ESHID-601010

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Date: NOV 1 8 2015
Symbol: ENV-DO-15-0313
LA-UR: 15-28468
Locates Action No.: Not Applicable

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

Dear Mr. Kieling:

Subject: Sampling and Analysis Information for LA-CIN01 Waste Containers, Los Alamos National Laboratory

The purpose of this letter is to provide the New Mexico Environment Department Hazardous Waste Bureau (NMED-HWB) with information on recent sampling activities conducted at Los Alamos National Laboratory (LANL). The U.S. Department of Energy (DOE) and Los Alamos National Security, LLC (LANS), collectively the Permittees, have completed sampling activities on eight waste containers included within the transuranic waste stream LA-CIN01 (cemented waste). Information regarding sampling and analysis of the waste containers was requested by NMED-HWB staff during a LANL site visit to observe sample collection from the final waste container sampled on September 16, 2015.

The Permittees collected samples from eight of the twelve waste containers originally chosen from the LA-CIN01 waste stream. The list of waste containers within Enclosure 1 consists of container identifiers for the chosen containers, a description of the results of the successful and attempted sample collection events, the dates of the sample events, and information real-time radiography (RTR) video for each waste container. Enclosure 2 includes RTR video for the waste containers that have not already been transmitted to the NMED-HWB. The analytical reports for each of the samples collected can be found in Enclosure 3.

If you have comments/questions or would like to meet regarding this submittal, please contact Mark P. Haagenstad at (505) 665-2014 or Gene E. Turner at (505) 667-5794.

Sincerely,

Alison M. Dorries
Division Leader
Environmental Protection Division
Los Alamos National Security, LLC

Sincerely,

Gene E. Turner
Environmental Permitting Manager
National Security Missions
Los Alamos Field Office
U.S. Department of Energy

AMD:GET:MPH:LRVH/tav

Enclosures: (1) Waste Containers Chosen for Sampling
(2) Real-time Radiography Videos
(3) Analytical Results for LA-CIN01 Waste Samples

Cy: Ryan Flynn, NMED, Santa Fe, NM, (E-File)
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Dave Cobrain, NMED/HWB, Santa Fe, NM, (E-File)
Neelam Dhawan, NMED/HWB, Santa Fe, NM, (E-File)
Siona Briley, NMED/HWB, Santa Fe, NM, (E-File)
Douglas E. Hintze, EM-LA, (E-File)
Kimberly Davis Lebak, LASO-OOM, (E-File)
David J. Nickless, EM-WM, (E-File)
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Gene E. Turner, LASO-NS-LP, (E-File)
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NOV 18 2015
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Hazardous Waste Bureau

Date: NOV 18 2015
Symbol: ENV-DO-15-0313
LA-UR: 15-28468
Locates Action No.: Not Applicable

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

Dear Mr. Kieling:

Subject: Sampling and Analysis Information for LA-CIN01 Waste Containers, Los Alamos National Laboratory

The purpose of this letter is to provide the New Mexico Environment Department Hazardous Waste Bureau (NMED-HWB) with information on recent sampling activities conducted at Los Alamos National Laboratory (LANL). The U.S. Department of Energy (DOE) and Los Alamos National Security, LLC (LANS), collectively the Permittees, have completed sampling activities on eight waste containers included within the transuranic waste stream LA-CIN01 (cemented waste). Information regarding sampling and analysis of the waste containers was requested by NMED-HWB staff during a LANL site visit to observe sample collection from the final waste container sampled on September 16, 2015.

The Permittees collected samples from eight of the twelve waste containers originally chosen from the LA-CIN01 waste stream. The list of waste containers within Enclosure 1 consists of container identifiers for the chosen containers, a description of the results of the successful and attempted sample collection events, the dates of the sample events, and information real-time radiography (RTR) video for each waste container. Enclosure 2 includes RTR video for the waste containers that have not already been transmitted to the NMED-HWB. The analytical reports for each of the samples collected can be found in Enclosure 3.

