detected concentration for butylbenzene[n-].*

LANL Response

45. Table I-2.2-9 has been revised to present the correct EPC for n-butylbenzene (0.000545 mg/kg). The concentration is correct in Table 7.35-3. Table I-4.2-20 has been revised to include the EPC of 0.000545 mg/kg, and the HQ was recalculated. This revision does not change the HI.

NMED Comment

46. Table I-4.2-14, Construction Worker Noncarcinogenic Screening Evaluation for SWMU 46-004(m), page I-69:

The listed SSL for copper (20,600 mg/kg) is incorrect. The correct NMED Construction Worker SSL is 12,400 mg/kg. Revise Table I-4.2-14 to include the correct SSL for copper.

LANL Response

46. Table I-4.2-14 has been revised to include the correct copper SSL, and the HQ was recalculated. The revision does not affect the HI.

NMED Comment

47. Table I-4.2-16, Residential Carcinogenic Screening Evaluation for SWMU 46-004(m), page I-70:

Trichloroethene was not included for residential screening at SWMU 46-004(m). It was detected in surface soil at a concentration of 0.00378 mg/kg and must be included in the carcinogenic risk screening for the residential scenario. Revise Table I-4.2-16 to include a risk estimate for trichloroethene, and revise the total excess cancer risk accordingly.

LANL Response

47. Table I-4.2-16 has been revised to include trichloroethene. The HQ does not change the HI.

NMED Comment

48. Table I-4.2-20, Industrial Noncarcinogenic Screening Evaluation for SWMU 46-006(b), page I-73:

The EPC for butylbenzene[n-] (0.00545 mg/kg) is inconsistent with the EPC of 0.000545 mg/kg presented on Table I-2.2-8. The EPC that was used is the more conservative of the two values, and therefore would not affect the results of the risk assessment. Revise Table I-4.2-20 to include the correct maximum detected concentration for butylbenzene[n-].

LANL Response

48. See response to Specific Comment 45.

NMED Comment

49. Table I-5.3-1, ESLs for Terrestrial Receptors, pages I-81 and I-82

The ecological screening levels (ESLs) for the following constituents and receptors are inconsistent with the values presented in the Ecorisk (Version 2.5) database:

a. Cyanide (American kestrel [intermediate carnivore], American kestrel [top carnivore], and red fox);

b. Selenium (American kestrel [intermediate carnivore], American kestrel [top carnivore], American robin [herbivore], American robin [insectivore], American robin [omnivore], deer mouse, desert cottontail, earthworm, plant, montane shrew, and red fox);

c. Silver (American kestrel [intermediate carnivore], American kestrel [top carnivore], American robin [herbivore], American robin [insectivore], American robin [omnivore], deer mouse, desert cottontail, plant, montane shrew, and red fox);

d. Zinc (American kestrel [intermediate carnivore], American kestrel [top carnivore], American robin [herbivore], American robin [insectivore], American robin [omnivore], deer mouse, desert cottontail, earthworm, plant, montane shrew, and red fox);

e. Anthracene (plant);

f. Benzo(a)anthracene (American kestrel [intermediate carnivore], American kestrel [top carnivore], American robin [herbivore], American robin [insectivore], American robin [omnivore], plant, and red fox);

g. Benzo(a)pyrene (American kestrel [intermediate carnivore], American kestrel [top carnivore], American robin [herbivore], American robin [insectivore], American robin [omnivore], deer mouse, desert cottontail, montane shrew, and red fox);

h. Benzo(b)fluoranthene (plant);

i. Chrysene (red fox);

j. Fluoranthene (earthworm);

k. Fluorene (earthworm);

l. Naphthalene (American kestrel [intermediate carnivore], American kestrel [top carnivore], American robin [herbivore], American robin [insectivore], American robin [omnivore], deer mouse, desert cottontail, Montane shrew, and red fox);

m. Phenanthrene (earthworm); and

n. Pyrene (earthworm).

It is noted that these errors do not affect the calculations, and the correct ESLs were used throughout the remainder of the ecological risk assessment. However, explain these inconsistencies, and revise Table I-5.3-1 to include ESLs that are consistent with those listed in Ecorisk (Version 2.5).

