Response to the Notice of Disapproval for the Investigation Report for Potrillo and Fence Canyons Los Alamos National Laboratory, EPA ID No. NM0890010515, HWB-LANL-10-101, Dated February 24, 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.

GENERAL COMMENTS

NMED Comment

1. *Dioxins/furans were not included in the analytical suites for sediment samples collected at Potrillo and Fence Canyons. Due to the nature of activities conducted at technical area (TA)-15 and TA-36 (e.g., the detonation of open-air explosives and historical use of burn pits at TA-36), chemical releases of dioxins/furans are likely to have occurred. The lack of data on concentrations of dioxins/furans at reaches sampled within Potrillo and Fence Canyons constitutes a data gap in defining the nature and extent of contamination, and for completing the associated human and ecological risk assessments. As such, one of the objectives of this investigation should be to determine if dioxins/furans have migrated into Potrillo and Fence Canyons. NMED notes that the Permittees followed the approved South Canyons Investigation Plan (2006). The Permittees have proposed to collect samples for dioxin/furan analyses in the Investigation Work Plan for Potrillo and Fence Canyons Aggregate Area, Revision 1(IR), July 2009. If the results of investigations indicate releases of dioxins/furans from the solid waste management units (SWMUs) and areas of concern (AOCs) included in the Potrillo and Fence Canyons Aggregate Area, NMED may require additional investigations to determine if dioxins/furans have migrated off-site into the canyons.*

LANL Response

1. The fieldwork for the Potrillo and Fence Canyons Aggregate Area investigation has been completed, and the analytical data are being evaluated. The results will be presented in the aggregate area investigation report, which is due to NMED by May 15, 2011. The Laboratory agrees these results should be evaluated to determine if additional investigation of dioxins and furans should be conducted in Potrillo and Fence Canyons. No revision to the investigation report is necessary.

NMED Comment

2. *The Permittees did not provide any figures in the IR that depict detected concentrations in individual canyon reaches. Tables with maximum detected concentrations within each reach are provided, but no figures were provided. It is difficult to review the report without the information on spatial distribution of chemicals of potential concern (COPCs) in each reach. Provide a figure for each investigated canyon reach depicting sampling locations and detected concentrations above background values to evaluate the spatial distribution of COPCs.*

LANL Response

2. Unlike aggregate area investigation reports, canyons investigation reports have not included maps displaying chemical of potential concern (COPC) concentrations for each reach but instead have included figures in appendixes showing COPC concentrations versus distance from the Rio Grande to help evaluate the spatial distribution of COPCs (Appendix D, pp. D-3–D-24, of the Potrillo and Fence Canyons investigation report). The reason the two types of reports differ is that the aggregate area reports primarily focus on site characterization and defining extent at solid waste management units (SWMUs) and areas of concern (AOCs), while the canyons reports primarily focus on downcanyon transport of contaminants. These figures emphasize overall contaminant trends in the watershed and are consistent with the approach for characterizing contamination at key locations: investigation reaches at NMED-approved locations specified in the investigation work plans. All previous NMED-approved canyons investigation reports have provided the same type of contaminant trend information, and the Laboratory believes that the Appendix D figures are adequate and sufficient to allow the spatial distribution of contaminants to be evaluated. In addition, because of the short turnaround-time specified in the notice of disapproval, the Laboratory would not have had sufficient time to prepare the figures NMED requested. No revision to the investigation report was made. For future reports, the Laboratory could include more information on spatial variations in COPC concentrations within reaches if this would be of help to NMED in its reviews.

NMED Comment

3. Data are reported in a manner that makes it difficult to determine if the results were not reported in the tables because no analyses were conducted, or because the detected values were below background values or method detection limits. For example, Table 6.2-2 indicates that triamino-trinitrobenzene (TATB) was detected in two reaches (FS-1 and F-2). The approved work plan required analyses of other high explosives (HE) such as 2,4,6-trinitrotoluene, nitrobenzene, 2,4/2,6-dinitrobenzene, 1,3,5-trinitrobenzene, HMX, RDX, and tetryl. It is not clear from the table if HE other than TATB were included in the analyses but were not reported, perhaps because they were not detected. Method 8321A, can be modified for analysis of some explosives; however, the list of constituents for which the method is applicable does not contain the HE discussed in the report or other commonly expected explosives. Clarify what explosive compounds Method 8321A modified is capable of detecting in the analysis of the sediment samples. Also clarify whether there are data gap(s) with respect to explosives potentially present in sediments. Include a "Samples Collected and Analysis Requested" table in the revised report.

