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CERTIFIED MAIL - RETURN RECEIPT REQUESTED

April 14, 2015

Christine Gelles, Acting Assistant Manager
 U.S. Department of Energy
 National Nuclear Security Administration
 Los Alamos Field Office
 3747 West Jemez Rd, MS A316
 Los Alamos, NM 87544

Michael T. Brandt, Associate Director
 Environment, Safety, and Health
 Los Alamos National Laboratory
 P.O. Box 1663, MS M991
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**RE: DISAPPROVAL
 SUPPLEMENTAL INVESTIGATION REPORT
 UPPER SANDIA CANYON AGGREGATE AREA
 LOS ALAMOS NATIONAL LABORATORY
 EPA ID #NM0890010515
 HWB-LANL-13-042**

Dear Ms. Gelles and Mr. Brandt:

The New Mexico Environment Department (NMED) has received the United States Department of Energy (DOE) and the Los Alamos National Security, LLC (LANS) (collectively, the Permittees) *Supplemental Investigation Report for Upper Sandia Canyon Aggregate Area (SIR)*, dated August, 2013 and referenced by LA-UR-13-26024/EP2013-0128. NMED has reviewed the SIR and issues this Disapproval with the following comments.

GENERAL COMMENTS:

1. Many of the sites evaluated at Upper Sandia Canyon Aggregate Area (for example, Solid Waste Management Units [SWMUs] 03-014(k,l,m,n), 03-045(a), 03-015, 03-052(f), 03-047(g), 03-051(c), 61-002, and Area of Concern [AOC] 03-053) contained concentrations of polycyclic aromatic hydrocarbons (PAHs) in soil that resulted in calculated human health risks being greater than the NMED target risk level of $1E^{-5}$ for the industrial and/or residential land use scenarios. Total petroleum hydrocarbon (TPH) contamination is also present at many of these sites and as such, there is not sufficient evidence to conclude that PAH concentrations are solely related to asphalt paving and/or laboratory

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infrastructure. If the PAH concentrations in soils within the Upper Sandia Canyon Aggregate Area are indeed related to laboratory infrastructure, then the Permittees may propose to develop site-specific background comparison values for PAHs in soil where sources of PAHs have not been identified. If there are anthropogenic levels of PAHs at some of the Los Alamos National Laboratory (LANL) sites where the history does not indicate a specific source of PAHs, then site-specific background comparison values may be proposed in order to determine the extent of site related contamination versus ambient levels of PAHs at that site. In lieu of establishing background levels, justification must be provided on a site-by-site basis to demonstrate the PAHs are not present as a result of past LANL activities. Evidence could include, but is not limited to, a discussion of past activities/operations and photographs showing site use and also showing how storm water run off/run on could occur. If it is determined that sufficient lines of evidence are provided to demonstrate that the PAHs are not attributed to LANL, the risks from the PAHs must still be evaluated and included in the uncertainty section of the risk assessment.

It should be noted that even if an off-site source of PAHs is identified, cleanup may still be necessary, in which case it would be the Permittees decision whether or not to seek financial relief from the responsible party that the Permittees identifies as the source of the contamination. If a responsible party cannot be identified then it is the Permittees' responsibility to achieve the applicable cleanup levels.

2. For the vapor intrusion risk and hazard calculations, it is not clear what criteria were used to determine whether a constituent was considered a volatile organic compound (VOC). NMED (2014) guidance states that a constituent is sufficiently volatile if it has a Henry's Law Constant greater than $1E-5$ atm-m³/mole and an atomic mass less than 200 g/mole. If these criteria are applied, then many VOCs were omitted from the vapor intrusion risk assessment calculations. Clarify the criteria that were used, and revise the assessments to include additional constituents to the vapor intrusion risk assessment calculations in accordance with NMED guidance referenced above.
3. In the provided Johnson and Ettinger spreadsheets, it appears that the toxicity data were not updated prior to the use of the models to calculate risk-based indoor air concentrations and that toxicity data supplied in the 2004 version of the Johnson and Ettinger model were applied. Update the vapor intrusion calculations to utilize current toxicity criteria where applicable.
4. The industrial screening levels for TPH were applied for the construction worker scenario as construction worker TPH screening levels were not available. This is acceptable. However, it is likely that the industrial screening levels underestimate risk to a construction worker especially for the inhalation and dermal pathways. Revise the Report to provide a discussion of uncertainties in the risk assessment (Section I-4.4).

