

FLUOR GLOBAL SERVICES

May 4, 2001

FH-0102506

Ms. J. H. Kessner, Program Manager
Analytical Services
Bechtel Hanford
3190 George Washington Way H9-03
Richland, Washington 99352

Dear Ms. Kessner:

FINAL RESULTS FOR THE 233S LIQUID AND SOLID SAMPLES – SDG8

References: (1) Letter, A. S. Chaloupka, BHI, to E. F. Mares, FDH, "Letter of Instruction for the 2233-S Plutonium Concentration Facility Sample Analysis", 084911, dated December 20, 2000.

(2) HNF-SD-CD-QAPP-016, Rev. 4A, *222-S Laboratory Quality Assurance Plan*, January 4, 2001.

This letter and attachments present the final results for solid sample (B118R2-A) and liquid sample (B118R3) received from the 233-S Plutonium Concentration Facility Process areas on January 15 and January 24, 2001. The samples were analyzed for those analytes indicated on the attached copy of the chain of custody form in accordance with the *Letter of Instruction for the 233-S Plutonium Concentration Facility Sample Analysis* referenced above.

Variances to the requested analyses were agreed upon as indicated in the electronic messages included as Attachment 5.

If you have any questions regarding this report, please feel free to call me on 373-4314.

Sincerely,



Ruth A Esch, Project Coordinator
Analytical Services
222-S Laboratory

RAE:lda

Attachments (5)

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ATTACHMENT 1

NARRATIVE

Consisting of 4 pages,
Including cover page

FINAL RESULTS FOR THE 233S LIQUID AND SOLID SAMPLES – SDG8

A solid sample (B118R2-A) and a liquid sample (B118R3) from the 233-S Plutonium Concentration Facility Process areas were received at the 222-S Laboratory on January 15, 2001 (liquid) and January 24, 2001 (solid). The samples were analyzed for those analytes indicated on the attached copies of the chain of custody (COC) forms in accordance with the *Letter of Instruction for the 233-S Plutonium Concentration Facility Sample Analysis (LOI)*, referenced in the cover letter.

A Data Summary Report was included as Attachment 2. The correlation between customer sample identification numbers and laboratory identification numbers was presented in the sample breakdown diagram included as Attachment 3. Copies of the chain of custody and Request for Sample Analysis forms were included as Attachment 4.

The chain of custody form for liquid sample B118R3 requested analysis for sulfides. The 222-S Laboratory does not have a procedure for that analysis. In addition, there was insufficient material available to perform the Toxicity Characterization Leaching Procedure (TCLP) or the pH analysis on the solid sample B118R2-A. The metals were determined by direct acid digest analysis of the solids in place of TCLP extraction. These variances were communicated to and accepted by the 233S Project personnel via electronic mail messages, included as Attachment 5.

Sample Appearance and Handling

B118R2-A: This sample was a dry white, slightly granular solid. There was a total of 1.79 g of sample in the original shipping container. This was split into 2 subsamples. As noted above, there was insufficient material to run all of the analyses, and upon concurrence from the 233S Project, the pH analysis was omitted.

B118R3: This sample was approximately 400 mL of a very dark green (nearly black) liquid delivered in a 2 L bottle. No settled solids were visible.

Analytical Results

Holding Times

The 16-day delay between the sampling and receipt dates for the liquid sample B118R3 and the 39-day delay between sampling and receipt of the solid sample B118R2-A caused the 222-S Laboratory to miss the SW-846 holding times for Hg (28 days) for the solid sample and pH (24 hours), nitrate (48 hours) and cyanide (14 days) for the liquid sample. In addition, radiological control requirement changes based on the alpha analysis of the liquid sample caused additional delays so that the holding time for Hg (28 days) was missed.

Quality Control Results

Standard Recovery

All laboratory control standard (LCS) recoveries were acceptable in accordance with the 222-S Laboratory Quality Assurance Plan (QAPP-016) (Clark 2001).

Preparation Blanks

Low levels of contamination from cyanide and gross alpha activity were detected in the method blanks analyzed with the liquid sample B118R3 (S01M000014 and S01M000013, respectively). Since the concentration of these analytes detected in the blanks were less than 5% of those detected for the sample, as allowed by QAPP-016 (Clark 2001), the contamination was considered insignificant and no reanalysis was requested.

Matrix Spikes and Duplicates

The LOI indicated that the quality control samples for this project would include blanks and laboratory control samples, that no batch matrix spikes or matrix spike duplicates were required for these samples.

Practical Quantitation Limits (PQL)

The LOI requested practical quantitation limits (PQL) be met for many of the requested analytes. All PQLs were met, except as discussed below.

Note that the TCLP extraction was omitted for solid sample B118R2-A, due to insufficient material, and the TCLP metals were reported by analysis of an acid digestion of the solid. The TCLP procedure allowed the regulatory levels, indicated in the LOI as PQLs, to be multiplied by a factor of 20 if direct solid sample analysis was performed. Therefore, the detection limits reported for the TCLP metals for the solid sample B118R2-A (S01M000019) were compared with 20 times the PQLs listed in the LOI. All of the PQLs for this analysis were met.