LANL Response

3. All samples were analyzed for the full analytical suite specified in Table 4.1-2 of the NMED-approved South Canyons Investigation Work Plan (LANL 2006, 093713), and as in other reports, if an organic chemical was not detected it was not presented in the data tables in the main body of the report. The tables in section 6 present maximum results for COPCs identified in each reach and are consistent with presentations in previous NMED-approved canyons investigation reports (LANL 2004, 087390; LANL 2006, 094161; LANL 2009, 106939; LANL 2009, 107416; LANL 2009, 107497) and in the Sandia Canyon investigation report (LANL 2009, 107453) that is pending revision following the collection of additional data (NMED 2010, 108683). All samples were analyzed for a full suite of explosive-compound analytes as specified by the analytical method (modified Method 8321A), the analytical laboratory statement of work (LANL 2008, 109962), and Table III-1 of the Compliance Order on Consent (the Consent Order). Appendix C presents the complete set of analytical data for these samples, documenting nondetects for explosive compounds such as 2,4,6-trinitrotoluene;

nitrobenzene; 2,4- and 2,6-dinitrobenzene; 1,3,5-trinitrobenzene; HMX (octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine); RDX (hexahydro-1,3,5-trinitro-1,3,5-triazine); and tetryl. In addition, Table C-2.0-1 in Attachment C-1 of the investigation report presents "Samples Collected and Analyses Performed for Sediment from Potrillo and Fence Canyons." No revision to the investigation report is necessary.

SPECIFIC COMMENTS

NMED Comment

4. Section 3.1, Sediment Investigations, page 5:

Permittees Statement*: The sediment investigations presented in this report focused on characterizing the nature, extent, and concentrations of COPCs in post-1942 sediment deposits in a series of reaches in the Potrillo and Fence watershed.*

NMED Comment: *The Permittees were directed to perform sampling of pre-1942 sediments to determine potential contaminant transport pathways in NMED 's* Approval with Modifications South Canyons Investigation Work Plan*, dated March 28, 2007. Provide a justification for not following the modification as specified in the Comment # 3 of the above mentioned letter.*

LANL Response

4. Some sampling of pre-1943 sediment occurred during this investigation, although sampling was focused on post-1942 sediment, as stated in the report. The text has been revised to clarify with the addition of references to pre-1943 sediment. In previous canyons investigations, the possibility of contaminant migration into pre-1943 sediment has been addressed by sampling deeper layers after the areas of highest contamination, and key contaminants were identified in the initial investigation. However, because of the low levels of contamination in Potrillo and Fence Canyons sediment and the limited surface water available for infiltration, the Laboratory does not believe additional sampling of deeper layers is warranted.

NMED Comment

5. Section 5.4, Stormwater Comparison values, page 9:

A typographical error appears to be present in the list of sources used for the stormwater comparison values. The bulleted list indicates that values from Sections 20.6.4 and 20.4.6 of the New Mexico Administrative Code (NMAC) were used for stormwater comparison values. Values from the NMAC Title 20, Chapter 6, Part 4 (Standards for Intrastate and Interstate Surface Waters) are used as stormwater comparison values. Revise the list of sources as appropriate.

LANL Response

5. The New Mexico Administrative Code (NMAC) citation in the report was incorrect, but the correct comparison values from NMAC 20.6.4 were used. The text has been revised to correct this typographical error.

NMED Comment

6. Section 6.2.1, Identification of Sediment COPCs, page 10:

This section explains that inorganics with nondetected results (and corresponding method detection limits) greater than their corresponding background values (BVs) are identified as COPCs. While some of the nondetected results are greater than their corresponding BVs were identified as COPCs in sediment at Portrillo and Fence Canyons, Tables 8.1-1 and 8.2-1 indicate that at many reaches, antimony, cadmium, and selenium were not identified as COPCs, despite having nondetected results greater than their corresponding BVs. The occasional inclusion or exclusion of COPCs with nondetected results greater than BVs is inconsistent. It is acknowledged that the results are non-detects, and detection limits of antimony, cadmium, and selenium are well below the residential soil screening levels. However, some of the detection limits are greater than the minimum ecological screening levels and would have been included on Table 8.1-1. The risk assessment should be consistent in its inclusion of COPCs with detection limits greater than BVs.

