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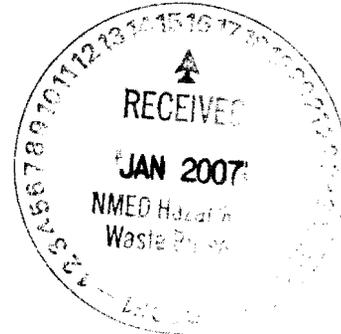


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ENTERED

January 10, 2007

Mr. David Cobrain
State of New Mexico Environment Department
Hazardous Waste Bureau
2905 Rodeo Park Drive East
Building One
Santa Fe, New Mexico 87505-6303



Reference: Work Assignment No. 06280.100; State of New Mexico Environment Department, Santa Fe, New Mexico; LANL Risk Assessment Support; Review of Appendix G of the Investigation Report for Material Disposal Area C, Solid Waste Management Unit 50-009, at Technical Area 50, Task 2 Deliverable.

Dear Mr. Cobrain:

This deliverable addresses the above-referenced work assignment and provides risk assessment review comments on Appendice G of the Investigation Report for Material Disposal Area C (MDA C) at Technical Area 50 at Los Alamos National Laboratory (LANL) dated December 2006.

The human health screening risk assessment in Appendix G indicates that the industrial risks are below the NMED threshold of 1×10^{-5} and a hazard index of 1.0. However, the summary of these results in the main report, Section 7.4 Summary of Risk Screening, does not acknowledge that the future residential risk exceeds the NMED risk threshold of 1×10^{-5} due to arsenic or the implications associated with this conclusion on corrective action decisions. First, Section 7.4 should state that an exceedance of the NMED risk threshold for residential risks suggests that landuse controls (LUCs) are needed in the event that the site is no longer under Laboratory control. It is possible that the risks are representative of background conditions however this is not discussed in the report or Appendix G. Second, Appendix G should state that the exceedance of the NMED threshold is due to the presence of arsenic at a maximum concentration of 7.11 mg/kg, and discuss the uncertainties associated with this conclusion. For example, it is possible that the distribution of arsenic concentrations at the site are representative of background conditions suggesting LUCs may not be required. The report would benefit by acknowledging all risk results, both industrial and residential, and placing these results in proper perspective to justify corrective decisions and support the need for LUCs or not.

The 95% upper confidence level of the mean (UCL) was used as the exposure point concentration (EPCs) in the risk assessment, where the UCLs were calculated using the United States Environmental Protection Agency's (USEPA) model ProUCL. Consistent with guidance

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for calculating EPCs, if a UCL could not be estimated or was deemed inappropriate, the site maximum detected value (MDV) was used as the EPC for the human risk assessment. No comments were drafted concerning EPCs.

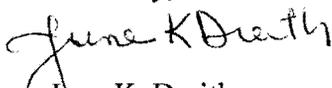
Groundwater was not evaluated in the risk assessment. The rationale for concluding that migration of contaminants in site soil to groundwater was not likely to occur include: (1) the depth to groundwater (1300 feet), (2) horizontal and vertical migration of contamination is limited by the low moisture content of the subsurface, (3) use of chloride mass-balance to demonstrate vadose zone fluxes are low and residence times long, and (4) lack of hydrostatic pressure (as measured by the USGS [1956 to 1961] within specific underlying conditions associated with MDA C). In addition, the report appropriately referenced information presented in Appendix F that further supports that groundwater likely has not been impacted by site soils, by referencing decreasing trends or stable concentrations in borehole data. Thus, the report has adequately supporting that the soil-to-groundwater migration pathway is not of concern.

Upon review of supplemental information provided with Appendix K, Summary of Biota Sampling Results, it appears that other potential lines of evidence were gathered in support of the Ecological Screening Risk Assessment (ESRA). However, this information was not incorporated into the appropriate portions of Appendix G, Risk Assessment. It is requested that the information provided within Appendix K be brought to 'closure' by presenting the relevant findings pertinent to the ESRA and their potential uncertainties. A specific comment has also been generated to address this issue.

There were few technical issues noted with the human health and ecological risk assessments. The assessments were conducted consistent with approved methodologies. A spot check of residential screening levels and ecological toxicity equivalency factors was conducted against LANL's EcoRisk database (version 2.2) and no discrepancies were noted.

This letter deliverable was emailed to you on January 10, 2007 at David.Cobrain@state.nm.us to Ms. Kathryn Chamberlain at kathryn.chamberlain@state.nm.us. A formalized hard (paper) copy of this letter deliverable will be sent via mail. If you have any questions, please call me at (303) 464-6525 or Ms. Claire Marcussen at (352) 332-0669.

