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June 17, 2004

Mr. David Cobrain
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Reference: Work Assignment No. 06110.130.0003; State of New Mexico Environment Department, Santa Fe, New Mexico; Human Health and Ecological Risk Assessment Support; Risk Assessment Review of the Interim Action Completion Report for Solid Waste Management Unit 21-024(i) at Technical Area 21, Task 3 Deliverable.

Dear Mr. Cobrain:

Enclosed please find the deliverable for the above-referenced work assignment. The deliverable consists of risk assessment review comments on Los Alamos National Laboratory's (LANL) "Interim Action Completion Report for Solid Waste Management Unit 21-024(i) at Technical Area 21 [TA 21]," dated March 2003.

As noted in the attached comments, there were some fundamental errors noted in the risk assessment calculations. Based on this preliminary review, the overall risks may exceed the New Mexico target risk levels of 1.0 for noncancer risks and 1.0E-05 for cancer risks. It is anticipated that the risk assessment will require a major re-work and the overall conclusions presented in the report may change.

For several of the radionuclides, the background value for Qbt 3 was listed as "not available". The "Inorganic and Radionuclide Background Data for Soils, Canyon Sediments, and Bandelier Tuff at Los Alamos National Laboratory" document does provide a background value for these radionuclides in Qbt 3. However, the value is based upon minimum detection limits. The exclusion of the background value is conservative, and therefore no comments were drafted concerning this issue.

As best, the discussion of the risk assessment was vague. The report did not provide any of the calculations used in estimating risk. While the methodology applied was

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understood, many readers may not inherently know the calculation methodologies. Therefore, a comment was drafted concerning this issue.

The document is formatted in Word. A draft of the deliverable was emailed to you on June 17, 2004 at David_Cobrain@nmenv.state.nm.us. A finalized hard (paper) copy of this deliverable will be sent via mail. If you have any questions, please call me at (303) 763-7188 or Ms. Paige Walton at (801) 451-2978.

Sincerely,

Paige Walton
for

June K. Breith
Program Manager

Enclosure: Risk Assessment Review Comments on the Interim Action Completion Report for Solid Waste Management Unit 21-024(i) at Technical Area 21

cc: Mr. John Young, NMED
Ms. Paige Walton, TechLaw

TASK 3 DELIVERABLE

RISK ASSESSMENT REVIEW COMMENTS ON THE INTERIM ACTION COMPLETION REPORT FOR SOLID WASTE MANAGEMENT UNIT 21-024(i) AT TECHNICAL AREA 21

Human Health and Ecological Risk Assessment Support

Submitted by:

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Submitted to:

Mr. David Cobrain
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In response to:

Work Assignment No. 06110.130

June 18, 2004

RISK ASSESSMENT REVIEW COMMENTS ON THE INTERIM ACTION COMPLETION REPORT FOR SOLID WASTE MANAGEMENT UNIT 21-024(i) AT TECHNICAL AREA 21

General Comments

1. The statistical analysis provided in Appendix E employs a "round-robin" approach to determining the upper confidence limit (UCL), which is used as the exposure point concentration in the risk assessment. Specific comments are included below. However, there is concern over the overall approach used to determine the UCLs. The current method may be technically okay in some cases, but it is not optimum or robust. For example, a UCL was calculated for non-normally distributed data sets using the Student's t test, which is only applicable if the data distribution is normal. Likewise, UCLs were calculated using lognormal-dependent statistical test when all of the distributional testing indicated the data set was normally distributed. While it is understood the intent of the analysis was to apply the most conservative UCL, the UCLs must be based on appropriate statistical analyses. The Environmental Protection agency (EPA) has released new guidance on how to determine UCLs ("Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites", OWSER 9285.6-10, December 2002). This guidance allows the user to determine the optimum method for calculating the UCL. Along with the guidance is a new software program, ProUCL, which will determine the data distribution and select the most appropriate statistical analysis to be used for estimating the UCL based upon the characteristics of the dataset. Currently version 3.0 of ProUCL is available at http://www.epa.gov/esd/tsc/download.htm. Given the problems noted in the below specific comments concerning the UCL calculations contained within Appendix E, the determinations of the UCLs will be required to be redone. It is suggested that the ProUCL software be used during this revision.