ENCLOSURE 1

Waste Containers Chosen for Sampling

ENV-DO-15-0313

LA-UR-15-28468

Date: NOV 1 8 2015

Enclosure 1

Sampling Activity	Sample Date	Drum	Result	RTR Video
1	5/13/15	S811785	Successful liquid sample	Included with ENV-DO-14-0312 on October 3, 2014
2	8/19/15	S855780	Unsuccessful liquid sample / Material sample was taken	Included with ENV-DO-140312 on October 3, 2014
3	8/20/15	S855782	Successful liquid sample	Included with ENV-DO-14-0312 on October 3, 2014
4	8/24/15	S822726	Successful liquid sample	Enclosure 2
5	8/25/15	S805263	Unsuccessful internal can sample	Included with ENV-DO-14-0312 on October 3, 2014
6	8/31/15	S813521	Unsuccessful Sample / 55 drum rust issue	Included with ENV-DO-14-0358 on November 19, 2014
7	9/1/15	S844611	Successful liquid sample	Enclosure 2
8	9/9/15	68045	Successful liquid sample	Enclosure 2
9	9/10/15	70088	Successful liquid sample	Included with ENV-DO-14-0364 on December 1, 2014
10	9/14/15	S813412	Successful liquid sample	Included with ENV-DO-14-0312 on October 3, 2014
11	9/15/2015	S822907	Unsuccessful Sample / 55 drum wrapped in plastic	Included with ENV-DO-14-0312 on October 3, 2014
12	9/16/2015	S813595	Successful liquid sample	Included with ENV-DO-14-0312 on October 3, 2014

ENCLOSURE 2

Real-time Radiography Videos

ENV-DO-15-0313

LA-UR-15-28468

Date: NOV 1 8 2015

Real-time Radiography Video for Waste Container Numbers:

S822726

S844611

68045

ENCLOSURE 3

Analytical Results for LA-CIN01 Waste Samples

ENV-DO-15-0313

LA-UR-15-28468

Date: NOV 1 8 2015

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EST. 1943

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Actinide Analytical Chemistry

To/MS: Bruce Robinson, ADEP, MS K491
David Funk, ADEP, MS J910
From/MS: Rebecca Chamberlin, C-AAC
Phone/Fax: 7-1841/Fax 5-4737
Symbol: C-AAC-15-0024
Date: June 24, 2015

SUBJECT: Analytical Results for Drum S8111785 Free Liquid Sample

Sample Summary	
Drum #	**S8111785**
Sample collection date	05/13/2015
Analysis start date	05/28/2015
Sample description	Heterogeneous: Brown liquid with lighter-colored sludge that was difficult to keep in suspension. After settling 10 min, the solids were ~25% of volume of the sample.
Sample mass	55.2 g
Sample volume	41 mL
Density (calculated)	1.35 g/mL
pH (potentiometric)	10.9
Radionuclides (NDA, SNAP)	**Ci/mL** (+/- 30% modeling uncertainty)
Pu-239	Not detected
Am-241	1.91E-10
Cs-137	7.71E-12
Anions (Ion Chromatography)	**g/100 mL** (+/- 10%)
Nitrate (NO_3^-)	32.2
Nitrite (NO_2^-)	2.7
Chloride (Cl^-)	0.4
Fluoride (F^-)	Not detected
Sulfate (SO_4^-)	1.1
Oxalate ($C_2O_4^-$)	Trace
RCRA Metals (ICP-MS/AES)	**µg/mL** (+/- 20%)
Silver (Ag)	0.035
Arsenic (As)	<0.9
Barium (Ba)	1.7
Cadmium (Cd)	0.14
Chromium (Cr)	34
Mercury (Hg)	0.30
Lead (Pb)	590
Selenium (Se)	<1.4

Major Elements (ICP-MS/AES)	**µg/mL, except as noted** (+/- 20%)
Sodium (Na, %)	12.4 g/100 mL
Potassium (K, %)	1.2 g/100 mL
Aluminum (Al)	200
Calcium (Ca)	72
Iron (Fe)	50
Magnesium (Mg)	21
Silica (SiO_2, crystobalite)	Detected in undigested residue

Sample photos

As-received sample, after mixing

As-received sample, after standing 10 min

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) WI-57, X-ray Diffraction
8) ANC 214, Spectrophotometric Determination of Silicon in Plutonium Materials (potentiometric pH method)