5. An inconsistency in how the site attribution analyses were conducted was noted. If too few samples were collected to conduct a statistical comparison of site data to background, the maximum detected concentration from the site was compared to the range of background detections. However, following NMED guidance (NMED, 2012), if the maximum detected concentration from a site is greater than the background reference value and too few samples and/or positive detections are available to conduct a statistical comparison and additional data are not proposed, then the constituent should be retained as a constituent of potential concern (COPC). Comparison to the range of background is not sufficient grounds alone to eliminate a COPC. Step 3 of the NMED site attribution analysis does allow for additional lines of evidence to support elimination of a constituent as a COPC. Site history is listed as a line of evidence that may be used; however, sufficient site history must be available to justify why the constituent would not be present due to historical activities. Consistent with EPA guidance (US EPA, 1989), if there is historical evidence to suggest that the constituent could be present at the site, then the constituent must be retained as a COPC. NMED has updated its risk assessment guidance (NMED 2014) which includes clarification related to background evaluation. Refer to the updated guidance when reviewing this comment (5). Revise the SIR accordingly.

SPECIFIC COMMENTS:

6. Section 6.4.1.4, Site Contamination, pages 29-30:

The text states that the extent of contamination is defined at SWMU 03-009(a). However, concentrations of several organic chemicals increased with depth at locations 03-608182 and 03-608181. For example, the concentration of benzo(a)pyrene in the samples collected from 0.0-1.0 feet below ground surface (ft bgs) and 1.0-2.0 ft bgs was 0.0557 mg/kg and 0.166 mg/kg, respectively, which is above the NMED residential screening level of 0.148 mg/kg. It was also noted that the only historical sample collected between 2 ft bgs and 9 ft bgs (location 03-22537) may not be representative of current site conditions. While the depth of contamination appears defined at SWMU 03-009(a), contamination appears uncharacterized from 2 to 9 ft bgs. Given that the residential risk already exceeds target levels, additional sampling may reveal an increased risk for the construction worker and ecological receptors. Further sampling is required in order to characterize the extent of contamination and risks and hazards associated with exposure to soil 2-9 ft bgs at SWMU 03-009(a). The Permittees must propose to collect additional samples from 2-9 ft bgs in the Phase II work plan which will be prepared after the SIR is approved.

7. Section 6.4.2.4, Site Contamination, page 32:

According to Table 6.4-5, chromium was detected in 6 tuff samples at SWMU 03-029, rather than 1 soil and 2 tuff samples, as stated in the text. The discussion on nature and extent of chromium on page 34 appears to be based on incorrect reporting of sampling media. Resolve the discrepancy and revise the SIR accordingly.

8. Section 6.5.4.4, Nature and Extent of Contamination, page 46:

While evaluating the nature and extent, the Permittees repeatedly make statements that concentrations were similar across the site and provide a range of concentrations of detected contaminants. However, there was more than an order of magnitude difference between the range of detected concentrations (e.g., detected concentrations of copper ranged from 0.696 mg/kg to 10.2 mg/kg). NMED concurs that no further investigations are warranted at this site, but either remove the references to concentrations being similar across the site and revise the text accordingly or provide an explanation of why the Permittees believe the concentrations are similar.

9. Section 6.6.1.4, Nature and Extent of Contamination, page 51:

At SWMU 03-012(b), chromium concentrations detected in soil from samples collected from location 03-608199 were used to determine that the lateral extent of chromium contamination was defined. However, this location is not depicted on either Plate 8 or Figure 6.6-1, making it difficult to evaluate whether the extent is defined. In addition, data for samples collected at location 03-608199 is not included in Table 6.6-2. Revise the SIR accordingly.

