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May 2, 2011

MAY 2011

DCN: NMED-2011-17

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 "Middle Los Alamos Canyon Aggregate Area Investigation Report," dated March 2011

Dear Mr. Cobrain:

Attached please find draft technical review comments on the risk assessment portions of Los Alamos National Laboratory's (LANL) "Middle Los Alamos Canyon Aggregate Area Investigation Report", dated March 2011.

Dioxins/furans were only included in the analytical suites for a few AOCs/SWMUs at Middle Los Alamos Canyon Aggregate Area. Risk assessments conducted at sites where dioxins/furans were analyzed for revealed that detected concentrations of dioxins/furans contributed significantly to the total lifetime excess cancer risk calculations, and at least two sites led to the total lifetime excess cancer risk being above the NMED target risk level of  $1E-5$ . Since detections of dioxins/furans led to significant risks at sites where dioxins/furans were analyzed, it is suggested that dioxins/furans should be included in the sampling and analysis plan for all sites at Middle Los Alamos Canyon Aggregate Area. The lack of data on concentrations of dioxins/furans at AOCs/SWMUs sampled within Middle Los Alamos Canyon Aggregate Area appears to constitute a data gap for the nature and extent of contamination investigations and the human and ecological risk assessments. NMED may wish to evaluate amending the investigation report at Middle Los Alamos Canyon Aggregate Area to require additional analytical data for dioxins/furans.

In Section 6.29.4.4, it is inferred that the extent of arsenic contamination was defined during the Phase I investigation at AOC 02-011(d), as no additional sampling was conducted during the Phase II investigation to further define the extent of arsenic contamination. It is questionable whether the extent of arsenic has been adequately defined at AOC 02-011(d) since one detection of arsenic in sediment (8.7 mg/kg) at sample location 02-01247 (Figure 6.29-2) was above the sediment background comparison value of 3.98 mg/kg, and no subsurface samples were collected along the industrial waste line and additional samples may reveal increasing

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concentrations of arsenic with increasing depth. Additional sampling may be warranted at AOC 02-011(d) in order to further define the extent of contamination of arsenic for the following reasons:

- The elevated detection of arsenic has led to a residential risk estimate that exceeds the NMED target risk level of 1E-5 (Section H-4.5.26).
- Section H-4.4.2 states that the elevated detection of arsenic is naturally occurring.
- Section H-4.5.26 states that there are no unacceptable risks to residents from exposure to soil/sediment at AOC 02-011(d).

NMED may wish to further evaluate the nature and extent of contamination of arsenic at AOC 02-011(d) to determine whether the site has been adequately characterized or whether additional sampling in subsurface media at AOC 02-011(d) may be warranted.

There is some concern with rounding of risk estimates as well as concluding that risks slightly above the target risk levels are acceptable. Interpretation of risk is at the discretion of the NMED. In some cases, sufficient site data, use of conservative assumptions, and other factors may lead to an acceptance of elevated risk. In other cases there may be sufficient uncertainty to conclude that while only slightly elevated, there is concern that excess risk is present and additional investigation and/or corrective actions are required. NMED may wish to evaluate these rounded risk estimates on a case-by-case basis.

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,



Paige Walton  
AQS Senior Scientist and Program Manager

CC: Ben Wear, NEMD (electronic)  
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## Draft Technical Review Comments on the “Middle Los Alamos Canyon Aggregate Area Investigation Report,” dated March 2011

### General Comments

1. The construction worker scenario was not evaluated in the risk assessments conducted at Middle Los Alamos Canyon Aggregate Area. The risk assessments must demonstrate that residual contamination is protective of all potential receptors if LANL is proposing corrective action complete without controls. This includes a future construction worker receptor, whether future construction, demolition and decommissioning, or remediation activities are proposed or not. The construction worker receptor must be evaluated at solid waste management units (SWMUs) and areas of concern (AOCs) at Middle Los Alamos Canyon Aggregate Area for the following reasons:

- The foreseeable reasonable future use of sites Middle Los Alamos Canyon Aggregate Area is industrial and/or recreational (Section 4.1). It is plausible to assume that at some point in the future, intrusive activities may occur in these areas.
- If a SWMU/AOC is proposed for the status of corrective action complete without controls, no land controls would be instated to prevent future construction activities.
- An evaluation of residential risk does not always equate to an assumption of protectiveness for all receptors. In several cases, the screening levels for metals for a construction worker are more conservative than those for a resident.