For those analytes reported as non-detected, the customer requested practical quantitation limits (PQL) or detection limits (DL) were not met for plutonium-238 (^{238}Pu), neptunium-237 (^{237}Np), europium-152 (^{152}Eu), europium-154 (^{154}Eu) and curium-243/244 ($^{243/244}\text{Cm}$) for the solid sample. For the liquid sample, PQLs were not met for the anions by ion chromatography (IC), the TCLP and requested total metals by inductively coupled plasma (ICP), the europium isotopes and radium-226 (^{226}Ra) by gamma energy analysis, and $^{243/244}\text{Cm}$. All other requested PQLs were met.

The high reported detection limits were the result of dilutions required to reduce the concentration of other analytes in the sample. A reanalysis was not performed because the laboratory used the least dilution, or the largest sample size possible.

Analytical Procedures

Table 1 presents the 222-S Laboratory analytical procedures used to generate the reported results.

Table 1. Analytical Procedures

Analysis	Preparation Procedure	Analysis Procedure
Inorganic Analyses		
pH	Direct	LA-212-106 Rev. C-6
Hg	Direct	LA-325-106 Rev. A-4
CN	Direct Liquid	LA-695-102 Rev. H-1
IC	Direct Liquid	LA-533-107 Rev. B-0
ICP	Acid Digest	LA-505-161 Rev. C-5
ICP/MS	Acid Digest	LA-506-101 Rev. A-4
Total U	Direct Liquid	LA-925-009 Rev. D-2
Radionuclide Analyses		
AT/TB	Direct Liquid Acid Digest of Solid	LA-508-101 Rev. G-2
GEA	Direct Liquid Acid Digest of Solid	LA-548-121 Rev. F-2
²³⁷ Np	Direct Liquid Acid Digest of Solid	LA-933-141 Rev. H-5
⁹⁰ Sr	Direct Liquid Acid Digest of Solid	LA-220-101 Rev. E-5
²⁴¹ Am	Direct Liquid Acid Digest of Solid	LA-953-104 Rev. B-4
^{239/240} Pu	Direct Liquid Acid Digest of Solid	LA-953-104 Rev. B-4

