Los Alamos NATIONAL LABORATORY EST 1943

EM-LA

ESHID-602786

Environmental Protection & Compliance Division
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Date: DEC 19 2017
Symbol: EPC-DO: 17-550
LA-UR: 17-31275
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 Sixth 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 sixth pre-treatment composite sample (from container 94068) was collected on October 31, 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. All constituents and properties were comparable to the expected ranges for the waste stream. However, anion concentrations were found to have high variability within this sample. Anion testing will be repeated to determine if the broad distribution is due to the sample's heterogeneity. The results of retesting will be included in the Permittees' remediated nitrate salt-bearing waste analytical summary report at a later date.

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,

Benjamine B. Roberts
(Acting) Division Leader

Sincerely,

Arturo Q. Duran
Permitting and Compliance Manager

BBR/AQD/MPH:am

Enclosure(s): 1) Analytical Results for Sample Collected from Remediated Nitrate Salt-Bearing Waste Container 94068
2) Comparison Table of Expected Chemical Constituents/Properties

Copy: Laurie King, USEPA/Region 6, Dallas, TX (E-File)
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Document: Analytical Results for 94068
Date: December 2017

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.

12/15/2017

Benjamine B. Roberts
(Acting) Division Leader
Environmental Protection and Compliance Programs
Los Alamos National Laboratory

Date Signed

for

12/19/2017

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 94068

EPC-DO: 17-550

LA-UR-17-31275

Date: DEC 19 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 RCC
Pat Martinez, C-AAC, MS G740 PMM 12/14/17
Phone: 7-1841/5-1646
Symbol: C-AAC-17-0078
Date: 12/14/2017

SUBJECT: Analytical Results for Drum 94068 Pre-Treatment Composite Sample

Sample Summary			
Drum #	**94068**		
Type of Sample	Pre-Treatment RNS		
Sample collection date	10/31/17		
Analysis start date	11/14/17		
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)	2.7		
Calculated pH of interstitial liquid	0.6		
Weight Loss Determination	**% weight loss**		**(% uncertainty)**
≤ 110 °C	14.9 ± 0.8		(5.4%)
≤ 600 °C	65.8 ± 0.7		(1.0%)
Radionuclides (NDA, SNAP)	**nCi/g**	**µg/g**	**(% uncertainty)***
Am 241	1.10E+05	32	(5.3%)
Am 243	3.01E+01	0.2	(5.7%)
Np 237	2.31E+00	3.3	(5.6%)
Pu 238	1.58E+03	0.1	(10.5%)
Pu 239	5.21E+04	840	(5.5%)
Pu 240	1.24E+04	55	(6.6%)
Pu 241	6.84E+04	0.7	(6.3%)

Anions (Ion Chromatography)***	**µg/g +/- 10% except where noted****	
Nitrate (NO_3^-)	230,000 (23 wt%)	(50%)
Nitrite (NO_2^-)	Not Detected	
Chloride (Cl^-)	820	(45%)
Fluoride (F^-)	650	(73%)
Sulfate (SO_4^{2-})	370	(86%)
Oxalate ($C_2O_4^{2-}$)	11000 (1.1 wt%)	(80%)

RCRA Metals (ICP-MS/AES)	**µg/g +/- 20% except where noted****	
Silver (Ag)	0.24	
Arsenic (As)	0.04	
Barium (Ba)	1.5	
Cadmium (Cd)	2.3	
Chromium (Cr)	40	
Mercury (Hg)	< 0.1	
Lead (Pb)	16000 (1.6 wt%)	
Selenium (Se)	0.1	(90%)
Cations (ICP-MS/AES)	**µg/g +/- 20% except where noted****	
Sodium (Na)	71000	
Aluminum (Al)	1200	
Calcium (Ca)	3300	
Potassium (K)	1300	
Magnesium (Mg)	8000	(23%)
Iron (Fe)	240	(33%)
Copper (Cu)	37	(33%)
Nickel (Ni)	54	(24%)
Silicon (Si)	27	
Zinc (Zn)	27	
Manganese (Mn)	16	
Beryllium (Be)	< 0.6	
Estimated Composition	**wt% (g/100 g sample)**	**(% uncertainty)**
Anions	24 $\pm$ 12	(51%)
Cations	8.5 $\pm$ 1.2	(14%)
Water	14.9 $\pm$ 0.8	(5.4%)
Calculated Organic Material (combustible)	33 $\pm$ 11	(34%)

