NEW MEXICO ENVIRONMENT DEPARTMENT

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CERTIFIED MAIL - RETURN RECEIPT REQUESTED

January 25, 2011

George J. Rael
Assistant Manager
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U.S. Department of Energy
National Nuclear Security Administration
Los Alamos Site Office
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Michael J. Graham
Associate Director
Environmental Programs
Los Alamos National Security, L.L.C.
P.O. Box 1663, MS M991
Los Alamos, NM 87545

RE: NOTICE OF DISAPPROVAL
REMEDY COMPLETION REPORT FOR UPPER LOS ALAMOS CANYON AGGREGATE AREA, FORMER TECHNICAL AREA 32
LOS ALAMOS NATIONAL LABORATORY
EPA ID #NM0890010515
HWB-LANL-10-083

Dear Messrs. Rael and Graham:

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) *Remedy Completion Report for Upper Los Alamos Canyon Aggregate Area, Former Technical Area 32* dated November 2010 and referenced by LA-UR-10-6899 / EP2010-0401 (Report). NMED has reviewed the Report and hereby issues this Notice of Disapproval (NOD).

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General Comments:

1. The risk and hazard results have been rounded to one significant figure. Because several of the results are at or slightly above target levels, significant figures showing that results are actually slightly above target levels must be included. Modify tables and text showing risk and hazard estimates to include at least two significant figures.

2. The vapor intrusion pathway was evaluated for residents at sites containing volatile organic compounds (VOCs). This pathway is also complete for the industrial receptors and risks via the vapor intrusion pathway and must be evaluated for an indoor worker at all sites containing VOCs. Revise the risk assessment accordingly.

   In addition, the construction worker could also be exposed to VOCs volatilized into outdoor air. It is generally accepted that unless there is a trenching scenario where vapors could pond, the indoor air pathway is protective of the outdoor air pathway. However, a qualitative discussion of inhalation of VOCs by the construction worker must still be included in the risk assessment. Revise the risk assessment accordingly.

3. For sites where the vapor intrusion pathway was evaluated, the calculated risks and hazards from exposure via the vapor intrusion pathway were not added to the calculated risk and hazard estimates from exposure to soil. Cumulative risk/hazard for all potential exposure scenarios must be evaluated when assessing total risk/hazard. Revise cumulative risks/hazard calculations accordingly.

4. Numerous inconsistencies were noted between exposure point concentrations (EPCs) used in vapor intrusion results and maximum detected concentrations. For example, the EPC in Table F-4.2-13 for methylene chloride (0.00489) is inconsistent with the maximum detected concentration of methylene chloride (0.014) mg/kg) at SWMU 32-002(b) presented in Table 4.2-3. The EPCs presented on Tables F-4.2-23 for methylene chloride (0.00799 mg/kg) are inconsistent with the maximum detected concentrations of methylene chloride (0.016 mg/kg) at AOC 32-003 presented on Table 4.3-3. Resolve the inconsistencies and update the vapor intrusion results utilizing correct maximum detected concentrations.

Specific Comments:

Comment 1. Section 4.1.4, Summary of Nature and Extent for SWMU 32-002(a), page 13:

Permittee's Statement: The vertical extent is not defined for:
- aluminum, barium, beryllium, copper, lead, and nickel at location 00-603582;
- aluminum, barium and copper at location 00-603585; and
- chromium and nickel at location 32-06372 .

NMED's Comment: Chromium also increased with depth at sample locations 00-603584, 00-603585, 00-603586, 00-603588, 00-603596, 32-06368 and 32-06372. Nickel also increased with depth at sample locations 00-603588, 00-603586 and 00-603596.

Comment 4. Section 4.4.2, Sample Analytical Results, pages 25-26:

NMED's Comment: According to Table 4.4-2, cadmium was detected above BVs in two surface soil samples and six reported non-detects had detection limits above BVs at SWMU 32-004. Retain cadmium as a COPC in risk evaluations or explain why is should not be carried forward.

Comment 5. Section 4.4.4, Summary of Human Health Risk Screening, pages 27 and F-80:

NMED's Comments: The Permittees assert that polynuclear aromatic hydrocarbons (PAHs) detected at AOC 32-004 are not site related and that the high concentrations of PAHs detected at sample location 32-06340 are the result of contamination from sources outside of the AOC 32-004 boundary. Thus, the Permittees excluded the PAH results from sample location 32-06340 from the final risk and hazard estimates.

