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FINAL REPORT FOR THE ARRA SAMPLING OF GLOVEBOX 200 IN ROOM 235D BUILDING 234-5Z AT THE PLUTONIUM FINISHING PLANT, MAY 2010 SAMPLE DELIVERY GROUP 222S20100465

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Table of Contents

NARRATIVE 1

1.0 INTRODUCTION 1

2.0 SAMPLE RECEIPT, HANDLING, AND APPEARENCE 1

3.0 HOLDING TIMES 1

4.0 ANALYTICAL RESULTS SUMMARY 1

4.1 INORGANIC ANALYSES 3

4.1.1 pH Analysis 3

4.1.2 Mercury 3

4.1.3 Ion Chromatography 3

4.1.4 Inductively Coupled Plasma-Atomic Emission Spectroscopy 3

4.1.5 Inductively Coupled Plasma-Mass Spectrometry 4

4.2 RADIOCHEMICAL ANALYSIS 5

4.2.1 Total Alpha/Total Beta 5

4.2.2 Gamma Energy Analysis 5

4.2.3 Strontium-90 5

4.2.4 Americium-241 5

4.2.5 Plutonium-238 and Plutonium-239/240 5

5.0 PROCEDURES 6

6.0 REFERENCES 6

Attachment 1 DATA SUMMARY REPORT 7

Attachment 2 SAMPLE BREAKDOWN DIAGRAMS 14

Attachment 3 HOLDING TIME REPORT 17

Attachment 4 CORRESPONDENCE 19

Attachment 5 RECEIPT PAPERWORK 26

222-S LABORATORY

FINAL REPORT FOR THE ARRA SAMPLING OF GLOVEBOX 200 IN ROOM 235D BUILDING 234-5Z AT THE PLUTONIUM FINISHING PLANT, MAY 2010 SAMPLE DELIVERY GROUP 222S20100465

1.0 INTRODUCTION

This report presents the results for the two solid samples received on July 6, 2010, from the sampling of Glovebox 200 in room 235D, building 234-5Z at the Plutonium Finishing Plant (PFP). The samples were analyzed in accordance with PFP-LOI-10-0003, *Letter of Instruction for Analysis of Glove Box 200 in Room 235D of 234-5Z Building* (LOI); Sampling Authorization Form (SAF) F10-142; DOE/RL-2004-29, *Sampling and Analysis Plan for the Plutonium Finishing Plant, Above-Grade Structures* (SAP); ATL-MP-1011, *ATL Quality Assurance Project Plan for 222-S Laboratory* (QAPP); SW-846, *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods;* and the additional guidance given by the customer point of contact (POC).

Due to the hazardous and complex nature of Hanford tank waste samples, most SW-846 test methods performed at the 222-S Laboratory contain deviations that are listed in an appendix in the analytical procedures. All other known deviations or variances from SW-846 are documented in this narrative. The following attachments are included in this report.

Attachment 1	Data Summary Report
Attachment 2	Sample Breakdown Diagrams
Attachment 3	Holding Time Report
Attachment 4	Correspondence
Attachment 5	Receipt Paperwork

2.0 SAMPLE RECEIPT, HANDLING, AND APPEARENCE

Two solid samples, B24WC7 and B24WC8, were collected on May 13, 2010, and received at the 222-S Laboratory on July 6, 2010, in good condition and with adequate paperwork. The chain of custody form indicated preservation of cooling to ~4 °C. There was no evidence of cooling of the samples during delivery, as indicated on the sample receipt checklist included in Attachment 5. Concurrence was received from the customer POC that cooling was not required. This is noted on the receipt checklist in Attachment 5.

3.0 HOLDING TIMES

Attachment 3 presents the Holding Time Report for all methods with applicable holding times based on SW-846. Due to the long delay between sample collection and delivery to the laboratory, the 28-day holding time for the mercury analysis was not met. Actual sampling and analysis dates and times are presented in Attachment 3.

4.0 ANALYTICAL RESULTS SUMMARY

The Data Summary Report (Attachment 1) presents the final analytical results for those analytes requested in the SAF and LOI. The laboratory met the requested detection limits for metals

using the inductively coupled plasma-atomic emission spectroscopy (ICP) method. Therefore, as indicated in the LOI, the inductively coupled plasma-mass spectrometry (ICP-MS) method was not required.

The "Units" column in Attachment 1 contains the reporting units for the samples. For the blank the units are actually μg/mL for anions, metals, and mercury. The "Det Limit" column in Attachment 1 contains the method detection limit (MDL) for non-radionuclide analyses or the minimum detectable activity for radionuclides.

In Attachment 1, the column labeled "A#" indicates the aliquot class or the method used for sample preparation before analysis. The aliquot classes are defined as follows:

- "A" indicates samples prepared by an acid digest that follows SW-846 Method 3050B.
- "E" indicates samples prepared by a strong acid digest.
- "W" indicates samples prepared by a water digest.

Samples without a letter identifier in the "A#" column were analyzed directly with no separate preparation analysis or with sample preparation performed as a part of the analytical procedure steps.

The "Qual Flags" column in Attachment 1 contains data qualifier flags that are defined as follows:

Inorganic Qualifier flags:

- "B" indicates that the reported result should be considered an estimate because the sample concentration is greater than the MDL but less than the quantitation limit.
- "C" indicates that the analyte was detected in the blank and in the sample, and the blank concentration was greater than 5% of the concentration detected in the sample.
- "N" indicates that the MS is outside of range listed in the SAP.
- "U" indicates that the reported result is less than the calculated detection limit.
- ">" indicates that the reported result is outside the calibration range. In this report, this flag is used to indicate that the pH result was <pH 2, which was the low calibration standard value.

Radionuclide Qualifier flags:

- "B"—for radionuclide results—indicates that the radionuclide was detected in the blank and in the sample, and the blank concentration or activity was greater than 5% of the concentration or activity detected in the sample.
- "J" indicates that the reported radionuclide result should be considered an estimate because the counting uncertainty is greater than 30%.
- "U" indicates that the reported result is less than the calculated detection limit.
- "X" is a user-defined flag. For this report, the "X" flag is applied to the ^{235}U results to indicate that the laboratory control sample (LCS) recovery was outside the acceptance criteria.

Manual calculations using rounded results from the Data Summary Report or result calculation forms may differ slightly from the actual results derived from the raw data.

4.1 INORGANIC ANALYSES

4.1.1 pH Analysis

The pH of the samples was determined on direct aliquots. The pH LCS measurement and relative percent difference (RPD) met the acceptance criteria in ATL-MP-1011. The sample and duplicate results for sample B24WC7 were outside of the calibration range. The results were < pH 2, which was the lower calibration standard value. Therefore, the results were assigned a ">" flag. The actual measurements met the acceptance criterion of ± 0.01 pH units for a duplicate analysis. SW-846 does not currently list a laboratory holding time for pH. The sampling and analysis dates are provided in Attachment 4.

4.1.2 Mercury

The Hg analysis was performed on acid-digested aliquots. The LCS recovery, MS recovery, and RPD met the criteria in the SAP. No Hg was detected in the method blank. The reported MDLs were below the required detection limit (RDL) in the SAP.

4.1.3 Ion Chromatography

Ion chromatography analysis was performed on water-digested aliquots. The LCS and MS recoveries and RPDs met the requirements in the SAP. Low levels of chloride and sulfate were detected in the preparation blank. Since the levels of these analytes in the blank were below the quantitation limit, no reanalysis was required. The concentration of sulfate in the blank was much less than 5% of the sample results and was considered insignificant. The level of chloride in the blank was at approximately the same level of chloride reported in sample B24WC7 and approximately 17% of the level in sample B24WC8. A "C" qualifier flag was applied to the sample results for chloride in these two samples. No other requested analytes were detected in the preparation blank. There were no RDLs listed in the SAP for anions in solids. This blank contamination issue was discussed with the customer POC who indicated that no reanalysis was necessary (see correspondence in Attachment 4).

4.1.4 Inductively Coupled Plasma-Atomic Emission Spectroscopy

The ICP/AES analysis was performed on acid-digested aliquots. All LCS recoveries and RPDs met the requirements in the SAP. No requested analytes were detected in the blanks. The analytes with RDLs listed in the SAP met the requirement. Therefore, no metals were reported from ICP-MS.