Sincerely,


June K. Dreith
Program Manager

Enclosure

cc: Ms. Kathryn Chamberlain, NMED
Ms. Claire Marcussen, TechLaw
TechLaw Files

TASK 2 DELIVERABLE

**RISK ASSESSMENT REVIEW OF APPENDIX G OF THE
INVESTIGATION REPORT MATERIAL DISPOSAL AREA C
AT TECHNICAL AREA 50
LOS ALAMOS NATIONAL LABORATORY
DECEMBER 2006**

LANL Risk Assessment Support

Submitted by:

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Submitted to:

**Mr. David Cobrain
State of New Mexico Environment Department
Hazardous Waste Bureau
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Building One
Santa Fe, New Mexico 87505**

In response to:

Work Assignment No. 06280.100.0002

January 10, 2007

**RISK ASSESSMENT REVIEW OF APPENDIX G OF THE
INVESTIGATION REPORT MATERIAL DISPOSAL AREA C
AT TECHNICAL AREA 50
LOS ALAMOS NATIONAL LABORATORY
DECEMBER 2006**

TECHNICAL REVIEW COMMENTS

1. **Investigation Report, Section 5.1, Screening Levels, page 20.** This section indicates that only industrial landuse-based human health screening levels were used. However, Appendix G Risk Assessment, indicates that residential screening levels were also included in the analysis. To be consistent, this section should include that residential-based screening levels were also used in the analysis.
2. **Investigation Report, Section 7.4 Summary of Risk Screening, page 30.** This section does not include the summary of risks associated with the residential scenario although this scenario was evaluated in the human risk assessment. It is understood that the residential scenario is not a decision scenario for the determination of further investigation or corrective action, however, this scenario is evaluated to determine the need for landuse restrictions. For this site, a summary statement needs to be expanded to also conclude that the residential scenario exceeds the NMED target risk level of 10^{-5} (NMED 2006, 92513) due to the presence of arsenic, therefore, landuse restrictions are required for the site unless it can be demonstrated that the arsenic is representative of background levels. Please include the residential scenario to accurately reflect the results of the risk assessment presented in Appendix G.
3. **Appendix G, Section G-3.1, Receptors and Exposure Pathways, page G-3--**The first paragraph of this section indicates that the residential scenario is evaluated for informational purposes only without providing a clear description on what purpose this information serves. Similar statements are made throughout the appendix. The reason a residential scenario is included as a future land use is to determine the need for landuse controls (LUCs) or other type of institutional control (ICs), in the event landuse were to ever change from current uses. Please remove reference to “informational purposes only” in this section and throughout the report and replace with a rationale as to why the residential scenario must be evaluated.
4. **Appendix G, Section G-3.1, Receptors and Exposure Pathways, page G-3--**This section does not describe why vapor intrusion for a future industrial building was not evaluated at a potential exposure pathway. According to Table 6.7-1, Comparison of Pore-Gas and Core Sample VOC Concentrations, a number of VOCs were detected in pore gas, which would suggest that vapor intrusion from the subsurface into a future building could be a potentially complete exposure pathway. USEPA’s *Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Soil Vapor Intrusion Guidance)* EPA 530-F-02-052, Office of Solid Waste and Emergency Response, Washington, D. C. provides default shallow soil gas [5 feet or less below ground surface (bgs)] and deep soil gas (greater than 5 feet bgs) screening levels that are protective of indoor air; the screening values for a 1×10^{-5} risk and a hazard index (HI) of 1.0 should be used. In

addition, this guidance references the use of a spreadsheet model, such as the Johnson and Ettinger model that can also be used. Please provide additional lines of evidence for determining that the pore gas data are not applicable to the risk assessment as a source for indirect exposure via inhalation, otherwise the data should be used in a screening evaluation of this pathway to support the need for landuse controls for this site.