Results from sample location 32-06340 must not be excluded from the residential risk assessment for the following reasons:

a. PAHs were detected at high concentrations in 1996, and additional PAH sampling was conducted in 2010 that confirmed the high concentrations of PAHs at AOC 32-004.

b. PAHs are detected at multiple sampling locations at Area of Concern (AOC) 32-004, indicating that PAHs are pervasive throughout AOC 32-004 and that the removal of the sample location containing the highest concentrations of PAHs is not justified.

c. Exposure to soil at AOC 32-004 via the ingestion, dermal, and inhalation pathways are complete. Human and ecological receptors would be exposed to all soisl at AOC 32-004.

d. After the removal of sample location 32-06340 from the dataset, the residential risk (1.2E-5) still exceeds the target level of 1E-5.

e. After the removal of sample location 32-06340 from the dataset, the residential Hazard Index (HI) of 1.2 also exceeds the target HI of one.

Potential unacceptable risks for a resident may exist at AOC 32-004; further evaluation is therefore necessary. Revise the risk assessment at AOC 32-004 accordingly.

Revise the text to correctly describe all locations and analytes where the vertical extent is not defined.

Comment 2. Section 4.2.4, Summary of COPCs at SWMU 32-002(b), pages 16-17:

NMED's Comment: According to Table 4.2-2, cadmium was detected above background values (BVs) in three surface soil samples, and five reported non-detects had detection limits above BVs in samples collected at Solid Waste Management Unit (SWMU) 32-002(b). The Permittees did not explain why cadmium was not retained as a constituent of potential concern (COPC) and evaluated in the noncarcinogenic risk screening for SWMU 32-002(b). The Permittees retained thallium and zinc which were determined, by statistical analyses, to be no different from background. Thallium and zinc should not be retained as COPCs. Revise the text to correctly identify COPCs.

Comment 3. Section 4.2.4, Summary of Human Health Risk Screening, page 19:

Permittee's Statement: The total excess cancer risk for the residential scenario is 2×10^{-5}, slightly above the NMED target risk level of 1×10^{-5}. For the residential scenario, arsenic contributes to the cancer risk (6×10^{-6}). The arsenic exposure point concentration is within the ranges of background concentrations and results in an overestimation of risk. Without arsenic, the total excess cancer risk is approximately 1×10^{-5}, equivalent to the NMED target risk level.

NMED's Comments: Arsenic must not be excluded from evaluation in the risk assessment for the following reasons:

a. Statistical analyses conducted in Appendix E show that site concentrations of arsenic are different from background and are shown to be site-related.

b. It is incorrect to compare Upper Confidence Limits (UCLs) with background comparison values. The background value (i.e., 95% upper tolerance limit) is used for point-to-point comparisons. Because the UCL is not a point estimate, it cannot be used as an estimate of an individual site observation for comparison to background threshold values.

c. Site history indicates that inorganic chemicals (e.g., arsenic) may have been used at SWMU 32-002(b) (Section 2.2.1).

Therefore, arsenic must not be excluded from the residential risk results. Modify the text to include arsenic in the final results and delete the text that states, "the arsenic exposure point concentration is within the ranges of background concentrations and results in an overestimation of risk." Modify the text to state that COPCs at SWMU-32-004(b) may pose unacceptable risks to residents and that further evaluation and/or removal actions are necessary.

Further, the refined ecological risk assessment indicates adverse risk may be present due to mercury. Perform additional analyses to confirm that residual contamination does not pose a threat to the environment.

Comment 6. Recommendations, page 31:

NMED's Comments:

a. NMED agrees that the Permittees may request a certificate of completion for AOC 32-003.

b. NMED does not agree with the Permittee's recommendation that further corrective action is not necessary at SWMU 32-002(b) or AOC 32-004. Revise the recommendations based on comments provided in this NOD.

c. NMED agrees with the Permittee's recommendation for further investigation to define vertical extent of inorganic chemicals at SWMU 32-002(a).

Comment 7. Figure 4.3-2, page 37:

NMED's Comments: Numerous inconsistencies were noted between the tables and figures. Several detections of inorganic chemicals at concentrations above background values (BVs) were not included in Figure 4.3-2. The missing detections are tabulated below. Revise Figure 4.3-2 to include the missing detections above BVs tabulated below.

