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June 30, 2004

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. 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 Los Alamos and Pueblo Canyons Investigation Report, 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) "Los Alamos and Pueblo Canyons Investigation Report," dated April 2004.

Only Section 6.0 (Canyons Contamination), Section 8.0 (Risk Assessments), and Appendix E (Statistical and Risk Information) were sent by NMED for review. As such, the deliverable only addresses these specific sections of the report.

Ms. Darlene Goering noted the LANL indicated that the screening assessments presented in the canyons investigation report were conducted in a manner consistent with NMED notice of deficiency (NOD) comments associated with the risk-based screening approach applied in the Phase III Resource Conservation and Recovery Act Facility Investigation (RFI) report for Solid Hazardous Waste Unit (SWMU) 16-021(c)99. As such, the comments and response to comments for SWMU 16-021(c)99 were reviewed to ensure consistency in review between the two LANL documents.

The risk assessment referenced a paper by Katzman (2002) as documentation of agreements between LANL and NMED for the risk assessment. However, in conversations with Ms. Goering, NMED does not believe that this paper documents agreements specific to the Los Alamos and Pueblo Canyons risk assessment. As such comments were drafted requesting either a revision to the risk assessment or specific documentation regarding this site.

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Results from field duplicates were not utilized in the risk assessment. Typically either the results from duplicates are averaged or the maximum detect of the two results is used. However, excluding the duplicate result is not against industry practice and was deemed acceptable.

The Tier 1 screening methodology was slightly different from standard screening processes. For example, LANL uses the term "cancer hazard index," which is not standard nomenclature. In addition, they use screening criteria of one (1) and 10 (based upon whether the screening numbers were based upon a 1E-5 or 1E-6 risk). However, the overall results obtained are similar to more standard practices and therefore, was deemed acceptable.

The input/output files for the RESRAD modeling do not appear to have been provided in the report. As such, the results could not be fully reviewed. If the report did contain these files, no comment is warranted; however, if the report did not contain these files, then a comment should be drafted requesting both the input and output files for the RESRAD modeling.

Overall, the risk assessment, especially Appendix E, was hard to follow, but was relatively well done and the methodology applied was acceptable. Very few major concerns were noted with the assessment. The majority of the comments addressed the statistical analyses and development of the exposure point concentrations.

The deliverable is formatted in Word. A draft of the deliverable was emailed to you on June 30, 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,

June K Dreith

June K. Dreith
Program Manager

Enclosure: Risk Assessment Review Comments on the Los Alamos and Pueblo Canyons Investigation Report

cc: Ms. Darlene Goering, NMED
Ms. Paige Walton, TechLaw

TASK 3 DELIVERABLE

RISK ASSESSMENT REVIEW COMMENTS ON THE LOS ALAMOS AND PUEBLO CANYONS INVESTIGATION REPORT

Human Health and Ecological Risk Assessment Support

Submitted by:

TechLaw, Inc.
560 Golden Ridge Road
Suite 130
Golden, CO 80401-9532

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. 06110.130

June 30, 2004

RISK ASSESSMENT REVIEW COMMENTS ON THE LOS ALAMOS AND PUEBLO CANYONS INVESTIGATION REPORT

General Comments

1. Several organics were eliminated as constituents of potential concern (COPCs) based upon low detection frequencies (less than 5%). It is agreed that this rule of detects is consistent with both Environmental Protection Agency (EPA) and New Mexico Environment Department (NMED) guidance. However the report references Katzman 2002 as documenting an agreement between Los Alamos National Laboratory (LANL) and NMED on applying the 5% detect rule. At the time of this review, the Katzman paper was not available to consult. However, site-specific agreements for other areas within the LANL facility do not necessarily mean that the approaches are automatically appropriate for other sites. 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. It appears that many constituents that are expected to be present as a result of site activities were eliminated as COPCs based on the 5% detection rule. As such, there is sufficient justification to warrant the inclusion of these constituents in the risk assessment. At a minimum, the risks to these constituents should be evaluated separately, and overall risks, with the COPCs included and the COPCs excluded, be compared. Either revise the risk assessment to include all organic constituents that have been historically present on-site, regardless of detection frequency, or provide specific documentation between LANL and NMED, which references the agreement of the 5% detection frequency specifically addressing the Los Alamos and Pueblo Canyons investigations and risk assessments.