LANL Response

49. The ESLs were incorrectly copied and pasted into Table I-5.3-1. Table I-5.3-1 has been revised to include the correct ESLs from the ECORISK Database, Version 2.5, for all receptors.

NMED Comment

50. Table I-5.4-15, Adjusted HI Analysis for [lowest observed adverse effect level] LOAEL-Based ESLs for SWMU 46-002, page I-97

The EPCs listed for SWMU 46-002 for mercury (0.138 mg/kg) and bis(2-ethylhexyl)phthalate (0.119 mg/kg) on Table I-5.4-15 are inconsistent with the EPCs presented on Table I-2.2-2 (1.283 mg/kg and 1.43 mg/kg, respectively). It is noted that this inconsistency does not affect the calculation of the adjusted HI for the American robin (insectivore) at SWMU 46-002. However, revise Table I-5.4-15 accordingly.

LANL Response

50. Table I-5.4-15 has been revised to include the correct EPCs for mercury and bis(2-ethylhexyl)phthalate. The calculations have also been revised accordingly. In addition, Table I-5.4-14 has been revised to present the correct HQ for mercury.

REFERENCES

Ferenbaugh, R.W., E.S. Gladney, and G.H. Brooks, Jr., October 1990. “Sigma Mesa: Background Elemental Concentrations in Soil and Vegetation, 1979,” Los Alamos National Laboratory report LA-11941-MS, Los Alamos, New Mexico. (Ferenbaugh et al. 1990, 110440)

LANL (Los Alamos National Laboratory), September 22, 1998. “Inorganic and Radionuclide Background Data for Soils, Canyon Sediments, and Bandelier Tuff at Los Alamos National Laboratory,” Los Alamos National Laboratory document LA-UR-98-4847, Los Alamos, New Mexico. (LANL 1998, 059730)

LANL (Los Alamos National Laboratory), September 2008. “Investigation Work Plan for Upper Cañada del Buey Aggregate Area, Revision 1,” Los Alamos National Laboratory document LA-UR-08-6122, Los Alamos, New Mexico. (LANL 2008, 105038.17)

Michelotti, R., and G. Erickson, April 8, 1992. “Documentation of Cesium-Ditch Waste Practices,” Los Alamos National Laboratory memorandum (CLS-ER-RM-004) to file from R. Michelloti (Project Leader OU-1140) and G. Erickson (CLS-6), Los Alamos, New Mexico. (Michelloti and Erickson 1992, 054783.77)

NMED (New Mexico Environment Department), October 20, 2008. “Notice of Approval, Revision 1, Investigation Work Plan for Upper Cañada del Buey Aggregate Area,” 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, 103429)

NMED (New Mexico Environment Department), December 2009. “Technical Background Document for Development of Soil Screening Levels, Revision 5.0,” with revised Table A-1, New Mexico Environment Department, Hazardous Waste Bureau and Ground Water Quality Bureau Voluntary Remediation Program, Santa Fe, New Mexico. (NMED 2009, 108070)

Attachment 1

Calculations of Construction Worker SSLs
(on CD included with this document)

Cross-Reference of NMED NOD Comments and Revisions to Upper Cañada del Buey Aggregate Area Investigation Report

NMED NOD Comment No.	Summary of NOD Comment	Section(s)/Page(s) in Original Report	Section(s)/Page(s) in Revised Report	Nature of Revision
General Comments				
1	Include a brief discussion in section F-4.2.10, Matrix Spike Samples, of Appendix F of how "J" and "J-" flags are assigned, explain why the method detection limits and practical quantitation limits are unusually high for the presumed method (SW-846, Method 8015C), and otherwise clarify the inconsistent use of data qualifiers.	Appendix F, Section 4.2.10	n/a*	No revisions are necessary.
2	Discuss the contaminant concentration-based evidence concerning whether or not nature and extent are defined at a given area of concern (AOC) or solid waste management unit (SWMU).	Section 6.2.4.4, p. 18	n/a	No revisions are necessary.
3	Clarify whether the analytical results define speciation of mercury, thus justifying the use of the regional screening levels and toxicity data for mercury salts.	n/a	n/a	LANL's response clarifies that the analytical results, whether for mercury or any other target analyte list metal, are for total metals. No speciation of the inorganic chemicals is done by the analysis.