Cy: C-AAC File

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Actinide Analytical Chemistry

To/MS: David Funk, ADEP, MS J910
Randy Erickson, ADEP, MS J910
From/MS: Rebecca Chamberlin, C-AAC, MS G740
Phone/Fax: 7-1841/Fax 5-4737
Symbol: C-AAC-15-0039, R1
Date: 10/16/15

SUBJECT: Analytical Results for DB-S855782 Free Liquid Sample

Sample Summary	
Drum #	**S855782**
Location	Liquid was collected from 55-gal drum bottom
Sample collection date	08/20/2015
Analysis start date	08/31/2015
Sample description	Heterogeneous: Near-colorless liquid with light brown-colored sludge. After settling, the solids were ~5% of volume of the sample.
Sample volume	33 mL
Density (calculated)	1.32 (+/- 0.01) g/mL
pH (potentiometric)	7.95 (+/- 0.05)
Radionuclides (NDA, SNAP)	**Ci/mL** (+/- uncertainty)
Pu-239	Not detected (<3E-09)
Am-241	3.8E-10 (>50%)
Anions (Ion Chromatography)	**g/100 mL** (+/- 10%)
Nitrate (NO_3^-)	37.3
Nitrite (NO_2^-)	0.3
Chloride (Cl^-)	1.1
Fluoride (F^-)	Not detected
Sulfate (SO_4^-)	0.7
Oxalate ($C_2O_4^-$)	Not detected
RCRA Metals (ICP-MS/AES)	**µg/mL** (+/- 20%)
Silver (Ag)	<0.3
Arsenic (As)	0.09
Barium (Ba)	0.62
Cadmium (Cd)	0.46
Chromium (Cr)	<0.2
Mercury (Hg)	0.07
Lead (Pb)	32
Selenium (Se)	4.9

Major Elements (ICP-MS/AES)	**µg/mL, except as noted** (+/- 20%)
Sodium (Na, %)	13.3 g/100 mL
Potassium (K, %)	0.93 g/100 mL
Aluminum (Al)	<0.3
Calcium (Ca)	77
Iron (Fe)	72
Magnesium (Mg)	860

Sample photos

As-received sample, after mixing

As-received sample, settled

Revision history: R1, Added uncertainties on density and pH.

LIMS ID #19926. 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) WI-57, X-ray Diffraction
8) ANC 214, Spectrophotometric Determination of Silicon in Plutonium Materials (potentiometric pH method)

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

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Actinide Analytical Chemistry

To/MS: David Funk, ADEP, MS J910
Randy Erickson, ADEP, MS J910
From/MS: Rebecca Chamberlin, C-AAC, MS G740
Phone/Fax: 7-1841/Fax 5-4737
Symbol: C-AAC-15-0040, R1
Date: 10/16/15

SUBJECT: Analytical Results for DB-S822726 Free Liquid Sample

Sample Summary	
Drum #	**S822726**
Location	Liquid was collected from 55-gal drum bottom
Sample collection date	08/24/2015
Analysis start date	08/31/2015
Sample description	Heterogeneous: Brown liquid with off-white sludge. After settling, the solids were ~5% of volume of the sample.
Sample volume	60 mL
Density (calculated)	1.28 (+/- 0.01) g/mL
pH (potentiometric)	12.3 (+/- 0.1)
Radionuclides (NDA, SNAP)	**Ci/mL** (+/- uncertainty)
Pu-239	4.0E-09 (48%)
Am-241	2.4E-08 (32%)
Cs-137	3.7E-11 (24%)
Anions (Ion Chromatography)	**g/100 mL** (+/- 10%)
Nitrate (NO_3^-)	24.8
Nitrite (NO_2^-)	8.9
Chloride (Cl^-)	0.1
Fluoride (F^-)	Not detected
Sulfate (SO_4^-)	<0.1
Oxalate ($C_2O_4^-$)	0.1
RCRA Metals (ICP-MS/AES)	**µg/mL** (+/- 20%)
Silver (Ag)	<0.3
Arsenic (As)	0.14
Barium (Ba)	12
Cadmium (Cd)	0.03
Chromium (Cr)	<0.2
Mercury (Hg)	0.05
Lead (Pb)	4900
Selenium (Se)	6.9

