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CERTIFIED MAIL – RETURN RECEIPT REQUESTED

April 17, 2017

Doug Hintze, Manager
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Bruce Robinson, Program Director
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RE: NOTICE OF DISAPPROVAL
INVESTIGATION REPORT FOR THE FORMER LOS ALAMOS INN PROPERTY SITES WITHIN THE UPPER LOS ALAMOS CANYON
LOS ALAMOS NATIONAL LABORATORY
EPA ID#NM0890010515
HWB-LANL-17-002

Dear Messrs. Hintze and Robinson:

The New Mexico Environment Department (NMED) has received the United States Department of Energy (DOE) and the Los Alamos National Security, L.L.C.'s (LANS) (collectively, the Permittees) *Investigation Report for the Former Los Alamos Inn Property Sites within the Upper Los Alamos Canyon Aggregate Area* (Report), dated January 2017 and referenced by LA-UR-17-20228/EP2016-0147. The Report was received on January 30, 2017.

NMED has reviewed the Report and hereby issues this Notice of Disapproval (NOD) with the following comments.

General Comments:

1. Throughout the Report the Permittees used comparison of total chromium data to the trivalent chromium [Cr(III)] residential soil screening level (SSL) (117,000 mg/kg) to determine whether additional sampling is warranted. Since the data were analyzed for total chromium (which is a naturally occurring ratio of Cr(III) and hexavalent chromium [Cr(VI)]) and not for Cr(III), use of the Cr(III) SSL is unacceptable. The use of Cr(III) alone does not reflect natural ratios of speciation that may be present in all soils; the ratio is a function of the mineralogy of the soils. Cr(VI) is present in soils/sediments at pH 5 where reduction within aerobic soils/sediments will be linked primarily to microbial oxidation of organic matter. Generation of Cr(VI) through oxidation of native sources of Cr(III) such as chromite would be most prolific in soils/sediments with limited organic matter and under acidic conditions. In addition, Cr(VI) is more commonly associated with mafic and ultramafic rocks (e.g., serpentines). Since soil at Los Alamos National Lab (LANL) is typically not acrid and serpentine rocks are not common, it is likely that most of the naturally occurring chromium in LANL soils is Cr(III). As such, use of the Cr(III) SSL may be appropriate for assessing extent of contamination. However, background sampling must be conducted by the Permittees to confirm these assumptions and to demonstrate that any chromium detected in LANL soils is Cr(III). Until such documentation of the speciation of chromium present in LANL soils is provided, all analytical data for total chromium should be compared to the total chromium SSLs.

   Section 4.2, Screening Levels states that "*The SWMUs and AOC included in this investigation report are not known or suspected to be sources of hexavalent chromium.*" The 2017 NMED Risk Assessment Guidance for Site Investigations and Remediation (SSG) states that if the history of a site does not indicate a known source for Cr(VI), data should be analyzed for total chromium. If there is documented evidence that there is no potential source of hexavalent chromium and site conditions are such that chromium speciation was not altered, the data may be evaluated using total chromium. If the data are statistically different from background and site history is not definitive on whether Cr(VI) could be present, then the Permittees must conduct additional sampling to determine speciation. The species-specific data must then be compared to the Cr(III) and Cr(VI) SSLs.

2. Section 5.1.1 lists lines of evidence to be used in determining if an inorganic chemical should be eliminated as a constituent of potential concern (COPC). The comparison to the maximum background concentration is listed as a line of evidence to be used to screen out a COPC. Except in special cases, NMED does not consider such comparisons as a valid line of evidence for eliminating detected inorganic compounds as COPCs. Note that Section 2.8.3 of the NMED SSG does not state that comparison to maximum background is an acceptable line of evidence. The range of values in the background data set is considered in the statistical determination of appropriate background threshold values (e.g., background values, BVs). As indicated in Section 2.7.3 of the SSG, if the maximum concentration of a COPC exceeds the applicable BV, statistical tests must be

used to determine if the data set for the COPC is statistically different from the applicable background data set. However, NMED would allow the upper end of the background data set to be used for comparison in special cases:

- Statistically determined BV is significantly greater than the maximum background concentration.
- Statistical tests cannot be performed because of insufficient data or a high percentage of non-detections.
- Sufficient number of samples have been collected to determine nature and extent but results are predominately non-detect (discussion of sample number versus detections).
- There is no history to suggest the constituent is directly related to site activities or a dominant waste stream. If there is site history to suspect that the constituent is present due to site activities (such as lead at a firing site), then it is possible that the constituent could be present from historical activities at low levels (in the high range of background). In these cases, the constituent still must be carried forward as a COPC and retained in the risk assessment (it will likely not be a risk driver).
- Spatial analyses does not show a pattern or trend indicating contamination.
- The maximum detected result is statistically determined to be an outlier (note, sufficient samples must be collected to show a point is an outlier and not indicative of a hotspot).