NMED NOD Comment No.	Summary of NOD Comment	Section(s)/Page(s) in Original Report	Section(s)/Page(s) in Revised Report	Nature of Revision
4	Provide the spreadsheets or calculation sheets with input parameters and formulae used to calculate the construction worker soil screening levels (SSLs).	n/a	Tables I-4.2-5, I-4.2-14 and I-4.2-22; Tables 6.2-2, 6.3-2, 7.2-2, 7.6-2, 7.7-2, 7.8-2, 7.10-2, 7.10-3, 7.12-3, 7.13-2, 7.13-3, 7.14-2, 7.14-3, 7.15-2, 7.16-2, 7.16-6, 7.16-7, 7.17-2, 7.17-6, 7.17-7, 7.17-10, 7.18-3, 7.20-2, 7.21-2, 7.21-3, 7.23-2, 7.24-2, 7.25-2, 7.26-2, 7.27-3, 7.31-2, 7.31-3, 7.32-2, 7.32-3, 7.33-2, 7.33-3, 7.35-3, 7.37-2, 7.38-2, 7.40-2, 7.42-2, 7.42-3, 7.43-3, 7.44-3, 7.46-3, 7.47-3, 7.49-3	An Excel spreadsheet is provided on CD response to show construction worker SSL calculations. Data tables in the main text and risk-screening tables in the risk appendix have been revised to incorporate the construction worker SSLs as presented in the spreadsheet.
5	Modify the risk assessment to use the current hierarchy of toxicological data because the Region 6 SSL tables are outdated, and Region 6 currently refers to Regions 3 or 9 for risk-based, media-specific screening levels.	n/a	Tables I-4.2-20, I-4.2-22, I-4.2-24 Tables 7.10-3, 7.14-3, 7.33-3, 7.35-3, 7.44-3	As of September 2010, the U.S. Environmental Protection Agency's (EPA's) Superfund Health Risk Technical Support Center provides a provisional peer reviewed toxicity value for n-butylbenzene (oral reference dose of 0.05 mg/kg-day) but concludes data are inadequate to derive a chronic toxicity value for sec-butylbenzene. SSLs were calculated for n-butylbenzene. Because SSLs cannot be derived for sec-butylbenzene, the SSLs for n-butylbenzene were used as surrogates in the risk-screening assessments. The new SSLs were incorporated into the risk-screening assessments and data tables.
Specific Comments				
6	Ensure maps that are scaled differently include all structure numbers in future report and work plans. No revision to the three plates for this report is required.	n/a	n/a	Comment noted. All structure numbers could not be included given the small scale of the inset.

NMED NOD Comment No.	Summary of NOD Comment	Section(s)/Page(s) in Original Report	Section(s)/Page(s) in Revised Report	Nature of Revision
7	Modify the text to indicate that initially concentrations of silver decreased at location 46-611374 at SWMU 46-002 but increased again with depth; discuss the need to further determine whether the vertical extent of silver contamination is defined at this location.	Section 7.2.4.4, p. 30; Table 7.2-2,; Plate 1	n/a	No revisions are necessary. The results from the three samples collected at this location show an overall decrease in concentration with depth.
8	Modify the text to reflect the collected data and include a discussion of the need to further determine whether the vertical extent of contamination of nitrate and selenium is defined at SWMU 46-003(a).	Section 7.3.4.4, p. 34	Section 7.3.4.4, p. 34	No revisions to the discussion of nitrate at SWMU 46-003(a) are necessary. Nitrate concentrations are naturally occurring levels, and extent is defined. The text has been revised to indicate selenium concentrations do not increase with depth and vertical extent is defined.
9	NMED cannot make any determinations with respect to Corrective Action Complete until the site investigation is complete at this SWMU. No response to this comment is necessary.	Section 7.3.7, p. 35	n/a	Comment noted.
10	Define the acronym “LLW” in the revised report.	Section 7.7.1, p. 47	Appendix A	The acronym for “LLW” was defined in section 3.2.11 (p. 11) and has been added to Appendix A.
11	Revise the text to call out the correct plate showing radionuclides at SWMU 46-003(f).	Section 7.9.4.3, p. 57; Plate 9	n/a	No revisions are necessary. The text refers to the correct plate.
12	Change “inorganic” to “organic” in section 7.11.4.4.	Section 7.11.4.4, p. 66	Section 7.11.4.4, p. 66	The text has been revised to correct the error.
13	Provide a brief explanation in the text for the relatively high concentrations of TPH-DRO and trichloroethylene, including the assignment of “J” and “J-” qualifiers, respectively. Revise the appropriate column(s) of Table 7.12-3 if the qualifiers are incorrect.	Section 7.12.4.3, p. 69; Table 7.12-3	n/a	No revisions are necessary. The data qualifiers were assigned correctly and are explained in Appendix F.