Major Elements (ICP-MS/AES)	**µg/mL, except as noted** (+/- 20%)
Sodium (Na, %)	11.7 g/100 mL
Potassium (K, %)	4.0 g/100 mL
Aluminum (Al)	1.9
Calcium (Ca)	75
Iron (Fe)	<7
Magnesium (Mg)	0.37

Sample photos

As-received sample, after mixing

As-received sample, settled

Revision history: R1, Added uncertainties on density and pH.

LIMS ID #19928. 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) WI-57, X-ray Diffraction
8) ANC 214, Spectrophotometric Determination of Silicon in Plutonium Materials (potentiometric pH method)

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

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Actinide Analytical Chemistry

To/MS: David Funk, ADEP, MS J910
Randy Erickson, ADEP, MS J910
From/MS: Rebecca Chamberlin, C-AAC, MS G740
Phone/Fax: 7-1841/Fax 5-4737

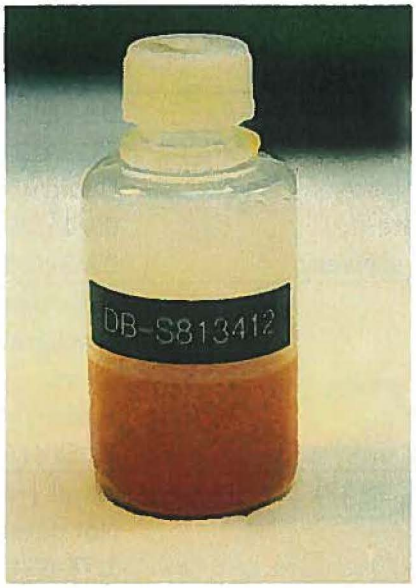
Symbol: C-AAC-15-0044, R1
Date: 10/16/15

SUBJECT: Analytical Results for DB-S813412 Free Liquid Sample

Sample ID	**DB-S813412**
Drum #	S813412
Location	Liquid was collected from 55-gal drum bottom
Sample collection date	09/14/2015
Analysis start date (received)	09/21/2015
Sample description	Heterogeneous: Terra-cotta solution with precipitate of the same color.
Sample volume	35 mL
Density (calculated)	1.28 (+/- 0.01) g/mL
pH (potentiometric)	12.57 (+/- 0.10)
Radionuclides (NDA, SNAP)	**Ci/mL** (+/- uncertainty)
Pu-239	Not detected (<9.9E-08)
Am-241	1.7E-09 (30%)
Anions (Ion Chromatography)	**g/100 mL** (+/- 10%)
Nitrate (NO_3^-)	24.3
Nitrite (NO_2^-)	6.2
Chloride (Cl^-)	<0.1
Fluoride (F^-)	<0.1
Sulfate (SO_4^-)	0.9
Oxalate ($C_2O_4^{2-}$, soluble)	0.2
RCRA Metals (ICP-MS/AES)	**µg/mL, except as noted** (+/- 20%)
Silver (Ag)	0.89
Arsenic (As)	0.43
Barium (Ba)	0.8
Cadmium (Cd)	11
Chromium (Cr)	25
Mercury (Hg)	0.12
Lead (Pb)	1.6 g/100 mL (16,000 µg/mL)
Selenium (Se)	<0.4
Major Elements (ICP-MS/AES)	**µg/mL, except as noted** (+/- 20%)
Sodium (Na)	12.5 g/100 mL (125,000 µg/mL)
Potassium (K)	9300

Aluminum (Al)	110
Calcium (Ca)	19
Iron (Fe)	39
Magnesium (Mg)	0.15
Other	Silicon 840; Tin 190 Tin phosphate solid (approximately 1 wt% of sample; indigestible in both 2% HNO_3 and 12 M HNO_3/trace HF)

Sample DB-S813412 photo



Revision history: R1, Indigestible solid positively identified as tin phosphate by XRF (10/09/15). Added uncertainty for pH and density. Slight correction on density.