The MS recoveries for aluminum, chromium, copper, potassium, sodium, thallium, and zinc were outside of the limits listed in the SAP. For aluminum, chromium, copper, sodium, and zinc, the concentration of analytes in the sample was greater than four times the spike concentration. Therefore, the spike recovery criteria were not applicable and no flag was applied. An "N" flag was applied to the potassium and thallium results for all samples in the batch to indicate the spike failure. These spike failures were discussed with the customer POC who indicated that no reanalysis was necessary (see correspondence in Attachment 4).

Note that low levels of cadmium, cobalt, manganese, and nickel were detected below the quantitation limit in two of the interference check standards that weren't spiked with these analytes. This is an indication of potential high bias in the results. The other interference check standards that contained these analytes were all within the acceptable limits. Cobalt was detected in the samples below the quantitation limit and a "B" flag was applied. These results may be biased high. The cadmium, manganese, and nickel results were all above the quantitation limit; therefore, it is the laboratory's opinion that the effect of the presence of this analyte in the interference check standard was insignificant.

4.1.5 Inductively Coupled Plasma-Mass Spectrometry

The ICP-MS analysis was performed on acid-digested aliquots. The requested analytes were ^{237}Np, ^{242}Pu, ^{233}U, ^{234}U, ^{235}U, and ^{238}U. An acid digestion using concentrated hydrochloric and nitric acids was used to get potential oxides into solution more effectively. The LCS and MS standards consisted of ^{237}Np, ^{239}Pu, ^{235}U, and ^{238}U. Since ^{239}Pu was not a requested analyte, it is not included in the data summary report. All of the RDLs were met except for ^{242}Pu. The failure to meet the RDL for ^{242}Pu was due to the analysis dilution required based on the concentration of ^{239}Pu in the samples.

The LCS recoveries and MS recoveries for all isotopes except ^{235}U met the criteria in the SAP. The RPDs all met the requirements in the SAP. The LCS recovery for ^{235}U was 137%, and the MS recovery was 173%. An "X" flag was applied to the results to indicate the standard failure, and an "N" flag was applied to indicate that the spike was outside of the requested limits. The post digestion spike recovery and the calibration check standards for ^{235}U met the requirements. This was the first time an LCS and MS for uranium was prepared using this strong acid digest, so the laboratory does not have historical data for performance. The cause for the failure of only the ^{235}U is unknown. The ^{238}U, present in the same standard solution, met the recovery requirements. Since the quality control data and sample results do not affect any personnel safety issues nor the path forward for waste disposition and the overall sample results are as expected based on PFP process knowledge, the customer point of contact accepted the results (see correspondence in Attachment 4).

No required analytes were detected in the preparation blank. A low level of ^{237}Np was detected in one of the ending continuing calibration blanks. The concentration in the blank was below the quantitation limit, so no reanalysis was required. The contamination appears to be carry-over from the standard run just prior to the blank, and it is the Laboratory's opinion that there is little effect on the sample results. However, the level in the blank was greater than 5% of the sample result, so a "B" flag was applied to the sample. The ^{237}Np result was much less than the RDL listed in the SAP.

Direct calibration, where a standard containing the isotope and element of interest is used to calibrate the response of the isotope, is the most accurate type of calibration; however, standard material is not available for all the isotopes of interest. Concentrations of those isotopes without available standards are estimated based on the instrument's mass-response curve, which is generated by using the intensity/concentration relationship for the available isotope standards. Results estimated in this manner are designated "semi-quantitative." The 222-S Laboratory currently does not have standards available for calibration, calibration checks, or matrix spikes for ^{242}Pu, ^{233}U, or ^{234}U. The results for these isotopes are all considered semi-quantitative.

4.2 RADIOCHEMICAL ANALYSIS

4.2.1 Total Alpha/Total Beta

The total alpha/total beta analysis was performed on acid-digested aliquots using the strong acid digest. The LCS recoveries, spike recoveries, and RPDs met the criteria in the SAP. The LCS and spike were prepared after the digestion. No alpha or beta activity was detected in the preparation blank. The reported minimum detectable activities (MDA) for gross beta met the RDL requirement in the SAP. The MDA for alpha did not meet the RDL because of the small sample size required based on the alpha activity in the sample.

4.2.2 Gamma Energy Analysis

The GEA was performed on acid-digested aliquots using the strong acid digest. The requested isotopes for GEA were ^{60}Co and ^{137}Cs. The LCS recoveries met the criteria in the SAP. No isotopes were detected in the preparation blank. The reported MDAs met the RDL requirement in the SAP.

4.2.3 Strontium-90

The ^{90}Sr analysis was performed on acid-digested aliquots using the strong acid digest. The LCS recovery met the criteria in the SAP. A negative result was reported for the duplicate analysis of sample B24WC7; therefore, an RPD calculation is not applicable. The counting uncertainty for both samples was greater than 30% and a "J" flag was applied. A low level of ^{90}Sr activity was detected in the preparation blank. A "B" flag was applied to the result for sample B24WC7. However, since a negative result was reported for sample B24WC8, no "B" flag was applied. The results for both samples were less than the RDL. Since the quality control data and sample results do not affect any personnel safety issues nor the path forward for waste disposition and the overall sample results are as expected based on PFP process knowledge, the customer point of contact accepted the results (see correspondence in Attachment 4). The reported MDAs met the RDL requirement in the SAP.

4.2.4 Americium-241

The ^{241}Am analysis was performed on acid-digested aliquots using the strong acid digest. The LCS recovery and RPD met the criteria in the SAP. No ^{241}Am activity was detected in the preparation blank. The reported MDAs did not meet the RDL requirement in the SAP because a small sample size was required based on the americium activity in the samples.

4.2.5 Plutonium-238 and Plutonium-239/240

The ^{238}Pu and $^{239/240}$Pu analysis was performed on acid-digested aliquots using the strong acid digest. The LCS recovery and RPD met the criteria in the SAP. No ^{238}Pu or $^{239/240}$Pu activity was detected in the preparation blank. The reported MDAs did not meet the RDL requirement in the SAP because a small sample size was required based on the high plutonium activity in the samples.

5.0 PROCEDURES

Table 1 lists the analytical procedures used for analysis of the PFP 235D Glovebox 200.

Table 1. Analytical Procedures

Analysis	Preparation Method	Analysis Procedure
Inorganic Analyses		
pH (9045C)	LA-212-105, Rev. G-0	LA-212-105, Rev. G-0
Mercury – Cold Vapor Atomic Absorption (7471A)	LA-325-110, Rev. A-0	LA-325-110, Rev. A-0
IC (9056A)	LA-504-101, Rev. M-0	LA-533-115, Rev. J-0
ICP/AES (3050B/6010C)	LA-505-163, Rev. G-0	LA-505-161, Rev. J-0-A
ICP/MS: actinides	LA-544-101, Rev. F-0	LA-506-102, Rev. F-1
Radiochemical Analyses		
Total Alpha/Total Beta	LA-544-101, Rev. F-0	LA-508-101, Rev. L-2
GEA	LA-544-101, Rev. F-0	LA-548-121, Rev. I-0
^{90}Sr – Separation/Beta counting	LA-544-101, Rev. F-0	LA-220-101, Rev. I-0
^{241}Am – Separation/AEA	LA-544-101, Rev. F-0	LA-953-104, Rev. H-1
$^{239/240}$Pu, ^{238}Pu – Separation/AEA	LA-544-101, Rev. F-0	LA-953-104, Rev. H-1

6.0 REFERENCES

ATL-MP-1011, 2009, *ATL Quality Assurance Project Plan for 222-S Laboratory*, Rev. 9, Advanced Technologies and Laboratories International, Inc., Richland, Washington.

DOE/RL-2004-29, 2005, *Sampling and Analysis Plan for the Plutonium Finishing Plant, Above-Grade Structures*, Rev. 0, U.S. Department of Energy, Richland, Washington.

Memorandum, from R. L. Cathel, CHPRC, to R. A. Bushaw, ATL, *Letter of Instruction for Analysis of Glove Box 200 in Room 235D of 234-5Z Building*, PFP-LOI-10-0003, dated May 13, 2010.

F10-142, March 24, 2010, *Sampling Authorization Form (SAF)*, Advanced Technologies and Laboratories International, Inc., Richland, Washington.

SW-846, 1986, *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods,* Third Edition, as amended, U.S. Environmental Protection Agency, Washington, D.C.