NMED NOD Comment No.	Summary of NOD Comment	Section(s)/Page(s) in Original Report	Section(s)/Page(s) in Revised Report	Nature of Revision
14	Revise the text to reflect the analytical results at location 46-611622 at SWMU 46-004(c).	Section 7.14.4.4, p. 77	n/a	No revisions are necessary. The results from the four samples at this location show an overall decrease in concentration with depth.
15	Propose additional sampling locations to determine the lateral and vertical extent of contamination south, east, and west of SWMU 46-004(c).	Section 7.14.4.4, pp. 77–78	n/a	No revisions are necessary. As noted in section 7.14.4.4, the investigation results presented are sufficient to define the lateral and vertical extent of contamination, and no additional sampling is needed.
16	Evaluate the southwest-to-northeast trending drainage during the Phase II investigation because the drainage was not sampled during the 2010 investigation and the nature and extent evaluation is not complete at this site.	Section 7.15.4.1 pp. 79–80; Figure 7.11-1	n/a	No revisions are necessary. The drainage referred to in the comment was not sampled because it did not receive discharges from SWMU 46-004(c2).
17	Propose additional sampling at location 46-611560 at SWMU 46-004(d) during the Phase II investigation to define the vertical extent of lead.	Section 7.16.1.4, p. 86	n/a	No revisions are necessary. The detected concentrations of lead at location 46-611560 are less than the maximum background concentration and vertical extent is defined.
18	Propose additional sampling at location 46-611561 at SWMU 46-004(e) during the Phase II investigation to define the vertical extent of copper.	Section 7.16.2.4, p. 90	n/a	No revisions are necessary. The detected concentrations of copper from the four samples at this location show an overall decrease in concentration with depth.
19	Revise the text to describe the increasing concentrations of certain organic chemicals at locations 46-611444, 46-611445, and 46-611446 at SWMU 46-004(g) to accurately reflect site conditions.	Section 7.17.3.4, pp. 102–103	n/a	No revisions are necessary. The text accurately describes the vertical distribution of all organic chemicals at these locations.
20	Revise the text to describe the increasing concentrations of three organic chemicals at location 46-611022 at AOC C-46-003 to accurately reflect site conditions.	Section 7.18.4.4, p. 113	n/a	No revisions are necessary. The report text accurately describes the vertical distribution of all organic chemicals at this location.