Modify the risk assessments at Middle Los Alamos Canyon Aggregate Area to include evaluation of the construction worker receptor.

2. The toxicity equivalency factor (TEF) of 0.001 utilized in the risk assessments conducted at Middle Los Alamos Canyon Aggregate Area for heptachlorodibenzodioxin[1,2,3,4,6,7,8-] is inconsistent with the TEF of 0.01 listed on the World Health Organization website [http://www.who.int/ipcs/assessment/tef\\_update/en/](http://www.who.int/ipcs/assessment/tef_update/en/). As such, the toxic equivalency calculations and cancer risks have been underestimated at sites containing heptachlorodibenzodioxin[1,2,3,4,6,7,8-]. Revise all tables, risk calculations, and conclusions with respect to the corrected TEF for heptachlorodibenzodioxin[1,2,3,4,6,7,8-].
3. The USEPA Regional Screening Levels (RSLs) for mercury (inorganic salts) were utilized for the residential and industrial scenarios, rather than the NMED (2009) soil screening levels for mercury. Clarify whether analytical results define speciation of mercury, thus justifying the use of the RSLs and toxicity data for mercury salts.
4. The vapor intrusion pathway was not evaluated at Middle Los Alamos Canyon Aggregate Area. Although no definable plume has been shown to be present (Section H-4.3), volatile organic compounds (VOCs) were included in the lists of analyses requested and were detected at some of the AOCs/SWMUs. The vapor intrusion pathway must be evaluated, at a minimum a qualitative discussion, at all sites where VOCs were detected, whether or not

buildings are present or are expected to be constructed in the future. To qualify for the status of corrective action complete without controls, the risk assessments must address (qualitatively and/or quantitatively) all potential exposure pathways.

### **Specific Comments**

1. Tables H-2.2-1 through H-2.2-56. Most of the tables display a negative value for the minimum concentrations (nondetected and some detected concentrations) for radionuclide COPCs. It is not possible to have a negative concentration. Modify Tables H-2.2-1 through H-2.2-56 accordingly.
  
2. Table H-4.2-59. The toxic equivalency calculations are incorrect for the following constituents of potential concern (COPCs):
  - Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]
  - Hexachlorodibenzodioxin[1,2,3,4,7,8-]
  - Hexachlorodibenzodioxin[1,2,3,6,7,8-]
  - Hexachlorodibenzodioxin[1,2,3,7,8,9-]
  - Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]
  - Pentachlorodibenzodioxin[1,2,3,7,8-]

Therefore, the 2,3,7,8-tetrachlorodibenzodioxin toxic equivalency sum has been underestimated. Modify Table H-4.2-69 accordingly and any subsequent tables that would be affected.

3. Table H-4.2-59. The exposure point concentration (EPC) listed for heptachlorodibenzofuran[1,2,3,4,7,8,9-] ( $6.57E-6$  mg/kg) is inconsistent with the EPC of  $1.468E-5$  mg/kg listed on Table H-2.2-13. Modify Table H-4.2-59 accordingly, and any subsequent tables that would be affected.
  
4. Sections 6.8.5 and H-4.5.7. The text concludes that the omission of arsenic from the residential risk calculations at SWMU 02-004(b,c,d) would result in an acceptable level of risk for the resident, and that site concentrations would not pose any potential unacceptable risks for a residential receptor. Arsenic should not be omitted from consideration in the conclusions for the following reasons:
  - Arsenic exceeded maximum background concentrations in several samples and site concentrations are statistically different than background;
  - The residential EPC for arsenic should not be compared to background ranges as it is generally incorrect to compare a 95% upper confidence limit (UCL) to background concentrations;
  - Concentrations of dioxins/furans posed a greater risk to residential receptors than arsenic;

- Since the TEF used for heptachlorodibenzodioxin[1,2,3,4,6,7,8-] was incorrect (as noted in General Comment Number 2), risks from exposure to dioxins/furans have been underestimated. Therefore, exposure to dioxins/furans may pose an unacceptable level of risk to residents, independent of arsenic exposure.

