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March 1, 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

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NMED Hazardous Waste Bureau

Reference: Work Assignment No. 06110.130.0003; State of New Mexico Environment Department, Santa Fe, New Mexico; Human Health and Ecological Risk Assessment Support; Review the Draft Risk Analysis, Communication, Evaluation, and Reduction at LANL – Site Conceptual Exposure Model, Task 3 Deliverable.

Dear Mr. Cobrain:

Enclosed please find the deliverable for the above-referenced work assignment. The deliverable consists of review comments on Los Alamos National Laboratory's (LANL) Draft Report on the "Risk Analysis, Communication, Evaluation, and Reduction at LANL – Site Conceptual Exposure Model," dated February 11, 2004.

Overall the document was poorly written and provided little to no explanation of its assumptions. In addition, the document relied upon outdated risk assessment guidance for obtain all of the exposure parameters. Based upon review of the initial draft, it is not clear how useful this document will be in conducting risk assessments in the areas surrounding the LANL facility.

The document is formatted in Word. A draft of the deliverable was emailed to you on March 1, 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) 45[illegible]78.

Sincerely,

June K Dreith

June K. Dreith
Program Manager

Enclosure: Technical Review Comments on the Draft Risk Analysis, Communication, Evaluation, and Reduction at LANL – Site Conceptual Exposure Model

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

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TASK 3 DELIVERABLE

TECHNICAL REVIEW COMMENTS ON THE LOS ALAMOS NATIONAL LABORATORY DRAFT REPORT RISK ANALYSIS, COMMUNICATION, EVALUATION, AND REDUCTION AT LANL – SITE CONCEPTUAL EXPOSURE MODEL FEBRUARY 11, 2004

Human Health and Ecological Risk Assessment Support

Submitted by:

TechLaw, Inc.
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Submitted to:

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

In response to:

Work Assignment No. 06110.130

March 1, 2004

TECHNCIAL REVIEW COMMENTS ON THE LOS ALAMOS NATIONAL LABORATORY DRAFT REPORT RISK ANALYSIS, COMMUNICATION, EVALUATION, AND REDUCTION AT LANL – SITE CONCEPTUAL EXPOSURE MODEL FEBRUARY 11, 2004

General Comments

1. One of the primary purposes of the Site Conceptual Exposure Model Report (the Report) was to provide a consistent approach and methodology for estimating ecological impacts from Los Alamos National Laboratory (LANL). This goal is discussed throughout the introduction. However, the Report does not address ecological assessments. An ecological conceptual site exposure model should address the following:
   - Qualitatively characterize the environmental setting, current and future land uses, and known or likely chemical stressors;
   - Identify contaminant fate and transport mechanisms;
   - Define mechanisms of toxicity associated with the contaminants and likely categories of receptors that could be affected;
   - Identify completed, and potentially completed, exposure pathways and exposure routes;
   - Select assessment endpoints;
   - Select representative receptor species to be evaluated; and
   - Develop analysis plans, including selection of measures of effects and identification or preliminary constituents of potential concern (COPCs).

   Either the Report should be revised to include a detailed discussion of the ecological conceptual site exposure model, or the Report should be revised to remove all references to the Report defining the ecological conceptual site exposure model.

2. The Report provides numerous examples of stakeholder interactions through which information was obtained to develop the site conceptual model. Stakeholders included individuals from government agencies and the public. However, it is not apparent that these interviews included discussions with Native Americans in the study area. For example, it appears that information related to home gardens and native plant collection was obtained from interviewing individuals at local farmer's markets and at the New Mexico State University Agricultural Science Center. Native Americans may consume more native plants for medicinal purposes and may potentially have a higher exposure rate due to their unique lifestyle in general. The lack of interviewing the Native American population may result in an underestimation of potential exposure pathways and ingestions rates. The Report should be clarified to indicate whether Native Americans in the study area were included in the stakeholder interviews. If not, it is suggested that the Report be modified to include this information specific to the Native American population in the study area. In addition, it is suggested that a Native American living on a reservation be added as one of the initial exposure scenarios to "test" the methodology in this Report.

3. The primary purpose of the Report appears to outline all potential exposure pathways, receptors, and scenarios for conducting a risk assessment on individuals living outside of the LANL facility. While the Report contains much information, it is not clear just how useful the Report actually is, as little justification for assumptions are presented. The Report outlines four exposure scenarios to "test" the methodology. However, there is no discussion as to how

these scenarios were selected. For example, the resident of Los Alamos does not have a garden and is an indoor worker, while the resident of White Rock does have a garden and is an outdoor worker. These scenarios do not appear to be based on conservatism, as a more conservative scenario would have the lifestyles reversed (i.e., the Los Alamos person would have a garden and work outdoors). Revise the Report to include discussions as to how these scenarios were developed, and what specific information collected from stakeholders was applied.

4. The exposure pathway tables are a little difficult to follow. The information in the tables skips around between geographic areas of potential exposure and exposure media. For example, for a specific geographic area of potential exposure, the exposure medium may list subsurface soil, then surface soil, then subsurface; or the table may present surface soil, air, then surface soil. It would be clearer if all like medium for a given geographic area of potential exposure were grouped together and all like geographic areas of potential exposure were grouped together. Revise accordingly.

