



GARY E. JOHNSON
GOVERNOR

State of New Mexico
ENVIRONMENT DEPARTMENT
Hazardous & Radioactive Materials Bureau
2044 Galisteo
P.O. Box 26110
Santa Fe, New Mexico 87502
(505) 827-1557
Fax (505) 827-1544



MARK E. WEIDLER
SECRETARY

EDGAR T. THORNTON, III
DEPUTY SECRETARY

**CERTIFIED MAIL
RETURN RECEIPT REQUESTED**

July 29, 1997

Mr. G. Thomas Todd, Area Manager
Los Alamos Area Office
Department of Energy
528 35th Street
Los Alamos, New Mexico 87544

Dr. Sigfried Hecker, Director
Los Alamos National Laboratory
P. O. Box 1663, MS A100
Los Alamos, New Mexico 87545

**RE: Request for Supplemental Information
Natural Background Geochemistry and Statistical Analysis of Selected Soil
Profiles, Sediments, and Bandelier Tuff, Los Alamos, New Mexico
Los Alamos National Laboratory
NM0890010515**

Dear Mr. Todd and Dr. Hecker:

The Resource Conservation and Recovery Act Permits Management Program (RPMP) of the Hazardous and Radioactive Materials Bureau (HRMB) has reviewed the aforementioned document, dated October 25, 1995, referenced by EM/ER: 95-572, and found it to be insufficient. The NMED Department of Energy (DOE) Oversight Bureau and the US Environmental Protection Agency (EPA) provided technical comments which were considered in staff review.

HRMB recommends that Los Alamos National Laboratory (LANL) obtain lab-specific background data for arsenic, beryllium and manganese for comparison with sites where these analytes may have been utilized. The use of the maximum detected concentrations for constituents with low frequency of detection (i.e., antimony, cadmium, mercury, selenium, and thallium) is inappropriate for determining constituent concentrations representative of natural background. In addition, as noted in the enclosed General Comments, the upper tolerance limit (UTL) approach used by LANL to calculate natural



9736

HSIA LANL G/M/S/97

TV

Mr. Todd and Dr. Hecker
July 29, 1997
Page 2

background concentrations does not appear appropriate, given the data limitations. LANL shall use an alternative approach for setting natural background levels for arsenic, beryllium and manganese, as well as, antimony, cadmium, mercury, selenium, and thallium.

LANL must respond to the request for supplemental information noted in Attachment A within thirty (30) calendar days of the receipt of this letter. If DOE/LANL does not submit a complete response to the request for supplemental information or submit the information within thirty (30) calendar days a Notice of Deficiency will then be issued.

Should you have any questions regarding this letter, please contact Dr. Robert (Stu) Dinwiddie or Mr. John Kieling, HRMB's LANL Facility Manager, at (505) 827-1558.

Sincerely,



Robert S. (Stu) Dinwiddie, Ph.D., Manager
RCRA Permits Management Program
Hazardous and Radioactive Materials Bureau

RSD:jek

attachment

Mr. Todd and Dr. Hecker
July 29, 1997
Page 3

cc: T. Baca, LANL EM-DO, MS J591
T. Davis, NMED HRMB
B. Garcia, NMED HRMB
T. Glatzmaier, LANL DDEES/ER, MS M992
K. Hill, NMED HRMB
J. Jansen, LANL EM/ER, MS M992
M. Johansen, DOE LAAO, MS A316
J. Kieling, NMED HRMB
M. Leavitt, NMED GWQB
H. LeDoux, DOE LAAO, MS A316
D. McInroy, LANL EM/ER, MS M992
D. Neleigh, EPA 6PD-N
J. Parker, NMED DOE OB
S. Pierce, NMED SWQB
G. Saums, NMED SWQB
T. Taylor, DOE LAAO, MS A316
B. Toth, NMED HRMB
S. Yanicak, NMED DOE OB, MS J993
File: Reading and HSWA LANL G/M/S 97
Track: LANL, doc date, NA, DOE/LANL, HRMB/jek, RE, File

A:\BAK2.NOD 7/29/97

ATTACHMENT A
Request for Supplemental Information
Natural Background Geochemistry and Statistical Analysis of Selected Soil
Profiles, Sediments and Bandelier Tuff, Los Alamos, New Mexico
Los Alamos National Laboratory

This report was not reviewed with regards to background concentrations established for radionuclides.