Attachment 1

DATA SUMMARY REPORT

PFP 235D Glovebox 200
Data Summary Report

Sample Group: 20100465

Customer Group or SDG Number: 222S20100465

Customer Sample ID: B24WC7

Sample Portion: Acid Dig

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
S10M000319		A	7440-22-4	Silver	ug/g	86.7	<5.00E-03	53.3	57.5	55.4	7.54	107	2.32	n/a	
S10M000319		A	7429-90-5	Aluminum	ug/g	87.3	<0.0300	1.51E+03	1.29E+03	1.40E+03	15.4	142	13.9	n/a	
S10M000319		A	7440-38-2	Arsenic	ug/g	91.7	<0.0500	42.7	45.1	43.9	5.40	105	23.2	n/a	B
S10M000319		A	7440-39-3	Barium	ug/g	89.9	<3.00E-03	102	98.6	101	3.87	78.8	1.39	n/a	
S10M000319		A	7440-41-7	Beryllium	ug/g	96.9	<1.00E-03	<0.464	<0.476	n/a	n/a	101	0.464	n/a	U
S10M000319		A	7440-43-9	Cadmium	ug/g	88.3	<5.00E-03	98.6	101	99.8	2.45	105	2.32	n/a	
S10M000319		A	7440-48-4	Cobalt	ug/g	86.8	<0.0100	20.6	20.0	20.3	2.95	105	4.64	n/a	B
S10M000319		A	7440-47-3	Chromium	ug/g	87.8	<5.00E-03	1.01E+03	8.93E+02	9.51E+02	12.2	66.8	2.32	n/a	
S10M000319		A	7440-50-8	Copper	ug/g	92.5	<5.00E-03	2.85E+03	3.24E+03	3.05E+03	13.1	400	2.32	n/a	
S10M000319		A	7440-09-7	Potassium	ug/g	89.0	<0.500	510	519	515	1.68	136	232	n/a	BN
S10M000319		A	7439-96-5	Manganese	ug/g	87.0	<3.00E-03	729	728	728	0.0634	110	1.39	n/a	
S10M000319		A	7440-23-5	Sodium	ug/g	98.1	<0.100	1.14E+04	1.19E+04	1.17E+04	4.56	1.02E+03	46.4	n/a	
S10M000319		A	7440-02-0	Nickel	ug/g	85.3	<0.0200	469	432	450	8.26	94.1	9.28	n/a	
S10M000319		A	7439-92-1	Lead	ug/g	83.5	<0.0500	263	267	265	1.29	108	23.2	n/a	
S10M000319		A	7440-36-0	Antimony	ug/g	87.1	<0.0500	27.7	37.1	32.4	28.9	106	23.2	n/a	B
S10M000319		A	7782-49-2	Selenium	ug/g	93.2	<0.100	<46.4	<47.6	n/a	n/a	115	46.4	n/a	U
S10M000319		A	7440-24-6	Strontium	ug/g	89.7	<3.00E-03	11.4	12.0	11.7	5.13	99.7	1.39	n/a	B
S10M000319		A	7440-28-0	Thallium	ug/g	95.5	<0.100	<46.4	<47.6	n/a	n/a	53.2	46.4	n/a	UN
S10M000319		A	7440-62-2	Vanadium	ug/g	90.0	<5.00E-03	<2.32	<2.38	n/a	n/a	102	2.32	n/a	U
S10M000319		A	7440-66-6	Zinc	ug/g	90.5	<5.00E-03	4.01E+03	3.53E+03	3.77E+03	12.8	-98.7	2.32	n/a	

Sample Portion: H20 Dig

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
S10M000321		W	16984-48-8	Fluoride	ug/g	94.7	<1.61E-03	<4.06	<4.10	n/a	n/a	90.1	4.06	n/a	U
S10M000321		W	16887-00-6	Chloride	ug/g	94.4	0.0193	46.8	36.9	41.8	23.6	99.4	25.2	n/a	CB
S10M000321		W	14797-65-0	Nitrite	ug/g	97.9	<0.0192	<48.4	<48.8	n/a	n/a	76.0	48.4	n/a	U
S10M000321		W	14808-79-8	Sulfate	ug/g	96.3	0.0304	4.70E+05	4.72E+05	4.71E+05	0.516	97.3	1.96E+03	n/a	
S10M000321		W	338-70-5	Oxalate	ug/g	97.8	<0.0231	5.15E+03	4.32E+03	4.73E+03	17.4	69.6	58.3	n/a	

NA = Not Analyzed, ND = Not Detected

U - < Det Limit
C - Blank Contamination
B - Estimated
> - Outside Calibration Range
N - Spike Outside Range

PFP 235D Glovebox 200
Data Summary Report

Sample Group: 20100465
Customer Group or SDG Number: 222S20100465
Customer Sample ID: B24WC7
Sample Portion: H20 Dig

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
S10M000321		W	14797-55-8	Nitrate	ug/g	93.0	<0.0208	<52.5	<52.9	n/a	n/a	107	52.5	n/a	U

Sample Portion: Parent

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
S10M000318			7439-97-6	Mercury	ug/g	93.1	<1.00E-04	0.254	0.338	0.296	28.6	107	0.0401	n/a	B
S10M000318			PH	pH	unitless	n/a	n/a	<2.00	<2.00	n/a	n/a	n/a	2.00	n/a	>

NA = Not Analyzed, ND = Not Detected

U - < Det Limit
C - Blank Contamination
B - Estimated
> - Outside Calibration Range
N - Spike Outside Range

PFP 235D Glovebox 200
Data Summary Report

Sample Group: 20100465

Customer Group or SDG Number: 222S20100465

Customer Sample ID: B24WC8

Sample Portion: Acid Dig

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
S10M000323		A	7440-22-4	Silver	ug/g	86.7	<5.00E-03	14.5	n/a	n/a	n/a	n/a	2.40	n/a	B
S10M000323		A	7429-90-5	Aluminum	ug/g	87.3	<0.0300	2.85E+03	n/a	n/a	n/a	n/a	14.4	n/a	
S10M000323		A	7440-38-2	Arsenic	ug/g	91.7	<0.0500	33.3	n/a	n/a	n/a	n/a	24.0	n/a	B
S10M000323		A	7440-39-3	Barium	ug/g	89.9	<3.00E-03	109	n/a	n/a	n/a	n/a	1.44	n/a	
S10M000323		A	7440-41-7	Beryllium	ug/g	96.9	<1.00E-03	<0.481	n/a	n/a	n/a	n/a	0.481	n/a	U
S10M000323		A	7440-43-9	Cadmium	ug/g	88.3	<5.00E-03	114	n/a	n/a	n/a	n/a	2.40	n/a	
S10M000323		A	7440-48-4	Cobalt	ug/g	86.8	<0.0100	18.6	n/a	n/a	n/a	n/a	4.81	n/a	B
S10M000323		A	7440-47-3	Chromium	ug/g	87.8	<5.00E-03	1.23E+03	n/a	n/a	n/a	n/a	2.40	n/a	
S10M000323		A	7440-50-8	Copper	ug/g	92.5	<5.00E-03	1.48E+03	n/a	n/a	n/a	n/a	2.40	n/a	
S10M000323		A	7440-09-7	Potassium	ug/g	89.0	<0.500	417	n/a	n/a	n/a	n/a	240	n/a	BN
S10M000323		A	7439-96-5	Manganese	ug/g	87.0	<3.00E-03	518	n/a	n/a	n/a	n/a	1.44	n/a	
S10M000323		A	7440-23-5	Sodium	ug/g	98.1	<0.100	1.46E+05	n/a	n/a	n/a	n/a	48.1	n/a	
S10M000323		A	7440-02-0	Nickel	ug/g	85.3	<0.0200	613	n/a	n/a	n/a	n/a	9.62	n/a	
S10M000323		A	7439-92-1	Lead	ug/g	83.5	<0.0500	1.61E+04	n/a	n/a	n/a	n/a	24.0	n/a	
S10M000323		A	7440-36-0	Antimony	ug/g	87.1	<0.0500	<24.0	n/a	n/a	n/a	n/a	24.0	n/a	U
S10M000323		A	7782-49-2	Selenium	ug/g	93.2	<0.100	<48.1	n/a	n/a	n/a	n/a	48.1	n/a	U
S10M000323		A	7440-24-6	Strontium	ug/g	89.7	<3.00E-03	4.28	n/a	n/a	n/a	n/a	1.44	n/a	B
S10M000323		A	7440-28-0	Thallium	ug/g	95.5	<0.100	<48.1	n/a	n/a	n/a	n/a	48.1	n/a	UN
S10M000323		A	7440-62-2	Vanadium	ug/g	90.0	<5.00E-03	2.40	n/a	n/a	n/a	n/a	2.40	n/a	B
S10M000323		A	7440-66-6	Zinc	ug/g	90.5	<5.00E-03	2.57E+03	n/a	n/a	n/a	n/a	2.40	n/a	

