

Mr. David Cobrain
September 24, 2007
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A three-tiered screening approach was used to identify the final list of chemicals of potential ecological concern (COPECs) in each solid waste management unit (SWMU) and area of concern (AOC). However, there are a number of concerns with the approach used which are outlined in the attached general comments.

This letter deliverable was emailed to you on September 24, 2007, at David.Cobrain@state.nm.us and to Ms. Jennifer Holman at Jennifer.Holman@state.nm.us. A formalized hard (paper) copy of this deliverable will be sent via mail. If you have any questions, please call me at (770) 752-7585, extension 105, or Ms. Claire Marcussen at (352) 332-0669.

Sincerely,



Sincerely,
Jasmine Schliesmann-Merkle
Vice President

Enclosure

cc: Ms. Jennifer Holman, NMED
Ms. Claire Marcussen, TechLaw
TechLaw Files

TASK 2 DELIVERABLE

**RISK ASSESSMENT REVIEW OF THE INVESTIGATION REPORT
GUAJE/BARRANCAS/REDIJA CANYONS AT TECHNICAL AREA 00
LOS ALAMOS NATIONAL LABORATORY
AUGUST 2007**

LANL Risk Assessment Support

Submitted by:

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Submitted to:

**Mr. David Cobrain
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Hazardous Waste Bureau
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In response to:

Work Assignment No. 06280.100.0002

September 24, 2007

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GENERAL COMMENTS

1. The potential for soil contamination to impact groundwater was not adequately addressed in the risk assessment or in other sections of the Investigation Report Guaje/Barrancas/Redija Canyons at Technical Area 00 (IR). A general discussion of chemical properties affecting the mobility and persistence of inorganic and organic contaminants in soil was included in Section F-3.1, 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 highly mobile constituents such as perchlorate 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. If such a screen is not performed, the potential risks and hazards associated with this pathway must be assessed in a quantitative risk assessment. Information on performing a migration screen is available in the *NMED Technical Background Document for Development of Soil Screening Levels* available at:

<http://www.nmenv.state.nm.us/hwb/guidance.html>.

2. The Screening Level Ecological Risk Assessment (SLERA) followed guidance provided in the "Screening Level Ecological Risk Assessment Methods, Revision 2" (LANL [Los Alamos National Laboratory] 2004, 087630). This method was developed specifically for screening the potential ecological risks that may result from past operations at the LANL. It is recommended that this document be attached as an appendix (electronic, if necessary) to the SLERA for future reference.
3. A three-tiered screening approach was used to identify the final list of chemicals of potential ecological concern (COPECs) in each solid waste management unit (SWMU) and area of concern (AOC). However, there are a number of concerns with the approach used. These concerns are as follows:

Step 1: Selection of Chemicals of Potential Concern (COPCs)

A chemical was selected as a COPC if the detected concentration or non-detect detection limit exceeded the background value (BV) or maximum background concentration, whichever was greater. The LANL SLERA method does not refer to the use of BVs or maximum background concentrations as a screening tool. The June 2001 EPA Eco

Update (EPA 540/F-01/014) specifically addresses the use of background concentrations as a screening tool. This guidance document states that the comparison of site data to background levels generally cannot be used to remove COPCs; however such a comparison can be used to focus a baseline risk assessment, if needed. A thorough justification for this step needs to be provided in Section E-1.2 (Overview of COPC Selection).

Step 2: Selection of Chemicals of Potential Ecological Concern (COPECs)

The list of COPCs was further refined by selecting only those chemicals with a calculated hazard quotient (HQ) greater than 0.3. HQs were calculated for all COPCs and all screening receptors using ecological screening levels (ESLs). The 1997 EPA Ecological Risk Assessment Guidance for Superfund (EPA 540-R-97-006) recommends using a HQ of 1.0 for this purpose, where < 1.0 indicates that the contaminant is unlikely to cause adverse ecological effects. Please provide the reasoning for the use of an HQ greater than 0.3 in Section F-5.3 (Screening Evaluation).

