LA-12913-MS (1/93)

General

9/15/95

Mr. Theodore J. Taylor
Program Manager
Department of Energy
Los Alamos Area Office
Los Alamos, NM 87544

Re: Natural Background Geochemistry, Geomorphology, and Pedogenesis of Selected Soil Profiles and Bandelier Tuff, Los Alamos NM

Dear Mr. Taylor:

The Environmental Protection Agency (EPA) has reviewed the draft background study entitled *Natural Background Geochemistry, Geomorphology, and Pedogenesis of Selected Soil Profiles and Bandelier Tuff, Los Alamos, NM* and the policy paper entitled *Statistical Comparisons to Background:Part I* and is providing the enclosed comments.

EPA understands that Los Alamos National Laboratory (LANL) has conducted additional sampling of background locations, and will be providing this information to EPA within several months. LANL should address the attached concerns or should provide an explanation as to why EPA's concerns were not addressed in the new background study report. Comments common to both documents are only indicated once.

Should you have any questions, please contact Ms. Barbara Driscoll at 214) 665-7441.

ER/ Framework

Sincerely,

David Neleigh
Chief
NM/FF Section

Enclosure

cc: Mr. Benito Garcia
New Mexico Environment Department
Mr. Jorg Jansen
Los Alamos National Laboratory, MS M992
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Comments
Los Alamos National Laboratory

Statistical Comparison to Background: Part I

1. Regulatory Literature Review, p. 3, First full paragraph, Second sentence -

It is important to note that although comparisons of detected concentrations to background concentrations is an accepted practice, constituents of concern should not be eliminated based on these comparisons. The CERCLA document referenced (**Guidance on Data Useability in Risk Assessment: Part A**) does not make mention of eliminating constituents of concern based exclusively on comparisons to background concentrations. Additionally, it is not clear what is meant by the selecting of number of background samples collected on the "minimum detectable difference" procedure. LANL references EPA's **Ecological Assessment of Hazardous Waste Sites: A Field and Laboratory Reference** as the source for this procedure. The specific procedure should be fully described in the LANL document to insure consistency.

2. Laboratory Background Data, p.4 -

a. The policy paper states that volcanic tuff is represented in the background soil concentrations. It is not appropriate to include this soil origin in the soil data population.

After conducting the review of the Longmire et. al. 1995 background report and this policy paper, it is unclear whether the reported UTLs are calculated or future UTLs will be calculated using a combination of four different types of soil concentrations. That is, the Longmire 47 soil samples (A, B or C soil horizons) analyzed using EPA's SW 846 methods, 50 soil (A, B or C horizons) and 38 tuff samples analyzed by non-SW 846 methods, additional 1995 data, and site-specific background concentrations. The combining of any of these data and/or the selective use of any particular data set over the others could at the very least present confusion in the presentation of different numbers for different purposes. Additionally, the applicability of these numbers to a base-wide background data universe should also be questioned.

b. It appears that LANL is providing exceptions for addressing the variability of the background data only in instances where a background chemical is neither present in the laboratory-wide background chemical population and/or when LANL suspects that the concentration at a specific site location may be higher than the calculated UTL. The fact that LANL sees a need for addressing background in a different manner illustrates that perhaps the proposed approach does not adequately represent the specific conditions at the facility.

3. Proposed Statistical Methods, p. 6 -

LANL proposes to use the Upper Tolerance Limit (UTL) statistical procedure as what is being termed a "hot measurement test". Changes to the proposed UTL calculation and application approach should be made prior to EPA concurrence. Essential information concerning the methodologies used to derive background concentrations as part of this policy paper should be incorporated into this document for completeness and clarity of presentation. At a minimum, all of the following criteria and/or requirements that apply to the calculation and use of background UTLs should be specifically listed in the document:

- The assumption of homogenous soil types should be verified.
- The data set must be comprised of an adequate sample size (at least 8 data points).
- Both ecological and human health relevance of the UTLs obtained should be addressed, i.e., comparison to ecological and human health screening values.
- The number of non-detects will be a determining factor in the application of the UTL procedure to a data set.
- LANL should submit all background data points for EPA's review.
- Variability within each data set should be addressed.
- A test for normality should be applied to the data set prior to the derivation of a UTL.
- The data set should be comprised of representative samples.
- Outliers should be addressed.
- No constituents of potential concern (COPCs) should be eliminated based on background.
- No organic compound should be considered in the risk screening phase.
- Risk due to background UTLs should be calculated for inorganic background compounds above screening values and for organic "anthropogenic" background values.
- The UTL is defined:

$$UTL = x + KS$$

UTL = upper tolerance limit
x = mean of the data set
K = tolerance factor at the 95% confidence level, 95% coverage
Note: The 99th percentile is not recommended since its use essentially allows for the use of almost 3 standard deviations from the mean. This will create inflated UTLs in the presence of variable data.

- In the case where the UTL procedure does not yield defensible background numbers, other statistical approaches should be utilized.

All background concentrations should be compared to the both human health and ecological screening values prior to conducting a screening risk assessment. Those inorganic background concentrations which are well below the screening values may be considered, however, background concentrations which approximate their respective screening value should be addressed on a case by case basis.

Only inorganic constituents that are well below the risk screening values and are

considered to be naturally occurring should be used in the screening risk assessment. All organic constituents should be carried forward to the baseline risk assessment.

Natural Background Geochemistry, Geomorphology, and Pedogenesis of Selected soil Profiles and Bandelier Tuff, Los Alamos, NM: Draft:

1. **Abstract, p.2 -**

a. Text indicates "the data set is not necessarily representative of the full suite of soils and tuff present at the Laboratory, and may not include the full range of natural concentrations for all elements". LANL needs to evaluate and collect additional data points. Of the elements investigated, only arsenic and beryllium have background concentrations greater than their corresponding Screening Action Levels. Based on this, additional background sampling may be warranted only for these elements. There is also variability between the various horizons, A, B and C which must be addressed.

b. Background concentrations that exceed risk-based screening action levels (SALs) should not be used to determine a release from a unit. In order for background concentrations to be used for a risk screen the concentrations should be well below their respective SALs. If background concentrations exceed SALs, it is necessary to allow EPA a thorough review of the background study prior to application of those concentrations. In situations where the investigated unit could have contributed the same chemical, it will be necessary to carry the specific unit into a baseline risk assessment. In either case, the risk due to the background concentrations should be calculated when the concentrations are in exceedance of the SALs.

2. **Table 2, p. 11 -** The lead screening value recommended by EPA's Office of Solid Waste and Emergency Response is 400 ppm as of July 1994.

3. **Sampling Digestion and Analytical Techniques, p. 12 -** LANL should indicate which samples were digested using HF and which were digested using HNO_3.

4. **Part II, p. 57 -** LANL makes an extensive effort to present information on the geology of the installation. However, presentation of the data vary from concentrations in ppm units of measure to % weight. It is difficult to assess the relation of the concentrations with this inconsistent form of presenting the data.