2. The report indicates that due to the depth to groundwater, the potential for groundwater contamination is not a concern. However, as the groundwater underlying the site is of beneficial use, a soil-to-groundwater analysis should have been conducted. Typically a tiered approach is applied, with the first step being to compare the maximum detected soil concentrations in the unsaturated zone to soil-to-groundwater screening values (SSLs). As part of this review, site concentrations were compared to NMED SSLs based on a dilution attenuation factor (DAF) of 20. Where NMED SSLs were not available, either Region IX Preliminary Remediation Goal SSLs were used or the EPA Soil Screening Guidance for Radionuclides (generic, accounting for no decay). Based upon these comparisons, several inorganics and radionuclides pose a potential threat for migration to groundwater (i.e., site maximums exceeded respective SSLs). Even though metals are not particularly mobile, given the results of this screening, a more refined screening should be conducted to determine whether these constituents do pose a threat to groundwater. A site-specific DAF and screening value should be calculated and compared to average site concentrations for each chemical with a maximum site concentration exceeding the default-based SSLs.

3. The report indicates that Area 3 is not a suitable habitat to support any receptor populations. However, this assumption appears to be based solely on photographs in Appendix I and not ecological evidence (Section 2.5.1.2 of the report). Based on review of these reference photographs, it appears that Area 3 could support some ecological populations, such as the deer mouse. This statement about Area 3 is critical, as several of the hazard indices for several receptors are significantly above the target risk of one for Area 3. The report should be revised to provide adequate justification for the exclusion of Area 3 as a viable habitat for any ecological receptor. If adequate justification cannot be provided, then a more refined ecological risk assessment for Area 3 will need to be conducted for each receptor with a hazard index greater than one.

4. This risk assessment methodology was not clearly presented. In order to make the document more clearly understood by all readers, the risk assessment should provide the equations used in estimating cancer risks and hazard quotients. Revise the report accordingly. No response to this comment is required.

5. In order to assist in the review, analytical results (Appendix D) should be provided in a searchable spreadsheet format (read-only acceptable). For all future revisions, please provide the analytical results accordingly. No response to this comment is required.

Specific Comments

1. Section 2.4.2.3, Evaluation of Chemicals. Several organics were eliminated as a constituent of potential concern (COPC) based upon low detection frequencies. The EPA guidance (*Risk Assessment Guidance for Superfund* [RAGS], 1989) allows for the elimination of chemicals from a risk assessment if it is detected infrequently (e.g., less than 5% per 20 samples), not detected in other sampled media, and/or if there is no reason to believe the chemical may be present. However, RAGS clearly states that, "chemicals expected to be present should not be eliminated" from the risk assessment. In reviewing the organic data of waste/soil removed from the site as part of remediation (Appendix D, Table D-3.0-3), several detections for bis(2-ethylhexyl)phthalate, chrysene, 1,4-dichlorobenzene, di-n-butyl phthalate, phenanthrene, and 1,2,4-trimethylbenzene were listed. Thus, there is not sufficient justification to warrant the exclusion of these constituents in the risk assessment. At a minimum the risks to these constituents should be evaluated separately, and overall risks with these COPC included and excluded be compared. Revise the risk assessment to include all organic constituents that have been historically present on-site, regardless of detection frequency.

2. Section 2.5.1.1, Human Health. Page 76 of the report indicates that the total estimated radiological dose is 20 millirem per year (mrem/yr) and that the background dose is 23 mrem/yr. However, page 78 of the report states that the radiological dose above background is 3.4 mrem/yr. It is not clear what is the actual

background dose and dose related to site activities. For example, if background is 23 mrem/yr, then the maximum allowed dose is 38 mrem/yr (background plus 15 mrem/yr). Given this, the site dose of 20 mrem/yr plus background (23 mrem/yr) results in a total dose of 43 mrem/yr, which would exceed the allowable dose. However, if background is 3.4 mrem/yr, then the allowable dose is 18.4 mrem/yr (3.4 mrem/yr plus 15 mrem/yr). The site dose of 20 mrem/yr also exceeds this allowable dose. Please clarify background dose and site dose.

In addition, the report states that because the site dose is similar to the background dose, the target dose limit is satisfied. This is slightly misleading. The text should be re-wording to clearly indicate that the dose due to exposure to site constituents is within the criterion of the background dose plus 15 mrem/yr.

