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NATIONAL LABORATORY
EST. 1943

Environmental Protection Division
Water Quality & RCRA Group (ENV-RCRA)
P.O. Box 1663, Mail Stop K490
Los Alamos, New Mexico 87545
(505) 667-0666/FAX: (505) 667-5224

Date: February 26, 2008
Refer To: ENV-RCRA-08-042

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

Dear Mr. Bearzi:

SUBJECT: TREATABILITY STUDY NOTIFICATION

The purpose of this letter is to provide notification that Los Alamos National Laboratory (EPA ID NM0890010515) plans to conduct a treatability study pursuant to New Mexico Administrative Code, Title 20, Chapter 4, Part 1 (20.4.1.200 NMAC) (incorporating Code of Federal Regulations [CFR], Title 40 § 261.4(f)). The enclosure details a study that will be conducted by the Dynamic Experimentation Division to separate mercury metal from high explosives (HE) to make the waste stream more amenable for disposal. The goal of this study is to separate each of the components of the waste and dispose of them via separate paths. A total sample volume of approximately 2.11 liters will be treated in this study. The anticipated start date for the treatability study is April 14, 2008.

If you have any questions, please contact me at (505) 667-0666.

Sincerely,

A R Grieggs

Anthony R. Grieggs
Group Leader
Water Quality & RCRA Group (ENV-RCRA)

ARG:LVH/lm

Enclosures: a/s

Cy: John Kieling, NMED-HWB, Santa Fe, NM
Gene Turner, LASO, w/enc., A316
Michael B. Mallory, PADOPS, w/o enc., A102

Cy (continued):
Richard S. Watkins, ADESHQ, w/o enc., K491
Tori George, ENV-DO, w/o enc., J978
Jack Ellvinger, ENV-RCRA, w/enc., K490
Jose Archuleta, DE-1, w/enc., C920
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Enclosure

Los Alamos
NATIONAL LABORATORY
Solid Waste Regulatory Compliance
P.O. Box 1663, Mail Stop K490
Los Alamos, New Mexico 87545

Facility Name:	**Los Alamos National Laboratory (LANL) Dynamic Experimentation (DE-1)**
Facility EPA ID Number:	**NM 890010515**
Project Title:	**Separation of Mercury metal from High Explosives**
Location of Project:	**Technical Area (TA) 9, Building 21, Room 117**
Project Contact:	**Jose G Archuleta** **DE-1, Mail Stop C920** **(505) 667-6361**
Other Contacts:	**Mary Sandstrom** **DE-1, Mail Stop C920** **(505) 665-6813** **Gabriel Avilucea** **DE-1, Mail Stop C920** **(505) 665-3385**

Project Description:

Several vital processes at DE-1 generate waste streams that contain both mercury (Hg), principally as metal, and high explosives (HE). Because of the combination of toxicity and reactivity, these waste streams are either prohibitively costly or impossible to ship for disposal off-site. Suitable disposal methods do not exist for disposal of this current waste combination. Two sources have been identified as sources for the Hg/HE waste: (1) Vacuum Thermal Stability testing (VTS) used to certify HE samples for laboratory use (2) Mercury porosimetry testing of HE samples for measurement of pore volumes in the material. Currently, there is a two liter cast iron container containing approximately 1 liter of sludge consisting primarily of Hg/HE, silicone oil and ethanol.

We propose to implement suitable and mature separations technology to partition the Hg and HE waste stream into Resource Conservation and Recovery Act (RCRA) compliant fractions that may be readily disposed of by LANL.

Project Goals and Objectives:

The primary objective of this project is to evaluate at least one method for separating Hg from HE for the purpose of evaluating the proper treatment method to facilitate disposal of this waste stream through established appropriate channels. Any clean Hg that is recovered from the extraction process will be

reused in the laboratory in one of the processes listed above.

Projected Tasks:

- Use one or two test methods found suitable to separate Hg and HE;
- Determine the efficiency of the method(s) used by performing High Explosives Spot Testing (HEST) on the effluents and residues produced; and
- Collect each of the waste streams for disposal.

