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October 12, 2007

DCN 06280.100.ID.012

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 the Investigation Report for Middle Mortandad/Ten Site Aggregate, Revision 1, and Associated Risk Assessment Appendices dated July 2007.

Dear Mr. Cobrain:

This deliverable addresses the above-referenced work assignment and provides risk assessment review comments on the human risk assessment sections of the Investigation Report (IR) for Middle Mortandad/Ten Site Aggregate, Revision 1, at Los Alamos National Laboratory (LANL) dated July 2007 as well as relevant appendices. The baseline human health risk assessment (HHRA) is presented in Appendix F of the IR with risk assessment results for each subarea presented in the subarea-specific conclusion sections of the IR. Supporting information located in Appendix D, Data Review, was also reviewed as part of the technical review of the risk assessment methodology and results.

Mr. Dhawan of NMED indicated a concern that the upper 95th confidence limit (UCL) on the mean may not have been calculated appropriately for sites with small data sets. To address this concern TechLaw reviewed Section D-1.2, Overview of Upper Confidence Limit Calculations, Page D-2, of the IR. According to this section, the risk assessment defaulted to the maximum reported concentration when the calculated 95% UCL was greater than the maximum reported concentration, or when the number of sampling results for a particular analyte was too small (less than ten samples). Thus, based on the information contained in this section of the IR, it appears that the UCLs were estimated appropriately using the ten sample set as a threshold for an insufficient number of samples.

A second concern raised by Mr. Dhawan of NMED is that the IR used a cancer-based Soil Screening Level (SSL) from EPA Region 6 over the cancer-based NMED SSL for Aroclor-1260. Table A-1: NMED Soil Screening Levels, as presented in the latest version of NMED's *Technical Background Document for Development of Soil Screening Levels dated June 2006*, presents the lower of the 1×10^{-5} cancer-based SSL or noncancer-based SSL. Thus for Aroclor-1260, the noncancer-based SSL of 1.12 milligram per kilogram (mg/kg) is listed in Table A-1



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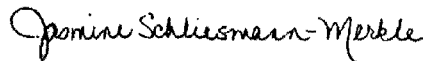
Page 2

because the cancer-based SSL of 2.2 mg/kg (not presented in the NMED guidance) is higher than the noncancer-based SSL. The EPA Region 6 cancer-based SSL of 0.22 mg/kg is based on a target risk of 1×10^{-6} , thus, to reflect the 1×10^{-5} NMED target risk level the cancer-based value of 0.22 mg/kg was adjusted by a factor of 10, resulting in a final cancer-based SSL of 2.2 mg/kg. The EPA Region 6 SSL for Aroclor-1260 is equivalent to the NMED value, however, the NMED cancer-based value is not shown in the NMED guidance Table A-1.

There were few technical issues noted with the human health risk assessments. The assessments were conducted consistent with approved methodologies and incorporated the majority of comments furnished on previous LANL documents. However, general comments were generated to address: 1) inconsistencies in the presentation of risk results throughout the IR; 2) exclusion of a screening evaluation using NMED's leachability-based soil screening levels (SSLs); and 3) exclusion of an industrial screening evaluation at five of the seven subareas even though these subareas have been designated for industrial use. Several subarea-specific comments were also generated in support of the general comments.

This letter deliverable was emailed to you today at David.Cobrain@state.nm.us and to Mr. Neelam Dhawan at neelam.dhawan@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 (770) 752-7585, extension 105 or the technical lead, Ms. Claire Marcussen at (352) 332-0669.