Sample Portion: H20 Dig

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
S10M000325		W	16984-48-8	Fluoride	ug/g	94.7	<1.61E-03	6.19	n/a	n/a	n/a	n/a	3.94	n/a	B
S10M000325		W	16887-00-6	Chloride	ug/g	94.4	0.0193	279	n/a	n/a	n/a	n/a	24.4	n/a	C
S10M000325		W	14797-65-0	Nitrite	ug/g	97.9	<0.0192	<47.0	n/a	n/a	n/a	n/a	47.0	n/a	U
S10M000325		W	14808-79-8	Sulfate	ug/g	96.3	0.0304	5.83E+05	n/a	n/a	n/a	n/a	1.90E+03	n/a	
S10M000325		W	338-70-5	Oxalate	ug/g	97.8	<0.0231	<56.5	n/a	n/a	n/a	n/a	56.5	n/a	U

NA = Not Analyzed, ND = Not Detected

U - < Det Limit
C - Blank Contamination
B - Estimated
> - Outside Calibration Range
N - Spike Outside Range

PFP 235D Glovebox 200
Data Summary Report

Sample Group: 20100465
Customer Group or SDG Number: 222S20100465
Customer Sample ID: B24WC8
Sample Portion: H20 Dig

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
S10M000325		W	14797-55-8	Nitrate	ug/g	93.0	<0.0208	4.17E+03	n/a	n/a	n/a	n/a	50.9	n/a	

Sample Portion: Parent

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
S10M000322			7439-97-6	Mercury	ug/g	93.1	<1.00E-04	<0.0398	n/a	n/a	n/a	n/a	0.0398	n/a	U
S10M000322			PH	pH	unitless	n/a	n/a	2.26	n/a	n/a	n/a	n/a	0.0100	n/a	

NA = Not Analyzed, ND = Not Detected

U - < Det Limit
C - Blank Contamination
B - Estimated
> - Outside Calibration Range
N - Spike Outside Range

PFP 235D Glovebox 200
Data Summary Report

Sample Group: 20100465
Customer Group or SDG Number: 222S20100465
Customer Sample ID: B24WC7
Sample Portion: Env Dig

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
S10M000353		E	12587-46-1	Gross alpha	uCi/g	103	<5.75E-03	2.27	2.42	2.34	6.50	99.9	2.88E-03	3.21	
S10M000353		E	12587-47-2	Gross beta	uCi/g	110	<0.0186	0.248	0.260	0.254	4.74	113	0.0117	9.67	
S10M000353		E	CM-243/244	Curium-243/244	uCi/g	n/a	<0.136	<0.150	<0.146	n/a	n/a	n/a	0.150	n/a	U
S10M000353		E	14596-10-2	Americium-241	uCi/g	102	<0.339	0.922	0.931	0.926	0.949	n/a	0.376	7.29	
S10M000353		E	15510-73-3	Curium-242	uCi/g	n/a	<0.136	<0.150	<0.146	n/a	n/a	n/a	0.150	n/a	U
S10M000353		E	10198-40-0	Cobalt-60	uCi/g	100	<2.21E-05	<2.42E-05	<2.48E-05	n/a	n/a	n/a	2.42E-05	n/a	U
S10M000353		E	10045-97-3	Cesium-137	uCi/g	103	<3.02E-05	8.72E-05	<3.32E-05	n/a	n/a	n/a	2.98E-05	24.31	
S10M000353		E	13968-55-3	Uranium-233	ug/g	n/a	<2.38E-05	<2.38E-04	<2.48E-04	n/a	n/a	n/a	2.38E-04	n/a	U
S10M000353		E	13966-29-5	Uranium-234	ug/g	n/a	<1.19E-05	5.07E-03	5.91E-03	5.49E-03	15.2	n/a	1.19E-04	n/a	
S10M000353		E	15117-96-1	Uranium-235	ug/g	137	<2.61E-05	0.0209	0.0216	0.0213	3.07	173	2.61E-04	n/a	XN
S10M000353		E	13994-20-2	Neptunium-237	ug/g	103	<1.26E-04	9.91E-03	1.00E-02	9.97E-03	1.22	100	1.26E-03	n/a	BJ
S10M000353		E	U-238	Uranium-238	ug/g	110	<1.31E-03	0.551	0.620	0.586	11.9	106	0.0131	n/a	
S10M000353		E	13982-10-0	Plutonium-242	ug/g	n/a	<9.50E-06	0.0293	0.0313	0.0303	6.43	n/a	9.50E-05	n/a	
S10M000353		E	PU-239/240	Plutonium-239/240	uCi/g	99.9	<0.178	1.51	1.41	1.46	6.98	n/a	0.314	6.64	
S10M000353		E	13981-16-3	Plutonium-238	uCi/g	n/a	<0.178	<0.314	0.303	n/a	n/a	n/a	0.314	n/a	U
S10M000353		E	SR-89/90	Strontium-89/90	uCi/g	101	2.28E-04	2.13E-04	-4.69E-05	n/a	n/a	n/a	1.96E-04	141.822	BJ

NA = Not Analyzed, ND = Not Detected

U - < Det Limit
J - Estimated
B - Blank Contamination
X - Comment
N - Spike Outside Range

PFP 235D Glovebox 200
Data Summary Report

Sample Group: 20100465
Customer Group or SDG Number: 222S20100465
Customer Sample ID: B24WC8
Sample Portion: Env Dig

Sample# R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
S10M000354	E	12587-46-1	Gross alpha	uCi/g	103	<5.75E-03	3.17	n/a	n/a	n/a	n/a	2.89E-03	2.71	
S10M000354	E	12587-47-2	Gross beta	uCi/g	110	<0.0186	0.349	n/a	n/a	n/a	n/a	0.0118	7.72	
S10M000354	E	CM-243/244	Curium-243/244	uCi/g	n/a	<0.136	<0.168	n/a	n/a	n/a	n/a	0.168	n/a	U
S10M000354	E	14596-10-2	Americium-241	uCi/g	102	<0.339	1.18	n/a	n/a	n/a	n/a	0.419	6.7	
S10M000354	E	15510-73-3	Curium-242	uCi/g	n/a	<0.136	<0.168	n/a	n/a	n/a	n/a	0.168	n/a	U
S10M000354	E	10198-40-0	Cobalt-60	uCi/g	100	<2.21E-05	<2.55E-05	n/a	n/a	n/a	n/a	2.55E-05	n/a	U
S10M000354	E	10045-97-3	Cesium-137	uCi/g	103	<3.02E-05	<3.08E-05	n/a	n/a	n/a	n/a	3.08E-05	n/a	U
S10M000354	E	13968-55-3	Uranium-233	ug/g	n/a	<2.38E-05	3.00E-04	n/a	n/a	n/a	n/a	2.38E-04	n/a	J
S10M000354	E	13966-29-5	Uranium-234	ug/g	n/a	<1.19E-05	6.44E-03	n/a	n/a	n/a	n/a	1.19E-04	n/a	
S10M000354	E	15117-96-1	Uranium-235	ug/g	137	<2.61E-05	0.0267	n/a	n/a	n/a	n/a	2.62E-04	n/a	XN
S10M000354	E	13994-20-2	Neptunium-237	ug/g	103	<1.26E-04	0.0150	n/a	n/a	n/a	n/a	1.26E-03	n/a	B
S10M000354	E	U-238	Uranium-238	ug/g	110	<1.31E-03	0.723	n/a	n/a	n/a	n/a	0.0131	n/a	
S10M000354	E	13982-10-0	Plutonium-242	ug/g	n/a	<9.50E-06	0.0465	n/a	n/a	n/a	n/a	9.54E-05	n/a	
S10M000354	E	PU-239/240	Plutonium-239/240	uCi/g	99.9	<0.178	1.87	n/a	n/a	n/a	n/a	0.312	6.25	
S10M000354	E	13981-16-3	Plutonium-238	uCi/g	n/a	<0.178	0.429	n/a	n/a	n/a	n/a	0.312	11.65	
S10M000354	E	SR-89/90	Strontium-89/90	uCi/g	101	2.28E-04	-8.51E-06	n/a	n/a	n/a	n/a	1.93E-04	3297.587	J

