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

GARY E. JOHNSON
GOVERNOR

PETER MAGGIORE
SECRETARY

1089

CERTIFIED MAIL -- RETURN RECEIPT REQUESTED

October 30, 1998

Michael Zamorski
Acting Area Manager
Kirtland Area Office
U. S. Department of Energy
P. O. Box 5400
Albuquerque, NM 87185-5400

Joan B. Woodard
Vice President, Div. 6000
Sandia Corporation
P. O. Box 5800
Albuquerque, NM 87185-0724

**RE: Notice of Deficiency: Mixed Waste Landfill RFI Report**

Dear Mr. Zamorski and Ms. Woodard:

The Hazardous and Radioactive Materials Bureau (HRMB) of the New Mexico Environment Department (NMED) has reviewed your responses (dated June 15, 1998) to HRMB's Letter of Denial issued for the submittal *Report of the Mixed Waste Landfill Phase 2 RCRA Facility Investigation (RFI), Sandia National Laboratories, Albuquerque, New Mexico*. Your supplemental information still leaves deficiencies in the RFI, which are noted in Enclosure A. Additional concerns and questions have been raised as a result of review of the risk assessment proposed for the landfill; these are also included in Enclosure A.

Other comments are provided in Enclosure B to communicate the HRMB's position on certain issues. The U. S. Department of Energy (DOE) and Sandia National Laboratories (SNL) are not required to respond to the comments in Enclosure B.

DOE/SNL must respond to the deficiencies and concerns noted in Enclosure A within 30 days of receipt of this letter.

You may contact William Moats of my staff at 827-1558 if you have any questions or comments.

Sincerely,

Benito J. Garcia
Chief
Hazardous and Radioactive Materials Bureau

Enclosure

cc: Mark Jackson, DOE/KAO
George Laskar, DOE/KAO
Stephanie Kruse, NMED/HRMB
Bill McDonald, NMED/DOE OB
Dick Fate, SNL
David Miller, SNL
David Neleigh, EPA
File: HSWA, SNL-OU 1289, 98

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**Enclosure A**
**Notice of Deficiency**

Department of Energy (DOE)/Sandia National Laboratories (SNL) Responses (June 15, 1988) to Hazardous and Radioactive Materials Bureau's (HRMB's) Letter of Denial (September 11, 1997) for

*Report of the Mixed Waste Landfill Phase 2 RCRA Facility Investigation, Sandia National Laboratories, Albuquerque, New Mexico*

**Deficiencies**

1. Response 8 -- The table must be revised to show the detection limits for the values listed as nondetects. The detection limits must be provided to evaluate whether they met data quality objectives.

HRMB suggests that DOE/SNL contact Radian Corporation, which conducted the field study, to obtain the detection limits for uranium, Pu-238, and Pu-239/240.

2. Response 23 -- The cross-sections indicate:

A. There has been a release of cadmium along the west side of the landfill. Cadmium concentrations range from about 1.02 - 1.97 mg/kg in soil samples collected at depths varying from 10 ft to greater than 100 ft.
B. There has been a release of cobalt along the southeast corner of the landfill (Borehole BH-13). In this area, cobalt concentrations range from about 5.83 - 9.62 mg/kg in soil samples collected at depths varying from 10 ft to greater than 100 ft.

C. There is evidence of possible copper contamination at concentrations ranging from 18.7 - 70 mg/kg in soil samples collected at depths of about 40 - 150 ft (Boreholes SB-4, SB-5, and BH-3).

D. There is evidence of possible nickel contamination at concentrations ranging from 11.8 - 21.5 mg/kg in soil samples collected at depths of about 70 - 100 ft (Boreholes SB-5 and BH-3).

E. There is a "hot spot" of contamination at a depth of 50 ft , Borehole 3 (BH-3). Contaminants are Ag (1.46 mg/kg), Cd (1.44 mg/kg), Co (105 mg/kg), Cu (645 mg/kg), Ni (97.5 mg/kg), and Zn (413 mg/kg).

The presence of metal contaminants at depths which can exceed 100 ft indicate that liquid wastes were disposed of in the landfill. Thus, ground-water monitoring for metals is required.

3. Response 37 -- The water-table map indicates that there is

only one downgradient monitor well at the Mixed Waste Landfill. Normally, a minimum of three downgradient wells is required for an adequate detection monitoring system.