5.1.1 (and the Report in its entirety) should be revised to eliminate comparisons of COPC concentrations to the maximum value in the applicable background data set as a line of evidence for eliminating a detected inorganic chemical as a COPC unless one (or more) of the special cases in the bulleted items above exists; thus, precluding the comparison of COPC data to the statistically derived BV. In such cases, lines of evidence supporting the comparison of COPC data to the maximum background value should be provided to demonstrate that one or more of the special cases exists in the area being evaluated.

3. Section 5.2, Extent of Contamination, states that comparisons of sample results to soil screening levels/screening action levels (SSLs/SALs) are used in determining whether the extent of contamination has been defined. According to the text, the comparisons are performed after determining whether extent is defined by decreasing concentrations vertically and laterally and that sample concentrations are below estimated quantitation limits (EQLs) or detection limits (DLs). The Permittees consider that no further sampling for extent is warranted if the applicable SSL/SAL is at least an order of magnitude greater than the maximum COPC concentration.

   While the above approach is not recommended in the SSG, the approach may be applied as a single line of evidence to determine that no further sampling is warranted for the COPC in question if the caveats listed below are met and sufficient justification for the applied methodology (including references) is provided in the discussion:

   - Contaminant concentrations do not increase significantly with depth or laterally and appear to be isolated cases (do not indicate a trend);

- There is no history of a contaminant release due to site activities and that sample results are representative of site conditions (sufficient data are available to determine extent);

- The SSL/SAL must be at least an order of magnitude greater than the COPC concentration;

- Inclusion or exclusion of the COPC would not impact overall risk (e.g., the COPC is not a significant contributor to risk due to low toxicity); and

- There is not a contaminant release from outfall into a drainage. Transport along drainages may be significant, both along the land surface and at depth, and require additional lines of evidence to ensure transport of contamination has been fully considered and that increasing concentrations are not the result of erosion/sediment transport. Under these circumstances, and similar, it is possible to have greater concentrations away from the initial source area due to release into drainages and outfalls.

Further, the comparison may only be used to determine the extent of COPC contamination and may not be used to eliminate a COPC from either the human health risk assessment or ecological risk assessment.

4. The Permittees do not consider nitrate as a COPC based on it being naturally occurring. Where the history of a site indicates that nitrate may be present due to lab activities, such as when the site contains a sanitary waste line and septic tank, nitrate must be considered as a potential COPC or additional lines of evidence must be provided to fully justify the statement that the detected concentrations of nitrate likely reflect naturally occurring levels (see Specific Comment 2). Appropriate lines of evidence may include site history and comparison of the maximum detected concentration to the SSL.

Specific Comments:

5. **Section 6.5.1 Site Description and Operational History, SWMU 01-001(d1), page 23:**

NMED Comment: Solid Waste Management Unit (SWMU) 01-001(d1) is the sanitary waste line that connected former buildings K, V, and Y to septic tank 138. The sanitary waste line also connected to former Cooling Tower 82, a potential source of hexavalent chromium. The Permittees must revise the Report to include a site history discussion of the cooling tower and any impact the cooling tower may have on current investigations for SWMU 01-001(d1).

6. **Section 6.6.4.3 Soil, Rock, and Sediment Sampling Analytical Results, SWMU 01-001(s1), page 30:**

   NMED Comment: The Permittees eliminate nitrate as a COPC because "*Nitrate is naturally occurring and the concentrations likely reflect naturally occurring levels*" even though SWMU 01-001(s1) was part of a sanitary waste line system. Nitrate is commonly present in sanitary waste lines and it is possible that releases may have occurred as a result of leaks that may have caused subsurface contamination. The Permittees must revise the Report to provide additional lines of evidence that support the conclusion that nitrate should not be retained as a COPC or retain nitrate as a COPC and include in the risk assessments at SWMU 01-001(s1).

7. **Section 6.6.4.4 Nature and Extent of Contamination, SWMU 01-001(s1), page 31:**

   NMED Comment: Chromium was detected above the Qbt 2,3,4 background value in three samples with a maximum concentration of 20.4 milligrams per kilogram (mg/kg). Concentrations increased with depth at location 00-603899 and increased laterally at location 03-603871. The trivalent chromium SSL was compared to the site concentrations as justification for the determination that no further sampling for chromium is warranted, however, the use of the trivalent chromium SSL has not been justified. The Permittees must revise the Report to remove the comparison to trivalent chromium and provide lines of evidence to support the conclusion that no further sampling for chromium is warranted despite increasing concentrations.