Acid digest procedure – solid: LA-505-163 Rev. C-0; liquid: LA-505-158 Rev. F-0

Abbreviations

Hg – mercury

CN – cyanide

IC – ion chromatography

ICP – inductively coupled plasma

ICP/MS – ICP-mass spectrometry

AT/TB – total alpha/total beta

GEA – gamma energy analysis

²³⁷Np – neptunium-237

⁹⁰Sr – strontium-90

²⁴¹Am – americium-241

^{239/240}Pu – plutonium-239/240

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ATTACHMENT 2

DATA SUMMARY REPORT

Consisting of 5 pages,
Including cover page

Attachment 2. Data Summary Report
233S SDG8

CORE NUMBER: n/a
SEGMENT #: B118R2-A

SEGMENT PORTION: ACID DIGEST

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S01M000019	A		Pu-239/240 by TRU-SPEC Resin	uCi/g	97.61	<9.27E+0	4.89E+02	n/a	n/a	n/a	n/a	26.50	1.82E+00
S01M000019	A		Pu-238 by TRU-SPEC Resin IonEx	uCi/g	n/a	<9.27E+0	< 26.50	n/a	n/a	n/a	n/a	26.50	5.67E+00
S01M000019	A		Np237 by TTA Extraction	uCi/g	83.98	<4.14E-1	<4.14E-01	n/a	n/a	n/a	n/a	8.64E-01	1.78E+02
S01M000019	A		Uranium-233 by ICP/MS AcidD159	ug/g	n/a	<0.00241	<4.25E-01	n/a	n/a	n/a	n/a	4.25E-01	n/a
S01M000019	A		Uranium-234 by ICP/MS AcidD159	ug/g	n/a	<0.00241	<4.25E-01	n/a	n/a	n/a	n/a	4.25E-01	n/a
S01M000019	A		Uranium-235 by ICP/MS AcidD159	ug/g	89.72	<0.00241	8.67E-01	n/a	n/a	n/a	n/a	4.25E-01	n/a
S01M000019	A		Uranium-236 by ICP/MS AcidD159	ug/g	n/a	<0.00322	<5.66E-01	n/a	n/a	n/a	n/a	5.66E-01	n/a
S01M000019	A		Uranium-238 by ICP/MS AcidD159	ug/g	92.60	<0.00241	30.45	n/a	n/a	n/a	n/a	4.25E-01	n/a
S01M000019	A		Plutonium-239 by ICP/MS	ug/g	n/a	<0.0101	3.49E+03	n/a	n/a	n/a	n/a	1.769	n/a
S01M000019	A		Plutonium-240 by ICP/MS	ug/g	n/a	<0.0101	2.51E+02	n/a	n/a	n/a	n/a	1.769	n/a
S01M000019	A		Plutonium-242 by ICP/MS	ug/g	n/a	<0.0101	1.822	n/a	n/a	n/a	n/a	1.769	n/a
S01M000019	A		Pu/Am-241 by ICP/MS	ug/g	n/a	<0.0101	30.68	n/a	n/a	n/a	n/a	1.769	n/a
S01M000019	A		Am 243/Cm 243 by ICP/MS	ug/g	n/a	<0.0101	< 1.769	n/a	n/a	n/a	n/a	1.769	n/a
S01M000019	A		Pu 244/Cm 244 by ICP/MS	ug/g	n/a	<0.0101	< 1.769	n/a	n/a	n/a	n/a	1.769	n/a
S01M000019	A		Silver -ICP-Acid Digest	ug/g	91.50	<0.0100	< 1.760	n/a	n/a	n/a	n/a	1.760	n/a
S01M000019	A		Arsenic -ICP-Acid Digest	ug/g	94.30	<0.100	< 17.60	n/a	n/a	n/a	n/a	17.60	n/a
S01M000019	A		Barium -ICP-Acid Digest	ug/g	94.20	<0.0500	< 8.800	n/a	n/a	n/a	n/a	8.800	n/a
S01M000019	A		Cadmium -ICP-Acid Digest	ug/g	93.40	<0.00500	1.610	n/a	n/a	n/a	n/a	8.80E-01	n/a
S01M000019	A		Chromium -ICP-Acid Digest	ug/g	93.10	<0.0100	1.78E+02	n/a	n/a	n/a	n/a	1.760	n/a
S01M000019	A		Lead -ICP-Acid Digest	ug/g	91.30	<0.100	< 17.60	n/a	n/a	n/a	n/a	17.60	n/a
S01M000019	A		Selenium -ICP-Acid Digest	ug/g	92.50	<0.100	< 17.60	n/a	n/a	n/a	n/a	17.60	n/a
S01M000019	A		Cobalt-60 by GEA	uCi/g	98.31	<5.24E-3	<4.73E-03	n/a	n/a	n/a	n/a	4.73E-03	n/a
S01M000019	A		Cesium-137 by GEA	uCi/g	100.3	<5.78E-3	<5.93E-03	n/a	n/a	n/a	n/a	5.93E-03	n/a
S01M000019	A		Europium-152 by GEA	uCi/g	n/a	<9.95E-3	<1.04E-02	n/a	n/a	n/a	n/a	1.04E-02	n/a
S01M000019	A		Europium-154 by GEA	uCi/g	n/a	<1.54E-2	<1.55E-02	n/a	n/a	n/a	n/a	1.55E-02	n/a
S01M000019	A		Europium-155 by GEA	uCi/g	n/a	<7.61E-3	<9.57E-03	n/a	n/a	n/a	n/a	9.57E-03	n/a
S01M000019	A		Radium-226 by GEA	uCi/g	n/a	<9.95E-2	<1.01E-01	n/a	n/a	n/a	n/a	1.01E-01	n/a
S01M000019	A		Americium-241 by GEA	uCi/g	n/a	<6.70E-3	1.12E+02	n/a	n/a	n/a	n/a	n/a	0.140
S01M000019	A		Am-241 by TRU-SPEC Resin IonEx	uCi/g	105.1	<2.81E+1	1.75E+02	n/a	n/a	n/a	n/a	38.00	2.26E+00
S01M000019	A		Cm-243/244 by TRU-SPEC Resin	uCi/g	n/a	<2.81E+1	< 38.00	n/a	n/a	n/a	n/a	38.00	1.00E+02
S01M000019	A		Alpha of Digested Solid	uCi/g	95.40	<1.05E-1	5.65E+02	n/a	n/a	n/a	n/a	1.66E-01	8.25E-01
S01M000019	A		Beta of Solid Sample	uCi/g	107.2	<3.05E-1	38.80	n/a	n/a	n/a	n/a	6.28E-01	2.66E+00

DIRECT2: DIRECT2

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S01M000018			Mercury by CVAA (PE) with FIAS	ug/g	101.2	<1.0E-4	1.300	n/a	n/a	n/a	n/a	1.30E-01	n/a

PARENT: PARENT

Sample#	R A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S01M000016		Volume % Settled Solids	%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1.00e-01	n/a
S01M000016		Color of Sample		n/a	n/a	white	n/a	n/a	n/a	n/a	n/a	n/a