After the two new wells are installed, and the water-table map is revised, the HRMB will reevaluate the adequacy of the detection monitoring system. HRMB requests a meeting with DOE/SNL technical and management staff to discuss the location and design of the two new wells.

4. Response 41 -- Please explain the method of Fogg and Senger (1985).

5. Response 46 -- The MWL inventory is not complete. Data derived from soil sampling beneath the landfill indicate that nickel is a possible contaminant at the MWL (see comment 2).

DOE/SNL must support their position on a technical basis that the elevated nickel levels detected in ground-water samples from monitor well MWL-MW1 (and MWL-MW3) are a result of the corrosion of 304 stainless-steel well screen; otherwise, such elevated levels of nickel will be attributed to a release of contaminants from the landfill.

DOE/SNL has argued a similar position with respect to elevated concentrations of chromium and nickel in ground-water samples from wells at the Chemical Waste Landfill (CWL). DOE/SNL claim that the corrosion of certain CWL monitor wells has been caused by a relatively high concentration of chloride (about 100-130 mg/L) and a relatively high pH condition in the ground water (about a pH of 10 for 45 days prior to well development). However, DOE/SNL have not provided technically defensible data demonstrating that MWL monitor wells have been subjected to similar chemical/physical conditions as those at the CWL. Additionally, DOE/SNL have not provided data that the chemical/physical conditions of CWL ground water will cause corrosion of 304 stainless-steel screen.

6. Response 47 -- The requested uranium data were not provided in the revised Appendix K.

7. Response 53 -- See comment 3 above.

8. Response 60 -- Please provide references and the actual values for the vapor pressure of tritiated and nontritiated water.

Consider also that soil samples from BH's 7, 9, 10, and 12 have elevated tritium activities that clearly demonstrate that tritium

is capable of migrating to depths below the bottoms of the trenches (or pits). What is the mechanism of transport of this tritium?

Cross-sections show that elevated tritium activities occur at depths which exceed 100 ft. Thus, ground-water monitoring for tritium is required.

9. Response 62 -- The following comments concern the MWL risk assessment.

A. Risk assessment performed for the MWL evaluates an industrial worker exposure scenario to determine current and future risk from the MWL. No human intrusion scenarios are included in this risk evaluation. The MWL land use restriction to an industrial exposure scenario is obviously representative of and applicable to the current land use designation. However, this situation requires assurance that an industrial land use designation will be maintained in the future. Therefore, DOE/SNL must provide NMED/HRMB with a method or mechanism to assure that DOE/SNL have the ability and systems in place to make controls of the land restriction effective.

In addition, the controls have to be appropriate for the hazard involved. Therefore, DOE/SNL has to document an auditable program of monitoring the controls for effectiveness and reporting their implementation.

B. Because land located approximately 1 mile west of the MWL could be developed for residential use, DOE/SNL must evaluate the potential for off-site contaminant migration from the landfill. The evaluation should consider ecological and human health impacts from any potential migration of COC's.

C. The nature and extent of subsurface contamination indicate that some contaminants are a potential threat to ground-water quality beneath and downgradient (west) of the MWL. A simple screening comparison of contaminant concentrations in subsurface soils against *available* EPA soil screening levels (SSL's) developed for the protection of ground-water resources demonstrates exceedances for cadmium and nickel (U. S. EPA, 1996, *Soil Screening Guidance: Technical Background Document*, EPA/540/R-95/128, Office of Emergency and Remedial Response, Washington, DC, PB96-963502). Therefore, the risk assessment for the MWL must evaluate potential impacts of cadmium, nickel, and

other contaminants (metals such as cobalt and copper, and radioactive materials such as uranium and tritium, for which SSL's are not available at this time) on local and regional ground-water quality.

D. Section 7.2, *MWL Exposure Routes*, page 7-1, last paragraph states that radionuclides evaluation includes ingestion in drinking water, ingestion in soil, external gamma radiation, and inhalation of soil-derived particulates and vapor-phase radon and tritium. However, evaluation of external gamma radiation exposure and exposure to radon gas is not documented in the subject report. Please provide the rationale for excluding this information from the report or, more preferably, provide data on the possible radon and external gamma radiation exposures to potentially impacted organisms.

E. Section 7.3, *Risk Assessment Analysis*, pages 7-2 through 7-8 implies that metal concentrations were measured in surface-soil samples. However, no surface-soil sampling and analysis data could be located in the subject report. Thus, DOE/SNL shall present all surface-soil sampling results and data, including soil sampling locations, depth, types of laboratory analyses used, detection limits, and quality assurance/quality control measures employed.

