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February 3, 2014

FEB 5 2014

DCN: NMED-2014-02

NMED
Hazardous Waste Bureau

Mr. David Cobrain
New Mexico Environment Department (NMED)
Hazardous Waste Bureau
2905 Rodeo Park Dr. E, Bldg 1
Santa Fe, NM 87505

RE: Draft Technical Review Comments on the "Supplemental Investigation Report for the Upper Sandia Canyon Aggregate Area", dated August 2013

Dear Mr. Cobrain:

Attached please find draft technical review comments on the risk assessment portions of Los Alamos National Laboratory's (LANL) "Supplemental Investigation Report for the Upper Sandia Canyon Aggregate Area", dated August 2013.

Many of the sites investigated at Upper Sandia Canyon Aggregate Area had elevated levels of polycyclic aromatic hydrocarbons (PAHs) which resulted in human health risks being above the NMED target risk level of 1E-5 for both industrial and residential land use scenarios. LANL proposes that the elevated levels of PAHs at all sites which had human health risks above the NMED target level are either: 1) overestimated since the exposure point concentrations (EPCs) are based on maximum detected concentrations; or 2) not a result of site activities and elevated levels of PAHs are related to anthropogenic sources such as asphalt paving and laboratory infrastructure. It is important to note that many of these sites with elevated risk levels due to PAHs also had detections of total petroleum hydrocarbons (TPH). It is unclear whether the detections of PAHs are related to the TPH contamination at the sites or if they are related to the asphalt paving. Due to this uncertainty over the source of PAHs, it is suggested that LANL to propose background comparison values for PAHs to determine the extent of site contamination versus ambient levels due to asphalt paving, laboratory infrastructure, and other industrial activities. The detection of PAHs has been an on-going issues and determination of background levels may also help resolve PAHs issues that have been noted as other sites. This issue is also addressed in General Comment Number 1 in the attached.

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If you or any of your staff have questions, please contact me at (801) 451-2864 or via email at paigewalton@msn.com.

Thank you,

A handwritten signature in black ink that reads "Paige Walton". The signature is written in a cursive, flowing style.

Paige Walton
AQS Senior Scientist and Program Manager

Enclosure

CC: Neelam Dhawan, NEMD (electronic)
Joel Workman, AQS (electronic)

**Draft Technical Review Comments on the “Supplemental Investigation Report for the
Upper Sandia Canyon Aggregate Area”, dated August 2013**

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) had polycyclic aromatic hydrocarbon (PAH) concentrations that resulted in human health risks being above the New Mexico Environment Department (NMED) target risk level of 1E-5 for the industrial and/or residential land use scenarios. While 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 related to asphalt paving and/or laboratory infrastructure. If the PAH concentrations in soil at Upper Sandia Canyon Aggregate Area are indeed related to laboratory infrastructure, then it would be in the best interest of Los Alamos National Laboratory (LANL) to propose background comparison values for PAHs in soil at LANL. Some regulatory agencies, including California’s Department of Toxic Substances Control, and the Massachusetts Department of Environmental Protection, have developed background values for PAHs at various types of sites to address such issues. If there are anthropogenic levels of PAHs at LANL, then laboratory-specific background comparison values should be proposed in order to determine the extent of site related contamination versus ambient levels of PAHs.

2. 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 chemical 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.

In the case of SWMU 03-002(c), chromium was screened out as a COPC as the maximum detected concentration was within the range of background. However, site history for this SWMU is that it was a wooden storage shed that stored liquid and solid pesticides and herbicides. Chromium, and specifically hexavalent chromium, has been used heavily since the 1940’s as a wood preservative and pesticide. Site history in the case of SWMU 03-002(c) would indicate that it is likely that chromium could be present due to historical activities and as such, such chromium should have been retained as a COPC. In addition, site history

suggests that the chromium could be present in the form of hexavalent chromium, and chromium speciation should also be addressed.

The above discussion for SWMU 03-002(c) is just one example where screening of COPCs did not follow NMED guidance and lines of evidence indicate that the constituent should have been retained as a COPC. For all sites addressed in this report, the site attribution analyses must be revised. Constituents may not be ruled out as a COPC if the site maximum is above the background reference value but within the range of background concentrations. In these cases, additional lines of evidence must be provided to justify exclusion of the constituent as a COPC. Lines of evidence must include an assessment of site history. Revise the report accordingly.

3. 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 (2012) guidance states that a constituent is sufficiently volatile if it has a Henry's Law Constant greater than $1\text{E-}5 \text{ atm}\cdot\text{m}^3/\text{mole}$ 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 as warranted.
4. 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.
5. The use of 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. A discussion of uncertainties should be provided in the risk assessment (Section I-4.4).

Specific Comments

1. Section 6.1.1. Text states that technical area (TA)-03 was also used as a firing site and contained a burn pit for destroying explosives. Provide additional information on the location of the burn pits and justification for why samples collected from sites at TA-03 were not analyzed for dioxin and furan congeners or explosives.
2. Section 6.4.1. The text states that the extent of contamination is defined at SWMU 03-009(a). However, concentrations of many organic chemicals increased with depth at locations 03-608182 and 03-608181. It was also noted that the only historical sample collected between 2 feet below ground surface (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). Propose additional samples from 2-9 ft bgs at SWMU 03-009(a).

3. Section 6.20.4.4. 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 additional samples at SWMU 030-056(a) in order to define the vertical extent of TPH contamination.
4. Section I-4.4.2. 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. US EPA's (1989) 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 overlap 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 possibly being exposed 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.
5. Section I-4.4.2. 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. ACO 03-51(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 not all residual contamination was removed 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 for the operation. 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. Otherwise, sufficient evidence has not been provided to exclude PAHs as being site related. AOC 03-051(c) should be retained for additional corrective action complete with controls. Revise the text accordingly.
6. Section I-4.4.2. 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 corrective action should be recommended for the industrial and residential land use scenarios. 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. Consideration should be given to collecting additional samples 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.

7. Section I-4.4.2. 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 indicates 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. Clarify whether additional sampling will be conducted at SWMUs 03-014(k,l,m,n).
8. 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. Upper confidence limits (UCLs) were calculated for many constituents that had less than six (6) 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 warrant visitation.
9. Tables I-4.3-1 through I-4.3-28. 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.
10. Tables I-4.3-3, I-4.3-8, and I-4.3-24. 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 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.

11. Table I-4.3-4. 2-methylnaphthalene is a VOC retained as a constituent of potential concern (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 applied or the exclusion 2-methylnaphthalene be addressed in the uncertainty section of the risk assessment.
12. Table I-3.3-1. 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).
13. Table I-5.3-42. 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.
- 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>