LANL Response

6. The approach of evaluating all reported values for inorganic chemicals in canyons contamination COPC identification (section 6) and only the maximum detected concentrations in each reach in the risk assessment (section 8) is conservative in that exposures likely occur at the reach scale or larger and the maximum detected concentration is likely an overestimate. The process is also conservative in that inorganic chemicals may be identified as COPCs based on detection limits greater than background values (BVs). It is also not reasonable to treat nondetects in the same manner as detected values in the risk assessment, and to do so would be inconsistent with how data are treated statistically for other purposes: for example, U.S. Environmental Protection Agency (EPA) guidance for calculating upper confidence levels on mean concentrations does not treat nondetects the same as detects. This approach is also consistent with the approach followed in previous canyons investigation reports (LANL 2004, 087390; LANL 2005, 091818; LANL 2006, 094161; LANL 2009, 106939; LANL 2009, 107453; LANL 2009, 107416; LANL 2009, 107497) and biota investigation work plans (LANL 2005, 089308; LANL 2006, 093553; LANL 2007, 099152).

   The Laboratory has added clarifying text to sections 8.1.4 and 8.2.2 to indicate that although antimony is a COPC based on elevated detection limits, none of the detected antimony sampling results require further evaluation in section 8 (all detected concentrations are less than the BV). Cadmium and selenium are included in the risk assessments in some, but not all, investigation reaches based on detected results above BVs (Tables 8.1-1 and 8.2-1).

NMED Comment

7. Section 7.1.1, Inorganic chemicals in Sediments, page 13:

Permittees Statement*: Four inorganic chemicals detected in sediment samples are important for assessing potential ecological risk, as discussed in section 8.1: cadmium, copper, selenium, and vanadium.*

NMED Comment: *In addition to the four chemicals mentioned in the above statement**,** lead, manganese, and zinc were also detected above their respective sediment background and ecological screening values (See Table 6.2-1). Provide an explanation as to why lead, manganese, and zinc were not considered important for assessing potential ecological risk or include the analytes in the assessment of ecological risk.*

LANL Response

7. Lead, manganese, and zinc were not considered important for assessing potential ecological risk because each had a hazard quotient (HQ) less than 3. An HQ greater than 3 represents levels that may impact receptors and is therefore appropriate for determining which COPECs should be included in site-specific biota studies. The use of an HQ greater than 3 as a threshold for evaluating potential ecological risk is based on a paper by Dourson and Stara (1983, 073474). Figure 4 (middle panel) of that paper shows that the most common ratio (the geometric mean) between the chronic lowest adverse observed effect level (LOAEL) and the chronic no observed adverse effect level (NOAEL) is 3. Therefore, to interpret an HQ based on a chronic NOAEL-based ESL, an HQ less than 3 is probably between the chronic NOAEL and chronic LOAEL, and an HQ of greater than 3 represents a reasonable threshold for identifying potential study design chemicals of potential concern (COPECs). An exception is for receptors that are threatened and endangered (T&E) species, and a threshold HQ greater than 1 was used for T&E receptors (kestrel with a flesh diet in the case of the Potrillo and Fence watershed). Text has been added to section 7.1.1 to clarify that only potential study design COPECs are discussed with regard to contaminant trends in sediment.

   Previous canyons reports and plans provide the rationale for using the HQ greater than 3 threshold for study design COPECs. The Los Alamos and Pueblo Canyons investigation report states,

   > COPECs for study design were selected during meetings between Laboratory, NMED, and DOE [Department of Energy] personnel; selection criteria included the spatial distribution of COPECs and the magnitude of the HQ values (HQ >5). Analytes with HQ values less than 1 were not considered to be COPECs. COPECs with HQ values between 1 and 5, based on the maximum watershed concentrations, did not warrant special biological studies because maxima are overly protective compared with central tendency values, which are more representative of actual exposure levels (Katzman 2002, 73667). (LANL 2004, 087390, pp. 8-1–8-2)

   The Los Alamos and Pueblo Canyons investigation report also states, “The upper-end HQ range of 3 was selected to represent the typical ratio between the NOAEL and lowest observed adverse effect level (LOAEL) (Dourson and Stara 1983, 73474) and is a slightly more inclusive selection criterion than the HQ >5 threshold originally used for the study design COPECs.” (LANL 2004, 087390, p. 8-2)

   The Mortandad Canyon biota investigation work plan states,

   > To determine whether areas of the canyon may pose a potential risk to ecological receptors, and therefore what areas should be included within the scope of the proposed biota investigation, the criterion of an HQ greater than 3 was used. An HQ greater than 3 represents levels that may impact receptors and is therefore appropriate for determining which COPECs should be included in site-specific biota studies in the Mortandad Canyon watershed. This criterion is based on the geometric mean of the ratio between the NOAEL and the lowest observed adverse effect level (LOAEL) (Dourson and Stara 1983, 73474). Concentrations corresponding to LOAELs represent levels where impacts to individuals or populations may occur, which makes those levels more appropriate criteria for determining which COPECs should be included in site-specific biota analyses to assess if impacts to ecological receptors have actually occurred. The same criterion of an HQ greater than 3 was used to refine the list of COPECs for the baseline studies conducted in Los Alamos Canyon and Pueblo Canyon. (LANL 2005, 089308, p. D-1)