Undissolved: The XRF analysis identified Pb as the major element in the undissolved sample. Other elements detected were Al, Ca, Fe, Cu, Pu, and Zr.

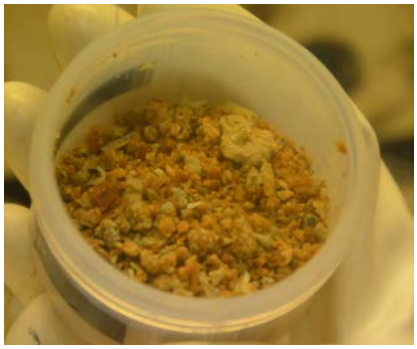
Oxidizers (as NO_2^- + NO_3^-)	22.9 $\pm$ 11.4	(50%)
Oxidizers (as $NaNO_2$ + $NaNO_3$)	31.3 $\pm$ 15.6	(50%

*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.

*** Replicate anion values diverge significantly compared to other RNS samples. Ion Chrometography QC checks were within normal range. This sample may be much more heterogeneous than previous RNS samples. A confirmation analysis will be performed.

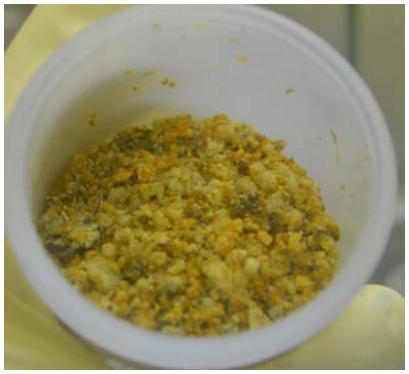
Sample Photos



94068-TOP

94068-MIDDLE

94068-BOTTOM



94068 Composite

Labware LIMS# 22971. 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: 17-550

LA-UR-17-31275

Date: DEC 19 2017

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

Analyte	Analysis Results	Expected Range within Waste Stream	Unit
Nitrate	23 ± 50 wt%	20-70	%
Lead	1.6 wt%	0-40	%
Water	14.9 ± 0.8 wt%	10-30	%
Sodium	7.1 wt%	0-25	%
Aluminum	1,200 ppm	0-10,000	ppm
Calcium	3,300 ppm	0-10,000	ppm
Iron	240 ppm	0-10,000	ppm
Magnesium	8,000 ppm	0-50,000	ppm
Potassium	1,300 ppm	0-10,000	ppm
Arsenic	0.04 ppm	0-1	ppm
Barium	1.5 ppm	0-10	ppm
Beryllium	< 0.6 ppm	0-1	ppm
Cadmium	2.3 ppm	0-100	ppm
Chromium	40 ppm	0-1,000	ppm
Copper	37 ppm	0-1,000	ppm
Gallium	Not measured	0-1,000	ppm
Mercury	< 0.1 ppm	0-1	ppm
Nickel	54 ppm	0-1,000	ppm
Selenium	< 0.1 ppm ± 90%	0-1	ppm
Silicon	27 ppm	0-1,000	ppm
Silver	0.24 ppm	0-1	ppm
Chloride	820 ppm ± 45%	0-1,000	ppm
Fluoride	650 ppm ± 73%	0-1,000	ppm
Nitrite	Not detected	0-1,000	ppm
Oxalate	1.1 % ± 80%	0-1	%
Sulfate	370 ppm± 86%	0-10,000	ppm
pH of moistened solid	2.7	0-7	pH
Organic Matter	33.3 ± 11.2 wt%	5-90	%