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Date: July 9, 2004
Refer To: ER2004-0374

Mr. James Bearzi
New Mexico Environment Department
Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303

SUBJECT: RESPONSE TO THE REQUEST FOR INFORMATION ON THE ANNUAL UPDATE AND REVISION OF THE LABORATORY'S ECORISK DATABASE, VERSION 2.0

Dear Mr. Bearzi:

Enclosed please find the response to NMED's request for information on the annual update and revision of the Laboratory's ECORISK Database, Version 2.0. The Department of Energy Los Alamos Site Operations Office received the request on June 23, 2004.

If you or your staff have any questions please contact Richard Mirenda at (505) 665-6953 or rmirenda@lanl.gov.

Sincerely,

David McInroy, Deputy Project Director
Remediation Services
Los Alamos National Laboratory

Sincerely,

David Gregory, Federal Project Director
Department of Energy
Los Alamos Site Operations

DM/DG/RM/th

Enclosures: Response to Request for Information

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RESPONSE TO THE REQUEST FOR INFORMATION ON THE ANNUAL UPDATE AND REVISION OF THE LABORATORY'S ECORISK DATABASE, VERSION 2.0

This submittal is the response by the Los Alamos National Laboratory (LANL or the Laboratory) to the "Request for Information on the Annual Update and Revision of the Laboratory's ECORISK Database, Version 2.0, Los Alamos National Laboratory, NM0890010515" issued by the New Mexico Environment Department (NMED) on June 21, 2004. The ECORISK Database, Version 2.0, was submitted by LANL to NMED in December 2003.

This response follows the organization of the NMED's Request for Information, with comments and responses to the comments. The NMED comments are provided verbatim, with LANL's responses following each comment.

1. **NMED Comment**: The Ecorisk database was developed by the LANL to provide ecological screening levels (ESLs) for use by LANL risk assessors. As such the values contained within the database, once approved, will be the default ESLs for all ecological screening risk assessments at LANL. The ECORisk database provides ESLs for several receptors, including phytotoxicity to generic plants. According to Efroymson et al. (1997), "If chemical concentrations reported in the field soils that support vigorous and diverse plant communities exceed one or more benchmarks... or if a benchmark is exceeded by background soil concentrations, it is generally safe to assume that the benchmark is a poor measure of risk to the plant community at the site." The phytotoxicity ESLs presented in ECORisk were compared to the LANL background values by media for inorganic chemicals (LANL 1998, Tables 6.0-1 and 6.0-2). For several of the inorganic constituents (specifically antimony, barium, beryllium, chromium, copper, mercury, nickel, selenium, silver, thallium, vanadium, and zinc) the ESL exceeded one or more of the background values by media (soil, canyon sediment, Qbt 2,3,4, Qbt 1v, and Qbt 1g,/Qct/Qbo). It is apparent that the phytotoxicity ESLs as presented in the database are not appropriate for use at LANL. NMED requests that the Permittees discuss whether background concentrations at LANL were considered when reviewing the toxicity data to determine ESLs. NMED also requests the Permittees to discuss how phytotoxicity should be addressed for the constituents where the ESL as presented in the ECORisk database is deemed inappropriate.

   LANL Response: Background concentrations are not considered when reviewing toxicity data used to determine ESLs. When the screening level ecological risk assessment methodology and database were being reviewed and discussed by NMED and LANL (circa 1998–1999), it was decided that the screening step should be inclusive rather than exclusive. The approach agreed upon was that the ESLs would be calculated without regard to background and exceedance of ESLs would require either a qualitative or quantitative evaluation of chemicals of potential ecological concern (COPECs). As a result, some ESLs for the plant as well as other receptors are less than background, and the ESLs are appropriate for the use intended with respect to the ecological screening risk assessment. The approach is also consistent with the U.S. Environmental Protection Agency's (EPA) use of background concentrations to develop ecological soil screening levels (Eco-SSLs). EPA compares its Eco-SSLs to background levels typical of the eastern and western United States, but the Eco-SSLs are not modified based on these background levels.

In the case of plants, the risk assessor is required to qualitatively evaluate whether the analyte(s) should be retained as a COPEC after the comparison between the exposure concentration and ESL. If the exposure concentration is similar to background, then the similarity is presented as a reason to eliminate a COPEC. If the exposure concentration is greater than background, then other factors, including visual observations of the plant community, are assessed to determine whether the analyte remains a COPEC, i.e., whether the plant community appears healthy, and whether it is similar to the surrounding vegetation. This approach is consistent with the Efroymson et al. (1997) quote regarding "...field soils that support vigorous and diverse plant communities...." Because contaminant releases have generally occurred years to decades ago, a qualitative assessment of the plant community is appropriate. Plants are stationary receptors that have been in place throughout the period of contamination and should reflect adverse impacts from exposure to COPECs.

2. **NMED Comment:** A chronic no-observed-adverse-effect-level (NOAEL) of 0.4 mg/kg/d was used to calculate the effect level for the deer mouse for beta-hexachlorocyclohexane (β-BHC). The NOAEL is cited from Sample et al. (1996); the primary reference in Sample et al. (1996) is Van Velsen et al. (1986). The study in Sample et al. (1996) identifies the constituent as "β-benzene hexachloride (β-BHC)"; however, the subject constituent is actually hexachlorobenzene, not β-BHC. It is also noted that the compounds listed in Sample et al. as BHC mixed isomers (encompassing Grabt et al. (19977), Bleavins et al. (1984), and Vos et al. (1971)) are for hexachlorobenzene and not β-BHC. Thus the application of the NOAEL may be inappropriate for use for β-BHC, as β-benzene hexachloride is not an appropriate surrogate. The Permittees should clarify whether the Van Velsen et al. study is based upon beta-hexachlorocyclohexane, and if Sample et al. misidentified the compound. It is suggested that gamma-BHC (Lindane) be used as a surrogate for the BHC isomers if warranted.

   LANL Response: The Van Velsen et al. (1986) study cited in Sample et al. (1996), entitled "The Subchronic Oral Toxicity of the Beta-Isomer of Hexachlorocyclohexane in Rats," is based on beta-hexachlorocyclohexane (β-HCH), which is synonymous with beta-benzene hexachloride (β-BHC). Both have a Chemical Abstract Service Registry Number (CASRN) of 319-85-7, which is a unique number assigned to a chemical for easy reference. Therefore, the application of the NOAEL from the Van Velsen et al. (1986) study is appropriate for β-BHC.

   The Van Velsen et al. (1986) study is the only source for the chronic NOAEL used to calculate the deer mouse ESL. The other studies [Grant et al. (1977), Bleavins et al. (1984), and Vos et al. (1971)] presented in Sample et al. (1996) as benchmarks for β-BHC were not reviewed or used in the ESL calculations. Although the titles of these other studies indicate that hexachlorobenzene was the chemical of interest, the studies may have also looked at BHC-mixed isomers and hence have NOAELs or lowest observed adverse effect levels (LOAELs) for β-BHC. However, because these studies were not reviewed for the ECORISK Database it is unknown whether they analyzed chemicals other than hexachlorobenzene and are not relevant to the value presented in the database.