NMED Comment

8. Section 7.1.1, Inorganic chemicals in Sediments, page 14:

***Permittees Statement**: Cadmium is an important COPC for evaluating potential ecological risk in Potrillo and Fence Canyons and has maximum detected concentrations exceeding the sediment BV of 0.4 mg/kg in three investigation reaches (PO-1, PO-2, and PO-3; Table 6.2-1).*

Selenium is an important COPC for evaluating potential ecological risk in Potrillo and Fence Canyons and has maximum detected concentrations exceeding the sediment BV of 0.3 mg/kg in five investigation reaches (PO-2, PO-3, PO-4, F-1, FS-1; Table 6.2-1).

***NMED Comment:** According to the Table 6.2-1, cadmium was detected in two investigation reaches (PO-2 and PO-3) above the background values. The detection limits for cadmium were above the sediment background value in the rest of the seven reaches investigated. The Permittees must resolve the discrepancy and revise the text accordingly.*

According to Table 6.2-1, selenium was detected above sediment background values in two reaches (PO-2 and PO-3). The detection limits for selenium were above the sediment background value in the rest of the seven reaches. Resolve the discrepancy and revise the text accordingly.

LANL Response

8. In Table 6.2-1, the maximum concentration is presented whether it was detected or not. In some cases the maximum nondetect result is greater than the maximum detected result. For example, in reach PO-1, the maximum cadmium nondetect is 0.473 mg/kg (presented in Table 6.2-1), and the maximum detect is 0.424 mg/kg (used to calculate the HQs presented in Tables 8.1-1 and 8.2-1). Both these sampling results are greater than the BV of 0.4 mg/kg. The statements made for selenium are also correct. To improve the clarity of the data presentation, notes have been added to Table 6.2-1 to indicate where detected concentrations of inorganic chemicals are greater than the BV but are not presented because they are less than the maximum nondetected result.

NMED Comment

9. Section 8.1.4, Results of the Screening Comparison for Soil, and Tables 8.1-1, 8.1-2, 8.1-3, pages 23 and 64-67:

The rationale for utilizing a hazard quotient (HQ) of 3.0 as a criterion to determine whether COPCs should be retained for further evaluation in the screening level ecological risk assessment is unclear and not justified. Los Alamos National Laboratory's (LANL's) (2004) Screening Level Ecological Risk Assessment Methods Revision 2 states that an HQ of 0.3 should be used as a criterion for determining ecological COPCs. In addition, NMED's (2008) Guidance for Screening Level Ecological Risk Assessments states that an HQ of 0.3 for individual chemicals or a hazard index of one should be used for determining whether ecological COPCs should be evaluated further in the ecological risk assessment. It is acknowledged that previous assessments where site-specific biota studies were conducted, such as Los Alamos and Pueblo Canyons (LANL 2004, 087390, p. 8-2); Mortandad Canyon (LANL 2006, 094161, p. 96); Pajarito Canyon (LANL 2009, 106939, p. 64); and Sandia Canyon (LANL 2009, 107453, p. 77) utilized a HQ of 3.0 for determining ecological COPCs. Since a site-specific biota study has not been conducted at Potrillo and Fence Canyons, such an approach is not appropriate here. Revise the ecological risk assessment to be consistent with guidance and use

hazard index (HI) of one (1) as the threshold value for determining whether ecological COPCs should be further evaluated in the ecological risk assessment.

LANL Response

9. Use of an HQ greater than 3 instead of an HQ greater than 1 is justified for several reasons. For example, this approach evaluates the maximum detected concentrations, which are conservative estimates of exposure for evaluating risk to ecological populations or to sensitive species with large home ranges, most of which are outside the area of contamination. In addition, the HQs are based on NOAEL information for the COPECs. Because NMED recommended in Comment 10 a "bounding" analysis of LOAELs, it is reasonable to manage the potential for ecological risks at a lowest observed effect level in contrast to a no effect level. The Laboratory notes that LOAEL-based ESLs are always greater than NOAEL-based ESLs, which are the default ecological screening values and the ones used in this report to identify potential study design COPECs. The response to Comment 7 details the logic for selecting an HQ greater than 3 based on the ratio of the chronic LOAEL to chronic NOAEL reported by Dourson and Stara (1983, 073474). Therefore, it is highly unlikely that using a threshold of HQ greater than 3 based on the maximum concentrations would ignore COPECs that present potential ecological risks based on realistic population area use factors, lowest effect levels, and the 95% upper confidence level of the mean concentration. For consistency with previous NMED-approved canyons investigation reports and biota plans, the HQ greater than 3 threshold for non-T&E species and the HQ greater than 1 threshold for T&E species were used in Potrillo and Fence Canyons. This includes the NMED-approved North Canyons Investigation Report, Revision 1 (LANL 2009, 107416; NMED 2009, 108120) and the NMED-approved Cañada del Buey Investigation Report, Revision 1 (LANL 2009, 107497; NMED 2009, 108111). No biota studies were conducted in those watersheds, and the need to conduct such studies was evaluated in the same manner as presented for Potrillo and Fence Canyons. This approach also has the advantage of being simple to implement and transparent to review. Therefore, no changes to the approach presented in this report are warranted.