Sincerely,



Sincerely,
Jasmine Schliesmann-Merkle
Vice President

Enclosure

cc: Mr. Neelam Dhawan, NMED
Ms. Claire Marcussen, TechLaw
TechLaw Files

TASK 2 DELIVERABLE

**RISK ASSESSMENT REVIEW OF THE INVESTIGATION REPORT
MIDDLE MORTANDAD/TEN SITE AGGREGATE, REVISION 1
LOS ALAMOS NATIONAL LABORATORY
JULY 2007**

LANL Risk Assessment Support

Submitted by:

**TechLaw, Inc.
310 Maxwell Road, Suite 500
Alpharetta, GA 30004**

Submitted to:

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

In response to:

Work Assignment No. 06280.100.0002

October 12, 2007

**RISK ASSESSMENT REVIEW OF THE INVESTIGATION REPORT
MIDDLE MORTANDAD/TEN SITE AGGREGATE, REVISION 1
LOS ALAMOS NATIONAL LABORATORY
JULY 2007**

GENERAL COMMENTS

1. The potential for soil contamination to impact groundwater was not adequately addressed in the risk assessment of the Investigation Report for Middle Mortandad/Ten Site Aggregate (IR). A general discussion of chemical properties affecting the mobility and persistence of inorganic and organic contaminants in soil was included in Section F-2.1, Environmental Fate and Transport, as a basis for determining that migration to groundwater would not occur at the site. However, a migration screen using New Mexico Environment Department (NMED) soil screening levels (SSLs) for the protection of groundwater was not conducted. To adequately support the conclusion that constituents will not reach groundwater, a migration-based screen using available NMED SSLs should be conducted. Relying solely on qualitative statements regarding chemical properties is not sufficient justification for eliminating this pathway from further evaluation. Revise the risk assessment to include a migration screen using NMED SSLs for the protection of groundwater.

2. The IR, including Appendix F, Risk Assessment, requires a thorough quality control (QC) review to ensure that the risk results summarized in the main text for each subarea are reflective of the information in Appendix F. Numerous discrepancies were noted where residential risks were referred to as industrial or recreational risks and the risk results were stated as equivalent to a threshold when in fact the result were well below the threshold. Even within Appendix F inconsistencies were noted in the interpretation of the risks associated with each land use scenario as land use scenarios were identified incorrectly. It is apparent that there are discrepancies between the main text of the IR and Appendix F as well as within the risk interpretations included in Appendix F. The entire report requires a thorough cross-check of text versus tables to ensure that the risk results and the words “residential”, “industrial”, and “recreational” are not interchanged. The risk results need to be summarized accurately and consistently throughout the IR in order to support risk management decisions. Further, the entire IR requires a thorough QC check to ensure that the risk results are accurately presented for each site. Specific comments have been generated to address this concern; however, these comments do not address all discrepancies in the IR. As such, the entire document must be reviewed to ensure that all discrepancies are identified and eliminated.

3. The Ten Site Slope, Mortandad Slope, Pratt Canyon, Ten Site Canyon, and East Ten Site Slope subareas are designated for industrial use. However, the default industrial worker exposure assumptions (8 hour work day for 225 days per year) were not considered realistic for the actual use of these subareas. Therefore, the screening evaluation used the recreational scenario SSLs which are based on a 1 hour per day exposure for 200 days per year. These are reasonable assumptions for current use; but if the subareas were to be

redeveloped for industrial use, risks to future industrial workers have not been adequately assessed. Please clarify why future industrial use is not a reasonable land use for these subareas in the event that the sites are redeveloped for industrial purposes. If such clarification cannot be provided, an industrial screen should be performed to determine if any site restrictions or remedial actions are necessary for these subareas.

**RISK ASSESSMENT REVIEW OF THE INVESTIGATION REPORT
MIDDLE MORTANDAD/TEN SITE AGGREGATE, REVISION 1
LOS ALAMOS NATIONAL LABORATORY
JULY 2007**

SPECIFIC COMMENTS

1. Investigation Report, Executive Summary, Page vii

The second paragraph on Page vii indicates a slightly elevated excess potential cancer risk at AOC 35-018(a) in the Mesa Top Subarea due to elevated concentrations of polycyclic aromatic hydrocarbons (PAHs) located directly beneath the asphalt pavement. Without addressing the risks to potential future workers if the site were redeveloped and the pavement removed or to utility workers in the event that utility repairs are required, the paragraph concludes that no complete pathways exist for a site worker. The paragraph must specify that there are no *current* exposure pathways for industrial workers. In addition, an explanation of how future worker exposure to site soils will be prevented and/or controlled is required.