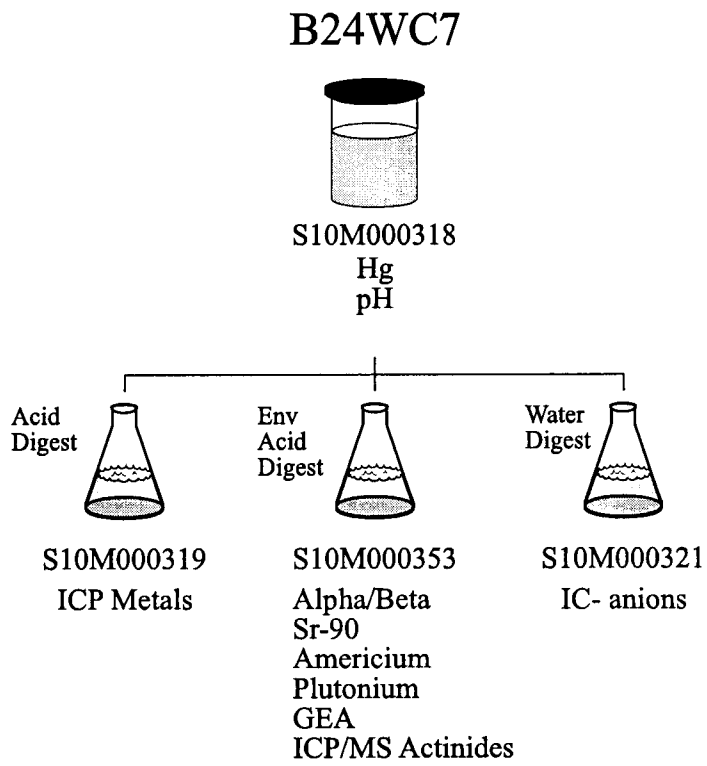
NA = Not Analyzed, ND = Not Detected

U - < Det Limit
J - Estimated
B - Blank Contamination
X - Comment
N - Spike Outside Range

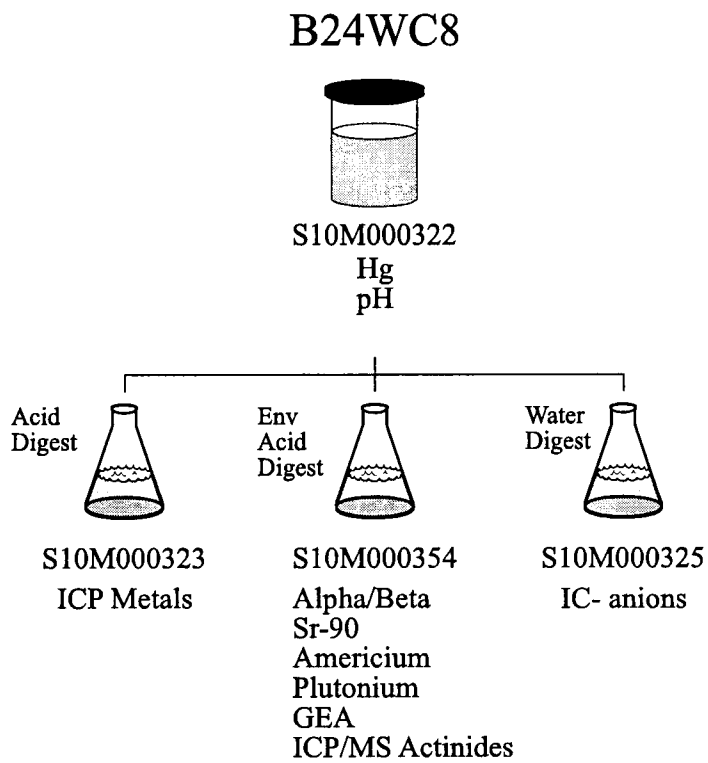
Attachment 2

SAMPLE BREAKDOWN DIAGRAMS

Project: PFP 235D Glovebox 200
SDG: 222S20100465



Project: PFP 235D Glovebox 200
SDG: 222S20100465



Attachment 3

HOLDING TIME REPORT

Hold Time Report for Sample Delivery Group 20100465

Sample Group	Sample	Matrix	Method	Prep Method	Sample Date	Received Date	Prep Date	Analysis Date	Missed Holding Time?
20100465	S10M000318	SOLID	PH SOLID		05/13/10 10:05	07/06/10 10:00	N/A	07/19/10 15:00	N
20100465	S10M000322	SOLID	PH SOLID		05/13/10 10:05	07/06/10 10:00	N/A	07/19/10 15:00	N
20100465	S10M000318	SOLID	HG		05/13/10 10:05	07/06/10 10:00	N/A	07/19/10 22:32	Y
20100465	S10M000322	SOLID	HG		05/13/10 10:05	07/06/10 10:00	N/A	07/19/10 22:32	Y
20100465	S10M000321	SOLID	IC - ANIONS/SMALL ORG. ACIDS	WATER DIGEST	05/13/10 10:05	07/06/10 10:00	7/15/2010 15:15	07/15/10 19:18	N
20100465	S10M000321	SOLID	IC - ANIONS/SMALL ORG. ACIDS	WATER DIGEST	05/13/10 10:05	07/06/10 10:00	7/15/2010 15:15	07/15/10 21:57	N
20100465	S10M000321	SOLID	IC - ANIONS/SMALL ORG. ACIDS	WATER DIGEST	05/13/10 10:05	07/06/10 10:00	7/15/2010 15:15	07/16/10 01:41	N
20100465	S10M000325	SOLID	IC - ANIONS/SMALL ORG. ACIDS	WATER DIGEST	05/13/10 10:05	07/06/10 10:00	7/15/2010 15:15	07/15/10 20:53	N
20100465	S10M000325	SOLID	IC - ANIONS/SMALL ORG. ACIDS	WATER DIGEST	05/13/10 10:05	07/06/10 10:00	7/15/2010 15:15	07/16/10 00:37	N
20100465	S10M000325	SOLID	IC - ANIONS/SMALL ORG. ACIDS	WATER DIGEST	05/13/10 10:05	07/06/10 10:00	7/15/2010 15:15	07/16/10 03:17	N
20100465	S10M000319	SOLID	ICP-RCRA METALS	ACID DIGEST, SOLID	05/13/10 10:05	07/06/10 10:00	7/15/2010 16:00	07/16/10 10:49	N
20100465	S10M000319	SOLID	ICP-RCRA METALS	ACID DIGEST, SOLID	05/13/10 10:05	07/06/10 10:00	7/15/2010 16:00	07/16/10 11:10	N
20100465	S10M000319	SOLID	ICP-RCRA METALS	ACID DIGEST, SOLID	05/13/10 10:05	07/06/10 10:00	7/15/2010 16:00	07/16/10 13:28	N
20100465	S10M000323	SOLID	ICP-RCRA METALS	ACID DIGEST, SOLID	05/13/10 10:05	07/06/10 10:00	7/15/2010 16:00	07/16/10 13:15	N
20100465	S10M000323	SOLID	ICP-RCRA METALS	ACID DIGEST, SOLID	05/13/10 10:05	07/06/10 10:00	7/15/2010 16:00	07/16/10 13:32	N

Attachment 4

CORRESPONDENCE

Bushaw, Ruth A

From: Cathel, Robert L
Sent: Tuesday, July 27, 2010 9:47 AM
To: Bushaw, Ruth A
Cc: Wyse, Eric J; Hansen, Daniel R
Subject: RE: Missed Holding Time for Mercury Analysis for PFP Glovebox Projects

Ruth,

Thanks. PFP Project personnel are acutely aware that holding times will be missed for many analytes based PFP processes to collect and ship samples to the laboratory.

Bob Cathel

From: Bushaw, Ruth A
Sent: Tuesday, July 27, 2010 9:05 AM
To: Cathel, Robert L
Cc: Wyse, Eric J; Hansen, Daniel R
Subject: Missed Holding Time for Mercury Analysis for PFP Glovebox Projects

Bob,

This message is to inform you that the 28-day holding time for mercury was missed for samples B24WC7 and B24WC8 from the PFP 235D Glovebox 200 project and sample B24WK8 from the PFP HA-46 Glovebox project. Note that the Glovebox 200 samples were collected on 5/13/2010 and the HA-46 glovebox sample was collected on 6/4/2010. All three samples were received on 7/6/2010, so the holding times were missed before the samples were received at the laboratory. This will be discussed in the narrative of the final reports.