NMED Comment

10. Section 8.1.4, Evaluation of Potrillo and Fence Canyons COPEC Concentrations for Biota Studies, page24:

Concentrations of ecological COPCs were compared with concentrations of COPCs from previous biota studies in other canyons at LANL where associated effects information indicated no unacceptable ecological risks. While this comparison may potentially provide relevant information for Potrillo and Fence Canyons, it should not take the place of a site-specific biota study or a refined ecological risk assessment using the methods outlined in LANL (2004) and NMED (2008). Refinement of the ecological risk assessment may include the use of area use factors, population area use factors, and/or use of lowest-observed adverse effect levels (LOAELs). Comparisons with previous biota studies at other LANL sites could be included as additional evidence in a weight of evidence analysis, for example, at Potrillo and Fence Canyons. Revise the ecological risk assessment to incorporate above suggestions.

LANL Response

10. Site-specific biota studies are warranted only when an evaluation of existing data, including that obtained from other biota studies, indicates that adverse ecological risks may exist from the concentrations of COPECs present at a site. As stated in the Laboratory's response to Comment 9,

the approach used by the Laboratory to evaluate the potential need for site-specific biota studies in Potrillo and Fence Canyons is consistent with the NMED-approved ecological risk evaluations in the North Canyons Investigation Report, Revision 1 (LANL 2009, 107416; NMED 2009, 108120) and the Cañada del Buey Investigation Report, Revision 1 (LANL 2009, 107497; NMED 2009, 108111). The only difference is that Potrillo and Fence Canyons have fewer COPECs and generally lower concentrations than those evaluated in the North Canyons and Cañada del Buey. The approach is to use the field and laboratory study results and the COPEC concentrations measured in other watersheds to determine if Potrillo and Fence Canyons have COPECs at concentrations not previously studied for ecological risks. Because COPECs and concentrations in Potrillo and Fence Canyons are not different from what has been measured and investigated in other canyons, no potential ecological risks are present and no additional studies are warranted. No revisions to the ecological risk assessment are necessary.

NMED Comment

11. Tables 6.2-2, Organic Chemicals in Potrillo and Fence Canyon Sediment Samples, page 57:

The residential soil screening level (SSL) for tert-butylbenzene is taken from USEPA (2007) Region 6 as indicated in the footnote. The USEPA (2007) Region 6 SSL tables are outdated and have been replaced by the Regional Screening Levels (RSLs). It is noted that use of the Region 6 SSL for tert-butylbenzene noted in Tables 6.2-2 and 8.2-1 does not change the overall conclusion of the assessment. No revision is necessary, but take care that the most current screening levels are applied in future risk assessments.

LANL Response

11. The EPA regional tables no longer contain any soil screening levels (SSLs) for tert-butylbenzene, and more recent SSLs do not exist. Therefore, the Laboratory used the SSL previously provided by EPA Region 6 in 2007 to avoid the use of a surrogate for screening purposes. No revision to the investigation report is necessary.

NMED Comment

12. Tables 8.1-3, HQs based on Maximum Detected Concentrations of Organic COPCs in Potrillo and Fence Canyon Sediment Samples and Soil ESLs, page 66:

The LANL (2010) ECORISK (v2.5) database indicates that Ecological Screening Levels (ESLs) for the American kestrel (top carnivore) are available for benzo(a)anthracene (64 mg/kg) and pyrene (460 mg/kg). However, ESLs for these compounds are not listed on Table 8.1-3 for the American kestrel. Revise Table 8.1-3 accordingly.

LANL Response

12. The ESLs for benzo(a)anthracene (64 mg/kg) and pyrene (460 mg/kg) have been added to Table 8.1-3. However, no text or conclusions in the report were affected by this omission.