2. The results of the statistical analyses to determine distribution and the 95% upper confidence limit (UCL) were not provided. As such, a review of the selection of the appropriate statistical test and derivation of the UCL could not be completed. Please provide the results for the distribution testing and the UCLs. Also, provide other statistical parameters and assumptions used in these calculations.

3. Many of the values used for food product intake parameters were based upon the 1997 "Exposure Factors Handbook". However, in March 2003, EPA (through the National Center for Environmental Assessment, NCEA) updated Chapters 9, 10, and 11 of the "Exposure Factors Handbook" with the "CSFII Analysis of Food Intake Distributions" (EPA/600/R-03/029). In reviewing the updated data, there appear to be some discrepancies in the ingestions rates (e.g., vegetable, fruit, and meat) applied in the risk assessment. The risk assessment should be revised to incorporate the most current data contained in the "CSFII Analysis of Food Intake Distributions."

4. Dioxin and furans were not included in the risk assessment. LANL indicated that an agreement between LANL and NMED had been reached not to include these constituents in the risk assessment, as noted in Katzman 2002. At the time of this review, the Katzman paper was not available to consult. However, site-specific agreements for other areas within the LANL facility do not necessarily mean that the approaches are automatically appropriate for other sites. Either revise the risk assessment to include dioxin and furans in the risk assessment, or provide specific documentation between LANL and NMED, which references the agreement excluding dioxins and furans from the Los Alamos and Pueblo Canyons investigations and risk assessments.

Specific Comments

1. Sections 6.2.2.1, Terrestrial Ecological Screen, and 6.2.2.2 Aquatic Receptor and Pathway Ecological Screen. Individual analytes are not retained as contaminants of potential ecological concern (COPECs) if the hazard quotient (HQ) for the detected result is less than or equal to 0.3. Provide justification for setting the screening limit to 0.3; also discuss looking at the overall hazard index (HI) and percent contribution of chemicals to the HI.

2. Section 6.3.3.2, Tier 2 Human Health Screen. The report indicates that all analytes with similar toxicological effects (carcinogens) were eliminated as Tier 2 COPCs for each location and field preparation combination if the HI was less than or equal to ten for carcinogens. For the Tier 1 screening, using a HI of ten (10) as the screen was appropriate where the screening action level (SAL) was based upon a risk level of 1E-06. However, for the Tier 2, it appears that regardless of the risk basis of the SAL, a criterion of ten is being used. This is not appropriate, as a COPC could have an associated risk between 1E-05 and 1E-04, which is above the NMED acceptable target risk of 1E-05. Please clarify the target risk for the Tier 2 analysis.

3. Section 6.3.3.3.1, Groundwater. The text indicates that due to low frequencies of detection, false positives, and potential upgradient sources, contaminants detected in groundwater are not representative of contaminant releases from the watershed areas. However, a soil-to-groundwater screening (SSL) was not conducted. Typically generic SSLs, based upon a dilution attenuation factor of 20, are compared to the maximum concentrations of detected contaminants in soil to determine whether the level of contaminant could potentially pose a threat to groundwater. Conducting this analysis would also provide additional justification that the detections in groundwater are not due to contamination present within the watersheds. Revise the risk assessment to include an analysis of site concentrations to SSLs.

4. Section 8.1, Baseline Ecological Risk Assessment. The report indicates that agreements between LANL and NMED concerning study design, COPECs, assessment endpoints, measurements of effect, exposure, receptor characteristics, and risk characterization were documented in Katzman 2002. At the time of this review, the Katzman paper was not available to consult. However, site-specific agreements

for other areas within the LANL facility do not necessarily mean that the approaches are automatically appropriate for other sites. Please provide specific documentation of these agreements specific to the Los Alamos and Pueblo Canyons ecological risk assessment.

5. Appendix E, Section E-2.1.1, Calculating UCLs. Several comments were noted on this section, as follows:

   - For lognormal distributions, the lognormal upper confidence limit (UCL) method from Gilbert (1987) was applied. The test in Gilbert (the Land H test) is not always appropriate for every data set. As discussed in EPA 2002 (*Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites*), the Land H test may not be appropriate for small sample sizes (less than 30) or when the skewness of the data set is high. In these cases, either the Chebyshev 99% or Chebyshev 95% test may be more appropriate. Each data set should be examined and the most appropriate test based on the individual characteristics of the data set should be applied as recommended in EPA 2002, instead of automatically selecting one set test for all data sets with lognormal distributions. Discuss the appropriateness of the Land H test to each of the data sets. Modify the UCL using other tests as warranted.