Detections of inorganic chemicals above BVs at AOC 32-003 not depicted in Figure 4.3-2			
Location ID	Sample ID	Analyte	Concentration detected (mg/kg)
00-603603	RE00-08-15209	lead	24.1
00-603603	RE00-08-15210	lead	12.7
00-603604	RE00-08-15204	magnesium	2230
00-603604	RE00-08-15204	vanadium	21
00-603604	RE00-08-15204	aluminum	14100
00-603604	RE00-08-15204	cobalt	5
00-603604	RE00-08-15204	lead	26.2
00-603604	RE00-08-15204	arsenic	4.5
00-603604	RE00-08-15204	barium	144
00-603605	RE00-08-15213	lead	12.7
00-603607	RE00-08-15219	barium	103
00-603607	RE00-08-15218	chromium	18.7
00-603607	RE00-08-15219	chromium	12.3
00-603608	RE00-08-15217	barium	48.5
00-603609	RE32-10-11387	aluminum	8970
00-603609	RE32-10-11387	barium	52.4

Comment 8. Plates 4 and 5:

NMED's Comment: Numerous inconsistencies were noted between various Tables and Plates. Uranium-235/236 was detected at 0.126 pCi/g, a concentration above background/fallout values (BVs/FVs), in sample ID 0132-96-0607 at location 32-06372. However, the detection is not depicted in Plate 4. Similarly, several detections of inorganic chemicals, at concentrations above BVs, were not included in Plate 5. The missing detections are tabulated below. Revise Plates 4 and 5 to include all detected analytes.

Detections of inorganic chemicals above BVs at AOC 32-002(b) not depicted in Plate 5			
Location ID	Sample ID	Analyte	Concentration detected (mg/kg)
00-603590	RE32-10-11442	sodium	2,840
00-603596	RE00-08-15181	barium	55.1
00-603596	RE00-08-15181	chromium	10.3
00-603596	RE00-08-15181	copper	5.6
00-603596	RE00-08-15181	lead	13.6
00-603596	RE00-08-15181	mercury	0.546
00-603596	RE00-08-15181	nickel	6.9
00-603596	RE00-08-15181	nitrate	0.16
00-603596	RE00-08-15181	selenium	0.34
00-603596	RE00-08-15182	chromium	17.8
00-603596	RE00-08-15182	nickel	9
00-603596	RE00-08-15182	nitrate	0.13
32-06312	0132-96-0325	cadmium	1.9
32-06313	0132-96-0323	cadmium	1
32-06344	0132-96-0801	cadmium	2.1
32-06353	0132-96-0751	calcium	4,700
32-06353	0132-96-0751	manganese	830
32-06365	0132-96-0611	cobalt	3.6
32-06366	0132-96-0612	calcium	2,500
32-06377	0132-96-0614	cobalt	3.6

Comment 9. Attachment F-2, Johnson and Ettinger Model Spreadsheets:

NMED's Comment: The only VOCs evaluated for the vapor intrusion pathway are methylene chloride, trichlorofluoromethane, acetone, and tetrachloroethene. Other organic constituents detected at Upper Los Alamos Canyon Aggregate Area, such as anthracene and pyrene, are considered VOCs. The Johnson and Ettinger User's Guide also considers fluoranthene, benzo(g,h,i)perylene, and chrysene to be VOCs. Clarify the criteria that were used to determine the selection of VOCs considered for this pathway and modify the vapor intrusion calculations as necessary.

Comment 10. Attachment F-2, Johnson and Ettinger Model Spreadsheets, Tables F-3.3-1, F-3.3-7, and F-3.3-10:

NMED's Comment: 95% UCLs were calculated for EPCs for several constituents with datasets containing fewer than 8 samples (i.e., number of analyses). The ProUCL User's Guide advises that, "Datasets with fewer than 8 to 10 observations cannot be considered representative and reliable enough to make important cleanup and remediation decisions." In addition, Section 1.4.2 of the Report specifically states that statistical analyses are not valid if there are fewer than 10 data points. Since fewer than eight samples are included in these datasets, maximum detected concentrations should be used as EPCs at SWMU 32-002(b) (cesium-137), AOCs 32-003 (organics) and 32-004 (inorganics and organics). Consequently, risks and hazards have been underestimated for the industrial and recreational scenarios. Modify Tables F-3.3-1, F-3.3-7, and F-3.3-10 to include maximum detected concentrations as EPCs, and revise all subsequent risk and hazard calculations that would be affected by the use of maximum detected concentrations as EPCs.

Comment 11. Attachment F-2, Johnson and Ettinger Model Spreadsheets, Tables F-3.3-4, F-3.3-5, and F.3-6:

NMED's Comment: The toxicity equivalency factor (TEF) of 0.001 listed for heptachlorodibenzo-dioxin[1,2,3,4,6,7,8-] is inconsistent with the 2005 TEF value of 0.01 listed on http://www.who.int/ipcs/assessment/tef_update/en/index.html. This has resulted in an underestimation of the EPC for 2,3,7,8-TCDD equivalent for the industrial, recreational, ecological, construction worker, and residential scenarios at SWMU 32-002(b). Revise the TEF for heptachlorodibenzo-dioxin[1,2,3,4,6,7,8-] and all subsequent calculations that would be affected.