8. **Section 6.7.4.4 Nature and Extent of Contamination, SWMU 01-002(a1)-00, page 37:**

   NMED Comment: Chromium was detected above the Qbt 2,3,4 background value in two samples with a maximum concentration of 29.9 mg/kg. Concentrations increased with depth at locations 00-603899 and 00-604223 and increased laterally at location 03-603871, which is associated with SWMU 01-001(s1). The trivalent chromium SSL was compared to the site concentrations as justification for the determination that no further sampling for chromium is warranted, however, the use of the trivalent chromium SSL has not been justified. The Permittees must revise the Report to remove the comparison to trivalent chromium and provide lines of evidence to support the conclusion that no further sampling for chromium is warranted despite increasing concentrations.

9. **Section 6.9.4.4 Nature and Extent of Contamination, SWMU 01-006(b), page 50:**

   NMED Comment: Chromium was detected above the Qbt 2,3,4 background value in one sample at a concentration of 29.9 mg/kg. Concentrations increased with depth at location 00-604223 and decreased downgradient. The trivalent chromium SSL was compared to the site concentrations as justification for the determination that no further sampling for chromium is warranted, however, the use of the trivalent chromium SSL has not been justified. The Permittees must revise the Report to remove the comparison to

trivalent chromium and provide lines of evidence to support the conclusion that no further sampling for chromium is warranted despite concentrations increasing with depth.

10. Section 6.12.4.4 Nature and Extent of Contamination, SWMU 01-006(n), page 66:

NMED Comment: Chromium was detected above the Qbt 2,3,4 background value in one sample at a concentration of 18.9 mg/kg. Concentrations increased with depth at location 00-604238 and decreased downgradient. The trivalent chromium SSL was compared to the site concentrations as justification for the determination that no further sampling for chromium is warranted, however, the use of the trivalent chromium SSL has not been justified. The Permittees must revise the Report to remove the comparison to trivalent chromium and provide lines of evidence to support the conclusion that no further sampling for chromium is warranted despite concentrations increasing with depth.

11. Section 6.13.4.3 Soil, Rock, and Sediment Sampling Analytical Results, SWMU 01-007(a), page 71:

NMED Comment:

a. At location LA-61504, barium was detected above the Qbt 2,3,4 BV (46 mg/kg) and above the maximum Qbt 2,3,4 background concentration (51.6 mg/kg) in one sample at a concentration of 102 mg/kg, however, barium is not included in the discussion of COPCs. Revise the discussion to evaluate barium as a possible COPC.

b. Perchlorate was retained as a COPC but not discussed in Section 6.13.4.4 Nature and Extent of Contamination. Revise Section 6.13.4.4 to include a discussion on the nature and extent of perchlorate.

12. Section 6.14.4.4 Nature and Extent of Contamination, SWMU 01-007(b), page 83:

NMED Comment: Chromium was detected above the soil and Qbt 2,3,4 background values in 1 soil sample and 14 tuff samples with a maximum concentration of 41.1 mg/kg. Concentrations increased with depth at locations 00-603786, 00-603791, 00-603793, 00-603797, and 01-614808 and increased downgradient. The trivalent chromium SSL was compared to the site concentrations as justification for the determination that no further sampling for chromium is warranted, however, the use of the trivalent chromium SSL has not been justified. The Permittees must revise the Report to remove the comparison to trivalent chromium and provide lines of evidence to support the conclusion that no further sampling for chromium is warranted despite concentrations increasing with depth.

13. Appendix G, Ecological Risk Assessment:

NMED Comment: In reviewing the ecological risk assessments, chemicals of

potential ecological concern (COPECs) with low hazard quotients (i.e., less than 0.3) were eliminated from additional tiers for the screening analysis (e.g., lowest observed adverse effect level (LOAEL) ecological screening level comparisons). NMED notes that LANL guidance does allow for a reduction in COPECs for the initial assessment. However, the guidance does not include a second-tier refinement of COPECs for the LOAEL assessment. The Permittees must revise the Report to include a discussion on whether the LOAEL screening based on the hazard quotient of 0.1 would have resulted in any residual contamination that could result in excess ecological risk.

The Permittees must address all comments in this letter in a revised Report. The Permittees must submit the response to this NOD and the revised Report to NMED. All submittals (including maps) must be in the form of two paper copies and one electronic copy in accordance with XXIV.A of the 2016 Consent Order. In addition, the Permittees must submit a redline-strikeout version that includes all changes and edits to the Report (electronic copy) with the response to the NOD.

Please contact Robert Murphy at (505) 476-6022 should you have any questions or comments.

Sincerely,

John E. Kieling
Chief
Hazardous Waste Bureau

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File: Reading and LANL 2017, TA-01, NOD Former Los Alamos Inn Property Sites within the Upper Los Alamos Canyon Aggregate Area

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