10. Section 6.6.2.5, Summary of Health Risk Screening, page 57:

The Permittees state “[B]ased on the risk-screening assessment results, no potential unacceptable risks exist for the industrial, construction worker, and residential scenarios at SWMU 03-045(b).” The statement is inaccurate since the extent of contamination is not defined at the site as stated in Section 6.6.2.4 (Site Contamination) of the SIR. Only two samples were collected from one location at the site and the Permittees concluded that the lateral extent of contamination is not defined at the site. In addition, the samples were not analyzed for hexavalent chromium which is a potential contaminant for the site. It is acceptable to perform screening level risk evaluations on an incomplete data set to guide further investigations; however, the statement that the site does not pose an unacceptable risk before characterization of the site is complete, is not supported by data. Similarly, ecological risk cannot be determined until complete site characterization data is available. Revise the text to either remove the statement or clarify that this risk assessment is based on insufficient data. This comment also applies to SWMU 03-013(i), AOC 03-014(c2), SWMU 03-045(c), SWMU-03-045(e), AOC C-03-022, and SWMU 60-007(a).

11. Section 6.6.3.4, Site Contamination, page 59:

Samples were collected from two depths from only one location at the SWMU 03-045(c). The lateral and vertical extent of contamination is not defined because samples were collected only from one location. Concentrations of several organic chemicals increased with depth at this location. For example, the detected concentrations of benzo(a)pyrene and Aroclor-1260 at location 03-608196 increased with depth. These detected concentrations exceeded the NMED residential soil screening levels (SSLs). The Phase II work plan must propose sampling to define the vertical and lateral extent of contamination at SWMU 03-045(c).

12. Section 6.7.4.4, Nature and Extent of Contamination, page 65:

The detected concentrations of several organic chemicals increased with depth at location 03-608219, the most distant location sampled. Benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene were detected at concentrations above the NMED residential SSLs in all samples collected at location 03-608219. The vertical extent of contamination is not defined at the site and the Permittees must propose additional sampling in the Phase II work plan. The risk screening assessment presented in the SIR also indicates that the site poses unacceptable carcinogenic risk under both the residential and industrial land use scenarios. (See also Comment # 1)

13. Section 6.9.9.4, Site Contamination, page 114:

The Permittees have used available data from surrounding SWMUs to define the extent of contamination. However, the data utilized to define the extent of contamination is not included in the SIR. For example, to define the extent of copper contamination at SWMU 03-056(d), the data from surrounding SWMUs (e.g., SWMU 03-014(g), SWMU 03-14(d), 03-014(h) and SWMU 03-014(j)) were used. However, the sampling locations and associated data cited in the text were not provided on Figure 6.9-1, Plate 12, or Table 6.9-21 making it difficult to evaluate whether the extent is defined for the site. While it is appropriate to use the available data from nearby SWMUs to define the extent of contamination, the data must be included in associated tables and figures to allow the reviewer to ascertain that the extent of contamination is defined. There are several other instances in the SIR where data from other SWMUs is utilized but not provided. Review the entire SIR and provide all associated data that is being utilized to define the nature and extent of contamination of a site.

14. Section 6.18.4.3, Soil, Rock, and Sediment Sampling Analytical Results, page 154:

The text states that four soil samples were collected from two locations and analyzed for organic chemicals at AOC 03-051(c). However Table 6.18-3 reports six rows of data. Analytical data for samples collected from locations 03-608328 (one depth) and 03-608329 (two depths) are repeated but two different values are reported for each of these samples. In addition, the Table 6.18-3 is incomplete, results are reported only for few of the contaminants (i.e., from acenaphthene to chrysene) although the text includes discussion on several other organic compounds that are not included in the table. Resolve the discrepancy and revise the table accordingly.

15. Section 6.20.4.4, Extent of Contamination, page 165:

Concentrations of TPH increased with depth at two sample locations at SWMU 03-056(a), as shown on Plate 5. Text in Section 6.20.4.4 states that further sampling to define the depth of contamination of TPH is not required. Provide further justification on how the vertical extent of TPH is defined. Otherwise, propose to collect additional samples at SWMU 03-056(a) in order to define the vertical extent of TPH contamination.