3. Section 2.5.1.2, Ecological. Page 84 lists the home range for the deer mouse at 0.077 ha (EPA 1993: Wildlife Exposure Factors Handbook). However, in reviewing the tabulated data for the deer mouse provided in this reference, it is not clear how the home range used in the report was derived. Several values based upon habitat are provided. It seems that the habitat most closely resembling that of New Mexico would be the Idaho desert. The habitat ranges for this area are female 0.94 ha and for the male 0.128 ha. Clarify how the home range for the deer mouse was estimated and provide justification for the rationale used in this determination.

4. Section 2.5.1.2, Ecological. The discussion for mercury on page 84 indicates that the hazard quotient (HQ) for the robin was greater than one for Area 3, but applying an AUF of 0.09 reduces the robin's HQ to less than one. However, the report does not provide the habitat area used to determine the AUF. The area of Area 3 is approximately 0.036 ha. Applying the AUF and the area of Area 3 would result in a habitat size of about 0.4 ha. This habitat size coincides with the mean value for Tennessee as listed in EAP 1993. However, the report should be revised to clearly state the habitat size applied for the robin.

5. Appendix E, Statistical Analysis. Table 4 does not contain any of the distributional testing results. Please revise the table to contain these data.

6. Appendix E, Statistical Analysis. In each table and for each constituent, the Student's t test was used to calculate an UCL. However, for some constituents in multiple tables (Tables 2, 5, 6, 7, 8, and 9), the Student's t test was applied even though every result for the testing for a normal distribution was "fail". If all the results of the distributional testing clearly indicate that the data distribution is not normally distributed, then the Student's t test is not applicable nor appropriate to used for estimating the UCL. In some cases, the result from the Student's t test was selected as the UCL. While this may be conservative, as the UCL based upon this result was the greatest, it is still not appropriate for use. Similarly, if the results for a lognormal distribution are all "fail", then the estimation of a UCL based on lognormal statistics is not appropriate. Revise the calculations of the UCL accordingly and revise all sections of the risk assessment and discussions of the report as warranted.

7. Appendix F, Section 2.0, Human Health Calculations. Table 2.0-1 presents the calculation of the hazard index (HI). A hazard quotient (HQ) for lead (0.06) was listed on the table. However, the screening action level (SAL) for lead is based upon is based upon the Environmental Protection Agency (EPA) Integrate Exposure Uptake Biokinetic (IEUBK) Model, not the noncancer HQ methodology. As such, calculating a HQ for lead is inappropriate. Lead should be considered separately. Revise the table to remove the HQ for lead and provide a separate discussion for the risks associated with exposure to lead. While the impact of excluding lead from the HI is minimal, the HI listed on Table 2.0-1 should be revised accordingly.

8. Appendix F, Section 2.0, Human Health Calculations. Table 2.0-2 presents the calculation of carcinogenic human health risk. There are inconsistencies with the data in the table as follows:

   - Using the exposure point concentration (EPC) listed in the table for arochlor-1254 (0.12 mg/kg), the resulting risk should be 5.5E-07. The EPC listed in the table is inconsistent with the EPC listed in Table 2.5-2 (EPC for arochlor-1254as 0.2 mg/kg). Using an EPC of 0.2 mg/kg would result in a cancer risk of 9.1E-07. Clarify the EPC for arochlor-1254 and verify cancer risk.

   - The incremental cancer risk (ICR) is listed as 1.1E-05. However, this value could not be verified. All of the individual cancer risks for the constituents listed in the table could be verified with the exception of arochlor-1254. Using an EPC of 0.12 mg/kg for arochlor-1254 would result in an ICR of 9.6E-05. Using an EPC of 0.2 mg/kg for arochlor-1254 would result in an ICR of 9.7E-05. Applying either EPC for arohlor-1254 does not result in the ICR of 1.1E-05 as listed in the table, and both of the resulting ICRs are significantly above the New Mexico acceptable target risk of 1.0E-05. Verify the calculation for the ICR.

9. Appendix F, Section 3.0, Ecological Scoping Checklist. Under the Part B site visit documentation, the category for interim action (page F-15) states that no action is required, as contaminated soil and sources were removed. As this remark was based upon visual observations only, the response should be "maybe". Only the results from an actual risk assessment can be used to confirm that all contamination that would result in unacceptable risks had in fact been removed. Revise accordingly.