Environmental Protection & Compliance Division
Los Alamos National Laboratory
PO Box 1663, K491
Los Alamos, New Mexico 87545
(505) 667-2211

Environmental Management
Los Alamos Field Office
1900 Diamond Drive, MS984
Los Alamos, New Mexico, 87544
(505) 665-5820/Fax (505) 665-5903

Date: NOV 2 0 2017
Symbol: EPC-DO: 17-478
LA-UR: 17-30316
Locates Action No.: *N/A*

Mr. John E. Kieling, Chief
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505

Subject: **Transmittal of Analytical Results of the Fourth Pre-treatment Sample for the Los Alamos National Laboratory Hazardous Waste Facility Permit**

Dear Mr. Kieling:

The purpose of this letter is to report analytical results as required by the Los Alamos National Laboratory (LANL) Hazardous Waste Facility Permit issued to the Department of Energy (DOE) and Los Alamos National Security, LLC (LANS), collectively the Permittees, in November 2010. Permit Section 7.6(2) and Section C.3.2.4 of Permit Attachment C (*Waste Analysis Plan*) require the collection of pre-treatment solid waste samples from six remediated nitrate salt-bearing waste containers and pre-treatment liquid waste samples from two unremediated nitrate salt-bearing waste containers. Analytical results from LANL on-site laboratory testing must be provided to the New Mexico Environment Department Hazardous Waste Bureau (NMED-HWB) within 60 days of the sample collection. The fourth pre-treatment composite sample (from container 69553) was collected on September 19, 2017.

Enclosure 1 includes a memorandum detailing the analytical results from the on-site analytical laboratory to the waste generating organization. Enclosure 2 includes a table with a column indicating expected ranges for each analyte based on the Permittee's surrogate waste testing. The expected ranges for the remediated nitrate salt-bearing waste stream were developed by the Permittees from the ranges of the surrogate materials utilized while developing the treatment method for nitrate salt waste. Most constituents and properties of this sample were comparable to the expected ranges for the waste stream.

The concentration of nitrate within the sample waste (11.8 %) was less than the expected concentration range, but similar to the concentration found within the pre-treatment sample from container 69490. While the expected concentration of nitrates (20-70%) is based on the anticipated processes that were used in creating the remediated nitrate salt-bearing waste, the sophistication of the mixing and associated record-keeping was of low quality. As a result, it is possible that the mixing was not adequate, leading to samples

with higher than expected organic concentrations. It is also possible that higher concentrations of *sWheat Scoop*® were used, leading to overall lower nitrate values.

Additionally, the concentration of Beryllium within this sample was reported greater than expected concentrations; at 1.5 part per million (ppm) with a ± measurement uncertainty of 28% when compared to the estimated 0-1 ppm. The measured concentration is: very close to the expected range when the measurement uncertainty is taken into account, does not affect the hazardous waste characterization information for the waste stream, and should not have any bearing on the effectiveness of the stabilization treatment process.

The oxalate concentration was also measured above the estimated range of 0-1% at 2.51%. This can be attributed to one of the original waste streams generated in the same area, known as the oxalate filtrate evaporator bottom waste. For waste characterization of the remediated nitrate salt-bearing waste, a complete classified record review of all original bags placed into the nitrate salt waste container was not conducted. The level of effort that would have been expended would not have changed the overall characterization or the stabilization method of the waste stream because the waste streams are similar. As with the Beryllium concentration within the sample, this does not have any bearing on the effectiveness of the stabilization treatment process.

If you have comments or questions regarding this submittal, please contact Arturo Duran (Environmental Management) at (505) 665-7772 or Mark P. Haagenstad (LANS) at (505) 665-2014.

Sincerely,

John C. Bretzke
Division Leader

Sincerely,

Arturo Q. Duran
Permitting and Compliance Manager

JCB/AQD/MPH:am

Enclosure(s): 1) Analytical Results for Sample Collected from Remediated Nitrate Salt-Bearing Waste Container 69553
2) Comparison Table of Expected Chemical Constituents/Properties

Copy: Laurie King, USEPA/Region 6, Dallas, TX (E-File)
Neelam Dhawan, NMED/HWB, Santa Fe, NM, (E-File)
Siona Briley, NMED/HWB, Santa Fe, NM, (E-File)
Robert Murphy, NMED/HWB, Santa Fe, NM, (E-File)
Pam Allen, NMED/HWB, Santa Fe, NM, (E-File)
Douglas E. Hintze, EM-LA, (E-File)
David J. Nickless, EM-WM, (E-File)
Duane A. Parsons, EM-LA, (E-File)

Copy:

William S. Goodrum, NA-LA, (E-File)
Peter Maggiore, NA-LA, (E-File)
Jody M. Pugh, NA-LA, (E-File)
Adrienne Nash, NA-LA, (E-File)
Karen E. Armijo, NA-LA, (E-File)
Jordan Arnswald, NA-LA, (E-File)
Darlene S. Rodriguez, NA-LA, (E-File)
Craig S. Leasure, PADOPS, (E-File)
William R. Mairson, PADOPS, (E-File)
Michael T. Brandt, ADESH, (E-File)
Randall M. Erickson, ADEM, (E-File)
Cheryl D. Cabbil, ADNHHO, (E-File)
Raeanna Sharp-Geiger, ADESH, (E-File)
Enrique Torres, ADEM, (E-File)
David J. Funk, ADEM, (E-File)
Stephanie Q. Griego, EWMO-DO, (E-File)
Robert C. Stokes, DESHS-EWMS, (E-File)
Rebecca M. Chamberlin, C-AAC, (E-file)
Patrick T. Martinez, C-AAC, (E-File)
Mark P. Haagenstad, EPC-CP, (E-File)
Ellena I. Martinez, EPC-CP, (E-File)
Victoria R. Baca, DESHS-EWMS (E-File)
lasomailbox@nnsa.doe.gov, (E-File)
locatesteam@lanl.gov, (E-File)
epc-correspondence@lanl.gov, (E-File)
adesh-records@lanl.gov, (E-File)
rcra-prr@lanl.gov, (E-File)

COPY

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CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

11-13-17

John C. Bretzke
Division Leader
Environmental Protection and Compliance Programs
Los Alamos National Laboratory

Date Signed

11/14/17

Arturo Q. Duran
Permitting Manager
Environmental Management
Los Alamos Field Office
U.S. Department of Energy

Date Signed

ENCLOSURE 1

Analytical Results for Sample Collected from Remediated Nitrate Salt-Bearing Waste Container 69553

EPC-DO: 17-478

LA-UR-17-30316

Date: NOV 20 2017

Los Alamos
NATIONAL LABORATORY
EST. 1943

memorandum

Actinide Analytical Chemistry

To/MS: David Funk, ADEP, MS J910
Randy Erickson, ADEP, MS J910
From/MS: Rebecca Chamberlin, C-AAC, MS G740 RWC
Pat Martinez, C-AAC, MS G740 PMM 11/7/17
Phone: 7-1841/5-1646

Symbol: C-AAC-17-0076
Date: 11/07/2017

SUBJECT: Analytical Results for Drum 69553 Pre-Treatment Composite Sample

Sample Summary			
Drum #	**69553**		
Type of Sample	Pre-Treatment RNS		
Sample collection date	9/19/17		
Analysis start date	9/28/17		
Sample description	RNS material composite prepared from equal portions of heterogeneous solid Top, Middle and Bottom drum samples.		
pH (1 g solid / 25 mL water)	3.6		
Calculated pH of interstitial liquid	1.4		
Weight Loss Determination	**% weight loss**		**(% uncertainty)**
≤ 110 °C	13.7 ± 0.2		(1.2%)
≤ 600 °C	77.5 ± 0.2		(0.3%)
Radionuclides (NDA, SNAP)	**nCi/g**	**µg/g**	**(% uncertainty)***
Am 241	1.24E+05	36	(5.5%)
Am 243	1.88E+01	0.1	(5.5%)
Np 237	1.67E+00	2	(5.6%)
Pu 239	2.94E+04	471	(5.5%)
Pu 240	6.97E+03	31	(28%)
Pu 241	3.58E+04	0.3	(13.5%)

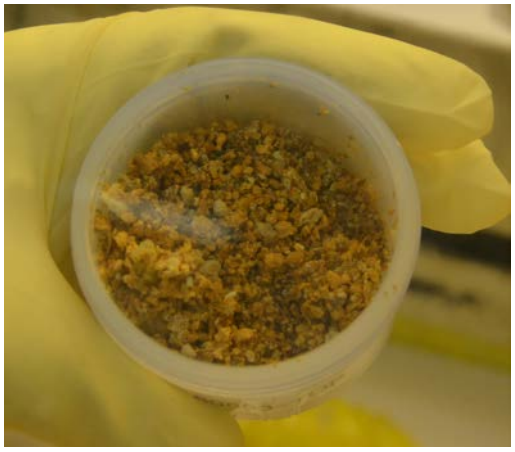
Anions (Ion Chromatography)	**µg/g +/- 10% except where noted****	
Nitrate (NO_3^-)	118000 (11.8 wt%)	
Nitrite (NO_2^-)	65	
Chloride (Cl^-)	660	
Fluoride (F^-)	510	(11%)
Sulfate (SO_4^{2-})	1250	
Oxalate ($C_2O_4^{2-}$)	25100 (2.51%)	