16. Section 7.2.2.4, Nature and Extent of Contamination, page 190:

The discussion on nature and extent of selenium contamination for SWMU 60-002 (east) incorrectly states that “[s]elenium was not detected above the Qbt 2,3,4 BV.” Selenium was detected at 0.579 mg/kg above the Qbt 2,3,4 BV (i.e., 0.3 mg/kg) in the sample collected from 4-4.5 ft. at location 60-22517 (see Table 7.2-4). However, NMED concurs with the Permittees that further sampling for extent of selenium is not warranted. Revise the text accordingly.

17. Section 7.3.4.1, Soil, Rock, and Sediment Sampling, page 194:

The text states that “[t]wenty samples were collected from five locations. At each location, samples were collected from 0.0-1.0 ft, 2.0-3.0 ft, 4.0-5.0 ft, and 9.0-10.0 ft bgs.” Section 7.3.5, Summary of Human Health Screening, states that “[n]o samples were collected from the 0.0-1.0 ft depth interval and the industrial scenario was not evaluated for AOC 60-004(f).” Review of Table 7.3-1 also indicates that samples were not collected from the 0.0-1.0 ft interval. Resolve the discrepancy and revise the text accordingly.

18. Section 8.3.4.4, Nature and Extent of Contamination, page 230:

Table 8.3-3 does not report butylbenzene[n-] at 9.4 mg/kg as stated in the text. Table 8.3-3 reports only one detection at 0.00054 mg/kg at location 61-24310 (1.5-2.0 ft). Resolve the discrepancy and revise accordingly.

19. Section 8.3.5, Summary of Health Risk Screening, page 233:

The Permittees were directed to remove contaminated soils containing concentrations above the risk-based screening levels and to collect confirmatory samples at SWMU 61-002 in a Notice of Approval Letter issued on November 9, 2010 for the Investigation Report for Upper Sandia Canyon Aggregate Area. Also see NMED’s comment in Notice of Disapproval (comment no. 21) issued on September 1, 2010. As stated previously, NMED cannot make a corrective action complete determination until additional remediation activities are conducted.

20. Section I-4.4.2, Exposure Evaluation, pages I-45 – I-51:

The exposure evaluation states that actual activity patterns are not represented by those activities assumed by the industrial scenario, and that risks are overestimated. Given that each site was evaluated separately in the risk assessments as separate exposure areas (with a few exceptions where sites were combined) that receptors would likely be exposed, and that many of the sites are adjacent to or close to each other, receptors’ exposure areas may overlap more than one site. The U.S. EPA’s (1989) risk assessment guidance states that known or suspected activity patterns should be considered during the exposure assessment and in estimating exposure areas. The activity patterns of human and ecological receptors at the sites evaluated in this report may encompass more than one site, and lead to subsequent exposure of contaminants at more than one site. Include in the discussion of uncertainties an evaluation of activity patterns for each type of receptor and exposure area and provide a qualitative evaluation of receptors possible exposure to more than one site. Also discuss whether the presently calculated risks are

still overestimated and if exposure to multiple sites would increase risk and hazard estimates.

21. Section I-4.4.2, Exposure Evaluation, pages I-45 – I-51:

The text concludes that the elevated levels of PAHs at AOC 03-051(c) are the result of asphalt paving and laboratory infrastructure and are not a result of site activities. However, TPH was detected in the same samples at AOC 03-051(c) and the data do not preclude that the PAHs are related to the TPH at the site. AOC 03-051(c) is a paved area where drums of acetone, vacuum pump oil, and ethylene glycol were stored. Voluntary measures were conducted in 1995 to remove known areas of operational leaks of vacuum pump oil. It is likely that residual contamination remains and the vacuum pump oil, which is a refined petroleum lubricant oil containing PAHs, may be the source for the PAHs detected at the site. However, it is noted that interviewed workers indicate non-petroleum oils were used. It is not clear that workers would remember all oils used given this site could date back to the 1960's. Clarify the dates of operations. Also, as expressed in General Comment Number 1, it may be in the best interest of LANL to propose background values for PAHs in soil for this site. Otherwise, sufficient evidence has not been provided to exclude PAHs as being site related. AOC 03-051(c) would only be eligible for corrective action complete with controls. Revise the text accordingly.