Project Discussion Treatability Study:

Description of Waste to Be Treated:

- HE infused with Hg metal;
- Cellulose products used for cleaning and handling of HE/Hg;
- Ethanol/silicone oil/hydraulic oil with HE and Hg (in the form of a sludge); and

Generally the waste may be categorized as (1) High HE/low Hg and (2) Low HE/high Hg.

Sample Waste Amounts to be Treated:

	WASTE TYPE	ESTIMATED VOLUME (liters)	ESTIMATED MERCURY (grams)
1.	Cellulose products	1	2
2.	HE infused with Hg	0.01	50
3.	Sludge containing ethanol/silicone/hydraulic oil with HE and Hg	1.1	175

RCRA Waste Code(s): Ignitable, D001; Reactive, D003; Toxic for Mercury, D009.

Description Of The Waste Treatment Technology:

A key feature of the proposal is its reliance on the mature technology of solvent extraction. The waste to be processed is to be segregated into 2 catagories:

1. High HE/low Hg: The waste is to be placed in a suitable container and a sufficient quantity of an appropriate solvent to dissolve the HE concerned will be added followed by agitation with air sparging for 2 hours. The resultant mixture will be centrifuged and the supernatant decanted. More solvent is added and the process will be repeated. HE will precipitate from the solvent and both the HE and solvent will be collected for disposal. The Hg in the bottom of the flask will then be filtered through a pinhole filter to remove any solids and tested with the HEST for the presence of HE. If HE is detected, the Hg will be treated by agitation under 10% nitric acid for 12 hrs (minimum) followed by two washings with deionized water. The Hg will be tested again with the HEST. The supernatant from this test will be filtered through a celite bed treated with zinc to remove any suspended Hg particles.

2. High Hg/Low HE: The waste will be placed in a suitable container and a sufficient quantity of an appropriate solvent to dissolve the HE concerned will be added followed by agitation with air sparging for 2 hours. The mixture will be filtered through a fast paper /pinhole filter and washed

with clean solvent. After passing through the filter, the resultant mixture will be centrifuged and the supernatant decanted. More solvent will be added and the process will be repeated. The Hg in the bottom of the flask will then be filtered through a pinhole filter to remove any solids and will be tested by the HEST for the presence of HE. If HE is detected, the Hg will then be treated by agitation under 10% nitric acid for 12 hrs (minimum) followed by two washings with deionized water and tested again with the HEST. The supernatant from this test will be filtered through a celite bed treated with zinc to remove any suspended Hg particles.

Procedures 1 and 2 though similar, differ in the amount of Non-Hg insoluble solids expected as well as in the amount of HE to be extracted from the mixtures. The high HE/low Hg stream will require the use of a greater volume of solvent to solubilize the HE. The high Hg/low HE stream will require a filtration prior to handling of the supernatants.

Waste Management: All wastes generated from the tests will be treated as prescribed by current waste management criteria for the specific waste streams:

- Solvents containing <1% HE will be shipped off-site for disposal;
- HE and HE contaminated filters will be sent for treatment to the TA-16-388 open burning treatment unit at LANL. Any remaining residues (ash) will be shipped off-site for disposal;
- Non-HE waste and mercury contaminated solids, cellulose products, nitrile gloves (contaminated with Hg) will be shipped off-site for disposal; and
- Concentrated nitric acid will be shipped off-site for disposal.

Project Milestones:

1.	Begin testing	45 Days after notification
2.	Determine the effectiveness of method(s)	Within 90 days after treatment
3.	Complete data evaluation	Within 1 year after notification

Qualifications:

Experience: Jose G Archuleta, Chemical Tech, Qualified waste handler
Mary Sandstrom, TSM , Chemical Tech, Qualified waste handler
Gabriel Avelucia, Chemical Tech, Qualified waste handler

Equipment and Facilities:

This project will be conducted within LANL facility TA-9-21-120 (chemistry laboratory). All experiments will be performed in well ventilated areas and in a vent hood when warranted. All personnel will wear appropriate personal protective equipment while conducting experiments.