NMED Comment

13. Tables 8.1-9, Summary of Potrillo and Fence Canyons Soil COPECs Unbounded by Previous Canyons Biota Investigations, page 70:

Average concentrations of di-n-butylphthalate in reaches F-1 and FS-1 were compared to ESLs and to concentrations of di-n-butylphthalate evaluated in previous biota studies. The use of average values as exposure point concentrations for comparisons with screening levels is not an acceptable method for risk assessments and is inconsistent with both NMED and LANL guidance. Because there are insufficient numbers of detections of di-n-butylphthalate to calculate exposure point concentrations, the maximum detected concentration should be used as exposure point concentration. Discussion using an average concentration may be used in the uncertainty analysis; however, refinement of an ecological risk assessment should follow guidance and include the use of area use factors, population area use factors, and/or LOAELs. Revise the ecological risk assessment accordingly.

LANL Response

13. Table 8.1-9 does not present the average concentration in the investigation reaches as an exposure point concentration to characterize risks or to refine the ecological risk assessment. Instead, the average is presented as one line of information to evaluate the need for site-specific biota studies. Potential risks to ecological receptors from COPECs have been characterized based on the maximum concentrations. The evaluation of COPECs in this report, including those unbounded by previous biota studies, is consistent with evaluations in previous NMED-approved investigation reports. Tables with content similar to Table 8.1-9 were included in the NMED-approved North Canyons Investigation Report, Revision 1 (LANL 2009, 107416; NMED 2009, 108120) and the NMED-approved Cañada del Buey Investigation Report, Revision 1 (LANL 2009, 107497; NMED 2009, 108111). In the Potrillo and Fence Canyons summary table of unbounded COPECs (Table 8.1-9), a LOAEL evaluation of di-n-butylphthalate was also included to support the evaluation. To improve the transparency of this evaluation and to clarify the potential for population impacts or impacts on broad-ranging species, additional information on the home range and population area of the representative bird species has been added to section 8.1.5.

NMED Comment

14. Table F-2, Stormwater Comparison Values, page F-4:

The human health persistent stormwater comparison value for thallium (6.3 µg/L) presented on Table F-2 is inconsistent with the surface water standard (0.47 µg/L) listed in 20.6.4.900 (J) NMAC presented on the following website: http://www.nmcpr.state.nm.us/nmac/parts/title20/20.006.0004.htm. The Permittees must resolve this inconsistency and update Table F-2 to include the correct stormwater comparison value for thallium. Determine if the detected concentrations of thallium in stormwater at Potrillo and Fence Canyons exceed the surface water standard of 0.47 µg/L.

LANL Response

14. The version of 20.6.4.900 (J) NMAC that was current when the December 2010 report was prepared listed 6.3 µg/L as the value for thallium. The thallium value was subsequently changed to 0.47 µg/L, effective January 14, 2011, following a triennial review (NMED Surface Water Quality Bureau website, http://www.nmenv.state.nm.us/swqb/Standards/). The stormwater comparison value for dissolved thallium in Table F-2 has been revised to 0.47 µg/L, as requested by NMED. This revision does not affect the text or conclusions in the report.

REFERENCES

Dourson, M.L., and J.F. Stara, 1983. "Regulatory History and Experimental Support of Uncertainty (Safety) Factors," *Regulatory Toxicology and Pharmacology,* Vol. 3, pp. 224–238. (Dourson and Stara 1983, 073474)

LANL (Los Alamos National Laboratory), April 2004. "Los Alamos and Pueblo Canyons Investigation Report," Los Alamos National Laboratory document LA-UR-04-2714, Los Alamos, New Mexico. (LANL 2004, 087390)

LANL (Los Alamos National Laboratory), May 2005. "Mortandad Canyon Biota Investigation Work Plan," Los Alamos National Laboratory document LA-UR-05-2231, Los Alamos, New Mexico. (LANL 2005, 089308)

LANL (Los Alamos National Laboratory), December 2005. "Los Alamos and Pueblo Canyons Supplemental Investigation Report," Los Alamos National Laboratory document LA-UR-05-9230, Los Alamos, New Mexico. (LANL 2005, 091818)

LANL (Los Alamos National Laboratory), July 2006. "Pajarito Canyon Biota Investigation Work Plan," Los Alamos National Laboratory document LA-UR-06-4106, Los Alamos, New Mexico. (LANL 2006, 093553)

LANL (Los Alamos National Laboratory), September 2006. "South Canyons Investigation Work Plan," Los Alamos National Laboratory document LA-UR-06-5979, Los Alamos, New Mexico. (LANL 2006, 093713)

LANL (Los Alamos National Laboratory), October 2006. "Mortandad Canyon Investigation Report," Los Alamos National Laboratory document LA-UR-06-6752, Los Alamos, New Mexico. (LANL 2006, 094161)