F. Tables 7.3-1 and 7.3-4 (pages 7-3 and 7-7, respectively) report maximum concentration of hexavalent chromium only. Results for both total and hexavalent chromium (if measured) shall be reported. In addition, background comparisons shall be made between relevant (i.e., comparable) chromium species, i.e., chromium (VI) maximum soil concentrations shall be compared with chromium (VI) NMED/HRMB-approved soil background levels for the KAFB area (NMED/HRMB-approved background soil concentration is 1 mg/kg for chromium (VI) and it is not 17 mg/kg, as reported in Table 7.3-4).

Also, please verify that Table 7.3-4 (page 7-7) reports correct and comparable background soil concentrations for aluminum and manganese.

G. Due to the qualitative nature of soil-gas survey results (both passive and active), it is inappropriate to use them in a quantitative risk assessment. Please use analytical results of soil-matrix sampling in a quantitative risk analysis.

H. Please clarify why cobalt, thallium, and vanadium RfD's are missing from Table 7.3-7 (page 7-10). Consequently, potential human health risks are not evaluated for these contaminants. In addition, Table 7.3-7 is missing a legend defining reported parameters and their sources.

I. Appendix N, page N-8 discusses potential sources of PEF's used to estimate exposure from inhalation of fugitive dust; however, it does not document their values.

J. In addition to human health risk evaluation, this risk assessment shall also address ecological risks for the MWL.

10. Response 64 -- Explain what is meant by "an additional four sampling events will be conducted".

11. Response 79 -- Approximately 1/2 of the information included in Attachment 80-1 (*Summaries of Laboratory and Field QC Results for MWL Groundwater Quality Data*) is labeled "draft". Draft information is unacceptable for the purpose of making final decisions. DOE/SNL must provide copies of final documents not labeled as draft for HRMB's review.

**Enclosure B**
**Notice of Deficiency**

Department of Energy (DOE)/Sandia National Laboratories (SNL) Responses (June 15, 1988) to Hazardous and Radioactive Materials Bureau's (HRMB's) Letter of Denial (September 11, 1997) Concerning

*Report of the Mixed Waste Landfill Phase 2 RCRA Facility Investigation, Sandia National Laboratories, Albuquerque, New Mexico*

**Additional Comments**

The following comments are provided to communicate the HRMB's position on certain technical issues. DOE/SNL are not required to respond to the comments in this enclosure (Enclosure B).

1. Response 10 -- Regulation 10 CFR 30.15 does not address the allowable tritium activity for a self-luminous "EXIT" sign.

2. Response 32 -- Large values (+/- 2-sigma) for uncertainty can be an indication that data are of marginal or poor quality.

3. Response 38 -- The top of the upper screen of MWL-MW4 is located approximately 22 ft below the water table. Because of the vertical gradient and the way the well is constructed, MWL-MW4 is of no value for determining the elevation of the water table (and therefore, the horizontal direction of ground-water flow and the horizontal gradient).

Also, because the top of the upper screen of MWL-MW4 is located 22 ft below the water table, the well is of little value for detecting any ground-water contamination (if any exists) that may be present in the saturated zone just below the water table.

4. Response 39 -- The horizontal gradient (and direction of ground-water flow) must be determined from measurements of water levels in monitor wells, not from computer-generated flow nets.

The site-specific water-level map, which is based on water level measurements, suggests a horizontal gradient of 0.0041 ft/ft. It is hoped that a more reliable horizontal gradient can be determined after the two new wells are installed.

5. Response 50 -- The pumping tests for monitor wells MWL-BW1, MWL-MW1, MWL-MW2, MWL-MW3, and MWL-MW4 (Upper) appear to have failed because the yield of each well was too small to permit a

successful pumping test to be conducted. The pumping test conducted on MWL-MW4 (Lower) also appears to have failed, possibly because the pumping rate was not high enough to stress the aquifer. Taking into account that the plots are semi-log, none of the drawdown curves appears to have a form which matches that of a type curve. Therefore, the reported values for hydraulic conductivity and transmissivity are considered by the HRMB to be unreliable.

Unless ground-water contamination is detected and confirmed in one or more MWL monitor wells, there is no need to establish hydraulic properties of the aquifer from field studies.