5. The Report is not consistent in terminology. For example, the Report uses the terms "recreational user" and "resource user" interchangeably and "utility worker", "construction worker" and "excavation worker" interchangeably. For consistency, and to avoid confusion, only one term should be used to represent a specific scenario or receptor. Revise the Report accordingly.

6. The Report basis much of its information from interviews with stakeholders, including children and other members of the public. Discuss how this information was collected and categorized. Also discuss whether the names, telephone numbers, and addresses of the interviewees were collected. In addition, it is not clear that any scientific methods were applied in collecting this information or any discrimination of the information was done to determine how actual it is. Discuss the uncertainties and usefulness of the information associated with interviews (especially from children).

7. The Report bases all of the exposure parameter data on the United States Environmental Protection Agency (USEPA) 1997 *Exposure Factor's Handbook*. Data contained in this document have been subsequently updated. The Report should be revised to reflect the most recent USEPA guidance for risk assessments.

8. Firewood was identified as a potential exposure medium and has been included as a pathway to be addressed in risk assessments. Clarify how exposure to COPCs from the burning of firewood will be evaluated.

9. There are several typographical errors in the Report. In several cases the word "form" appears in the text rather than the word "from". Correct all typographical errors.

Specific Comments

1. Table 3, Exposure Media, page 16. Surface soil is defined as zero (0) to three (3) feet below ground surface (ft bgs) for residents, non-excavation workers, and recreation; while for the excavation worker, surface soil is defined as 0-13 ft bgs. However, justification for the soil intervals was not provided. Per USEPA (1996 OSWER 9355.4-23), the depth over which soils are samples should reflect the type of exposure expected at the site. Typically for residential and recreation scenarios, surface soil is defined as 0-0.5 ft bgs, as this interval is the expected soil exposure interval where non-intrusive direct contact by human receptors

predominately occurs. An interval of 0-0.5 ft also minimizes potential sampling errors associated with collecting surface samples at depths less than 0.5 ft bgs. For the intrusive workers (construction/excavation), typically two soil exposure scenarios are evaluated: surface soil (0-0.5 ft bgs) and total soil (0-10 ft bgs). The 0-10 ft bgs is typically defined as the likely soil exposure interval for an intrusive worker based on the potential that short-term intrusive activities might require excavations up to 10 ft bgs. In some cases, such as an assessment of underground sewer lines that are location at depths greater than 10 ft bgs, the soil exposure interval may be increased to accommodate possible exposures to the intrusive worker. Provide justification for the definition of surface soil as presented in Table 3. In addition, the definition of subsurface soil (greater than 3 ft bgs) may require modification.

2. Table 4, Transfer Mechanisms, page 19. For the environmental medium "air", surface water is not listed as an exposure medium. LANL operates several different types of equipment, which have corresponding air emissions. These may include vitrification systems, incinerators, and/or open burn/open detonation (OB/OD) units. These emissions, which may contain COPCs, may be carried via natural transport mechanisms to nearby surface water bodies. As such, the surface water loading due to emissions should be considered as a potential exposure medium. Revise the exposure media associated with air to also include surface water bodies and contaminant loading from watersheds into these surface water bodies.

3. Exposure Scenarios for Use in the Initial Contemporary Risk Assessment, page 31. Four scenarios were evaluated in the initial contemporary human health risk evaluation. The Report indicates that these scenarios are realistic and address the broad range of exposure pathways identified by the stakeholders. It is not clear whether the resident of White Rock, the utility worker, include evaluation of construction/excavation activities. The Report uses several terms to represent this scenario, from utility worker to construction, to excavation, to outdoor worker. First, the Report should be revised to be consistent in how this scenario is defined. Secondly, in order to determine the effectiveness of the risk assessment methodology and to provide a realistic assessment of all potential scenarios, each of the main exposure pathways should be included. This would include the construction/excavation worker scenario. The Report should be clarified to indicate that the White Rock resident is a utility/construction/excavation worker, or be revised to include a fifth exposure scenario, which evaluates a resident of either Los Alamos or White Rock that conducts construction/excavation activities in and around the LANL facility. In addition, as noted in the general comments, it is suggested that a Native American living on a nearby reservation be added as an exposure scenario.

4. Table 12, Exposure Pathways Addressed in the Four Exposure Scenarios Evaluated for the Initial Contemporary Risk Assessment for the RACER at LANL Project, pages 32 and 33. The table defines a footnote "a"; however, nothing in the table is footnoted with "a". It is assumed that the heading "ingestion from homegrown/cultivated/irrigated crops" should be footnoted. Clarify to what this footnotes refers.

5. Geographic Area of Potential for Use in the Initial Contemporary Risk Assessment, page 34. For the initial contemporary risk assessment, the geographic area of exposure was defined by drawing a polygon around the area where specific activities may occur. The Report provides four different methods for estimating the geographic area of exposure. However, the Report does not provide any justification for selection of the polygon method over the other three methods. Provide the rationale used in determining that a polygon drawn around the area

where specific activities may occur is the best method for estimating the geographic area of potential exposure.

