Department of Energy
Albuquerque Operations Office
Los Alamos Area Office
Los Alamos, New Mexico 87544

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CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Ms. Janice Archuleta
Hazardous and Radioactive Materials Bureau
New Mexico Environment Department
2044 Galisteo St., Bldg. A
P. O. Box 26110
Santa Fe, New Mexico 87505

Dear Ms. Archuleta:

Subject: Re-characterization of *"Soil with Heavy Metals"* - Request for Removal from Site Treatment Plan (STP)

The purpose of this letter is to present additional information requested by the New Mexico Environment Department (NMED) by letter dated November 20, 1996 regarding our request for reclassification of forty-seven (47) fifty-five gallon containers of soil currently being stored at the Los Alamos National Laboratory (LANL) as Low-Level Mixed Waste (LLMW). These containers currently make up part of the 59 items listed in the STP under Section 3.1.2 in the Compliance Plan Volume (CPV, Rev. 3.0, Exhibit A) and the Background Volume in the treatability group "*soil with heavy metals*," MWIR waste ID LA-W904. Our reclassification request was submitted to NMED on October 18, 1996.

In its November 20, 1996 letter, NMED requested additional information in order to proceed with revision of LANL's Federal Facility Compliance Order (FFCO, Rev. 3.0). Each question is addressed below. Please note, however, that when LANL re-reviewed the supporting data, it was determined that one of the 47 containers was apparently never received into storage at LANL. Once this information has been fully validated, this 47th drum will be deleted, in accordance with the FFCO, as a separate revision. Therefore, we wish to amend our previous request in order to proceed with nonhazardous determination for only 46 of the 59 items in this treatability group at this time. The remaining 13 items will continue to be managed as LLMW according to the terms of the STP. The following information, therefore, is presented for the 46 containers remaining in LANL's reclassification request.

Question 1: Are the samples from the drums representative of the entire drum, e.g., is it a homogeneous sample? If so, how was this obtained?

The representativeness of the samples is based on three factors: (1) the homogeneous nature of contaminants in the waste material in each waste stream; (2) extensive interviews of the waste generator; and (3) LANL's sampling methodology. The 46 drums contain wastes from two separate waste streams.

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Additional interviews with the original waste generator (the project manager who supervised both decommissioning projects) confirmed previous information describing the composition of the waste streams and the original packing of the 46 drums. Best management practices in both projects were used to minimize the number of waste drums being generated, by optimally packing each drum with a uniform mix of the various particle sizes present in the waste stream. Because the generator believed the waste streams were homogeneous, no effort was made to bias the contents of any particular drum within each waste stream. Therefore, process knowledge supported the theory of homogeneity within drums. This homogeneity of distribution is supported by the following project/site descriptions from Technical Area (TA) 2 and TA-35, respectively.

TA-2 Waste Stream

This waste stream consists of 42 drums. The process knowledge/historical information, as discussed in *"Final Project Report, TA-2 Water Boiler Reactor Decommissioning Project,"* (LA-12049), indicated that lead was the primary chemical hazard at this decommissioning site. The lead and concrete were used as shielding material and were laid in a continuous manner along the bottom of the trench. The soil, rocks, and concrete rubble in these drums originated from subsurface areas excavated around and beneath the shield and related utility trench. Based on the excavation process, in filling the drums with soil, rocks, and concrete rubble, any lead contamination would be thoroughly mixed in with the soil excavated from around the biological shield and related utility tunnels that used lead as shielding, thereby creating a homogeneous waste material.

TA-35 Waste Stream

The four drums from this waste stream consists of two waste stream subsets:

SUBSET 1 - soil with phosphoric acid rinse, lead.
The soil with phosphoric acid rinse and lead originated from the area excavated from around the fuel reservoir tank which was assumed to contain an acid rinse solution of phosphoric acid.

SUBSET 2 - soil with chromium and lead.
The soil with chromium and lead originated from the area excavated from around the reactor "steel safety enclosure", which was assumed to contain chromium as a corrosion by-product from the stainless steel reactor related components.

The process knowledge/historical information, as discussed in *"Final Project Report, TA-35 Los Alamos Power Reactor Experiment No. II (LAPRE II) Decommissioning Project"* (LA-12464), indicated that lead was the primary chemical hazard at this decommissioning site. Lead was used for radiation shielding material and was laid in a continuous manner surrounding the reactor vessel within the reactor "steel safety enclosure." The soil, rock, and concrete rubble in these drums originated from subsurface areas excavated from around the fuel reservoir tank and the "steel safety enclosure" and related trenches. Based on the excavation process, in filling the drums with soil, rocks, and concrete rubble, any lead contamination would be thoroughly mixed in with the soil excavated from around the fuel reservoir tank and the "steel safety enclosure."