Step 3: Final Screening in the Uncertainty Analysis

A final screening effort occurred in the Uncertainty Analysis (Section F-5.4). The LANL SLERA method states that more accurate estimates of exposure for the COPECs can be considered by including factors such as area use and bioavailability. Modification of these types of factors can result in the addition or deletion of a particular COPEC. Residential soil screening levels and surrogate screening values were used to remove COPECs in each SWMU and AOC from further consideration. For example, perchlorate maximum concentrations were compared to the Region 6 medium-specific screening level (MSSL) for residential soil. This type of screening is not acceptable in a SLERA, because it is based on a screening level which does not protect ecological receptors. This type of screening also does not seem to adhere to the concept of adjusting variables within the screening process to represent more real-life exposures. Justification for this step needs to be provided in Section F-5.4 (Uncertainty Analysis).

4. The raw analytical data collected from each SWMU and AOC needs to be presented in a table in Appendix E (Data Review). This table should provide each sample location, sample date, all of the detected concentrations and non-detects (with detection limits) for each chemical analyzed, along with data validation qualifiers. Currently, the tables only show data for contaminants whose concentrations or non-detect detection limits exceed the BVs or maximum background concentration. Data from contaminants not present above their detection limits were excluded. The proposed table will provide a better understanding of the types of analyses performed and the range of concentrations detected (or not detected) at each sampling location. Revise the IR to include a comprehensive data summary table in the SLERA.
5. The tables summarizing the inorganic or organic chemicals detected or above BVs (Tables E-2-1.1, E-3-1.1, E-4-1.1, and E-5-1.1 in Appendix E) only present a subset of the chemicals analyzed at each of the SWMUs and AOC. For example, Table E-2.2-1 presents only 15 of the 24 metals from the Target Analyte List (TAL) for SWMU 00-001 (a). It is recommended that these tables include all of the chemicals that were analyzed. In addition, the frequency of detection, minimum detected concentration, maximum

detected concentration, location of the maximum detected concentration, the selected screening concentrations, and selected screening value needs to be shown. Currently, only the detected concentration or non-detect detection limit for each location are listed. The selected screening concentration for each chemical would be either the maximum detected concentration or the highest detection limit, if not detected. These changes would reduce the amount of numbers shown in the tables and make it easier to identify which chemicals are in exceedance, and therefore selected as a COPC. Please amend the SLERA accordingly.

6. The organic chemicals detected in the soil samples from AOC C-00-0041 were selected as COPCs because no background values were available. This selection process does not take into account the potential for elevated detection limits caused by dilution during analysis. An elevated detection limit can increase the uncertainty as to whether or not the chemical was present. It is recommended that the detected concentrations and the detection limits of the non-detects be compared to conservative soil ecological screening values (such as those developed by EPA Region 4 [USEPA Region 4, August, 2003]). The comparison to soil screening values would ensure that non-detected chemicals with detection limits above the screening values are not eliminated as COPCs.
7. ESLs were based on species similar to those selected as ecological receptors in this SLERA. The ESLs were derived based on No Observable Adverse Effect Levels (NOAELs), Lowest Observable Adverse Effect Levels (LOAELs), or doses lethal to 50% of the population (LC₅₀). The ECORISK Database (Version 2.2, LANL, 2005) provided the information used to derive the ESLs. Since these ESLs were calculated values, a table needs to be included in Section F-5.2 (Scoping Evaluation) presenting the equations and input parameters used to derive the ESLs. This information would allow an independent reviewer to verify that conservative input parameters were used in the ESL calculations. The June 1997 EPA Ecological Risk Assessment Guidance for Superfund (EPA 540-R-97-006) specifically addresses the importance of conservative assumptions to ensure that all potential ecological threats are not missed. Some examples of conservative assumptions include: using the most sensitive life stage, minimum body weight, 100% of the diet consisting of the most contaminated dietary component, and assuming the chemical is 100% bioavailable. Please amend the SLERA accordingly.
8. The Uncertainty Analysis (Section F-5.4) described the main sources of uncertainty related to the screening assessments. This section needs to describe the uncertainties associated with the selected ESLs (Table F-4.1-4). Several receptors lacked ESLs for particular COPCs. For example, acenaphthalene had only five screening values for the 11 ecological receptors. It is more likely that the lowest-available ESLs will not be protective of all of the ecological receptors as the number of ESLs for a COPC decreases. Revise the IR to discuss this concept in the uncertainty analysis.