LIMS ID #19976. 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) ANC 214, Spectrophotometric Determination of Silicon in Plutonium Materials (potentiometric pH method)

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

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Actinide Analytical Chemistry

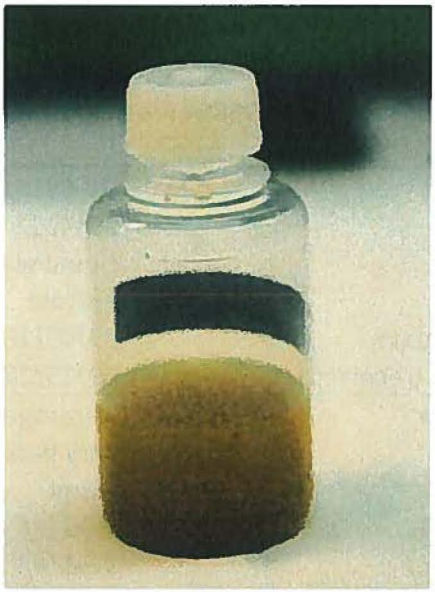
To/MS: David Funk, ADEP, MS J910
Randy Erickson, ADEP, MS J910
From/MS: Rebecca Chamberlin, C-AAC, MS G740
Phone/Fax: 7-1841/Fax 5-4737
Symbol: C-AAC-15-0042, R1
Date: 10/16/15

SUBJECT: Analytical Results for DB-S855864 Free Liquid Samples

Sample ID	**DB-S855864**
Drum #	S844611 (WCATS 68045)
Location	Liquid was collected from 55-gallon drum bottom
Sample collection date	09/09/2015
Analysis start date (received)	09/15/2015
Sample description	Heterogeneous: Golden-brown solution with very dark brown precipitate
Sample volume	35 mL
Density (calculated)	1.36 (+/- 0.01) g/mL
pH (potentiometric)	9.58 (+/- 0.06)
Radionuclides (NDA, SNAP)	**Ci/mL** (+/- uncertainty)
Pu-239	2.2E-08 (40%)
Am-241	1.2E-07 (30%)
Am-243	1.9E-11 (35%)
Anions (Ion Chromatography)	**g/100 mL** (+/- 10%)
Nitrate (NO_3^-)	40.6
Nitrite (NO_2^-)	0.1
Chloride (Cl^-)	1.7
Sulfate (SO_4^-)	1.8
Not detected	Oxalate (soluble), Fluoride
RCRA Metals (ICP-MS/AES)	**µg/mL** (+/- 20%)
Silver (Ag)	0.04
Arsenic (As)	<0.1
Barium (Ba)	0.05
Cadmium (Cd)	0.18
Chromium (Cr)	0.74
Mercury (Hg)	0.35
Lead (Pb)	2.3
Selenium (Se)	<0.4
Major Elements (ICP-MS/AES)	**µg/mL, except as noted** (+/- 20%)
Sodium (Na)	15.6 g/100 mL (156,000 µg/mL)

Potassium (K)	7550
Aluminum (Al)	3.5
Calcium (Ca)	180
Iron (Fe)	700
Magnesium (Mg)	32
Other	Silicon 130

Sample DB-S855864 photo



Revision history: R1, Added uncertainty on density and pH. Slight correction to density.

LIMS ID #19971. 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) ANC 214, Spectrophotometric Determination of Silicon in Plutonium Materials (potentiometric pH method)

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

Los Alamos
NATIONAL LABORATORY
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Actinide Analytical Chemistry

To/MS: David Funk, ADEP, MS J910
Randy Erickson, ADEP, MS J910
From/MS: Rebecca Chamberlin, C-AAC, MS G740
Phone/Fax: 7-1841/Fax 5-4737