The sampling methodology also ensured the sample material was representative of the drums' contents. All 46 drums were visually inspected as to the contents prior to sampling. This confirmed the generator's information, and ensured that composite samples from the drums selected would be homogeneous, because of the consistent spatial distribution of particle sizes comprising the waste matrix (i.e., the waste in each drum was uniformly composed of soil, rocks, and concrete rubble). For each sample, the sampling personnel collected some soil, rocks, and pieces of concrete rubble from randomly selected multiple areas and at various depths within each waste drum that was sampled.

These practices are consistent with sampling guidelines established in Chapter Nine of EPA's SW-846 guidance, as incorporated into LANL's Sampling Plan for this project. The samplers' visual inspection prior to sampling verified the uniform composition of the waste matrix.

Question 2: Are the samples from the drums sampled representative of the entire group or a subset of drums to be recharacterized?

The samples from the TA-2 and TA-35 drums sampled are representative of the entire TA-2 and TA-35 waste streams, respectively. The strategies used are as follows:

TA-2 Waste Stream

From this group of 42 drums, five samples were taken. All 42 drums were visually inspected as to the contents prior to sampling. This visual inspection confirmed the waste in all 42 drums to be composed of soil, rocks, and concrete rubble distributed uniformly throughout the drum. The processes generating the waste (soil excavated from a trench continuously shielded with lead) further supported LANL's hypothesis of a homogeneous waste stream, in which any potential contaminants would be randomly distributed throughout all 42 drums. Each of the five samples collected were randomly selected from multiple areas and at various depths within each waste drum.

Different methods to determine representative sampling were used to verify that a good representation was achieved.

LANL requested guidance on sampling debris waste from the USEPA's SW-846 hotline. The guidance received was to sample no less than 10 percent of the entire waste stream. Five out of 42 drums (12 percent) were sampled, which exceeds the USEPA's 10 percent criterion.

The second method used was to employ the statistical analysis outlined in USEPA's SW-846 guidance to determine whether five samples were sufficient. Lead was the hazardous constituent of primary concern in this waste stream.

Out of the five samples analyzed, four were found to contain lead levels below the Minimum Detectable Level (MDL) of 0.3 mg/l (the fifth sample had a value of 1.1 mg/l). Therefore, in order to estimate the mean and sample variance, the MDL was assigned to four of the samples in place of the actual non-detect measurement . The appropriate number of samples was calculated as follows (see SW-846, Chapter 9):

a. Sample mean = $\bar{x} = \sum_{i=1}^{n} x_i/n$

where n = no. of samples
and x_i = individual measurement

$$\bar{x} = \frac{(0.3+0.3+1.1+0.3+0.3)}{5} = 2.3 / 5 = 0.46$$

Sample variance or $s^2 = [\ \sum_{i=1}^{n} x_i^2 - (\sum_{i=1}^{n} x_i)^2 / n\ ] / n-1$

$$s^2 = \frac{((0.3^2+0.3^2+1.1^2+0.3^2+0.3^2) - (0.3+0.3+1.1+0.3+0.3)^2 / 5)}{5-1}$$

$$=(1.57 - 1.058) / 4 = 0.128$$

Number of samples to collect = $n = t^2_{.2}\, s^2 / \Delta^2$
where

$\Delta = RT - \bar{x}$

$t^2_{.2}$ = Student's "t" = 1.533 (from Table 9-2, SW-846)

RT = regulatory threshold = 5.0 mg/l (for lead)

So $n = (1.533^2)(0.128) / 4.54 = 0.06625802$

$n \Rightarrow 1$ sample

Five out of 42 drums were sampled, which well exceeds this value.

TA-35 Waste Stream

From this group of four drums, one drum was sampled from each waste stream subset. All four drums were visually inspected as to the contents prior to sampling. This visual inspection confirmed the waste in all four drums was composed of soil, rocks, and concrete rubble distributed uniformly throughout each drum. Each of the samples collected were randomly selected from multiple areas and at various depths within each waste drum.

As with the TA-2 samples, USEPA's SWA-846 hotline guidance was followed, which was to sample no less than 10 percent of the entire waste stream. One out of each waste stream subset (50 percent) were sampled, which well exceeds the USEPA 10 percent criterion.

Question 3: Is there sampling data from the sites where the soil was originally which can be used to support the laboratory analysis of the samples from the drum? Is there previous data which supports or contradicts laboratory sampling from the drums?

