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Date: OCT 0 5 2017
Symbol: EPC-DO: 17-408
LA-UR: 17-29001
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 Third 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 third pre-treatment composite sample (from container 69208) was collected on August 10, 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. Most constituents and properties were comparable to the expected ranges for the waste stream.

The nitrite concentration within this sample was 1,500 parts per million (ppm) which is greater than the estimated concentration of 1-1,000 ppm. Nitrites in radioactive nitrate salt matrices are typically generated from the radiolysis of the nitrated salts. The nitrite contribution depends on 1) the quantity of nitrates; 2) the type of active radionuclides in the matrix; and 3) the quantity of the active radionuclides in the matrix.

The estimate presented in Enclosure 2 was based on some of the original sampling that was conducted in the 2014 timeframe; however, modeling on the full range of combinations of nitrates and radionuclides was not conducted. Consequently, the full range of nitrites was not represented in the original estimated range. This does not affect the waste characterization associated with the remediated nitrate salt-bearing waste stream and there is no impact to the effectiveness of the treatment process associated with this concentration of nitrite because the surrogate testing utilized by the Permittees was bounding. The estimated concentration range will be revised to 0-10,000 ppm for subsequent reports.

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 69208
2) Comparison Table of Expected Chemical Constituents/Properties

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OCT 06 2017
NMED
Hazardous Waste
Bureau

Mr. John E. Kieling, Chief
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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.

10-3-17

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

Date Signed

10/4/17

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 69208

EPC-DO: 17-408

LA-UR-17-29001

OCT 0 5 2017

Date: _____

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
Pat Martinez, C-AAC, MS G740 pmm 9/27/17
Phone: 7-1841/5-1646
Symbol: C-AAC-17-0072
Date: 09/27/2017

SUBJECT: Analytical Results for Drum 69208 Pre-Treatment Composite Sample

Sample Summary			
Drum #	**69208**		
Type of Sample	Pre-Treatment RNS		
Sample collection date	08/9-10/2017		
Analysis start date	08/17/2017		
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)	5.2		
Calculated pH of interstitial liquid	3.0		
Weight Loss Determination	**% weight loss**		**(% uncertainty)**
≤ 110 °C	14.1 ± 0.2		(1.7%)
≤ 600 °C	57.2 ± 0.2		(0.4%)
Radionuclides (NDA, SNAP)	**nCi/g**	**µg/g**	**(% uncertainty)***
Am 241	2.04E+05	59	(3.9%)
Am 243	1.81E+02	1	(4.8%)
Np 237	2.76E+00	4	(4.7%)
Pu238	2.17E+03	0.1	(150%)
Pu 239	4.83E+04	772	(4.3%)
Pu 241	6.40E+04	1	(11.9%)
U 235	4.48E-02	20	(122%)
Anions (Ion Chromatography)	**µg/g +/- 10% except where noted****		
Nitrate (NO_3^-)	339000 (33.9 wt%)		
Nitrite (NO_2^-)	1500		(18%)
Chloride (Cl^-)	490		(12%)
Fluoride (F^-)	150		
Sulfate (SO_4^{2-})	580		
Oxalate ($C_2O_4^{2-}$)	4100		(48%)

RCRA Metals (ICP-MS/AES)	**µg/g +/- 20% except where noted****	
Silver (Ag)	< 2	
Arsenic (As)	< 0.3	
Barium (Ba)	3	
Cadmium (Cd)	2.9	(27%)
Chromium (Cr)	65	
Mercury (Hg)	< 0.1	
Lead (Pb)	17900 (1.79 wt%)	
Selenium (Se)	< 0.8	
Cations (ICP-MS/AES)	**µg/g +/- 20% except where noted****	
Sodium (Na)	122000 (12.2 wt%)	
Aluminum (Al)	910	
Calcium (Ca)	1250	
Potassium (K)	2400	
Magnesium (Mg)	1340	(53%)
Silicon (Si)	12	(43%)
Iron (Fe)	490	(36%)
Zinc (Zn)	67	(35%)
Beryllium (Be)	< 0.6	
Manganese (Mn)	24	(27%)
Estimated Composition	**wt% (g/100 g sample)**	**(% uncertainty)**
Anions	34.6 ± 1.1	(3.3%)
Cations	14.6 ± 2.0	(13.7%)
Water	14.1 ± 0.2	(1.7%)
Calculated Organic Material (combustible)	17.7 ± 1.3	(7.6%)

Undissolved: There was undissolved material that contained Pb (lead) with minor amounts Al (aluminum), Si (silicon), P (phosphorus) , and Pu (plunonium) identified by XRF. These elements are not leached from the parent RNS material.

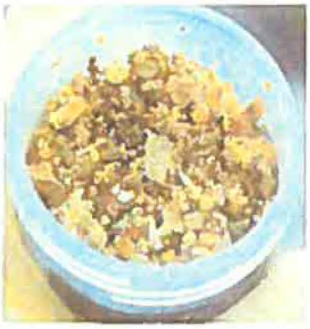
Oxidizers (as NO_2^- + NO_3^-)	34.0 ± 1.0	(3.0%)
Oxidizers (as $NaNO_2$ + $NaNO_3$)	46.7 ± 1.4	(3.0%)

*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

69208-TOP



69208-MIDDLE

69208-BOTTOM

69208 Composite

Labware LIMS# 22712. 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: 17-408

LA-UR-17-29001

Date: OCT 0 5 2017

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

Analyte	Analysis Results	Expected Range within Waste Stream	Unit
Nitrate	33.9 wt%	20-70	%
Lead	1.79 wt%	0-40	%
Water	14.1 ± 0.2 wt%	10-30	%
Sodium	12.22 wt%	0-25	%
Aluminum	910 ppm	0-10,000	ppm
Calcium	1,250 ppm	0-10,000	ppm
Iron	490 ppm	0-10,000	ppm
Magnesium	1,340 ppm	0-50,000	ppm
Potassium	2,400 ppm	0-10,000	ppm
Arsenic	< 0.3 ppm	0-1	ppm
Barium	3 ppm	0-10	ppm
Beryllium	< 0.6 ppm	0-1	ppm
Cadmium	2.9 ppm	0-100	ppm
Chromium	65 ppm	0-1,000	ppm
Copper	Not measured	0-1,000	ppm
Gallium	Not measured	0-1,000	ppm
Mercury	< 0.1 ppm	0-1	ppm
Nickel	Not measured	0-1,000	ppm
Selenium	< 0.8 ppm	0-1	ppm
Silicon	12 ppm	0-1,000	ppm
Silver	< 2 ppm	0-1	ppm
Chloride	490 ppm	0-1,000	ppm
Fluoride	150 ppm	0-1,000	ppm
Nitrite	1,500 ppm ± 300 ppm	0-1,000	ppm
Oxalate	0.41 %	0-1	%
Sulfate	580 ppm	0-2,500	ppm
pH of moistened solid	5.2	0-7	pH
Organic Matter	17.7 ± 1.3 wt%	5-90	%