Thanks,

Ruth A. Bushaw
Project Manager
ATL International, Inc.
222-S Laboratory
office: 509-373-4314
cell: 509-554-4978

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Bushaw, Ruth A

From: Cathel, Robert L
Sent: Monday, August 02, 2010 11:11 AM
To: Bushaw, Ruth A
Cc: Clinton, Richard (Rich)
Subject: RE: Interim Results for PFP 235D Glovebox 200 and PFP HA-46 Glovebox Samples

Ruth,

The interim results are acceptable for use by the PFP project. No additional digestions or analysis will be required.

Bob

From: Bushaw, Ruth A
Sent: Tuesday, July 27, 2010 4:25 PM
To: Cathel, Robert L
Cc: Clinton, Richard (Rich)
Subject: Interim Results for PFP 235D Glovebox 200 and PFP HA-46 Glovebox Samples
Importance: High

Bob,

The attached file contains interim results for pH, mercury, anions, and ICP metals for two samples received on 7/6/2010 from the PFP 235D Glovebox 200 project and one sample from the PFP HA-46 Glovebox project. The ICP-AES results met the requirements in the LOI, so we do not plan to analyze for any metals by ICP-MS. I do not have any radionuclide data to provide to you at this time.

Note that these results should be considered preliminary and subject to change upon final review of the project. I will let you know if any of the results are different in the final report.

The samples for the two projects were analyzed in single batch. The analytical duplicate and spike analyses were performed on sample B24WC7. Unfortunately, our LIMS data summary report for the PFP HA-46 Glovebox will not show the duplicate and spike results. I will discuss these QC results in the narrative.

There was a low level of chloride detected in the preparation blank above the method detection limit, but below the quantitation limit. Since the result is below the quantitation limit, the QAPP (ATL-MP-1011) does not require a repreparation and reanalysis. The samples were diluted prior to analysis, which might have diluted out any contamination that was detected in the preparation blank that was analyzed with no dilution. However, to be conservative, the results were flagged with a "C" to indicate that the result for chloride in the blank was greater than 5% of the chloride results in the samples. I have indicated the levels of potential contamination below. The DOE document that you provided for requirements for this work does not list anions for solid analysis. Please let me know if these results are acceptable for your use. If not, we will have to re-digest and reanalyze all samples.

PFP 235D Glovebox 200 samples:
B24WC7 - chloride result for the blank (when the dilution factor is accounted for) is about the same level as the sample.
B24WC8 – chloride in the blank is about 17% of the sample result.

PFP HA-46 Glovebox sample:
B24WK8 – chloride in the blank is about 12% of the sample result.

For the metals analysis by ICP-AES, the pre-digestion spike recovery for potassium was high (~135%) and for thallium was low (~53%). All of the samples in the batch were flagged with an "N" to reflect these spike failures. For potassium, the initial low level standard recovery (LLS) was low, but passed the requirement of 70% - 130% recovery. The ending LLS for potassium was high (135%). For non-IH analyses, our QAPP only requires that this failure be documented in the narrative of the final report. The DOE document that you provided for requirements for this work does not list these two analytes. Please let me know if these results are acceptable for your use. If not, we will have to re-digest and reanalyze all samples.

<< File: Interim Results for PFP 235D Glovebox 200.xlsx >> << File: Inerim Results for PFP HA-46 Glovebox.xlsx >>

Please feel free to contact me if you have any questions concerning these results.

Thanks,

Ruth A. Bushaw
Project Manager
ATL International, Inc.
222-S Laboratory
office: 509-373-4314
cell: 509-554-4978

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Bushaw, Ruth A

From: Cathel, Robert L
Sent: Tuesday, August 17, 2010 1:19 PM
To: Bushaw, Ruth A
Cc: Ross, Roxie R; Clinton, Richard (Rich)
Subject: RE: ICP/MS Uranium Results for PFP 235D Glovebox 200 and PFP HA-46 Glovebox Projects

Ruth,

The QC data and sample results do not affect any personnel safety issues nor the path forward for waste disposition. The overall sample results are as expected based on PFP process knowledge. As such, PFP will accept the data as-is.

Bob Cathel

From: Bushaw, Ruth A
Sent: Monday, August 16, 2010 5:14 PM
To: Cathel, Robert L
Cc: Ross, Roxie R
Subject: ICP/MS Uranium Results for PFP 235D Glovebox 200 and PFP HA-46 Glovebox Projects
Importance: High

Bob,

I have attached two Excel files that contain all of the results for the PFP 235d Glovebox 200 and PFP HA-46 Glovebox projects. Note that, even though I named the files as "Final" results, I have not yet approved the results in the LIMS. I also have not performed the final review on the Sr-90 results.

I have two issue that I still need to bring to your attention for approval, or denial, of results.

First, as we discussed on the phone this morning, the prep standard run for the samples from these two projects had a high recovery for U-235 (137%). This exceeds your requested limits of 70% - 130%. The sample results were flagged with an "X" to indicate this failure. The predigestion spike recovery was also very high (173%). I spoke with the chemist today and it appears that an "N" flag should be applied for the failed spike recovery. The sample result was not more than 4 times the spike added.

Note that in the past, we did not prepare a digested standard and spike with this acid digest that uses stronger acid. Therefore, we don't have any historical data to look at to see if these high recoveries are normal or something wrong. Since the standard and spike recoveries for U-238 (which is in the same standard), the chemist doesn't have an explanation for why the U-235 recoveries were so high.

The U-235 results for samples are:

B24WC7 0.0209 μg/g
B24WC8 0.0267 μg/g
B24WK8 0.00152 μg/g

The detection limit for U-235 requested in DOERL2004-29 is 2.00E-05 μCi/g. The specific activity that I use for U-235 is 2.1E-06 μCi/μg. The detection limit requested converts to 9.52 μg/g. The reported results are

much less than this. However, the ratio of U-235/U-238 seems high to me. Since we don't know why just the U-235 recoveries were so high, I don't know if a redigestion and reanalysis would improve the results. Please let me know if these U-235 results will meet your needs.

The second issue concerns the Sr-90 results. As you can see in the attached files, there was a low level of Sr-90 detected in the preparation blank (2.28E-04 μCi/g). The result is about the same level as the results for samples B24WC7 and B24WK8, so a "B" flag was applied to these results. The results for these two samples were also "J" flagged because the counting uncertainty is greater than 30%. For sample B24WC8, the sample was reported as a negative number, so no "B" flag was applied. The detection limit for Sr-90 requested in DOERL2004-29 is 3.30E-04 μCi/g. All of our sample results are less than that detection limit. Will these results meet your needs?

Also, did you get me message last week about the sulfate blank contamination? Are those results acceptable?

Thank you.
Ruth

Bushaw, Ruth A

From: Cathel, Robert L
Sent: Thursday, August 19, 2010 10:20 AM
To: Bushaw, Ruth A
Cc: Clinton, Richard (Rich)
Subject: RE: Anion Results for PFP HA-46 Glovebox

Ruth,

The sulfate data with the "C" flag applied is acceptable for use by PFP personnel as-is.

Bob Cathel

From: Bushaw, Ruth A
Sent: Tuesday, August 17, 2010 2:41 PM
To: Cathel, Robert L
Subject: RE: Anion Results for PFP HA-46 Glovebox

Bob,

How about this sulfate blank contamination. I forgot to include it in the much earlier message about the Cl blank contamination because the chemist had forgotten to flag the result.

Thanks,
Ruth A. Bushaw
Project Manager
222-S Laboratory
373-4314

From: Bushaw, Ruth A
Sent: Thursday, August 12, 2010 1:55 PM
To: Cathel, Robert L
Subject: Anion Results for PFP HA-46 Glovebox
Importance: High

Bob,

I was performing my final review of the data for PFP HA-46 Glovebox samples and noticed that sulfate was present in the preparation blank run for the anion analysis. The blank was approximately 8% of the sample result and will have a "C" flag applied. As indicated in my email to tell you about chloride in the blank, since the level in the blank was less than the quantitation limit, no reanalysis was required. Also as noted in the previous email, the DOE document that you provided for requirements for this work does not list this analyte. Please let me know if the results are acceptable for your use. If not, we will have to re-digest and reanalyze all samples.

Note that this is the same preparation blank that was run for the PFP 235D Glovebox 200 samples, but was less than 0.1% of those sample result, so was considered insignificant.