NMED NOD Comment No.	Summary of NOD Comment	Section(s)/Page(s) in Original Report	Section(s)/Page(s) in Revised Report	Nature of Revision
21	Revise the text to describe the increase in the cesium concentration in the deepest sampling interval at SWMU 46-004(p) and indicate that both lateral and vertical extent are not defined.	Section 7.22.4.4, p. 129	Section 7.22.4.4, p. 129	The text has been revised to better explain the basis for determining the extent of cesium based on natural variability of background concentrations.
22	Add text to discuss the potential impacts to groundwater from cesium at SWMU 46-004(p) in light of the nature of past operations, particularly the historical use of the dry well.	Section 7.22.5, p. 130	Section 7.22.1, p. 127	The report text has been revised to provide additional information on the low inventory of cesium disposed of at the site.
23	Review the text, plate, and table to ensure consistency in the information provided on cesium-137 detected at two locations at SWMU 46-004(q). Revise the extent discussion, if appropriate. Define the unit pCi/g in the Appendix A or in notes to the tables.	Section 7.23.4.4, p. 134	Section 7.23.4.4, p. 134; Plates 1–27	Cesium-137 activities decreased with depth at both locations, but results from the upper samples are not presented in Table 7.23-4 or shown on Plate 15 because they are surface samples and the results are below soil fallout value (FV). The text in section 7.23.4.4 has been revised to present the results of both surface samples. The definitions of units of measures were removed from plates.
24	Revise the text to discuss the highest cadmium concentration in the deepest sample collected at location 46-612231 at SWMU 46-004(r) and indicate that the vertical extent of cadmium is not defined.	Section 7.24.4.4, p. 136	Section 7.24.4.4, p. 136	The text has been revised to indicate determination of vertical extent is not relevant at this location because of the intervals sampled.
25	Propose additional sampling in the Phase II investigation to address uncertainty in concentration trends for several of the polycyclic aromatic hydrocarbons and volatile organic compounds at SWMU 46-004(r).	Section 7.24.4.4, p. 137	Executive Summary; Sections 7.24.4.1, 7.24.4.4, 7.24.5, 7.24.6, 7.29.5, 7.29.6, 9.1.2, and 10.1; Table 9.1-1; Appendix I	Text has been revised to explain that samples were collected over a very shallow interval at this site given the presence of a concrete liner in the storm drain. Text has also been revised to explain that evaluation of vertical extent is not relevant for these data. Extent of contamination is defined at this site and collocated SWMU 46-004(w) and risk assessments will be performed as part of the Phase II investigation.

NMED NOD Comment No.	Summary of NOD Comment	Section(s)/Page(s) in Original Report	Section(s)/Page(s) in Revised Report	Nature of Revision
26	Include a discussion either in section 7.26.4.3 or in Appendix B that explains why a hand auger was used instead of a backhoe to locate the drainline. Also, propose using a backhoe to locate the line in the Phase II investigation work plan and verify that the 2010 sampling locations were adequately placed to determine potential impacts associated with various segments of the line. Alternatively, propose noninvasive geophysical techniques to locate the line if underground utilities are a concern.	Section 7.26.4.3, p. 142; Appendix B; Section B-10.0	Section 7.26.4.1, p. 142; Section 10.1, p. 250; Appendix B, Section B-10.0	The text has been revised to note that the presence of the drainline was not confirmed by potholing and the drainline will be located using a backhoe and additional samples collected, if necessary, during the Phase II investigation. Appendix B was revised to describe why potholing with a hand auger was performed.
27	Revise the text to indicate the vertical extent of beryllium is not defined at location 46-611637 at SWMU 46-005.	Section 7.33.4.4, p. 172	n/a	No revisions are necessary. The concentrations of beryllium in soil were not statistically different from background concentrations so extent is defined.
28	Revise the text to indicate chromium was detected in the 2- to 3-ft interval at location 46-611371 at SWMU 46-006(b) and deeper samples were not collected. Indicate that the vertical extent of chromium is not defined at this location.	Section 7.35.4.4, p. 178	n/a	No revisions are necessary. The concentration of chromium detected at location 46-611371 is less than the maximum background concentration, and vertical extent is defined.
29	Modify the text to include the correct depths at which acetone was detected at SWMU 46-006(b) or modify Table 7.35-3 and Plate 5 if the text is correct. Indicate that the vertical extent of acetone contamination is not defined and whether further evaluation at this site is necessary.	Section 7.35.4.4, p. 179; Table 7.35-3; Plate 5	Section 7.35.4.4, p. 179	The text has been revised to correct the reported sampling depth. No other revisions are necessary.
30	Revise the text to resolve the discrepancy between Table 7.42-2 and Plate 22 and the text as to where the highest antimony concentration was detected at location 46-611203 at SWMU 46-008(b).	Section 7.42.4.4, p. 209; Table 7.42-2; Plate 22	Section 7.42.4.4, p. 209	The text has been revised to present the correct sampling depth.