2. Investigation Report, Section 3.0, Scope of Activities, Page 5

At the top of Page 5, the IR acknowledges that preliminary analytical results for confirmation samples collected at SWMUs 35-016(o) and 35-016(p) are available but not validated and are not included in the IR. However, the report continues to present interpretations of these data and concludes that the extent of PAHs and inorganic chemicals has been defined and no additional risk issues will result. The IR should not present interpretations or draw conclusions based on these data unless the data are included in the IR. Further, the IR should indicate when the validated data will be available and identify the specific report in which the data will be presented. This information is needed so that the preliminary conclusions presented in Section 3.0 of the IR can be verified. It should be noted these same interpretations and conclusions regarding the unvalidated data are also presented in Appendix F, Section SWMU 35-016(p) on Page F-79.

3. Investigation Report, Section 5.3, Conclusions – Mesa Top Subarea, Page 13

The fourth paragraph of Section 5.3 indicates that a risk of 4×10^{-5} at AOC 35-018(a) does not pose a potential unacceptable risk to human health because the risk drivers (PAHs) are: 1) located beneath pavement and 2) the PAHs are not operational releases. First, the paragraph does not specify whether the 4×10^{-5} risk is current or a future risk. Under current conditions it is understood that the PAHs are not available for exposure because they are detected below pavement. However, the future risks may be real if the pavement were removed for redevelopment or utility repair. Second, a risk cannot be discounted as acceptable because the PAHs are stated as not operational releases. If the

PAHs are available for exposure in the future, then the risk is real and above the 1×10^{-5} NMED threshold, making the risk unacceptable. Furthermore, the document has demonstrated that PAHs are related to site operations. As acknowledged in the second paragraph on Page 8, Section 5.0, Mesa Top Subarea, the operational history of this area may include a variety of inorganic, organic, and radiological contaminants as a result of past laboratory operations. The operational history includes oil spills which may have contributed a number of organic chemicals, including PAHs.

The IR must include accurate lines of evidence to support the claim that a risk above the NMED threshold of 1×10^{-5} is acceptable for future receptors. If this information is not available, at a minimum, the risk results justify the need for controls in this subarea to ensure future industrial exposure is reduced or mitigated. Note, this comment also applies to the bullet at the bottom of Page 46, Section 12.0, Summary of All Subareas/Aggregate.

4. Investigation Report, Section 6.3, Conclusions – Ten Site Slope Subarea, Page 19

The first paragraph on Page 19 summarizes the risk and dose results associated with the residential land use scenario. However, the total dose range is referred to inappropriately as the industrial dose range. According to Appendix F, Risk Assessment, Section F.4.4.4, Interpretation, the total dose range under the residential scenario is equivalent to a total risk range of 2×10^{-5} to 1×10^{-4} . Please ensure that the conclusions presented in Section 6.3 accurately reflect the information presented in Appendix F. In addition, for consistency between Appendix F and the main report text, ensure that Section 6.3 presents risk ranges from low to high rather than high to low.

5. Investigation Report, Section 8.3, Conclusions – Pratt Canyon Subarea, Page 31

The third paragraph of Section 8.3 indicates that a hazard index (HI) of 0.1 is less than or equivalent to NMED's target level of 1. This sentence is in error as 0.1 is less than but not equivalent to the target HI of 1. In addition, this paragraph inappropriately states that the total dose range for a "residential user" in the Pratt Canyon Subarea is equivalent to a total risk range of 2×10^{-5} to 5×10^{-5} . This sentence should refer to the total dose range for a "recreational user" and the total risk range should be 2×10^{-8} to 1×10^{-6} (see Page F-106, Section F-6.6.4, Interpretation, second paragraph). Please ensure that the conclusions presented in Section 8.3 accurately reflect the information presented in Appendix F, Risk Assessment.