Attachment 5

RECEIPT PAPERWORK

ATL	SAMPLE RECEIPT AND CHAIN OF CUSTODY VERIFICATION CHECKLIST	LO-090-101 Rev 6.6.0

Date Samples Received: 7.6.10 Group #: 20100465 20100466

Number of Samples: 3

Sample Custodian: RHCathel

Sample Custodian to Complete:

Action	OK? (Y/N)	N/A	Comments
RSA/COC provided?	✓		
RSR provided?	✓		
Verify GKI is complete		✓	on f. h
Check that outer custody seal is intact, if present	✓		Container 05204 sample # 05283
Record cooler temperature in centigrade, as appropriate		N/A	☑ Check if no cooler and/or no ice
Samples are intact and in good condition			If No, provide comments on back
Verify that COC or RSA is accurate and complete, containing the following information:			
• Client name and client sample number	✓		
• Date and time of sampling	✓		
• Sampling location or origin	✓		
• Container type, size, and number	✓		
• Analysis request is clear	✓		
• Signature of persons relinquishing and receiving samples	✓		
• Date and/or time of sample custody exchange	✓		
Verify that sample numbers on containers match the COC and/or RSA	✓		
Samples stored properly (e.g., refrigeration)	✓		

Notify the PM immediately if any problems are noted. (A "No" answer requires Project Manager resolution.)

PM to Complete:

Samples acceptable for release? yes PM Initials PM Date 7/6/08

If No, comment on communication and resolution:

Other Comments: No Cooling Requirements / telecon w/ R. L. Cathel

A-6005-342 (REV 0)

20100465

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F10-142-002	PAGE 1 OF 2
COLLECTOR: ERIC BERTRAND	COMPANY CONTACT: WIDRIG, DL	TELEPHONE NO.: 376-2858	PROJECT COORDINATOR: WIDRIG, DL	PRICE CODE: 9N	DATA TURNAROUND
SAMPLING LOCATION: Glovebox 200 (rm 234D); Sample #2	PROJECT DESIGNATION: Glove Box 200 in 235D PFP Sampling & Analysis - Other Solid		SAF NO.: F10-142	AIR QUALITY ☐	45 Days / 45 Days
ICE CHEST NO.: NA	FIELD LOGBOOK NO.: NA	ACTUAL SAMPLE DEPTH: NA	COA: 301897ES10	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: 222-S Lab Operations	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*: A=Air, DL=Drum Liquids, DS=Drum Solids, L=Liquid, O=Oil, S=Soil, SE=Sediment, T=Tissue, V=Vegetation, W=Water, WI=Wipe, X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS: Contains Radioactive Material at concentrations that may or may not be regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 5400.5 (1990/1993)

SPECIAL HANDLING AND/OR STORAGE

PRESERVATION	Cool~4C
TYPE OF CONTAINER	G/P
NO. OF CONTAINER(S)	1
VOLUME	60mL
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME
B24WC7	OTHER SOLID	5-13-10	1005
S10V000318			

CHAIN OF POSSESSION / SIGN/ PRINT NAMES

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Eric Bertrand	5-13-10 1037	Dan Sorenson	5-13-10 1037
Dan Sorenson	7-6-10 8:40	Robin Scott	7-6-10 8:40
Robin Scott	7-6-10 09:00	Nick Bass	7/6/10 0900
Nick Bass	7/6/10 10:00	[illegible]	7-6-10 1000

SPECIAL INSTRUCTIONS

SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

22250100465

☐ ORIGINAL

LABORATORY SECTION	RECEIVED BY	TITLE	DATE/TIME
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

A-6003-618(01/06)

20100465

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F10-142-002	PAGE 2 OF 2
COLLECTOR ERIC BERTRAND	COMPANY CONTACT WIDRIG, DL	TELEPHONE NO. 376-2858	PROJECT COORDINATOR WIDRIG, DL	PRICE CODE 9N	DATA TURNAROUND
SAMPLING LOCATION Glovebox 200 (rm ~~234D~~ 235D); Sample #2	PROJECT DESIGNATION Glove Box 200 in 235D PFP Sampling & Analysis - Other Solid		SAF NO. F10-142	AIR QUALITY ☐	45 Days / 45 Days
ICE CHEST NO. NA	FIELD LOGBOOK NO. NA	ACTUAL SAMPLE DEPTH NA	COA 301897ES10	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO 222-S Lab Operations	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

SPECIAL INSTRUCTIONS

** NDA will be performed and provided to both 222-S laboratory and the S&GRP shipping POC prior to sample shipment.

** 222-S will attempt to report preliminary data within in 30 days of sample receipt. — See comments below BL 5/11/10

(1)6020_METALS_ICPMS (TAL) {Arsenic, Lead, Antimony, Barium, Chromium, Cadmium, ~~Copper~~, Thallium, Beryllium, Zinc, Manganese, ~~Nickel~~, Vanadium, Silver, Selenium} ICP Metals - 6010B (TAL) {Sodium, Aluminum, Potassium, Antimony, Chromium, Cobalt, Barium, Cadmium, Copper, Zinc, Nickel, Vanadium, Calcium, ~~Magnesium~~, Silver} ICP Metals - 6010B (Add-On) {Arsenic, Lead, Strontium, Thallium, Beryllium, Selenium} Mercury - 7471 - (CV); Actinides ICPMS {Neptunium-237, Uranium-235, Uranium-234, Uranium-233, Uranium-238, Plutonium-242} IC Anions - 9056 {Oxalate, Nitrate, Chloride, Fluoride, Sulfate} pH (Soil) - 9045; Gamma Spectroscopy {Cesium-137, Cobalt-60} Gross Alpha {Gross alpha} Gross Beta {Gross beta} Americium-241; Isotopic Plutonium {Plutonium-239/240, Plutonium-238} Strontium-89,90 -- Total;

- IC Anions - 9056 to include Nitrite as well. Bob Cattell 3/24/10
- Per discussion with ATL 222-S Laboratory Project Manager - Ruth Bushaw - the following metals have been deleted from the 6020 Metals ICPMS list: Copper & Nickel. BL 5/11/10
- Delete Magnesium from the 6010 ICP metals list. BL 5/11/10
- Add Manganese to the 6010 ICP metals list. BL 5/11/10.
- 6020 Metals ICPMS shall be run only if SAP (DOE/RL-2004-29, Rev 0) detection limits cannot be met by 6010 ICP analysis. BL 5/11/10

ORIGINAL

A-6003-618(01/06)

20100465

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F10-142-001	PAGE 1 OF 2
COLLECTOR: Eric Bertrand	COMPANY CONTACT: WIDRIG, DL	TELEPHONE NO.: 376-2858	PROJECT COORDINATOR: WIDRIG, DL	PRICE CODE: 9N	DATA TURNAROUND
SAMPLING LOCATION: Glovebox 200 (rm ~~234D~~ 235); Sample #1	PROJECT DESIGNATION: Glove Box 200 in 235D PFP Sampling & Analysis - Other Solid		SAF NO.: F10-142	AIR QUALITY ☐	45 Days / 45 Days
ICE CHEST NO.: NA	FIELD LOGBOOK NO.: NA	ACTUAL SAMPLE DEPTH: NA	COA: 301897ES10	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: 222-S Lab Operations	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*: A=Air, DL=Drum Liquids, DS=Drum Solids, L=Liquid, O=Oil, S=Soil, SE=Sediment, T=Tissue, V=Vegetation, W=Water, WI=Wipe, X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS: Contains Radioactive Material at concentrations that may or may not be regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 5400.5 (1990/1993)

SPECIAL HANDLING AND/OR STORAGE

PRESERVATION	~~Cool 4C~~ ~~Pak~~ NONE 5/6/10
TYPE OF CONTAINER	G/P
NO. OF CONTAINER(S)	1
VOLUME	60mL
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME
B24WC8	OTHER SOLID	5-13-10	0955
S10V000322			

CHAIN OF POSSESSION / SIGN/ PRINT NAMES

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Eric Bertrand / LAB	5-13-10 1032	Donald Sanson	5-13-10 1032
Don Sanson	7/6/10	Robin Scott	7-6-10 840
Robin Scott	7-6-10 0901	Nick Bass	7/6/10 0901
Nick Bass	7/6/10 1000	R Steele	7-6-10 1000

