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Date: **AUG 14 2017**  
 Symbol: EPC-DO: 17-306  
 LA-UR: 17-27165  
 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 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 first pre-treatment composite sample (from container 68685) was collected on June 15, 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. Most constituents and properties were comparable to the expected ranges for the waste stream. 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. The oxalate concentration higher than the expected range, but would not change the treatment effectiveness.



Mr. John Kieling  
EPC-DO: 17-306

- 2 -

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

- Enclosures: 1) Analytical Results for Sample Collected from Remediated Nitrate Salt-Bearing Waste Container 68685  
2) Comparison Table of Expected Chemical Constituents/Properties

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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.



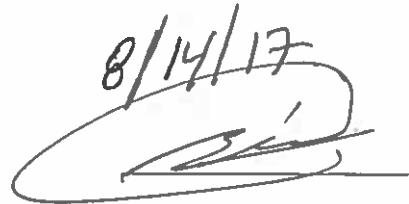
**John C. Bretzke**  
Division Leader  
Environmental Protection and Compliance Programs  
Los Alamos National Laboratory



Date Signed



**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 68685**

**EPC-DO: 17-306**

**LA-UR-17-27165**

**AUG 14 2017**

**Date:** \_\_\_\_\_

# memorandum

Actinide Analytical Chemistry

To/MS: David Funk, ADEP, MS J910  
Randy Erickson, ADEP, MS J910  
From/MS: Rebecca Chamberlin, C-AAC, MS G740 *rene*  
Pat Martinez, C-AAC, MS G740 *per*  
Phone: 7-1841/5-1646  
Symbol: C-AAC-17-0059  
Date: 08/07/2017

**SUBJECT: Analytical Results for Drum 68685 Pre-Treatment Composite Sample**

## Sample Summary

Drum #	68685
Type of Sample	Pre-Treatment RNS
Sample collection date	06/15/2017
Analysis start date	06/22/2017

Sample description	RNS material composite prepared from heterogeneous solid Top, Middle and Bottom drum samples (18 g each).
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pH (1 g solid / 25 mL water)	4.5
Calculated pH of interstitial liquid	2.1

Weight Loss Determination	% weight loss
≤ 110 °C	9.9
≤ 600 °C	61.6

Radionuclides (NDA, SNAP)	nCi/g	µg/g	(uncertainty)
Am 241	6.27E+04	18.7	(4.5%)
Am 243	9.72E+00	0.05	(4.1%)
Np 237	9.97E-01	1.4	(4.2%)
Pu 238	8.17E+02	0.05	(62%)
Pu 239	1.66E+04	272	(4.4%)
Pu 240	4.54E+03	20.4	(29%)
Pu 241	2.39E+04	0.2	(12%)
U 235	2.72E-02	12.9	(24%)

Anions (Ion Chromatography)	µg/g +/- 10% except where noted*	
Nitrate (NO <sub>3</sub> <sup>-</sup> )	235,000 (23.5 wt%)	
Nitrite (NO <sub>2</sub> <sup>-</sup> )	24	(140%)
Chloride (Cl <sup>-</sup> )	420	
Fluoride (F <sup>-</sup> )	< 800	
Sulfate (SO <sub>4</sub> <sup>2-</sup> )	270	(36%)
Oxalate (C <sub>2</sub> O <sub>4</sub> <sup>2-</sup> )	49,900 (5 wt%)	(67%)

<b>RCRA Metals (ICP-MS/AES)</b>	<b>µg/g +/- 20% except where noted*</b>	
Silver (Ag)	< 1	
Arsenic (As)	1	
Barium (Ba)	0.5	
Cadmium (Cd)	0.02	
Chromium (Cr)	69	(27%)
Mercury (Hg)	0.04	
Lead (Pb)	210	(185%)
Selenium (Se)	< 0.4	
<b>Cations (ICP-MS/AES)</b>	<b>µg/g +/- 20% except where noted*</b>	
Sodium (Na)	111,500 (11.2 wt%)	
Aluminum (Al)	55	(46%)
Calcium (Ca)	12	(63%)
Potassium (K)	2345	
Magnesium (Mg)	125	(133%)
Silicon (Si)	9	(93%)
Iron (Fe)	6	(87%)
Zinc (Zn)	0.4	
Beryllium (Be)	< 0.3	
<b>Estimated Composition</b>	<b>wt% (g/100 g sample)</b>	<b>(uncertainty)</b>
Anions	28.6	(3.8) wt%
Cations	11.4	(0.6)
Water	9.9	(2.2)
Calculated Organic Material (combustible)	31.1	(6.0)
Undissolved:	13.0	(0.8)
<i>The undissolved portion of the sample was identified as PbO by XRF and SEM. This would have a composition of 12.1% Pb and 0.9% O.</i>		
Oxidizers (as NO <sub>2</sub> <sup>-</sup> + NO <sub>3</sub> <sup>-</sup> )	23.5	(0.4)
Oxidizers (as NaNO <sub>2</sub> + NaNO <sub>3</sub> )	32.2	(0.4)

\*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****68685-TOP****68686-MIDDLE****68685-BOTTOM****68685 Composite**

Labware LIMS# 22509. 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) WI-56. Scanning Electron Microscopy
- 9) ANC1325, X-Ray Fluorescence Spectrometers in CMR

Cy: Ann Schake, C-AAC, MS G740  
C-AAC File



## **ENCLOSURE 2**

**Comparison Table of Expected Chemical Constituents/Properties**

**EPC-DO: 17-306**

**LA-UR-17-27165**

**Date:**                     **AUG 14 2017**

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

Analyte	Analysis Results	Expected Range within Waste Stream	Unit
Nitrate	23.5%	20-70	%
Lead	210 µg/g (soluble) + 12.1% (insoluble)	0-40	%
Water	9.9 wt%	10-30	%
Sodium	11.2 wt%	0-25	%
Aluminum	55 µg/g	0-1	%
Calcium	12 µg/g	0-1	%
Iron	6 µg/g	0-1	%
Magnesium	125 µg/g	0-5	%
Potassium	2345 µg/g	0-1	%
Arsenic	1 µg/g	0-1	ppm
Barium	0.5 µg/g	0-10	ppm
Beryllium	<0.3 µg/g	0-1	ppm
Cadmium	0.02 µg/g	0-100	ppm
Chromium	69 µg/g	0-1000	ppm
Copper	Not measured	0-1000	ppm
Gallium	Not measured	0-1000	ppm
Mercury	0.04 µg/g	0-1	ppm
Nickel	Not measured	0-1000	ppm
Selenium	<0.4 µg/g	0-1	ppm
Silicon	9 µg/g	0-1000	ppm
Silver	<1 µg/g	0-1	ppm
Chloride	420 µg/g	0-1000	ppm
Fluoride	<800 µg/g	0-1000	ppm
Nitrite	24 µg/g	0-1000	ppm
Oxalate	5 wt%	0-1	%
Sulfate	270 µg/g	0-100	ppm
pH of moistened solid	4.5	0-7	pH
Organic Matter	31.1 wt%	5-90	%