LANL (Los Alamos National Laboratory), September 2007. "Sandia Canyon Biota Investigation Work Plan," Los Alamos National Laboratory document LA-UR-07-6077, Los Alamos, New Mexico. (LANL 2007, 099152)

LANL (Los Alamos National Laboratory), June 30, 2008. "Exhibit "D" Scope of Work and Technical Specifications, Analytical Laboratory Services for General Inorganic, Organic, Radiochemical, Asbestos, Low-Level Tritium, Particle Analysis, Bioassay, Dissolved Organic Carbon Fractionation, and PCB Congeners," Los Alamos National Laboratory document RFP No. 63639-RFP-08, Los Alamos, New Mexico. (LANL 2008, 109962)

LANL (Los Alamos National Laboratory), August 2009. "Pajarito Canyon Investigation Report, Revision 1," Los Alamos National Laboratory document LA-UR-09-4670, Los Alamos, New Mexico. (LANL 2009, 106939)

LANL (Los Alamos National Laboratory), October 2009. "North Canyons Investigation Report, Revision 1," Los Alamos National Laboratory document LA-UR-09-6794, Los Alamos, New Mexico. (LANL 2009, 107416)

LANL (Los Alamos National Laboratory), October 2009. "Investigation Report for Sandia Canyon," Los Alamos National Laboratory document LA-UR-09-6450, Los Alamos, New Mexico. (LANL 2009, 107453)

LANL (Los Alamos National Laboratory), November 2009. “Cañada del Buey Investigation Report, Revision 1,” Los Alamos National Laboratory document LA-UR-09-7317, Los Alamos, New Mexico. (LANL 2009, 107497)

NMED (New Mexico Environment Department), May 11, 2005. “Approval as Modified, Los Alamos and Pueblo Canyons Investigation Report,” New Mexico Environment Department letter to D. Gregory (DOE-LASO) and G.P. Nanos (LANL Director) from J.P. Bearzi (NMED-HWB), Santa Fe, New Mexico. (NMED 2005, 088756)

NMED (New Mexico Environment Department), February 23, 2007. “Approval with Direction, Mortandad Canyon Investigation Report,” 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 2007, 095109)

NMED (New Mexico Environment Department), November 3, 2009. “Notice of Approval, Pajarito Canyon Investigation Report, Revision 1,” New Mexico Environment Department letter to D. Gregory (DOE-LASO) and D. McInroy (LANL) from J.P. Bearzi (NMED-HWB), Santa Fe, New Mexico. (NMED 2009, 107367)

NMED (New Mexico Environment Department), November 13, 2009. “Notice of Approval, North Canyons Investigation Report, Revision 1,” New Mexico Environment Department letter to D. Gregory (DOE-LASO) and D. McInroy (LANL) from J.P. Bearzi (NMED-HWB), Santa Fe, New Mexico. (NMED 2009, 108120)

NMED (New Mexico Environment Department), November 24, 2009. “Notice of Approval, Cañada del Buey Investigation Report, Revision 1,” New Mexico Environment Department letter to D. Gregory (DOE-LASO) and D. McInroy (LANL) from J.P. Bearzi (NMED-HWB), Santa Fe, New Mexico. (NMED 2009, 108111)

NMED (New Mexico Environment Department), February 9, 2010. “Approval with Modification, Investigation Report for Sandia Canyon,” New Mexico Environment Department letter to G.J. Rael (DOE-LASO) and M. Graham (LANL) from J.P. Bearzi (NMED-HWB), Santa Fe, New Mexico. (NMED 2010, 108683)

Cross-Reference of NMED NOD Comments and Revisions to Investigation Report for Potrillo and Fence Canyons, Revision 1