   - When the data fit neither a normal or lognormal distribution, the Chebyshev Inequality method was applied in determining the UCL. If the data sets have a high degree of skewness, the 95% Chebyshev may not be as effective in estimating the UCL and a higher confidence coefficient (i.e., 99%) should be used. Discuss whether the skewness of each data set was determined and discuss whether a confidence coefficient of 95% or 99% was applied. If skewness was not determined, and all UCLs were estimated based upon a confidence coefficient of 95%, then the UCLs may need to be revised and estimated using the appropriate confidence coefficient.

   - When the data are different from both normal and lognormal distributions, the Chebyshev method was used. Which confidence limit was applied for the test: 95% or 99%? Also discuss whether the applied confidence limit resulted in a robust analysis of the UCL.

   - The text indicates that when the data are different from both normal and lognormal distributions, the Chebyshev method was applied. Discuss whether the data were tested for any other distributions other than normal or lognormal (e.g., gamma distribution). Also discuss the appropriateness of the Chebyshev method to all data sets, versus application of other test methods such as bootstrapping.

   - When the data sets consist of less than three (3) values, the test method listed on pages 141 and 142 of Gilbert (1987) was applied. However, the nonparametric confidence limit for quantiles methodology described in Gilbert is only applicable for data sets with greater than 20 samples. For sample sizes of less than 20,

Gilbert recommends that the Conover method be used. Clarify how the UCL was estimated for these small data sets. Typically with three or fewer values in a data set, the maximum detected concentration is used as the exposure point concentration.

6. Appendix E, Section E-5.1.1, Chemical Hazard.

   - The inverse of the mean concentration at the center of a 30-acre square source (Q/C) is listed as 46.84 g/m^2-s per kg/m^3. However, no reference is provided for this value. It is noted that the Q/C for a 30-acre square source in Albuquerque is 43.37 g/m^2-s per kg/m^3 (EPA Soil Screening Guidance, 1996). Provide the reference of the derivation of the value used for Q/C.

   - The equivalent threshold value of windspeed at seven meters (U_t) is 4.124 m/s. However, no reference is provided for this value. It is noted that U_t for Albuquerque is listed as 11.32 m/s (EPA Soil Screening Guidance, 1996). In addition, no references are provided for the height above the surface (Z) and the surface roughness height (Z_0). Provide the references for these parameters.

7. Table E-5.3-1, Exposure Parameters for Soil and Water Risk Calculations.

   - The particulate emission factor (PEF) listed for the trail user is based upon the December 2000 version of the NMED Soil Screening Levels (SSL). However, the PEF was updated in the October 2003 version of this document. In addition, the PEF as presented in the NMED document is based upon a source area of 0.5 acres squared, not 30 acres squared, as applied throughout the risk assessment. If the NMED PEF were modified to incorporate a Q/C based on a 30-acre square source, the resulting PEF would be approximately 3.8E09 m^3/kg. Revise the PEF for the trail user to reflect the update as listed in the 2003 NMED SSL Guidance and to be based upon a 30-acre square source.

   - Clarify why an adult resident body weight of 60 kg versus the standard 70 kg was used in the radionuclide dose calculations.

8. Table E-5.3-2, RESRAD Input Values for Calculations of RBCs. A different site utilization rate was applied for each of the receptors for the RESRAD modeling versus those used for the chemical risk assessment. It is not clear why different utilization rates were applied. For example, the chemical risk assessment is based upon the assumption that the resident spends 100% of his day at home, while the RESRAD modeling only accounts for 96% of the time. Similarly, the construction worker in the RESRAD modeling is based upon a 5.5 hours day, while the chemical risk assessment is based upon an 8-hour day. Please clarify these discrepancies in the utilization rates for each receptor.

9. Table E-5.2-5, Analyte-Specific Parameter Values for Calculating Dermal Absorption and Biotic Uptake. While most the values provided in the table could be cross-

checked, not all values could be verified, as no references were provided. Provide the reference used for obtaining each datum listed in the table.