Modify the conclusions in Section 6.8.5 and H-4.5.7 to include arsenic in the risk evaluation, and determine if potential unacceptable risks to residential receptors may exist at SWMU 02-004 (b,c,d) from exposure to dioxins/furans.

5. Table H.2-2-16. There is a typographical error for the EPC for 2,3,7,8-tetrachlorodibenzodioxin (105E-6 mg/kg). The EPC should be 1.05E-6 mg/kg, as shown in Table 6.11-3. Revise Table H.2-2-16 accordingly.
6. Table H-4.2-78. The residential risk from exposure to dioxins/furans has been underestimated at AOC 02-004(e) due to an incorrect TEF value as explained in General Comment Number 2. As the current risk is estimated to be at the NMED target level of 1E-5, the corrected risk level is likely to be above the NMED target risk level of 1E-5. Utilizing the correct TEF for heptachlorodibenzodioxin[1,2,3,4,6,7,8-], determine if COPCs present at AOC 02-004(a) would pose an unacceptable level of risk to residential receptors.
7. Table H-4.2-97. The residential risk from exposure to dioxins/furans has been underestimated at AOC 02-004(g) due to an incorrect TEF value as explained in General Comment Number 2. As the current risk is estimated to be at the NMED target level of 1E-5, the corrected risk level is likely to be above the NMED target risk level of 1E-5. Utilizing the correct TEF for heptachlorodibenzodioxin[1,2,3,4,6,7,8-], determine if COPCs present at AOC 02-004(g) would pose an unacceptable risk to residential receptors.
8. Sections H-4.5.10 and H-4.4.2. The risk assessment conducted at AOC 02-004(g) demonstrates that the total dose to residents is 17 mrem/yr, which is above the DOE target dose limit of 15 mrem/yr. Sections H-4.5.10 and H-4.4.2 explain that the majority of the dose is due to a single sample with a high detection of cesium-137. The conclusions of the risk assessment state that no unacceptable doses exist for a resident based on the removal of the high detection of cesium-137 from the radionuclide dataset. No reason is provided for why it is justified to remove this detection from the dataset. Rather a more compelling argument would be a spatial evaluation of risk driven by a single detection. However, a residential receptor would be exposed to all surface soil at AOC 02-004(g) and removal of this detection of cesium-137 from consideration in the risk assessment is not justified. Further, radionuclide COPCs are of particular concern at Middle Los Alamos Canyon Aggregate Area based on site history. Provide additional lines of evidence to justify the radiological risk at AOC 02-004(g).
9. Tables H-4.2-94, H-4.2-97, and H-4.2-101. The EPC listed for 2-methylnaphthalene (0.0178 mg/kg) is inconsistent with the EPC of 0.0152 mg/kg listed on Tables H-2.2-19 and H-2.2-

20. It is noted that the EPC used is greater and results in a more conservative hazard index, and therefore does not affect the risk assessment. However, modify Tables H-4.2-94, H-4.2-97, and H-4.2-101 to display the correct EPC for 2-methylnaphthalene.

10. Table H-2.2-19. The analyte 1,2,3,4,7,8-hexachlorodibenzodioxin is not listed on Table H-2.2-19, and is inconsistent with Table 6.13-3. This does not affect the conclusions of the risk assessment as 1,2,3,4,7,8-hexachlorodibenzodioxin was included for evaluation in the risk assessment. However, modify Table H-2.2-19 to include 1,2,3,4,7,8-hexachlorodibenzodioxin.

11. Section H-4.4.2. The uncertainty discussions for AOCs 02-006(b), 02-006(e), and 02-011(d) state that elevated levels of arsenic are likely background related based on comparing the 95% UCL on the mean with background comparison values. It is incorrect to compare a mean concentration with a background comparison value. 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. Remove these discussions from the text in Section H-4.4.2 and retain arsenic for evaluation in the risk assessment conclusions for AOCs 02-006(b), 02-006(e), and 02-011(d). Determine if additional lines of evidence would suggest that the elevated detections of arsenic are representative of background concentrations.