As discussed under question 1, LANL extensively interviewed the project manager initially responsible for generating the TA-2 and TA-35 waste streams. This was particularly helpful in verifying the nature and composition of each waste stream, and the homogeneity of packaging within and among containers. This also filled in knowledge gaps in the characterization data originally collected at the decommissioning sites. This information was rechecked with the generator when this letter was prepared.

TA-2 Waste Stream

Recent laboratory analyses of the drummed soil waste from the TA-2 Water Boiler Reactor project were reported in attachments to LANL's October 18, 1996 letter. The initial site characterization data had indicated no hazardous constituents were present in the respective soils. As stated in the referenced final project report, composite soil samples for metals, as determined by the Toxicity Characteristic Leaching Procedure (TCLP), did not indicate that hazardous waste was present. The recent analyses of excavated soil waste from TA-2, reported in LANL's October 18, 1996 letter, confirm this initial site characterization sample data.

TA-35 Waste Stream

No direct analyses of excavated soil waste from the TA-35 Water Boiler Reactor LAPRE II decommissioning project were performed at the time this waste stream was generated, but analysis done on soil samples collected from the remediated site following soil removal did not indicate the presence of hazardous waste constituents. The recent analysis of the excavated soil waste from each subset, reported in LANL's October 18, 1996 letter, likewise did not indicate the presence of hazardous constituents.

Both streams were initially characterized as LLMW (on the basis of the potential presence of lead only) using a conservative approach, because of the use of lead shielding around subsurface areas of both reactors and reactor assemblies. LANL's recent sampling and analysis efforts confirmed the initial site characterization sampling results. No hazardous contaminants of concern were found, and the soil should be considered to be non-RCRA regulated, low level radioactive waste.

Question 4: What methods or protocols were followed to arrive at a drum sampling number?

Visual inspection of the containerized waste prior to sampling had confirmed a uniformly composed waste matrix, which gave LANL a high degree of confidence in sample representativeness with respect to regulated hazardous waste constituents. However, at the time of resampling for LANL's October 18, 1996 request, radiological surveys were also conducted to ensure all radiation protection requirements would be met when managing the waste prior to and during final disposal of the waste. To ensure that the range of radionuclide concentrations was adequately addressed in LANL's characterization, radiation dose rate measurements were used as a guide for selecting drums. The particular drum for sampling was selected at random within these categories by the sampling team. In selecting the two (one from each subset) of the four

TA-35 drums for sampling, LANL took one drum from each of these waste stream subsets, determined by the generator's descriptions of the contaminants (e.g., "soil with phosphoric acid rinse, lead" and "soil with chromium and lead"). The particular drum for sampling was selected at random within these categories by the sampling team.

Upon approval of this request by NMED, LANL wishes to proceed as expeditiously as possible with the re-labeling and on-site disposal of the referenced 46 items as low-level radioactive waste. The remaining 13 items will continue to be managed in accordance with the requirements of the STP. LANL respectfully requests that, if possible, NMED please provide an indication by April 15, 1997 as to whether it intends to approve LANL's request, in order to allow us to proceed expeditiously (if not) with LLMW disposal of these wastes, to meet their compliance dates in a timely manner.

Enclosed is a certification statement. These documents were prepared in accordance with the requirements of Section XX, "Documents, Information, and Reporting," of the FFCO.

LANL's records and documents supporting the information provided in this letter are available to NMED's staff upon request. We would be happy to discuss the information contained in this letter with you at your earliest possible opportunity. Please contact me at (505) 665-5042, or Kenneth Hargis at (505) 667-2347.

Sincerely,

H. L. "Jody" Plum
Office of Environment and Projects

LAAMEP:2JP-065

Enclosure

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Office of Environment and Projects

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Enclosure

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CERTIFICATION

RE-CHARACTERIZATION OF *"SOIL WITH HEAVY METALS"* - REQUEST FOR REMOVAL FROM SITE TREATMENT PLAN (STP)

I certify that I am the project manager responsible for overseeing the implementation of the Site Treatment Plan for the Los Alamos National Laboratory. To the best of my knowledge and belief, the information in this document is true, accurate, and complete.

Kenneth M. Hargis

Kenneth M. Hargis
Manager of Operations
Waste Management Program
Environmental Management Programs
Los Alamos National Laboratory
Operator

21 March 1997
Date Signed

H. L. Plum
Regulatory Permitting and Compliance Manager
Los Alamos Area Office
U.S. Department of Energy
Albuquerque Operations
Owner/Operator

3/26/97
Date Signed

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Waste Management Program
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Los Alamos National Laboratory
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Date Signed

H. L. Plum
Regulatory Permitting and Compliance Manager
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U. S. Department of Energy
Albuquerque Operations
Owner/Operator

3/20/97
Date Signed