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SPECIFIC COMMENTS

1. Section 5.1 Screening Levels, Page 16

Section 5.1 indicates that the December 2006 version of the United States Environmental Protection Agency (EPA) Region 6 residential-based soil screening levels was used in the absence of an SSL developed by NMED. It is understood that the IR was in progress well before the August 2007 release date. However, for future reports please ensure that the most current EPA Region 6 SSLs are used, as these levels were updated in February and May of 2007. In the uncertainty analysis, please include a discussion of any of the SSLs from EPA Region 6 that have changed significantly and how these changes impact risk conclusions.

2. F-2.2 Investigation Sampling and Determination of Chemicals of Potential Concern, Page F-2

The first paragraph of this section stated that the inorganic samples collected in 1993 could not be used to quantitatively determine the nature and extent of contamination, because the validation of the data was incomplete. The tables which summarized the data collected from each of the SWMUs and AOC (Tables E-2.0-1, E-3.0-1, E-4.0-1, and E-5.0-1 in Appendix E: Data Review) need to provide the sample date. This information would allow an independent reviewer to verify that the data from 1993 were not included in this risk assessment. Revise the IR to address this issue.

3. Section F-3.1 Environmental Fate and Transport, Page F-3

Impact to groundwater was not evaluated in the risk analysis. Qualitative rationale for concluding that the potential for the migration of contaminants to groundwater is very low included:

- 1) distance to regional aquifer of 1200 feet below ground surface (bgs);
- 2) vertical and lateral extent of soil contamination is defined for the solid waste management units/area of concern (SWMUs/AOC), and indicate a lack of a source for continued releases into the subsurface;
- 3) horizontal and vertical migration of contamination is limited by the low moisture content of the subsurface;
- 4) lack of hydrostatic pressure;

- 5) the length of time the contamination has been present in the subsurface; and
- 6) the low concentrations and infrequent detection. To more clearly demonstrate that groundwater has not been impacted by mobile site contaminants (i.e., perchlorate), site data should be evaluated against NMED's conservative SSLs for the protection of groundwater. Such an analysis constitutes a site-specific demonstration that soil contaminants do not pose a leaching concern. Conducting a migration-based screen using site-specific data reduces the uncertainty surrounding IR conclusions when those conclusions are supported solely by qualitative lines of evidence.

Revise the risk assessment to include a migration screen using NMED SSLs for the protection of groundwater. If such a screen is not performed, the potential for soil contamination to migrate to groundwater and impact potential receptor populations must be assessed in a quantitative risk assessment. Information on performing a migration screen is available in the NMED Technical Background Document for Development of Soil Screening Levels available at:

<http://www.nmenv.state.nm.us/hwb/guidance.html>.

4. **Section F-3.1.1 Inorganic Chemicals, Page F-4**

The last paragraph of Section F-3.1.1 indicates that the vertical extent of perchlorate is defined at all sites investigated within the aggregate area indicating that perchlorate is not migrating to groundwater. Stating that the vertical extent of contamination has been determined does not furnish sufficient technical support for the conclusion that soil contamination is not migrating to groundwater. An interpretation of the vertical extent data is needed to provide adequate justification. Please include such an interpretation or reference to the section of the IR that provides such an interpretation within a revised Section F-3.1.1. Examples of the types of interpretive information needed, either singly or in combination with other lines of evidence, include, but are not limited to:

- Documentation that soil concentrations are below migration-based soil screening levels.
- Discussion of the age of perchlorate release(s).
- Documentation that sampling analysis results in groundwater are below detection limits.

Revise the IR to address these issues.

5. **Appendix F: Risk Assessment – F-3.1.1 Inorganic Chemicals, Page F-4**

The last sentence in the first paragraph on page F-4 stated that based on this K_d criterion (listed in Table F-3.1-1), cobalt, lead, manganese, mercury, and nickel have very low potential for migration to groundwater. Nickel was not selected as a COPC and no K_d criterion was listed in Table F-3.1-1. Therefore, nickel should be removed from this statement.