RCRA Metals (ICP-MS/AES)	**µg/g +/- 20% except where noted****	
Silver (Ag)	0.09	
Arsenic (As)	0.28	
Barium (Ba)	2.7	
Cadmium (Cd)	1.4	
Chromium (Cr)	87	
Mercury (Hg)	< 0.1	
Lead (Pb)	17200 (1.72 wt%)	(33%)
Selenium (Se)	0.1	
Cations (ICP-MS/AES)	**µg/g +/- 20% except where noted****	
Sodium (Na)	37800 (3.78 wt%)	
Aluminum (Al)	1500	
Calcium (Ca)	1550	(23%)
Potassium (K)	3200	
Magnesium (Mg)	3450	
Silicon (Si)	43	
Iron (Fe)	800	(23%)
Zinc (Zn)	220	
Beryllium (Be)	1.5	(28%)
Manganese (Mn)	28	
Estimated Composition	**wt% (g/100 g sample)**	**(% uncertainty)**
Anions	14.5 $\pm$ 0.1	(1.0%)
Cations	4.9 $\pm$ 0.2	(4.7%)
Water	13.7 $\pm$ 0.2	(1.2%)
Calculated Organic Material (combustible)	53.5 $\pm$ 0.4	(0.8%)
Undissolved: In XRF analysis lead (Pb) was the major element detected. Minor amounts of K, Ca, Fe, U, and Pu were detected above background.		
Oxidizers (as NO_2^- + NO_3^-)	11.8 $\pm$ 0.2	(1.5%)
Oxidizers (as $NaNO_2$ + $NaNO_3$)	16.1 $\pm$ 0.2	(1.5%)

*The NDA SNAP results are reported with 2 X standard deviation (2σ). All other uncertainties are reported as 1 X standard deviation (1σ).

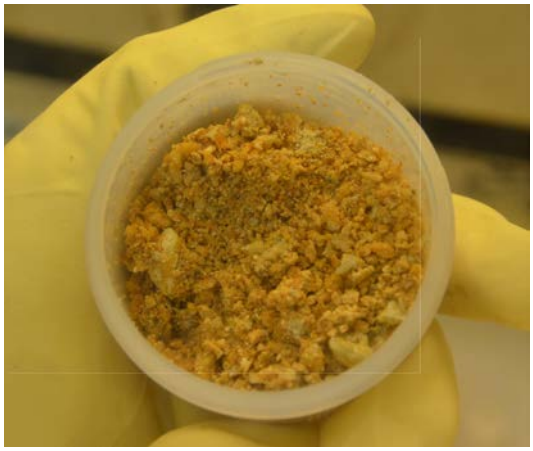
**Measurement uncertainty is 10% for anions and 20% for cations/RCRA. Uncertainties in excess of these values may be a result of sample inhomogeneity.

Sample Photos



69553-TOP

69553-MIDDLE



69553-BOTTOM

69553 Composite

Labware LIMS# 22850. Analytical procedures and work instructions used:

1) ANC 212, Ion Chromatography
2) ANC 102, Inductively Coupled Plasma—Mass Spectrometry Using the VG Elemental Plasma Quad
3) ANC 221, Operating the Jobin-Yvon (JY) Inductively Coupled Plasma – Atomic Emission Spectrometer
4) WI-5, Analytical Sample Receipt, Subsampling, and Distribution within Analytical Chemistry
5) WI-30, Chemical Analysis, Characterization and Research
6) WI-42, Radiochemical Research and Development at CMR
7) NF-ANC-124, Nuclear Materials-Weight Loss Determination
8) ANC1325, X-Ray Fluorescence Spectrometers in CMR

Cy: Craig Taylor, C-AAC, MS G740
C-AAC File

ENCLOSURE 2

Comparison Table of Expected Chemical Constituents/Properties

EPC-DO: 17-478

LA-UR-17-30316

NOV 2 0 2017

Date: _____

Expected Chemical Constituents/Properties of Pre-Treatment Nitrate Salt-Bearing Waste

Analyte	Analysis Results	Expected Range within Waste Stream	Unit
Nitrate	11.8 wt%	20-70	%
Lead	1.72 wt%	0-40	%
Water	13.7 ± 0.2 wt%	10-30	%
Sodium	3.78 wt%	0-25	%
Aluminum	1,500 ppm	0-10,000	ppm
Calcium	1,550 ppm	0-10,000	ppm
Iron	800 ppm	0-10,000	ppm
Magnesium	3,450 ppm	0-50,000	ppm
Potassium	3,200 ppm	0-10,000	ppm
Arsenic	0.28 ppm	0-1	ppm
Barium	2.7 ppm	0-10	ppm
Beryllium	1.5 ppm	0-1	ppm
Cadmium	1.4 ppm	0-100	ppm
Chromium	87 ppm	0-1000	ppm
Copper	Not measured	0-1000	ppm
Gallium	Not measured	0-1000	ppm
Mercury	< 0.1 ppm	0-1	ppm
Nickel	Not measured	0-1000	ppm
Selenium	0.1 ppm	0-1	ppm
Silicon	43 ppm	0-1000	ppm
Silver	0.09 ppm	0-1	ppm
Chloride	660 ppm	0-1000	ppm
Fluoride	510 ppm	0-1000	ppm
Nitrite	65 ppm	0-1000	ppm
Oxalate	2.51 %	0-1	%
Sulfate	1,250 ppm	0-10,000	ppm
pH of moistened solid	3.6	0-7	pH
Organic Matter	53.5 ± 0.4 wt%	5-90	%