NMED NOD Comment No.	Summary of NOD Comment	Section(s)/Page(s) in Original Report	Section(s)/Page(s) in Revised Report	Nature of Revision
31	Review the text, Table 7.42-2, and Plate 22 to indicate where selenium was detected and revise as needed for consistency; indicate that the vertical extent of selenium is not defined at location 46-611200 at SWMU 46-008(b).	Section 7.42.4.4, p. 210; Table 7.42-2; Plate 22	Section 7.42.4.4, p. 210; Section 9.1.2, p. 248	The text has been revised to indicate that selenium concentrations increased with depth at location 46-611200 and vertical extent is not defined.
32	Address the vertical extent of TPH-DRO at location 46-611201 at SWMU 46-008(b) during the Phase II investigation and indicate that the vertical extent of TPH-DRO is not defined at this location.	Section 7.42.4.4, p. 211; Table 7.42-3; Plate 23	n/a	No revisions are necessary. The only concentration of TPH-DRO detected at location 46-611201 was below the EQL, so vertical extent is defined.
33	Address the vertical extent of chromium at locations 46-611343 and 46-611347 at SWMU 46-008(d) during the Phase II investigation and indicate that the vertical extent of chromium is not defined at these locations.	Section 4.43.4.4, p. 214; Table 7.43-2; Plate 7	n/a	No revisions are necessary. The detected concentrations of chromium at locations 46-611343 and 46-611347 are less than the maximum background concentration and vertical extent is defined.
34	Address the vertical extent of lead at location 46-611343 at SWMU 46-008(d) during the Phase II investigation and indicate that the vertical extent of lead is not defined at these locations.	Section 4.43.4.4, p. 214; Table 4.43-2; Plate 7	n/a	No revisions are necessary. The detected concentration of lead at location 46-611343 is less than the maximum background concentration and vertical extent is defined.
35	Review the pertinent analytical information on the highest cesium-137 concentration in the deepest sampling interval at location 46-611752 at SWMU 46-008(g) and revise the text, table, or plate as necessary.	Section 7.46.4.4, p. 228; Table 7.46-4; Plate 9	Section 7.46.4.4, p. 228	Cesium-137 activities decreased with depth at location 46-611752, but the result from the upper sample is not presented in Table 7.46-4 or Plate 9 because it is a surface sample and was below soil FV. The text in section 7.46.4.4 has been revised to clarify that cesium-137 was detected in two samples and activities decreased with depth.
36	Add the unit of measure to the distance.	Section 7.48.1, p. 234	Section 7.48.1, p. 234	The sentence has been revised to add the missing unit of measure (feet).

NMED NOD Comment No.	Summary of NOD Comment	Section(s)/Page(s) in Original Report	Section(s)/Page(s) in Revised Report	Nature of Revision
37	Revise the text to indicate chloromethane was detected in only one sample from one location at a very low concentration. The horizontal extent of chloromethane is defined at SWMU 46-009(b).	Section 7.48.4.4, p. 237	Section 7.48.4.4, p. 237; Section 9.1.2, p. 248	The text has been revised to indicate that lateral extent is defined for chloromethane.
38	Submit a request for a Certificate of Completion for SWMU 52-001(d) since additional corrective actions are not required.	Section 10.2	n/a	Comment noted.
39	Revise Table F-1.0-1 to include a list of analytical method(s) used for analyses of TPH-DRO.	Table F-1.0-1	Table F-1.0-1	Table F-1.0-1 has been revised to add the method for TPH-DRO.
40	Revise Table F-1.0-1 to remove Method TO-15 since the scope of work outlined in the investigation report does not indicate air was sampled during the investigation.	Table F-1.0-1	Table F-1.0-1	Table F-1.0-1 has been revised to remove Method TO-15.
41	Revise the text to state that the plant and montane shrew receptors, along with the robin and deer mouse, had hazard indexes (HIs) greater than 1 at SWMU 46-006(g).	Section I-5.3.5, p. I-20	Section I-5.3.5, p. I-20	The text has been revised to state the plant and montane shrew receptors also have HIs greater than 1.
42	Do not eliminate COPECs from further consideration based on comparing upper confidence limits with background comparison values. Delete the discussion in text and delete corresponding tables. Include the inorganic chemicals that were eliminated as COPECs in the refined ecological risk assessment.	Section I-5.4.4; Tables I-5.4-1, I-5.4-2; I-5.4-3, and I-5.4-4	Section I-5.4.4, I-21–I-23; Tables I-5.4-1, I-5.4-2, I-5.4-3, and I-5.4-4	Based on the uncertainty analyses of SWMUs in the Upper Cañada del Buey Aggregate Area, the text in section I-5.4.4 has not been deleted but has been revised to clarify the basis for not further evaluating some inorganic COPECs for risk. In addition, because the analyses remain, deletion of Tables I-5.4-1, I-5.4-2, I-5.4-3, and I-5.4-4 from the risk appendix is not warranted. However, these tables have been revised for consistency.