Comment 12. F-2, Johnson and Ettinger Model Spreadsheets, Table F-3.3-6:

NMED's Comment: An EPC of 1.6754E-7 mg/kg is listed for pentachlorodibenzofuran[1,2,3,7,8-]. This is inconsistent with the maximum detected concentration of 2.3E-7 mg/kg listed on Table F-3.3-3. Revise Table F-3.3-6 accordingly and any subsequent calculations that would be affected.

Comment 13. F-2, Johnson and Ettinger Model Spreadsheets, Tables F-4.2-2, F-4.2-11, F-4.2-34, and F-4.2-38:

NMED's Comment: The residential soil screening level, 15,600 mg/kg, and industrial soil screening level, 227,000 mg/kg, for cyanide are inconsistent with the NMED Soil Screening Levels (SSLs) values of 1,560 mg/kg and 22,700 mg/kg, respectively. Because the screening levels that were used are greater than the values listed in the SSLs, residential and industrial hazards have been underestimated. Modify Tables F-4.2-2, F-4.2-11, F-4.2-34, and F-4.2-38 to include the correct residential and industrial SSLs for

cyanide, and modify the hazard quotient (HQ) calculations and resulting hazard indices accordingly.

Comment 14. F-2, Johnson and Ettinger Model Spreadsheets, Tables F-4.2-7 and F-4.2-19:

NMED's Comment: The screening level for aroclor-1260 for the construction worker scenario (7.58 mg/kg) is inconsistent with the SSL value of 7.58. It is noted that the incorrect screening level is more conservative than the SSL value and correction of this value would not affect the results of the risk assessments in Tables F-4.2-7 and F-4.2-19. Modify the tables to include the correct construction worker SSL (75.8 mg/kg) for aroclor-1260.

Comment 15. F-2, Johnson and Ettinger Model Spreadsheets, Tables F-4.2-8, F-4.2-19, and F-4.2-30:

NMED's Comment: Noncarcinogenic hazards for the construction worker scenario were not calculated for SWMU 32-002(b), AOC 32-003 and AOC 32-004 for one or more of the following COPCs: arsenic, bis(2-ethylhexyl)phthalate, methylene chloride, and 2,3,7,8-TCDD. The construction worker SSLs for these constituents are based on noncarcinogenic endpoints and should be evaluated as noncarcinogens and included on Tables F-4.2.8, F-4.2.19, and F-4.2-30 for the construction worker scenario. The hazard indices for the construction worker have been slightly underestimated at SWMU 32-002(b), AOC 32-003 and AOC 32-004, as they currently do not include the evaluation of these constituents. It is noted that the addition of arsenic, bis(2-ethylhexyl)phthalate, methylene chloride, and 2,3,7,8-TCDD to the hazard index calculations would most likely not affect the overall conclusions of the risk assessments. Revise Tables F-4.2.8, F-4.2.19, and F-4.2-30 to include hazard quotients (HQs) for arsenic, bis(2-ethylhexyl)phthalate, methylene chloride, and 2,3,7,8-TCDD for accuracy.

Comment 16. F-2, Johnson and Ettinger Model Spreadsheets, Table F-4.2-20:

NMED's Comment: The EPC utilized for zinc (43.85 mg/kg) is inconsistent with the EPC of 40.58 mg/kg listed on Table F-3.3-9. It is noted that the overall results of the risk assessment are not affected by this inconsistency since the EPC that was used is greater than the EPC listed on Table F-3.3-9 and results in a more conservative risk estimate. Modify Table F-4.2-20 to include the correct EPC and modify any calculations that would be affected.

Comment 17. F-2, Johnson and Ettinger Model Spreadsheets, Table F-4.2-36:

NMED's Comment: Supporting Johnson and Ettinger spreadsheets indicate that a reference concentration (RfC) of 0.35 mg/m^3 was used to calculate the risk-based indoor soil concentration for acetone. The currently accepted RfC for acetone, listed in the SSLs, is 31 mg/m^3. It is noted that the RfC of 0.35 mg/m^3 that was utilized in the calculation results in a more conservative risk estimate and would not affect the overall results. Regardless, update the calculation to utilize the

appropriate toxicity value (31 mg/m^3) for acetone and include the updated results on Table F-4.2-36.

The Permittees must address all comments and submit a revised report by **February 28, 2011.** The revised Report must include a response letter that details where all revisions have been made, cross-referencing NMED's comments. All submittals (including 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 an electronic version of the Report that indentifies where all changes have been made in redline-strikeout format.

Please contact Pat Stewart at (505) 476-6059 should you have any questions.

Sincerely,

James Bearzi
Chief
Hazardous Waste Bureau

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