5. **Appendix G, Section G-3.0, Conceptual Site Model, Page G-7**—There appears to be a paragraph missing from this section as the components and objectives of a conceptual site model (CSM) are not described. Previous reviews of other MDA risk assessment documents provide a brief summary of the contaminant sources, current and reasonable future landuses, followed by environmental fate and transport analysis and identification of potential exposure pathways for human health and ecological receptors. Please complete the description of the conceptual side model for this section to expand on contaminant sources, current and reasonable future landuses, and the reasons for including or excluding specific exposure pathways.
6. **Appendix G, Section I-5.0, Human Health Risk Results, page G-9**—The third paragraph of this section indicates that residential risks were evaluated for information purposes only. As stated previously, it is understood that the residential scenario is not a decision scenario for further investigation or corrective action, however, this scenario is evaluated to determine the need for landuse restrictions. Therefore, to place the residential risks in proper perspective, a summary statement needs to be included that explains whether the residential scenario above the NMED target risk level of 10^{-5} (NMED 2006, 92513) due to arsenic, is representative of background conditions otherwise, landuse restrictions are required for the site.
7. **Appendix G, Section G-5.2, Interpretation, page G-12**—This section only interprets the results of the risks associated with an industrial exposure and excludes the results of the hypothetical residential exposure even though the risks were calculated for residential exposure. This section should include a second paragraph that summarizes that total estimated excess cancer risk for the residential landuse which is approximately 2×10^{-5} . This section should indicate that the residential risk is above the NMED target level of 10^{-5} due to the presence of arsenic at an exposure point concentration (EPC) of 7.11 mg/kg. If this EPC is representative of background conditions, then landuse controls are not required for the site. Please determine if arsenic risks are representative of background, otherwise, the site residential risk results support the need for landuse controls at this site.
8. **Appendix G, Section G-6.5.3, Screening Data, page G-15**--This section describes the uncertainties associated with the lack of surface analytical inorganic data in the ecological risk assessment. A qualitative analysis is presented demonstrating that if the screening-level data were used, the hazard quotient for silver is 120, however, the risk is then discounted because the report states that the vegetative community at MDA C appears healthy and not affected by any COPECs. A general observation that the vegetative community appears healthy does not substantiate the lack of ecological risk without further site-specific information. Additional information should include a table presenting the qualitative comparison to the screening-level data similar to Table G-6.4-1, Final ESL Comparison for

MDA C, as well as documentation that indicates the current plant community is representative of the diversity and abundance of species expected for this area under unimpacted conditions.

9. **Appendix G, Section G-7.0, Conclusions, page G-16**--This section does not include the summary of risks associated with the residential scenario although this scenario was evaluated in Section G-5.0, Human Health Risk Assessment Results, the human risk assessment. It is understood that the residential scenario is not a decision scenario for the determination of further investigation or corrective action, however, this scenario is evaluated to determine the need for landuse restrictions. For this site, a summary statement needs to be expanded to also conclude that the residential scenario exceeds the NMED target risk level of 10^{-5} (NMED 2006, 92513) due to the presence of arsenic, therefore, landuse restrictions are required for the site unless it can be demonstrated that the arsenic is representative of background levels. Please include the residential scenario to accurately reflect the results of the risk assessment presented in Appendix G.
10. **Appendix G, Figure G-3.1-1. Conceptual site model for MDA C, page G-21**--The soil pore gas data indicate detections of a number of volatile organic compounds (VOCs); however, the conceptual site model does not address the presence of vapors in the subsurface as a potential source contributing to the future vapor intrusion exposure pathway if a building were to be built on this site. Please revise the figure to include inhalation exposure from subsurface vapors and revise the text to include rationale for including/excluding this pathway from further analyses.
11. **Appendix G, Table G-2.2-1 Exposure Point Concentrations for the Industrial Scenario and Ecological Assessment (0–1- and 0–5-ft bgs depths, respectively), page G-23**—This table indicates that two sets of exposure point concentrations (EPCs) are presented corresponding to two depth intervals, 0–1- and 0–5-ft bgs depths, respectively, however, it appears only one set of values are presented. This table is unclear whether these EPCs are inclusive of 0-5 feet and used for both the industrial and ecological risk assessment, or it is possible that this table is incomplete and there should be two sets of EPCs presented. Please correct this discrepancy to clearly present what EPCs were used in the industrial scenario and the ecological risk assessment.
12. **Appendix K, Summary of Biota Sampling, page G-23**—According to the Investigation Report (page 8) biota sampling was conducted to determine whether any evidence of uptake and transport of contaminants by biota could be found at MDA C. Although the uptake pathway by biota and results of this sampling were not considered in the SERA, it may be due to the fact that severe flaws exist in this study as described in Appendix K. First, there was no scientific design for the study of transport of contaminants (ants and burrowing mammals) and the uptake of contaminants in tree needles. For example, there are no 'background' points and no statistical correlations between variables (tree age with needle content). In addition, the assumptions (such as the use of needles as an indicator of uptake) are flawed because there could well be 'fall out values' on the surface not measured and compared to actual needle tissue content. As a result of the lack of a study design, the study is not associated with any relevant assessment endpoint (i.e., what information is furnished

by the 'needle tissue value' to evaluate ecological risk). The study as presented does not provide useable information to determine exactly what was measured and how and whether any quality assurance and quality control was conducted. Appendix K should be removed from the report or be significantly revised in order to provide the appropriate information to render the study valid for supporting contaminant transport and uptake by biota conclusions. In addition, if this data is intended for use in the SERA, a relevant assessment endpoint needs to be identified prior to study design in order to ensure that the measurable data can support the evaluation of the assessment endpoint.