6. Investigation Report, Section 9.3, Conclusions – Ten Site Canyon Subarea, Page 36

The second paragraph of Section 9.3 summarizes the residential risks; however, the results do not agree with the results presented on Page F-123 of Appendix F, Risk Assessment, Section F-7.4.4, Interpretation, first paragraph. The text states that the range of total excess cancer risks for this site is 5×10^{-9} to 4×10^{-7} which is equivalent to the NMED target level of 1×10^{-5} when in fact, the risks are well below the NMED target level of 1×10^{-5} . In addition, this paragraph inappropriately states that the total dose

range for a “recreational user” is equivalent to a total risk range of 5×10^{-5} to 4×10^{-6} . This sentence should refer to the total dose range for a “residential user”. It should be noted that Appendix F, Section F-7.4.4, Page F-123 also lists this same error; the words “recreational user” in the first paragraph should be replaced with “residential user”. Please ensure that the conclusions presented in Section 9.3 accurately reflect the information presented in Appendix F. In addition, for consistency between Appendix F and the main report text, ensure that risk ranges are presented from low to high rather than from high to low.

7. **Investigation Report, Section 10.3, Conclusions – East Ten Site Slope Subarea, Page 41**

The second paragraph of Section 10.3 presents a summary of the residential risks; however, the presentation does not agree with the results listed in Appendix F, Risk Assessment. The main text discussion states that the total dose range for a residential user is equivalent to a total risk range of 1×10^{-4} to 5×10^{-6} . However, Appendix F (see Section F.8.4.4, Interpretation, second paragraph, Page F-146) indicates that this total risk range is associated with an industrial exposure. The residential total dose range should be equivalent to 2×10^{-7} to 5×10^{-4} which is stated on Page F-146, Section F-8.4.4, first paragraph. However, Section F-8.4.4 later identifies 2×10^{-7} to 5×10^{-4} as the industrial total risk range. Revise Section 10.3 and Appendix F, Section F-8.4.4 to address these issues.

8. **Investigation Report, Section 11.3, Conclusions – Sigma Mesa Subarea, Page 46**

The first paragraph on Page 46 provides a summary of the residential risk results; however, the information does not agree with the results presented in Appendix F, Risk Assessment. Section 11.3 states that the total dose for an industrial user is equivalent to a total risk of 1×10^{-4} when it should be referring to a residential user. The same error is observed in Appendix F (see Section F.9.4.4, Interpretation, first paragraph, Page F-161), the total dose for a residential user is referred to as the total dose for an “industrial user.” Revise Section 11.3 and Appendix F, Section F.9.4.4 to eliminate these errors.

9. **Investigation Report, Table 5.3-1, Summary of Human Health Risk Screening for Site Decisions, Page 182**

As presented, Table 5.3-1 is not amenable to supporting site decisions because the results are not organized by subarea. To expedite review and site decision-making, this table should be sorted to present the subarea first, followed by the sites within the subarea. In addition, the table contains editorial errors. For example, for sites with a “c” designation, the “c” is displayed as a copyright symbol. Please reorganize the table by subarea and correct the editorial errors.

10. **Appendix F – Section F-3.3, Conceptual Site Model, Page F-26**

Section F-3.3 of Appendix F indicates that surface releases are likely to result in infiltration of contaminants into surface soils and through cracks in asphalt, into backfill

soils and possibly the underlying tuff. However, this section also states “The construction worker is not evaluated for the Mesa Top subarea because the exposure is assumed to be from the surface (0–1 ft).” Furthermore, this section states “If activities at the site change to include construction or other intrusive activities, EP will work with facility management to ensure workers are protected.” Because the subsurface soils were not evaluated in a human health risk assessment, a formal land use control must be implemented for this area to prevent future construction worker activities. Alternatively, assess the risk to receptor populations potentially exposed to subsurface soils.