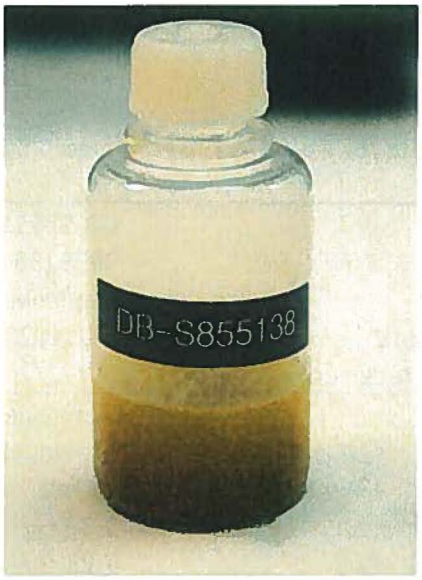
Symbol: C-AAC-15-0043, R1
Date: 10/16/15

SUBJECT: Analytical Results for DB-S855138 Free Liquid Sample

Sample ID	**DB-S855138**
Drum #	S855138 (WCATS 70088)
Location	Liquid was collected from 55-gal drum bottom
Sample collection date	09/10/2015
Analysis start date (received)	09/21/2015
Sample description	Heterogeneous: Brown solution with dark brown, almost black, precipitate.
Sample volume	31 mL
Density (calculated)	1.38 (+/- 0.01) g/mL
pH (potentiometric)	7.23 (+/- 0.05)
Radionuclides (NDA, SNAP)	**Ci/mL** (+/- 30%)
Pu-239	7.4E-07
Am-241	4.1E-06
Am-243	2.0E-10
Anions (Ion Chromatography)	**g/100 mL** (+/- 10%)
Nitrate (NO_3^-)	36.9
Nitrite (NO_2^-)	0.6
Chloride (Cl^-)	1.3
Sulfate (SO_4^-)	3.0
Not detected	Oxalate (soluble), Fluoride
RCRA Metals (ICP-MS/AES)	**µg/mL** (+/- 20%)
Silver (Ag)	0.03
Arsenic (As)	0.65
Barium (Ba)	0.57
Cadmium (Cd)	1.2
Chromium (Cr)	4.0
Mercury (Hg)	0.15
Lead (Pb)	14
Selenium (Se)	<0.4
Major Elements (ICP-MS/AES)	**µg/mL, except as noted** (+/- 20%)
Sodium (Na)	17.0 g/100 mL (170,000 µg/mL)
Potassium (K)	2600

Aluminum (Al)	29
Calcium (Ca)	3300
Iron (Fe)	5400
Magnesium (Mg)	1600
Other	Silicon 100

Sample DB-S855138 photo



Revision history: R1, Added uncertainty on density and pH. Slight correction to density.

LIMS ID #19974. 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) ANC 214, Spectrophotometric Determination of Silicon in Plutonium Materials (potentiometric pH method)

Cy: Ann Schake, C-AAC, MS G740
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Los Alamos
NATIONAL LABORATORY
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memorandum

Actinide Analytical Chemistry

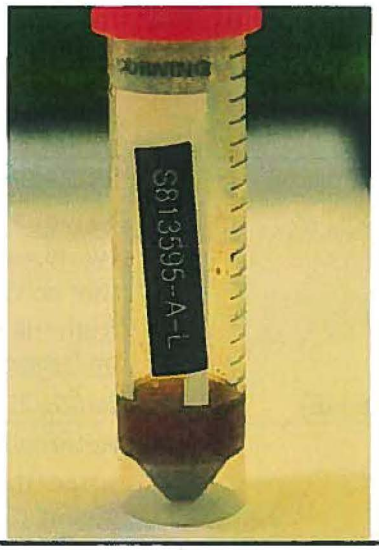
To/MS: David Funk, ADEP, MS J910
Randy Erickson, ADEP, MS J910
From/MS: Rebecca Chamberlin, C-AAC, MS G740
Phone/Fax: 7-1841/Fax 5-4737
Symbol: C-AAC-15-0045, R0
Date: 10/16/15