22. Section I-4.4.2, Exposure Evaluation, pages I-45 – I-51:

The text states that the elevated levels of PAHs at SWMUs 03-014(k,l,m,n) are related to asphalt paving and laboratory infrastructure and are not a result of site activities. Although the highest detection of benzo(a)pyrene was not present in the same location as the highest detections of TPH, benzo(a)pyrene and other PAHs were detected along with TPH at the same locations at the site and could therefore be the result of site activities. The industrial and residential risks from exposure to soil at SWMUs 03-014(k,l,m,n) are above the NMED target levels and additional corrective action must be conducted. It was noted that text in Section I-4.5.9 states that further sampling will be conducted at SWMUs 03-014(k,l,m,n) for TPH. Additional sampling must be proposed in order to calculate a statistically-based exposure point concentration (EPC) (i.e., based on 95% upper confidence limits) for PAHs. Revise the text accordingly. (See Comment # 1)

23. Section I-4.4.2, Exposure Evaluation, pages I-45 – I-51:

It was noted that text in Section I-4.5.9 states that further sampling will be conducted at SWMUs 03-014(k,l,m,n) to determine the vertical extent of TPH contamination. However, Section 9.0 and Section 10.2 of the SIR indicate that the nature and extent of contamination at SWMUs 03-014(k,l,m,n) is defined and no further sampling for extent is warranted. The sites are recommended for corrective action complete without controls. Clarify whether additional sampling will be conducted at SWMUs 03-014(k,l,m,n).

24. Tables I-2.3-8, I-2.3-14, I-2.3-15, I-2.3-18, I-2.3-19, I-2.3-20, I-2.3-21, I-2.3-22, I-2.3-24, I-2.3-25, I-2.3-26, I-2.3-30, I-2.3-32, I-2.3-33, I-2.3-35, I-2.3-36, I-2.3-38, I-2.3-48, I-2.3-55, I-2.3-56, I-2.3-66, I-2.3-67, I-2.3-69, I-2.3-74, I-2.3-75, I-2.3-78, I-2.3-79, I-2.3-82, and I-2.3-84, pages I-134 – I-224:

Upper confidence limits (UCLs) were calculated for many constituents that had less than six detections. UCLs should only be calculated for data sets that meet the minimum requirements. As stated in US EPA's (2010) ProUCL guidance, the minimum requirements for calculating UCLs are: 1) each data set must contain at least eight samples for the analyte being evaluated; and 2) there must be a minimum of six detections for the analyte being evaluated. US EPA's (2010) ProUCL guidance also states that although it is possible to calculate UCLs with small datasets (i.e., $n \leq 8$) and low frequencies of detection (i.e., ≤ 6 detected observations), these estimates are not considered reliable and representative enough to make defensible and correct cleanup and remediation decisions. If both of these minimum requirements are not met, then maximum detected concentrations should be used as the EPC. Revise these tables accordingly and any subsequent risk and hazard calculations that would be affected. It is also noted that LANL's EP-DIV-SOP-10006 states that a minimum of five detections and ideally 8-10 detections are also required to statistically determine the EPC; however, this document has not been revised in several years and may need updating.

25. Tables I-4.3-1 through I-4.3-28, pages I-354 – I-362:

The vapor intrusion risk based concentrations displayed in Tables I-4.3-1 through I-4.3-28 are incorrect. The Johnson and Ettinger model returns risk based results in units of micrograms per kilogram ($\mu\text{g}/\text{kg}$). The risk based concentrations in Tables I-4.3-1 through I-4.3-28 are displayed in units of milligrams per kilogram (mg/kg) and it does not appear that the risk based concentrations were converted from $\mu\text{g}/\text{kg}$ to mg/kg . Thus, the risk based concentrations and the subsequent risk and hazard calculations are underestimated by three orders of magnitude. Revise Tables I-4.3-1 through I-4.3-28 to include the correct risk based concentrations and subsequent risk and hazard calculations. Update the cumulative risks and hazards.