6. Adult Resident of Los Alamos, page 35. The adult resident of was located adjacent to DP Canyon and to the west of the Airport. The location was selected solely on the basis that air-monitoring stations were nearby and historical sampling had been conducted in the area. However, the Report does not discuss whether this area represents a worst-case area or whether was just convenient. Nor does the Report discuss whether the air-monitoring stations and sampling events were conducted to monitor emission from the airport or activities as LANL. Clarify these issues and discuss the representativeness of this area compared to other residential areas in Los Alamos.

7. Adult Resident of White Rock, page 36. Similar to the resident for Los Alamos, the location for the resident of White Rock was selected based on proximity to air-monitoring stations and historical sampling. However, the Report does not discuss whether this area represents a worst-case area or whether was just convenient. Discuss the representativeness of this area compared to other residential areas in White Rock.

8. Adult Resident of Española, page 37. Similar to the residents of Los Alamos and White Rock, the location for the resident of Española was selected based on proximity to the air-monitoring station. However, the Report does not discuss whether this area represents a worst-case area or whether was just convenient. Discuss the representativeness of this area compared to other residential areas in Española.

9. Exposure Frequency, Exposure Time and Exposure Duration, page 39. In the first paragraph, there is a notation, "Error! Reference source not found." Please remove this notation. In addition, it is not clear why an exposure duration of one year was selected. All USEPA risk assessment guidance suggests that the residential exposure duration be 30 years and occupational exposure durations be evaluated for 25 years (USEPA 1991, OSWER No. 9285.6-03). The exposure duration for lifetime residents is based upon a combined exposure for children (6 years) and adults (24 years). The Report should be modified to include a residential exposure duration of 30 years and an occupational exposure duration of 24 years.

10. Table 16 and 17, page 42. The time spent at work outdoors is listed as 250 days/year. However, more recent USEPA guidance has revised the exposure frequency for an outdoor worker to 225 days/year (USEPA 2001 OSWER 9355.4-24). This more recent guidance should be used. Revise the Report to include an exposure frequency for an outdoor worker at 225 days/year.

11. Averaging Time and Body Weight, page 43. The averaging time for non-carcinogens (AT_n) is determined by multiplying the exposure duration by 365 days per year. Table 19 lists the AT_n as 1 year. Note that this will require modification to reflect the residential exposure duration of 30 years, as noted in the above comment.

12. Table 20, Air Inhalation Rate, page 44. The air inhalation rates for the adult residents are listed as 0.55 cubic meters per hour (m^3/hr) for indoor air, 1.1 m^3/hr for outdoor air and the utility worker is listed as having an inhalation rate of 1.3 m^3/hr. However, most risk assessment use the 1991 USEPA guidance and the 2001 USEPA guidance. These guidance suggest that an inhalation rate of 20 m^3/day (0.833 m^3/hr) be applied (USEPA 1991, OSWER No. 9285.6-03, USEPA 2001 OSWER 9355.4-24) for each of these scenarios. Revise the inhalation rates to reflect this more recent guidance.

13. Drinking Water Ingestion Rate, page 45. The drinking water ingestion rates for the adult and child are listed as 1.4 Liters per day (L/day) and 0.87 L/day, respectively. However, subsequent USEPA guidance has updated these values. USEPA suggests that a drinking water ingestion rate for adults and children be 2.0 L/day and 1.0 L/day, respectively. Revise the Report to reflect these more recent values.

14. Table 23, Dermal Contact with Water and Soil, page 47. Exposure surface areas for the skin are listed in the table. However, the 2001 USEPA Dermal Assessment Guidance (USEPA 2001, EPA/540/R-99/005) has updated these values. Revise the Report to include the skin surface area values as listed in this more recent guidance.

15. Table 24, Incidental Ingestion of Soil, page 49. The table provides several soil ingestion rates for each receptor. However, these rates are based upon 1997 USEPA guidance. Subsequent USEPA guidance has updated these values. Typically, the adult resident consumes 100 milligrams per day (mg/day) soil, the child resident consumes 200 mg/day, the indoor worker consumes 100 mg/day, and the construction worker consumes 330 mg/day. Revise the Report to include the soil ingestions rates in more recent and/or standard USEPA guidance (USEPA 1991, OSWER No. 9285.6-03 and USEPA 2001 OSWER 9355.4-24)

16. Table 25, Exposure Factor Values for Drinking Water Ingestion Rate, Incidental Soil Ingestion Rate and Inhalation Rate From Previous Studies and Tables 26 and 27, pages 51 through 53. These tables were included in the Report to provide a comparison of risk assumptions applied in three separate risk assessments. However, the Report does not draw any conclusions regarding the information provided in the tables nor does the Report discuss why this information is presented. The most recent USEPA guidance should be used for selection of exposure parameters. It is suggested that either the Report be revised to provide a discussion as to the meaning of the comparisons (e.g., the values contained in the Report are more conservative) and values listed in the tables or that the Report be revised to remove these tables.