NMED NOD Comment No.	Summary of NOD Comment Requirement	Section(s)/Page(s) in Original Report	Section(s)/Page(s) in Revised Report	Nature of Revision
1	Additional investigations may be required to determine if dioxins or furans have migrated off-site into the canyons based on the results of the Potrillo and Fence Canyons Aggregate Area investigations.	n/a*	n/a	No revision to the investigation report is required.
2	Provide a figure for each investigated canyon reach depicting sampling locations and detected concentrations above background values (BVs) to evaluate the spatial distribution of chemicals of potential concern (COPCs).	Appendix D	n/a	No revision to the investigation report is required. Figures displaying the spatial distribution of COPCs in the watershed were included in Appendix D, as is consistent with previous New Mexico Environment Department– (NMED-) approved canyons investigation reports.
3	Clarify what explosive compounds modified Method 8321A is capable of detecting in the analysis of the sediment samples and whether data gap(s) exist with respect to explosives potentially present in sediments. Include a “Samples Collected and Analysis Requested” table in the revised report.	Section 6	n/a	No data gaps exist, and no revision to the investigation report is required. Data on all explosive-compound analyses required by the Compliance Order on Consent (Consent Order) and a “Samples Collected and Analyses Performed” table were provided in Appendix C.
4	Perform sampling of pre-1942 sediments to determine potential contaminant transport pathways discussed in NMED’s approval with modifications for the South Canyons investigation work plan, dated March 28, 2007.	Section 3.1, p. 5	Section 3.1, p. 6; section 4.1, p. 7; Appendix B, p. B-1	Some sampling of pre-1943 sediment occurred in this investigation, although sampling was focused on post-1942 sediment as stated in the report. The text has been revised to clarify this by adding reference to pre-1943 sediment.
5	Correct the typographical error in the list of sources used for the stormwater comparison values.	Section 5.4, p. 9	Section 5.4, p. 9	The citation to the New Mexico Administrative Code (NMAC) has been corrected.

NMED NOD Comment No.	Summary of NOD Comment Requirement	Section(s)/Page(s) in Original Report	Section(s)/Page(s) in Revised Report	Nature of Revision
6	Include COPCs with detection limits greater than BVs consistently in the risk assessment.	Section 6.2.1, p. 10	Section 8.1.4, p. 24; section 8.2.2, p. 29	Text has been added to clarify that the risk assessments are based on the maximum detected concentrations and that one COPC (antimony) has no detected concentrations greater than BV and is not evaluated in section 8.
7	Explain why lead, manganese, and zinc were not considered important for assessing potential ecological risk or include the analytes in the assessment of ecological risk.	Section 7.1.1, p. 13, and Table 6.2-1, p. 56	Section 7.1.1, p. 13	Text has been added to clarify that only potential study design chemicals of potential ecological concern (COPECs) are discussed in section 7.1.
8	Address apparent discrepancies between text discussing cadmium and selenium detections and Table 6.2-1.	Section 7.1.1, p. 14, and Table 6.2-1, p. 56	Table 6.2-1, p. 58	Notes have been added to Table 6.2-1 to clarify that in some cases the maximum concentration is a nondetect, and some detected concentrations are less than this value but greater than the BV. No revision to the text is warranted.
9	Revise the ecological risk assessment to be consistent with guidance and use hazard index of 1 as the threshold value for determining whether ecological COPCs should be further evaluated in the ecological risk assessment.	Section 8.1.4	n/a	No revision was made because the approach is consistent with NMED-approved biota investigation work plans and is also consistent with the NMED-approved investigation reports for the North Canyons and Cañada del Buey.
10	Revise the ecological risk assessment to incorporate the following suggestions: (1) include the use of area use factors, population area use factors, and/or use of lowest-observed adverse effect levels (LOAELs) and (2) include comparisons with previous biota studies at other sites as additional evidence in a weight of evidence analysis, for example, at Potrillo and Fence Canyons.	Section 8.1.4	n/a	The text has not been revised because the approach used is consistent with the NMED-approved investigation reports prepared for the North Canyons and Cañada del Buey.

NMED NOD Comment No.	Summary of NOD Comment Requirement	Section(s)/Page(s) in Original Report	Section(s)/Page(s) in Revised Report	Nature of Revision
11	Ensure the most current screening levels are applied in future risk assessments.	Table 6.2-2	n/a	No revision is needed, but it should be noted that in some cases outdated sources are used for screening values because more recent values do not exist.
12	Include the ecological screening levels (ESLs) for the American kestrel (top carnivore) for benzo(a)anthracene (64 mg/kg) and pyrene (460 mg/kg).	Table 8.1-3, p. 66	Table 8.1-3, pp. 68–69	ESLs for benzo(a)anthracene and pyrene were added to the table.
13	Include the use of area use factors, population area use factors, and/or LOAELs in the ecological risk assessment and revise the assessment accordingly.	Table 8.1-9, p. 70	Section 8.1.5, p. 27	Additional information on the home range and population area of the representative bird species has been added to the investigation report.
14	Resolve the inconsistency in the surface water standard (0.47 µg/L) listed in 20.6.4.900 (J) NMAC and update Table F-2 to include the correct stormwater comparison value for thallium.	Table F-2, p. F-4	Table F-2, p. F-4	The dissolved thallium comparison value has been changed from 6.3 µg/L to 0.47 µg/L.
n/a	n/a	Table E-2.0-1, Attachment 1	Table E-2.0-1, Attachment 1	Table E-2.0-1 was revised to correct several errors found during review, and the revised table is included in Attachment 1 of the revised report.

*n/a = Not applicable.