Attachment 2. Data Summary Report
233S SDG8

CORE NUMBER: n/a
SEGMENT #: B118R3

SEGMENT PORTION: Inorganic

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S01M000014			Cyanide Water Distillation	ug/mL	89.00	1.50E-2	7.29e-01	n/a	n/a	n/a	n/a	1.10e-01	n/a
S01M000014			pH Direct	pH	n/a	n/a	<5.00e-01	n/a	n/a	n/a	n/a	1.00e-02	n/a
S01M000014			Fluoride IC SW846	ug/mL	90.62	<0.0120	<2.44e+02	n/a	n/a	n/a	n/a	243.6	n/a
S01M000014			Chloride SU-846	ug/mL	98.00	<0.0170	3.51e+03	n/a	n/a	n/a	n/a	345.1	n/a
S01M000014			Nitrite IC SW846	ug/mL	91.86	<0.108	<2.19e+03	n/a	n/a	n/a	n/a	2.19e+03	n/a
S01M000014			Nitrate by IC SW846	ug/mL	96.95	<0.139	4.02e+05	n/a	n/a	n/a	n/a	2.82e+03	n/a
S01M000014			Phosphate by IC SW846	ug/mL	94.76	<0.120	<2.44e+03	n/a	n/a	n/a	n/a	2.44e+03	n/a
S01M000014			Sulfate by IC SW846	ug/mL	96.18	<0.138	4.69e+03	n/a	n/a	n/a	n/a	2.80e+03	n/a
S01M000014			Oxalate by IC SW846	ug/mL	99.82	<0.105	<2.13e+03	n/a	n/a	n/a	n/a	2.13e+03	n/a

PARENT: PARENT

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S01M000012			Volume % Settled Solids	%	n/a	n/a	nd	n/a	n/a	n/a	n/a	1.00e-01	n/a
S01M000012			Color of Sample		n/a	n/a	dark gre	n/a	n/a	n/a	n/a	n/a	n/a

Radionuclides: Radionuclides

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S01M000013			Uranium by Phosphorescence	ug/mL	100.2	<4.41e-4	1.17e+05	n/a	n/a	n/a	n/a	229.0	n/a
S01M000013			Strontium-89/90 High Level	uCi/mL	97.03	<1.77e-4	<3.38e-04	n/a	n/a	n/a	n/a	4.59e-04	3.14E+02
S01M000013			Pu-239/240 by TRU-SPEC Resin	uCi/mL	99.67	<2.88E+1	7.75e+02	n/a	n/a	n/a	n/a	63.00	2.05E+00
S01M000013			Pu-238 by TRU-SPEC Resin IonEx	uCi/mL	n/a	<2.88E+1	3.08e+02	n/a	n/a	n/a	n/a	63.00	2.75E+00
S01M000013			Np237 by TTA Extraction	uCi/mL	80.52	<9.21E-3	2.220	n/a	n/a	n/a	n/a	1.17e-02	1.80E+00
S01M000013			Cobalt-60 by GEA	uCi/mL	100.0	<1.87e-4	<5.84e-04	n/a	n/a	n/a	n/a	5.84e-04	n/a
S01M000013			Cesium-137 by GEA	uCi/mL	103.6	<5.92e-4	3.25e-03	n/a	n/a	n/a	n/a	n/a	34.5
S01M000013			Europium-152 by GEA	uCi/mL	n/a	<3.51e-4	<8.48e-03	n/a	n/a	n/a	n/a	8.48e-03	n/a
S01M000013			Europium-154 by GEA	uCi/mL	n/a	<5.70e-4	<1.97e-03	n/a	n/a	n/a	n/a	1.97e-03	n/a
S01M000013			Europium-155 by GEA	uCi/mL	n/a	<4.25e-4	<3.20e-02	n/a	n/a	n/a	n/a	3.20e-02	n/a
S01M000013			Radium-226 by GEA	uCi/mL	n/a	<3.01e-3	<5.11e-02	n/a	n/a	n/a	n/a	5.11e-02	n/a
S01M000013			Americium-241 by GEA	uCi/mL	n/a	<9.85e-4	4.96e+02	n/a	n/a	n/a	n/a	n/a	0.0800
S01M000013			Am-241 by TRU-SPEC Resin IonEx	uCi/mL	97.55	<1.23E+2	9.78e+02	n/a	n/a	n/a	n/a	169.0	1.91E+00
S01M000013			Cm-243/244 by TRU SPEC Resin	uCi/mL	n/a	<1.23E+2	<1.69e+02	n/a	n/a	n/a	n/a	169.0	1.00E+02
S01M000013			Alpha in Liquid Samples	uCi/mL	97.55	6.38E-2	1.94e+03	n/a	n/a	n/a	n/a	8.14e-02	4.80E-01
S01M000013			Beta in Liquid Samples	uCi/mL	111.3	<4.79E-1	2.74e+02	n/a	n/a	n/a	n/a	5.45e-01	1.02E+00

TCLP ACID DIGEST: TCLP ACID DIGEST

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S01M000047	B		Uranium-233 by ICP/MS AcidD158	ug/mL	n/a	<0.485	< 2.424	n/a	n/a	n/a	n/a	2.424	n/a
S01M000047	B		Uranium-234 by ICP/MS AcidD158	ug/mL	n/a	<0.485	< 2.424	n/a	n/a	n/a	n/a	2.424	n/a
S01M000047	B		Uranium-235 by ICP/MS AcidD158	ug/mL	92.36	<0.485	70.98	n/a	n/a	n/a	n/a	2.424	n/a
S01M000047	B		Uranium-236 by ICP/MS AcidD158	ug/mL	n/a	<0.646	10.95	n/a	n/a	n/a	n/a	3.232	n/a
S01M000047	B		Uranium-238 by ICP/MS AcidD158	ug/mL	90.70	<0.485	1.55e+04	n/a	n/a	n/a	n/a	2.424	n/a