11. Appendix F – Section F-3.4.3 Uncertainty Analysis, Page F-30

The fifth paragraph of the discussion of uncertainties in the Exposure Assessment indicates that 85% of the cancer risk at AOC 35-018(a) reported as 4×10^{-5} is from PAHs associated with the presence of asphalt and not from potential site releases. However, there is no discussion supporting this claim. To support the contention that elevated PAH constituents are not related to the site releases, the constituents associated with oil spills at the site should be identified. In addition, the text states that no complete exposure pathway to workers exists for the constituents of potential concern (COPCs) located under asphalt; however, no support of this statement is provided. Section F-3.1.2, Subsurface Conditions, indicates that there are utility lines (e.g. electrical, natural gas, water, sewer, and telephone) at the site; thus, the potential exists for a future construction worker/utility worker to contact subsurface soils if repairs are required. As acknowledged in the second paragraph on Page 8, Section 5.0, Mesa Top Subarea, the operational history of this subarea may include a variety of inorganic, organic, and radiological contaminants as a result of past laboratory operations. The operational history does include oil spills which may have contributed a number of organic chemicals, including PAHs. The IR must include clear justification supporting the conclusion that a risk exceeding the NMED threshold of 1×10^{-5} does not pose an unacceptable risk. In addition, information demonstrating that site releases were not associated with PAHs is needed.

12. Appendix F – Section F-4.4.1 Screening Levels, Page F-55

The second paragraph of Section F-4.4.1 states that the Ten Site Slope Subarea is designated for industrial use. However, the default industrial worker exposure assumptions, 8 hour work day for 225 days per year, were not considered realistic for the actual use of the subarea. Therefore, the screening evaluation used recreational scenario soil screening levels (SSLs) which are based on a 1 hour per day exposure for 200 days per year. These are reasonable assumptions for current use; however, if the site is redeveloped for industrial use, then future industrial risks have not been adequately assessed. Please clarify why future industrial use is not a reasonable land use for this subarea should the site be redeveloped for industrial purposes. Otherwise, an industrial screen should be performed to determine if any site restrictions or remedial actions are necessary.

13. Appendix F – Section F-5.4.1 Screening Levels, Page F-81

The second paragraph of Section F-5.4.1 states that the Mortandad Slope Subarea is designated for industrial use; however, the default industrial worker exposure assumptions, 8 hour work day for 225 days per year, were not considered realistic for the actual use of the subarea. Therefore, the screening evaluation used the recreational scenario SSLs which are based on a 1 hour per day exposure for 200 days per year. These are reasonable assumptions for current use; however, if the site is redeveloped for industrial use, then future industrial risks have not been adequately assessed. Please clarify why future industrial use is not a reasonable land use for this subarea should the site be redeveloped for industrial purposes. Otherwise, an industrial screen should be performed to determine if any site restrictions or remedial actions are necessary. Revise the IR to address this issue.

14. Appendix F – Section F-6.4.1 Screening Levels, Page F-103

The second paragraph of Section F-6.4.1 states that the Pratt Canyon Subarea is designated for industrial use; however, the default industrial worker exposure assumptions, 8 hour work day for 225 days per year, were not considered realistic for the actual use of the subarea. Therefore, the screening evaluation used the recreational scenario SSLs which are based on a 1 hour per day exposure for 200 days per year. These are reasonable assumptions for current use; however, if the site is redeveloped for industrial use, future industrial risks have not been adequately assessed. Please clarify why future industrial use is not a reasonable land use for this subarea should the site be redeveloped for industrial purposes. Otherwise, an industrial screen should be performed to determine if any site restrictions or remedial actions are necessary. Revise the IR to address this issue.

15. Appendix F – Section F-7.4.1 Screening Levels, Page F-120

The second paragraph of Section F-7.4.1 states that the Ten Site Canyon Subarea is designated for industrial use; however, the default industrial worker exposure assumptions, 8 hour work day for 225 days per year, were not considered realistic for the actual use of the subarea. Therefore, the screening evaluation used the recreational scenario SSLs which are based on a 1 hour per day exposure for 200 days per year. These are reasonable assumptions for current use; however, if the site is redeveloped for industrial use, future industrial risks have not been adequately assessed. Please clarify why future industrial use is not a reasonable land use for this subarea should the site be redeveloped for industrial purposes. Otherwise, an industrial screen should be performed to determine if any site restrictions or remedial actions are necessary. Revise the IR to address this issue.