SUBJECT: Analytical Results for S813595-A-L and DB-S813595 Free Liquid Samples

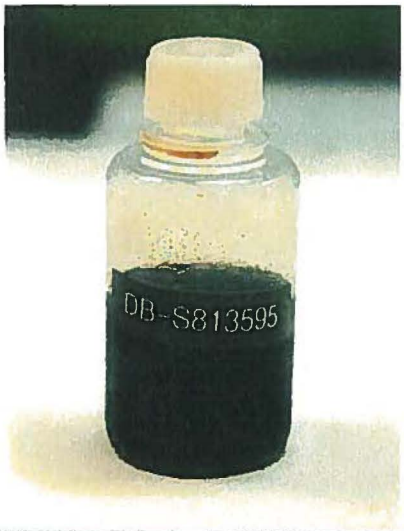
Sample ID	**S813595-A-L**
Drum #	S813595
Location	Liquid was collected from interior of plastic bag that contained one cemented can. The can was from the top level of the drum.
Sample collection date	09/16/2015
Analysis start date (received)	09/28/2015
Sample description	Heterogeneous: Brown solution with suspended solids.
Sample volume	7.5 mL
Density (calculated)	1.28 (+/- 0.01) g/mL
pH (potentiometric)	NA (Insufficient sample)
Radionuclides (NDA, SNAP)	**Ci/mL** (+/- uncertainty)
Pu-239	1.10E-07 (30%)
Am-241	1.33E-07 (30%)
Anions (Ion Chromatography)	**g/100 mL** (+/- 10%)
Nitrate (NO_3^-)	20.5
Nitrite (NO_2^-)	5.7
Chloride (Cl^-)	0.1
Sulfate (SO_4^-)	0.7
Oxalate ($C_2O_4^{2-}$, soluble)	0.1
Not detected	Fluoride
RCRA Metals (ICP-MS/AES)	**µg/mL** (+/- 20%)
Silver (Ag)	0.03
Arsenic (As)	0.28
Barium (Ba)	1.5
Cadmium (Cd)	10
Chromium (Cr)	87
Mercury (Hg)	0.17
Lead (Pb)	<3
Selenium (Se)	0.54

Major Elements (ICP-MS/AES)	**µg/mL, except as noted** (+/- 20%)
Sodium (Na)	8.74 g/100 mL (87,400 µg/mL)
Potassium (K)	0.77 g/100 mL
Iron (Fe)	730
Aluminum (Al)	63
Calcium (Ca)	16
Other	Silicon 480; Tin 250

Sample S813595-A-L photo



Sample ID	**DB-S813595**
Drum #	S813595
Location	Liquid collected from 55-gal drum bottom
Sample collection date	09/16/2015
Analysis start date	09/28/2015
Sample description	Heterogeneous: Brown-black solution with suspended solids.
Sample volume	38 mL
Density (calculated)	1.26 (+/- 0.01) g/mL
pH (potentiometric)	11.87 (+/- 0.09)
Radionuclides (NDA, SNAP)	**Ci/mL** (+/- uncertainty)
Pu-239	Not detected (<2.95E-08))
Am-241	2.46E-08 (30%)
Anions (Ion Chromatography)	**g/100 mL** (+/- 10%)
Nitrate (NO_3^-)	31.4
Nitrite (NO_2^-)	2.2
Chloride (Cl^-)	0.1
Fluoride (F^-)	<0.1

Sulfate (SO_4^-)	0.9
Oxalate ($C_2O_4^{2-}$, soluble)	0.1
RCRA Metals (ICP-MS/AES)	**µg/mL** (+/- 20%)
Silver (Ag)	0.05
Arsenic (As)	0.47
Barium (Ba)	0.61
Cadmium (Cd)	7.2
Chromium (Cr)	21
Mercury (Hg)	0.11
Lead (Pb)	220
Selenium (Se)	1.5
Major Elements (ICP-MS/AES)	**µg/mL, except as noted** (+/- 20%)
Sodium (Na)	12.3 g/100 mL (123,000 µg/mL)
Potassium (K)	1.04 g/100 mL
Iron (Fe)	26
Aluminum (Al)	22
Calcium (Ca)	4.7
Other	Silicon 410; Tin 190
Sample DB-S813595 photo	

LIMS ID #19978 and 19980. 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
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To/MS: David Funk, ADEP, MS J910
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From/MS: Rebecca Chamberlin, C-AAC, MS G740
Phone/Fax: 7-1841/Fax 5-4737