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S01M000047	B		Plutonium-239 by ICP/MS	ug/mL	n/a	<2.02	5.74e+02	n/a	n/a	n/a	n/a	10.10	n/a
S01M000047	B		Plutonium-240 by ICP/MS	ug/mL	n/a	<2.02	96.19	n/a	n/a	n/a	n/a	10.10	n/a
S01M000047	B		Plutonium-242 by ICP/MS	ug/mL	n/a	<2.02	< 10.10	n/a	n/a	n/a	n/a	10.10	n/a
S01M000047	B		Pu/Am-241 by ICP/MS	ug/mL	n/a	<2.02	25.15	n/a	n/a	n/a	n/a	10.10	n/a
S01M000047	B		Pu 244/Cm 244 by ICP/MS	ug/mL	n/a	<2.02	< 10.10	n/a	n/a	n/a	n/a	10.10	n/a
S01M000047	B		Silver -ICP-Acid Digest-Liquid	ug/mL	90.50	<0.0100	< 5.050	n/a	n/a	n/a	n/a	5.050	n/a
S01M000047	B		Arsenic -ICP-Acid Digest-Liq	ug/mL	90.30	<0.100	< 50.50	n/a	n/a	n/a	n/a	50.50	n/a
S01M000047	B		Barium -ICP-Acid Digest-Liquid	ug/mL	89.30	<0.0500	< 25.30	n/a	n/a	n/a	n/a	25.30	n/a
S01M000047	B		Cadmium -ICP-Acid Digest-Liq	ug/mL	90.20	<0.00500	< 2.530	n/a	n/a	n/a	n/a	2.530	n/a
S01M000047	B		Chromium -ICP-Acid Digest-Liq	ug/mL	89.10	<0.0100	1.44e+04	n/a	n/a	n/a	n/a	5.050	n/a
S01M000047	B		Iron -ICP-Acid Digest-Liquid	ug/mL	91.70	<0.0500	5.59e+04	n/a	n/a	n/a	n/a	25.30	n/a
S01M000047	B		Nickel -ICP-Acid Digest-Liquid	ug/mL	89.60	<0.0200	8.25e+03	n/a	n/a	n/a	n/a	10.10	n/a
S01M000047	B		Lead -ICP-Acid Digest-Liquid	ug/mL	88.40	<0.100	< 50.50	n/a	n/a	n/a	n/a	50.50	n/a
S01M000047	B		Sulfur -ICP-Acid Digest-Liquid	ug/mL	96.80	<0.100	1.66e+03	n/a	n/a	n/a	n/a	50.50	n/a
S01M000047	B		Selenium -ICP-Acid Digest-Liq	ug/mL	89.10	<0.100	< 50.50	n/a	n/a	n/a	n/a	50.50	n/a

TCLP Metals: TCLP Metals

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S01M000015			Mercury by CVAA (PE) with FIAS	ug/mL	103.6	<1.0e-4	2.190	n/a	n/a	n/a	n/a	1.00e-04	n/a

FH-0102506

ATTACHMENT 3

SAMPLE BREAKDOWN DIAGRAM

Consisting of 3 pages,
Including cover page

233-S Pu Concentration Facility Samples

SDG8
Process Line Powder
B118R2-A



S01M000016
Appearance



S01M000017



S01M000018

Hg

Acid
Digest



S01M000019

Total Alpha/Beta

²³⁷Np
²⁴¹Am, ²⁴³Am, ²⁴⁴Cm
²³⁸Pu, ²³⁹Pu, ²⁴⁰Pu

GEA: ¹³⁷Cs, ¹³⁴Co,
¹⁵²Eu, ¹⁵⁴Eu,
¹⁵⁶Eu, ²²⁶Ra,
²⁴¹Am

ICP/MS: actinides
ICP: TCLP metals

233-S Pu Concentration Facility Samples

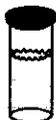
SDG8

Liquid Sample B118R3



S01M000012

Breakdown



S01M000013

Total Alpha/Beta
⁹⁰Sr
²³⁷Np
²⁴¹Am/^{242m}Am
²³⁹Pu/²⁴⁰Pu
GEA: ¹³⁷Cs, ⁶⁰Co,
¹⁵²Eu, ¹⁵⁴Eu,
¹⁵⁵Eu, ²²⁶Ra,
²⁴¹Am
Total Uranium