26. Tables I-4.3-3, I-4.3-8, and I-4.3-24, pages I-355, I-357, and I-361:

Footnote "c" indicates that a surrogate was used for 2-hexanone. A reference concentration (RFC) is available for 2-hexanone in US EPA's Integrated Risk Information System (IRIS). Update the hazard quotient for 2-hexanone on Tables I-4.3-3, I-4.3-8, and I-4.3-24 to use the original toxicity criteria for 2-hexanone, rather than a surrogate. However, even if a surrogate was used for toxicity data (e.g., MEK), the chemical and physical properties for 2-hexanone should still have been used in the modeling. Revise the physical and chemical property tables to reflect those for 2-hexanone.

27. Table I-4.3-4, page I-355:

2-methylnaphthalene is a VOC retained as a COPC at SWMU 03-013(i) due to its noncarcinogenic endpoint. However, the toxicity data in the Johnson and Ettinger model are outdated and since the last update of the model (1994), the inhalation data for 2-

methylnaphthalene has been rescinded. Either surrogate toxicity data should be used or the exclusion of 2-methylnaphthalene must be addressed in the uncertainty section of the risk assessment.

28. Table I-3.3-1, page I-228:

The toxicity equivalent EPC for 1,2,3,4,6,7,8-Heptachlorodibenzodioxin (4.59E-8 mg/kg) at location CAMO-09-6010 is incorrect. The original EPC was 8.45E-5 mg/kg and when a toxicity equivalency factor of 0.01 is applied, the result is 8.45E-7 mg/kg. It is noted that updating Table I-3.3-1 with the correct value does not change the overall results of the risk assessments. However, update Table I-3.3-1 and all subsequent risk and hazard calculations for SWMU 03-045(h).

29. Table I-5.3-42, page I-398:

Several inorganic ecological COPCs (aluminum, barium, chromium, cobalt, copper, nickel, selenium, and vanadium) were not included in the minimum ecological screening level (ESL) comparison for SWMU 03-045(h). Revise Table I-5.3-42 to include these COPCs and any subsequent ecological risk assessment calculations that may be affected.

References

LANL 2011. *Standard Operating Procedure for Performing Human and Ecological Risk Screening Assessments*. EP-DIV-SOP-10006, revision 0.

NMED, 2012. *Risk Assessment Guidance for Site Investigations and Remediation*. February.

NMED, 2014. *Risk Assessment Guidance for Site Investigations and Remediation*. December.

US EPA, 1989. *Risk Assessment Guidance for Superfund Volume I Human Health Evaluation Manual (Part A)*. <http://www.epa.gov/oswer/riskassessment/ragsa/index.htm>

The Permittees must respond to all comments and submit a revised SIR by **September 14, 2015**. As part of the response letter that accompanies the revised SIR, the Permittees must include a table that details where all revisions have been made to the SIR and that cross-references NMED's numbered comments. All submittals (including maps and tables) must be in the form of two paper copies and one electronic copy in accordance with Section XI.A of the Order. In addition, the Permittees must submit a redline-strikeout version that includes all changes and edits to the SIR (electronic copy) with the response to this Disapproval.

In addition, the submittal date for the Phase II Investigation Work Plan for Upper Sandia Canyon Aggregate Area has been changed from April 16, 2015 to **December 31, 2015** to allow the Permittees to revise the SIR and include any additional investigations identified during the revision process.

Ms. Gelles and Mr. Brandt
April 14, 2015
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Please contact Neelam Dhawan of my staff at (505) 476-6042 should you have any questions.

Sincerely,

A handwritten signature in black ink, appearing to read "John E. Kieling" with a stylized flourish at the end.

John E. Kieling
Chief
Hazardous Waste Bureau

cc: K. Roberts, Director, NMED RPD
D. Cobrain, NMED HWB
N. Dhawan, NMED HWB
S. Yanicak, NMED DOE OB, MS M894
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File: Reading and LANL 2015 NOD for USCAA SIR