Symbol: C-AAC-15-0041, R1
Date: 10/16/15

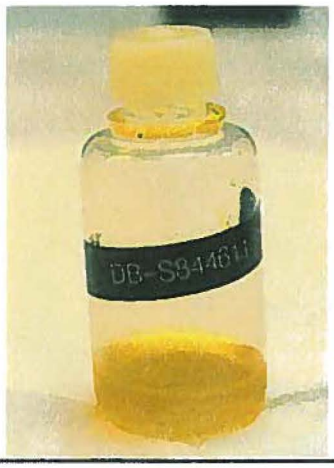
SUBJECT: Analytical Results for S844611-A-L and DB-S844611 Free Liquid Samples

Sample ID	**S844611-A-L**
Drum #	S844611
Location	Liquid was collected from interior of plastic bag that held 3 cans
Sample collection date	09/01/2015
Analysis start date (received)	09/09/2015
Sample description	Heterogeneous: Brown solution with black precipitate.
Sample volume	20 mL
Density (calculated)	1.21 (+/- 0.01) g/mL
pH (potentiometric)	4.55 (+/- 0.08)
Radionuclides (NDA, SNAP)	**Ci/mL** (+/- uncertainty)
Pu-239	1.33E-07 (30%)
Am-241	1.64E-07 (30%)
Anions (Ion Chromatography)	**g/100 mL** (+/- 10%)
Chloride (Cl^-)	17.2
Sulfate (SO_4^-)	2.1
Oxalate ($C_2O_4^{2-}$, soluble)	<0.1%
Not detected	Nitrate, Nitrite, Fluoride
RCRA Metals (ICP-MS/AES)	**µg/mL** (+/- 20%)
Silver (Ag)	0.05
Arsenic (As)	2.0
Barium (Ba)	0.12
Cadmium (Cd)	3.5
Chromium (Cr)	14
Mercury (Hg)	0.27
Lead (Pb)	3.4
Selenium (Se)	1.5
Major Elements (ICP-MS/AES)	**µg/mL, except as noted** (+/- 20%)
Sodium (Na)	6.55 g/100 mL (65,500 µg/mL)
Potassium (K)	1.64 g/100 mL
Magnesium (Mg)	1.51 g/100 mL

Iron (Fe)	2.22 g/100 mL
Aluminum (Al)	9.8
Calcium (Ca)	580
Other	Manganese 230

Sample S844611-A-L photo

Sample ID	**DB-S844611**
Drum #	S844611
Location	Liquid was collected from 85-gal drum bottom
Sample collection date	09/01/2015
Analysis start date	09/09/2015
Sample description	Heterogeneous: Yellow solution with light yellow-brown precipitate
Sample volume	8 mL
Density (calculated)	1.24 (+/- 0.01) g/mL
pH (potentiometric)	N/A (insufficient sample)
Radionuclides (NDA, SNAP)	**Ci/mL** (+/- uncertainty)
Pu-239	Not detected (<4.85E-08)
Am-241	6.84E-09 (30%)
Anions (Ion Chromatography)	**g/100 mL** (+/- 10%)
Chloride (Cl^-)	20.5
Sulfate (SO_4^-)	1.5
Not detected:	Nitrate, Nitrite, Fluoride, Oxalate (soluble)
RCRA Metals (ICP-MS/AES)	**µg/mL** (+/- 20%)
Silver (Ag)	0.02
Arsenic (As)	<0.1
Barium (Ba)	0.43

Cadmium (Cd)	0.07
Chromium (Cr)	0.36
Mercury (Hg)	<0.03
Lead (Pb)	0.70
Selenium (Se)	1.7
Major Elements (ICP-MS/AES)	**µg/mL, except as noted** (+/- 20%)
Sodium (Na)	7.68 g/100 mL (76,800 µg/mL0
Potassium (K)	1.97 g/100 mL
Magnesium (Mg)	1.56 g/100 mL
Iron (Fe)	1.23 g/100 mL
Aluminum (Al)	<2
Calcium (Ca)	450
Other	Manganese 260; Zinc 200
Sample DB-S844611 photo	

Revision history: R1, Added photograph of sample DB-S844611 (10/09/15). Added uncertainty on pH and density. Slight correction on density.

LIMS ID #19942 and 19943. 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
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