S01M000014

pH
CN
IC: Cl, F, NO₂,
NO₃, PO₄,
SO₄, oxalate



S01M000015

Hg

Acid
Digest



S01M000047

ICP: Total & TCLP metals
ICP/MS: Iso Pu
Iso U

FH-0102506

ATTACHMENT 4

**CHAIN OF CUSTODY AND
REQUEST FOR SAMPLE ANALYSIS FORMS**

Consisting of 6 pages,
Including cover page

Bechtel Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				B99-024-33	Page 1 of 2	
Collector J. Davis	Company Contact Dave Encke	Telephone No. 373-3461	Project Coordinator TRENT, SJ	Price Code 9L	Data Turnaround 60 Days		1-24-01	
Project Designation 233-S Plutonium Concentration Facility Process Areas - Oth	Sampling Location 233-S	SAF No. B99-024	Air Quality <input type="checkbox"/>					
Ice Chest No. 4H2	Field Logbook No. NA	COA R233SP280C	Method of Shipment Hand Carry GOV. VEHICLE					
Shipped To 222-S Lab Operations	Offsite Property No. RSR # 106684	Bill of Lading/Air Bill No. NA						
POSSIBLE SAMPLE HAZARDS/REMARKS	Preservation	None						
	Type of Container	Snap Vial						
	No. of Container(s)	1						
	Volume	60mL						
Special Handling and/or Storage			See item (1) in Special Instructions.					
SAMPLE ANALYSIS			SO1M000016					TIE TO
Sample No.	Matrix *	Sample Date	Sample Time					
B118R2-A	OTHER SOLID	12-15-00	1230	X			B118R2	
CHAIN OF POSSESSION				SPECIAL INSTRUCTIONS			Matrix *	
Relinquished By R. Thoren	Date/Time 1/24/01	1345	Received By <i>[Signature]</i>	Date/Time 1/24/01	** The ERC acknowledges that some hold times may not be achievable due to delays in delivery of the samples to the laboratories or short analytical holding times (holding times less than 7 days).		S=Soil SE=Sediment SO=Solid S=Sludge W=Water O=Oil A=Air DS=Drum Solids DL=Drum Liquids T=Tissue Wl=Wipe L=Liquid V=Vegetation X=Other	
Relinquished By	Date/Time		Received By	Date/Time	(1) Metals by ICP (TCLP) - 1311/6010A; Mercury (TCLP) - 1311/7470; Actinides ICPMS; Gross Alpha; Gross Beta; Gamma Spectroscopy (Americium-241, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Radium-226); Isotopic Plutonium; Neptunium-237; Am ER (CURM)-241/CURIUM-244; pH			
Relinquished By	Date/Time		Received By	Date/Time	Samples originally sent to RCE for GEA analysis. See ¹⁻²⁴⁻⁰¹ page 2 of 2 represents custody transfer. Sample was relabeled, and new SOC Generators for transfer to 222 S Lab for directed analysis. Page 1 of 2 represents custody transfer			
Relinquished By	Date/Time		Received By	Date/Time				
Relinquished By	Date/Time		Received By	Date/Time				
Relinquished By	Date/Time		Received By	Date/Time				
LABORATORY SECTION	Received By	Title			Date/Time			
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By			Date/Time			

Bechtel Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST					B99-025-07		Page 1 of 1		
Collector J. DAVIS		Company Contact Dave Encke		Telephone No. 373-3461		Project Coordinator TRENT, SJ		Price Code 9L		Data Turnaround 60 Days	
Project Designation 233-S Plutonium Concentration Facility Process Areas - Oth		Sampling Location 233-S		SAF No. B99-025		Air Quality <input type="checkbox"/>					
Ice Chest No. GPC 96-081		Field Logbook No. EL-1519		COA R2335P280C		Method of Shipment Hand Carry					
Shipped To 222-S Lab Operations		Offsite Property No.		Bill of Lading/Air Bill No.							
POSSIBLE SAMPLE HAZARDS/REMARKS				Preservation	None	Cool 4C	None	None	None		
				Type of Container	GP	GP	GP	GP	GP		
				No. of Container(s)	1	1	1	1	1		
				Special Handling and/or Storage	Volume	* 15mL	* 20mL	* 75mL	* 100mL	* 100mL	
SAMPLE ANALYSIS				Actinides ICPMS	See item (1) in Special Instructions.	See item (2) in Special Instructions.	See item (3) in Special Instructions.	Metals by ICP (TCLP) - 1311/6010A; Mercury (TCLP) - 1311/7470			
SDIM 000012											
Sample No.	Matrix *	Sample Date	Sample Time								
B118R3	OTHER LIQUID	12-29-00	0930	X	X	X	X	X			
CHAIN OF POSSESSION				Sign/Print Names				SPECIAL INSTRUCTIONS			
Relinquished By	Date/Time	Received By	Date/Time	(1) IC Anions - 9056 (Chloride, Fluoride, Nitrogen in Nitrate, Nitrogen in Nitrite, Phosphate, Sulfate); IC Anions - 9056 Add On (Oxalate); pH (Soil) - 9045; Total Cyanide - 9010; Sulfides - 9030 (2) Gross Alpha; Gross Beta; Gamma Spectroscopy (Americium-241, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Radium-226); Americium-241/Curium-244; Neptunium-237; Isotopic Plutonium; Strontium-90; Total Uranium (3) ICP Metals - 6010A (SW-846); ICP Metals - 6010A (Add-on) (Lead); Mercury - 7471 - (CV)				Matrix * S=Soil SE=Sediment SO=Solid S=Sludge W=Water O=Oil A=Air DS=Drum Solids DL=Drum Liquids T=Time WI=Wipe L=Liquid V=Vegetation X=Other			
Relinquished By	Date/Time	Received By	Date/Time								
Relinquished By	Date/Time	Received By	Date/Time								
Relinquished By	Date/Time	Received By	Date/Time								
Relinquished By	Date/Time	Received By	Date/Time								
				* Entire contents of sample is in one 2-Liter container.							
LABORATORY SECTION	Received By	Title				Date/Time					
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By				Date/Time					