NMED NOD Comment No.	Summary of NOD Comment	Section(s)/Page(s) in Original Report	Section(s)/Page(s) in Revised Report	Nature of Revision
43	Resolve the discrepancy between the exposure point concentration (EPC) for tetrachloroethene for the industrial scenario at SWMU 46-004(m) and the maximum detected concentration presented in Table 7.21-3; update any subsequent calculations that would be affected.	Section I-2.2-4, p. I-44	Tables I-2.2-4 and I-4.2-10	Table I-2.2-4 has been revised to present the correct EPC for tetrachloroethene (0.000432 mg/kg). Table I-4.2-10 has been revised to include the EPC of 0.000432 mg/kg and the cancer risk was recalculated. This revision does not change the total cancer risk.
44	Resolve the discrepancy between the EPC for xylene[1,3-]+xylene[1,4-] for the industrial scenario at SWMU 46-004(m) and the maximum detected concentration presented in Table 7.21-3; update any subsequent calculations that would be affected.	Section I-2.2-4, p. I-44	Tables I-2.2-4 and I-4.2-11	Table I-2.2-4 has been revised to present the correct EPC for xylene[1,3-] + xylene[1,4-] (0.000358 mg/kg). Table I-4.2-11 has been revised to include the EPC of 0.000358 mg/kg and the hazard quotient (HQ) was recalculated. This revision does not change the HI.
45	Resolve the discrepancy between the EPC for n-butylbenzene at SWMU 46-004(m) and the maximum detected concentration presented in Table 7.35-3; revise Table I-2.2-9 to include the correct maximum detected concentration for n-butylbenzene.	Section I-2.2-9, p. I-54	Tables I-2.2-9 and I-4.2-20	Table I-2.2-9 has been revised to present the correct EPC for butylbenzene[n-] (0.000545 mg/kg). Table I-4.2-20 has been revised to include the EPC of 0.000545 mg/kg and the HQ was recalculated. This revision does not change the HI.
46	Revise Table I-4.2-14 to include the correct NMED construction worker SSL for copper.	Section I-4.2-14, p. I-69	Table I-4.2-14	Table I-4.2-14 has been revised to include the correct copper SSL, and the HQ was recalculated. The revision does not affect the HI.
47	Revise Table I-4.2-16 to include a risk estimate for trichloroethene for the residential scenario for SWMU 46-004(m), and revise the total excess cancer risk accordingly.	Section I-4.2-16, p. I-70	Table I-4.2-16	Table I-4.2-16 has been revised to include trichloroethene. The HQ does not change the HI.
48	Revise Table I-4.2-20 to include the correct maximum detected concentration for n-butylbenzene.	Table I-4.2-20	Table I-4.2-20	See response to Specific Comment 45.

NMED NOD Comment No.	Summary of NOD Comment	Section(s)/Page(s) in Original Report	Section(s)/Page(s) in Revised Report	Nature of Revision
49	Revise Table I-5.3-1 to include ecological screening levels (ESLs) that are consistent with those listed in ECORISK Version 2.5 since the ESLs and receptors are inconsistent with the values presented in the database.	Table I-5.3-1	Table I-5.3-1	The ESLs were incorrectly copied and pasted into Table I-5.3-1. Table I-5.3-1 has been revised to include the correct ESLs from the ECORISK Database, Version 2.5, for all receptors.
50	Revise Table I-5.4-15 to include the correct EPCs for mercury and bis(2-ethylhexyl)phthalate for SWMU 46-002.	Table I-5.4-15	Tables I-5.4-14 and I-5.4-15	Table I-5.4-15 has been revised to include the correct EPCs for mercury and bis(2-ethylhexyl)phthalate. Calculations have also been revised accordingly. In addition, Table I-5.4-14 has been revised to present the correct HQ for mercury.

*n/a = Not applicable.