6. **Appendix F: Risk Assessment – F-3.1.1 Inorganic Chemicals, Page F-4**

The last sentence in the second full paragraph on page F-4 stated that the soil pH at SWMU 00-011(a), SWMU 00-011(d), SWMU 00-011(e), and AOC C-00-0041 was much lower than 7.5, indicating that selenium was not likely to migrate. The soil pH ranges for each of the SWMU and AOC areas were not provide in the data tables. This information needs to be presented in order to support the statement that the pHs of these soils are much lower than 7.5. Revise Appendix F to address this issue.

7. **Section AOC C-00-041, Page F-7**

The second paragraph of this section indicates that “TPH-GRO has no screening value, but it was detected at low concentrations across the AOC....” This statement is followed by a conclusion that the screening assessment indicates no potential for unacceptable risks to residential receptors at AOC C-00-041. NMED did not intend to develop a separate screening level for TPH-GRO. The NMED screening methodology requires sites contaminated by a gasoline release to be screened using SSLs established for gasoline constituents including benzene, toluene, ethylbenzene, xylene, and the individual polycyclic aromatic hydrocarbons (PAHs). Thus, revise the SSL screening analysis for this site to compare the concentrations of individual constituents associated with gasoline contamination detected at the site against the appropriate contaminant-specific NMED SSLs. If not all of the petroleum constituents were included in the analytical suite for this site, please include an explanation of the potential impact on risk conclusions in the uncertainty analysis. Examples of useful information would include, but not limited to, a site history relating gasoline use or lack thereof and a comparison of TPH-GRO concentration to the benzene NMED SSL as a qualitative indicator of potential risk. Revise the IR to address this issue.

8. **Figure F-3.1-1 Conceptual Site Model for Guaje/Barrancas/Rendija Canyons Aggregate Area, Page F-21**

This figure does not identify the historical potential sources of contamination; rather, the sources are listed as mechanisms of release. Please revise the CSM to accurately depict the chemical sources of contamination [e.g., munitions and explosives of concern (MEC), asphalt plant]. In addition, to provide a comprehensive depiction of all migration and exposure pathways considered, the migration of soil contaminants to groundwater should be included in the CSM with a “low” designation for exposure potential. Revise Figure F-3.1-1 to address these issues.

9. **Appendix E: Data Review – E-1.2 Overview of COPC Identification**

The concepts of less than twice the BV or less than 50% above the BV were used to remove chemicals from the COPC list. The significance of twice the BV or less than 50% above the BV was not described in this section. Please provide an explanation of these two terms in the revised IR.

10. Table F-2.2-1 Exposure Point Concentrations for the Residential Scenario and Ecological Assessment

This table listed the selected COPCs for each of the SWMUs and AOC and provided the values used to select the exposure point concentrations (EPCs). The column with the heading of “95% UCL (mg/kg)” listed two types of values: 1) a value calculated using the 95% Upper Confidence Level (UCL) and 2) the maximum detected concentration. It is recommended that only the values calculated using the 95% UCL be listed in this column and a column showing the selected EPC value (either the 95% UCL or maximum detected concentration) be added.

11. HI Analysis for SWMUs and AOC (Tables F-5.3-4, F-5.3-6, F-5.3-7, and F-5.3-8)

These tables summarized the HIs for each receptor in a given SWMU or AOC.

- The column labeled “95% UCL (mg/kg)” should be more accurately labeled “Representative Concentration.” The values in these columns represent EPCs, only some of which were calculated using the 95% UCL.
- Perchlorate (only in the SWMUs) and TPH-DRO, TPH-GRO, and 1,2,4-trimethylbenzene (only in AOC C-00-0041) were not listed in these tables because there were no ESLs available. It is recommended that these chemicals be listed, with “NA” (not available) in the ESL column and a “Yes” in the COPEC column. This way all of the chemicals selected as COPECs for a specific SWMU or AOC are being evaluated and summarized in this table.