REQUEST FOR SAMPLE ANALYSIS (RSA)

Group ID No. (For lab use only)

20010024

1. Sample Origin: **233-S Facility (BHI)** 2. Date Sampled: **12/15/00** 4. Requestor's Name: **SJ TRENT** 6. CACN/COA: **DB1051** 7. Cost Center:

Customer/Project Code: 3. Submitted By: **KIKKI Thonen** 5. Requestor's Phone/MSIN/FAX: **2-9651/A9-03/2-9487**

8. Customer ID No.	9. Laboratory Sample No.	10. Volume of Sample	11. Matrix of Sample	12. Requested Analyses	13. Expected Range
B11BR2-A	SOLW00116	20g	solid	See chain of custody	5×10^7 pCi Pu activity

14. Does sample have a MSDS?
 Yes HEHF assigned MSDS No. _____
 No Description of process that produced waste/sample:
Scrapings from process line piping

5×10^7 pCi \approx 8.06e-4g Pu

Will radiochemistry results be used for unconditional release? Yes No

15. Is this sample RCRA listed? Yes No

Applicable Listed Waste Codes:
 Yes No P Codes: (list) _____
 Yes No U Codes: (list) _____
 Yes No K Codes: (list) _____
 Yes No F Codes: (list) _____

Applicable Characteristic Codes:
 Yes No D001: (how determined) _____ Ignitable
 Yes No D002: (how determined) _____ Corrosive
 Yes No D003: (how determined) _____ Reactive
 Yes No Toxic: (list codes) _____

PCB: Does this waste/sample contain PCBs?
 Yes Over 500 ppm If YES, what is the source of the PCBs?
 Yes Over 50 ppm Transformer, capacitor, or ballast
 Yes PCBs are suspected Other, specify _____
 No PCBs are suspected Unknown

16. Sample Disposition
 Return to Customer
 Samples found to contain PCBs will be returned to the customer
 Dispose of per facility procedures with applied charges for analyses and disposal

Sample(s) Dose Rate at Contact: **1.2**
 HPT Signature: *[Signature]*

17. QC Required Per 222-S Laboratory Quality Assurance Plan (HNF-SD-CP-QAPP-016)
 Other (list reference document or attach) **Letter of Instruction for 233-S Plutonium Conc. Facility Sample Analysis**

18. Special Instructions (Special Storage Requirements, Reporting format, holding times, etc.)

19. Requested Turnaround Time
 2 Weeks 4 Weeks
 Other **45 day preliminary / 60 day Final**

20. Sample Received By: *[Signature]* Date: **1/24/01** Time: **1349**

21. Chain of Custody
 No Yes
 Number: _____

REQUEST FOR SAMPLE ANALYSIS (RSA)

Group ID No. (For APUs only)

Sample Origin 33-S Facility (BHI)	2. Date Sampled 12/29/00	4. Requestor's Name S J TRENT	5. CAC/COA DB1051	7. Cost Center
Customer/Project Code	3. Submitted By		6. Requestor's Phone/MSIN/FAX 2-9651/49-03/2-9487	

Customer ID No.	10. Volume of Sample	11. Matrix of Sample	12. Requested Analysis	13. Expected Range
B118R3	400ml	liquid	see chain of custody	0.2g Pu as determined by NOA 2.1g Np

14. Does sample have a MSDS?

Yes HEHF assigned MSDS No. _____

No Description of process that produced waste/sample:
233-S Process vessel drained liquid (pH < 1.0)

Will radiochemistry results be used for unconditional release? Yes No

15. Is this sample RCRA listed? Yes No

Applicable Listed Waste Codes:

Yes No P Codes: (list) _____

Yes No U Codes: (list) _____

Yes No K Codes: (list) _____

Yes No F Codes: (list) _____

Applicable Characteristic Codes:

Yes No D001: (how determined) _____ Ignitable

Yes No D002: (how determined) _____ Corrosive

Yes No D003: (how determined) _____ Reactive

Yes No Toxic: (list codes) _____

PCB: Does this waste/sample contain PCBs?

Yes Over 500 ppm

Yes Over 50 ppm

Yes PCBs are suspected

No PCBs are suspected

If YES, what is the source of the PCBs?