General Comments:

1. This document recommends that additional characterization (sampling) be performed on the A and C horizons. HRMB concurs with this recommendation based on the following:
 - The sample size for most analytes in the A and C horizons is small (generally < 25).
 - The A and C horizon Upper Tolerance Limits (UTLs) and the corresponding proposed LANL background soil screening values repeatedly exceed the maximum analyte concentration. These exceedances are found in all three soil horizons, but primarily in soil horizons, A and C.
2. The maximum soil concentrations of numerous analytes listed by horizons A, B and C do not coincide with those listed in Table 21. See Specific Comment 2.
3. A prerequisite of the statistical equation used to calculate LANL UTLs ($UTL_{0.95,0.95} = \text{mean} + \text{standard deviation} * k_{0.95,0.95}$) is that the analyte's data set be normally distributed. The draft report states that the majority of the analytes for which background soil screening values were determined had data that were "approximately" normally distributed either prior to or after transformation. If a data set is not normally distributed (prior to or after transformation), statistical measures based on the mean and standard deviation of that data set cannot be appropriately derived. LANL shall propose a method for "approximately" normally distributed data. See Specific Comment 6.
4. According to the Region III algorithms, to calculate the screening action levels (SALs), proposed LANL background soil screening values exceed the SALs for arsenic, beryllium and manganese. All three of these analytes show a significant difference in soil sample concentrations within subhorizons. This suggests that the data for these three analytes are variable and that soil concentrations may be laboratory derived (as opposed to natural background). LANL preferably shall either collect more data to address this variability or use the lowest concentration in deriving background soil constituent concentrations.

Specific Comments:

1. **Page 6.** Table 2 does not contain a description or a legend defining the various soil horizons listed in the last column. LANL shall provide a table or a legend clarifying the various soil horizons as indicated in the last column of Table 2.
2. **Page 28.** The reported maximum soil sample concentrations listed in the "All Data" page of Table 8 do not coincide with the reported maximum soil sample concentrations in Table 21 (page 55) for the following analytes:

Aluminum	Arsenic	Barium
Beryllium	Cadmium	Calcium
Chromium	Nickel	Potassium -TOTAL
Thorium-TOTAL	Uranium	Uranium-TOTAL

While the maximum reported concentration for calcium (730 mg/kg) was excluded as an outlier (according to discussions on page 46) many of the other analytes listed above had no outliers which might account for the maximum soil concentration discrepancies observed between Tables 8 and 21. LANL shall provide clarification indicating outliers and explaining the differences between Tables 8 and 21.

3. **Page 30.** This section discusses an analysis of key inorganic elements, major elements and minor elements. LANL shall define the terms "key", "key major" and "key minor".
4. **Page 41.** LANL shall clarify "significant" correlation as defined with regards to the correlation reported between major elements and other trace elements. Although the document summarizes the correlations in Table 11, LANL fails to report the significance and define the correlations.
5. **Page 51, Item "d" of Step 3** states that the UTLs calculated for normal, lognormal, or square root-transformed distributions were based on a **99th percentile** and 95% confidence. Page 23 states that the UTL is determined as the 95% upper confidence limit of the 95th percentile. LANL shall clarify which percentile was used to calculate the UTL. LANL shall calculate UTLs at the 95% upper confidence level of the 95th percentile.

6. **Page 52, Table 20** summarizes statistical analyses of each analyte's soil sample results. Of the 30 listed analytes in Table 20, 18 analytes are reported as having data which is "approximately" normally distributed or "more" normally distributed than without data transformations. Only four analytes (chromium, iron, manganese and sulfate) were normally distributed after data transformation. LANL shall define "**approximately normally**" distributed data and indicate if it has evaluated the exception to the required assumption for statistical determination of UTLs and how it will compromise the UTL results.
7. **Pages 53 through 58, Table 21: Summary of Calculated UTLs and Maximum Concentrations by Soil Horizons.** In determining the concentrations of natural background, LANL proposes to use the maximum detected concentration values for the following constituents with a low frequency of detection: antimony, cadmium, mercury, selenium, and thallium. LANL has proposed the least conservative approach to address the uncertainties associated with its data base. The maximum detected concentration values are not acceptable as natural background concentration values. Therefore, LANL shall propose an alternative and more credible approach to address these data gaps. Additional sampling and analyses using more sensitive analytical methodology and lower detection limits is warranted.
8. **Page 55.** A summary of the lead soil concentrations and the calculated UTLs are omitted from Table 21.