Transformer, capacitor, or ballast

Other, specify _____

Unknown

16. Sample Disposition

Return to Customer

Samples found to contain PCBs will be returned to the customer

Dispose of per facility procedures with applied charges for analyses and disposal

Sample(s) Dose Rate at Contact: **120 mrem/hr**

HPT Signature: *[Signature]*

17. QC Required Per 222-S Laboratory Quality Assurance Plan (HNP-SD-CP-QAPP-001)

Other (list reference document or attach) **233- Letter of Instruction for 233-S Plutonium Conc. Facility**

18. Special Instructions (Special Storage Requirements, Reporting format, holding times, etc.)

19. Requested Turnaround Time **sample analysis:**

2 Weeks 4 Weeks

Other **45 day Prelim**

20. Sample Received By: *[Signature]* Date: **1/15/01** Time: **1415**

21. Chain of Custody **60 day Final**

No Yes

Number: _____

FH-0102506

ATTACHMENT 5

CORRESPONDENCE

Consisting of 4 pages
Including cover page

Esch, Ruth A

From: Esch, Ruth A
Sent: Friday, May 04, 2001 8:19 AM
To: Trent, Stephen J
Cc: Powell, Katherine L; Ayres, Doris E
Subject: RE: 233S Sample Information for ~~B118R3~~ (white solid)
B118R2-A

The solid sample was actually sample ID B118R2-A. I had previously sent a correction message for the incorrect sample ID listed in my message below. Sorry for the confusion.

Ruth Esch
222-S Project Coordinator

-----Original Message-----

From: Trent, Stephen J
Sent: Friday, May 04, 2001 8:04 AM
To: Esch, Ruth A
Cc: Powell, Katherine L; Ayres, Doris E
Subject: RE: 233S Sample Information for B118R3 (white solid)

Ruth:

As an addendum to the message below, the laboratory was instructed to run a total metals analysis in place of the TCLP analysis.

Regards,

Steve Trent
ERC Sample Management

-----Original Message-----

From: Trent, Stephen J
Sent: Friday, May 04, 2001 7:55 AM
To: Esch, Ruth A
Cc: Powell, Katherine L; Ayres, Doris E
Subject: RE: 233S Sample Information for B118R3 (white solid)

Ruth:

It's my understanding that due to the limited amount of material associated with this sample, that there was not enough sample to complete the TCLP analysis. Therefore, consider the TCLP analysis cancelled.

Regards,

Steve Trent
ERC Sample Management

-----Original Message-----

From: Trent, Stephen J
Sent: Tuesday, February 06, 2001 3:32 PM
To: Esch, Ruth A
Cc: Powell, Katherine L
Subject: RE: 233S Sample Information for B118R3 (white solid)

Ruth:

Thanks for the heads up...

Steve

-----Original Message-----

From: Esch, Ruth A
Sent: Tuesday, February 06, 2001 3:24 PM
To: Trent, Stephen J
Cc: Powell, Katherine L
Subject: 233S Sample Information for B118R3 (white solid)
Importance: High

Steve,

I'm sending this message to inform you that we have insufficient sample to perform all of the requested analyses on sample B118R3 (white powder) from 233S.

We transferred the sample out of the petri dish that it was received in and into sample vials. The final weights of the two subsamples were 0.963 g and 0.827 g. We will have plenty in the vial with 0.963 g to run the acid digest for the radionuclides and metals, and should even have enough to run a fusion for the radionuclides if there is significant solids left undissolved after the acid digest. However, with the 0.827 g in the second vial, there will only be sufficient mass to run the direct Hg analysis. We will not have enough solids in either bottle to run a pH analysis according to our procedure.

Ruth Esch

Project Coordinator, 222-S Laboratory
373-4314

Esch, Ruth A

From: Trent, Stephen J
Sent: Thursday, January 25, 2001 1:14 PM
To: Esch, Ruth A
Subject: RE: 233-S Sample Analyses

Ruth:

Dave Encke wants to run both ICP-MS and the AEA methods on both his 233-S samples. In addition, he said to disregard the request for sulfides...

Steve

-----Original Message-----

From: Esch, Ruth A
Sent: Thursday, January 25, 2001 12:08 PM
To: Trent, Stephen J
Cc: Powell, Katherine L
Subject: RE: 233-S Sample Analyses

Steve,

Thanks for the update. I'm glad that I interpreted the 221U COC properly. Your description is exactly the way I logged it in.

To my knowledge, we don't run any sulfide method. We only have IC for sulfates and ICP for sulfur.

Ruth Esch

Project Coordinator, 222-S Laboratory
373-4314

-----Original Message-----

From: Trent, Stephen J
Sent: Thursday, January 25, 2001 12:02 PM
To: Esch, Ruth A
Cc: Powell, Katherine L
Subject: RE: 233-S Sample Analyses
Importance: High

Ruth:

Sorry for the confusion on the 233-S COC. I need to talk w/ Dave Encke and clarify what he actually wants; I have a phone call into him. I'll send you another e-mail as soon as I hear from him. Typically, Dave has been asking for both AEA and ICP-MS to help build his ICP-MS/AEA correlation database....

Regarding the 221-U samples, the game we want to play is as follows -

- 1) Run ICP-MS to get actinide data
- 2) Run Am-241/Cm-244 by AEA to resolve isotope interference at mass number 241.

Finally, what sulfide method does the laboratory run???

Thanks for putting up with our "interesting" samples.

Regards,

Steve

-----Original Message-----