SPECIAL INSTRUCTIONS

SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

22252010046 5

ORIGINAL

LABORATORY SECTION	RECEIVED BY	TITLE	DATE/TIME
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

A-6003-618(01/06)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F10-142-001	PAGE 2 OF 2
COLLECTOR ERIC BERTRAND	COMPANY CONTACT WIDRIG, DL	TELEPHONE NO. 376-2858	PROJECT COORDINATOR WIDRIG, DL	PRICE CODE 9N AIR QUALITY ☐	DATA TURNAROUND 45 Days / 45 Days
SAMPLING LOCATION Glovebox 200 (rm 234D); Sample #1	PROJECT DESIGNATION Glove Box 200 in 235D PFP Sampling & Analysis - Other Solid		SAF NO. F10-142		
ICE CHEST NO. NA	FIELD LOGBOOK NO. NA	ACTUAL SAMPLE DEPTH NA	COA 301897ES10	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO 222-S Lab Operations	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

SPECIAL INSTRUCTIONS

** NDA will be performed and provided to both 222-S laboratory and the S&GRP shipping POC prior to sample shipment.

** 222-S will attempt to report preliminary data within in 30 days of sample receipt. See comments below BR 5/11/10

(1)6020_METALS_ICPMS (TAL) {Arsenic, Lead, Antimony, Barium, Chromium, Cadmium, ~~Copper,~~ Thallium, Beryllium, Zinc, Manganese~~, Nickel,~~ Vanadium, Silver, Selenium} ICP Metals - 6010B (TAL) {Sodium, Aluminum, Potassium, Antimony, Barium, Chromium, Cobalt, Cadmium, Copper, Zinc, Nickel, Vanadium, Calcium, ~~Magnesium~~, Silver} ICP Metals - 6010B (Add-On) {Arsenic, Lead, Strontium, Beryllium, Thallium, Selenium} Mercury - 7471 - (CV); Actinides ICPMS {Neptunium-237, Uranium-235, Uranium-234, Uranium-233, Uranium-238, Plutonium-242} IC Anions - 9056 {Oxalate, Nitrate, Chloride, Fluoride, Sulfate} pH (Soil) - 9045; Gamma Spectroscopy {Cesium-137, Cobalt-60} Gross Alpha {Gross alpha} Gross Beta {Gross beta} Americium-241; Isotopic Plutonium {Plutonium-239/240, Plutonium-238} Strontium-89,90 -- Total;

- IC Anions - 9056 to include Nitrite as well. Bob Cattrall BR 3/24/10
- Per discussion with ATL 222-S Laboratory Project Manager - Ruth Bushaw - the following metals have been deleted from the 6020 Metals ICPMS list: Copper & Nickel. BR 5/11/10
- Delete Magnesium from the 6010 ICP metals list. BR 5/11/10
- Add Manganese to the 6010 ICP metals list. BR 5/11/10
- 6020 Metals ICPMS shall be run only if SAP(DOE/RL-2004-29, Rev 0) detection limits cannot be met by 6010 ICP analysis. BR 5/11/10

ORIGINAL

A-6003-618(01/06)

ISOCS Item Report

Item ID:	B24WC7
Date Assayed:	6/2/10
Item Mass, kg:	0.05
Isotopic Source:	HNF-15500 (DSA)

Isotope	Mass Fraction (% of tot-Pu)	Activity (uCi)	Total Uncrtnty (uCi)	Upper Limit (uCi)	Isotope Mass (g)	Total Uncrtnty (g)	Upper Limit (g)	Codes*
Pu-238	0.210%	5.62E+00	8.28E-01	7.28E+00	3.28E-07	4.84E-08	4.25E-07	I
Pu-239	81.361%	7.89E+00	8.59E-01	9.61E+00	1.27E-04	1.38E-05	1.55E-04	M
Pu-240	16.355%	5.80E+00	8.55E-01	7.51E+00	2.56E-05	3.77E-06	3.31E-05	I
Pu-242	0.670%	4.15E-03	6.11E-04	5.37E-03	1.05E-06	1.54E-07	1.36E-06	I
Np-237								
Am-241	2.470%	1.32E+01	1.96E+00	1.72E+01	3.86E-06	5.72E-07	5.00E-06	I
Other TRU								
U-235								
U-238								
Pu-241	1.404%	2.27E+02	3.34E+01	2.94E+02	2.19E-06	3.23E-07	2.84E-06	I
Other								
Other								
Other								

Total Pu, g**	1.563E-04
Total Uncertainty, g***	2.310E-05
Upper Limit, g Pu****	2.025E-04

Total TRU Activity, uCi	3.26E+01
Total Uncertainty, uCi***	3.97E+00
Upper Limit, uCi****	4.05E+01

TRU Specific Activity, nCi/g	6.26E+02
Total Uncertainty, nCi/g***	7.63E+01
Upper Limit, nCi/g****	7.79E+02

Total Activity (TRU + non-TRU), uCi	2.59E+02
Total Uncertainty, uCi***	3.64E+01
Upper Limit, uCi****	3.32E+02

* Codes: M = Activity directly measured by ISOCS.
I = Activity inferred from ISOCS measured Pu-239 and mass fraction using identified isotopic source.
C = Mass fraction calculated from measured ISOCS value and total plutonium.

** Based on Pu-239 and mass fraction of Pu-239.

*** Uncertainties stated at 1 standard deviation.

**** The upper limit is the result plus 2 times the uncertainty. The Upper Limit, g Pu is also the PFP Criticality Value.

6/8/2010
Calculated Date

6-8-10
Reviewed Date

PFP ISOCS V2.00

ISOCS Item Report

Item ID:	B24WC8
Date Assayed:	5/13/10
Item Mass, kg:	0.05
Isotopic Source:	HNF-15500 (DSA)

Isotope	Mass Fraction (% of tot-Pu)	Activity (uCi)	Total Uncrtnty (uCi)	Upper Limit (uCi)	Isotope Mass (g)	Total Uncrtnty (g)	Upper Limit (g)	Codes*
Pu-238	0.210%	2.59E+01	3.82E+00	3.35E+01	1.51E-06	2.23E-07	1.96E-06	I
Pu-239	81.361%	3.63E+01	3.93E+00	4.42E+01	5.86E-04	6.34E-05	7.12E-04	M
Pu-240	16.355%	2.67E+01	3.94E+00	3.46E+01	1.18E-04	1.73E-05	1.52E-04	I
Pu-242	0.670%	1.91E-02	2.81E-03	2.47E-02	4.82E-06	7.11E-07	6.25E-06	I
Np-237								
Am-241	2.470%	6.10E+01	9.05E+00	7.91E+01	1.78E-05	2.64E-06	2.31E-05	I
Other TRU								
U-235								
U-238								
Pu-241	1.404%	1.04E+03	1.54E+02	1.35E+03	1.01E-05	1.49E-06	1.31E-05	I
Other								
Other								
Other								

Total Pu, g**	7.199E-04
Total Uncertainty, g***	1.060E-04
Upper Limit, g Pu****	9.320E-04

Total TRU Activity, uCi	1.50E+02
Total Uncertainty, uCi***	1.83E+01
Upper Limit, uCi****	1.87E+02

TRU Specific Activity, nCi/g	2.88E+03
Total Uncertainty, nCi/g***	3.52E+02
Upper Limit, nCi/g****	3.59E+03

Total Activity (TRU + non-TRU), uCi	1.19E+03
Total Uncertainty, uCi***	1.68E+02
Upper Limit, uCi****	1.53E+03

* Codes: M = Activity directly measured by ISOCS.
I = Activity inferred from ISOCS measured Pu-239 and mass fraction using identified isotopic source.
C = Mass fraction calculated from measured ISOCS value and total plutonium.

** Based on Pu-239 and mass fraction of Pu-239.

*** Uncertainties stated at 1 standard deviation.

**** The upper limit is the result plus 2 times the uncertainty. The Upper Limit, g Pu is also the PFP Criticality Value.

6/8/2010 — Calculated — Date

6/8/10 — Reviewed — Date

PFP ISOCS V2.00

RADIOACTIVE SHIPMENT RECORD

3. Page 1 of 1 | 4. Ship Prepaid | 5. Via Site Carrier

1. SHIP FROM U.S. DEPT. OF ENERGY C/O
Company CH2MHILL PRC
Address PFP
City, State, Zip 200 West Area
Contact Jeff Widney
Phone 372-3090

2. SHIP TO ☒ U.S. DEPT. OF ENERGY C/O
Company ATLII
Address 222-S
City, State, Zip 200 West Area
Attention Gerald Ritenour
Phone 372-2742

6. SHIPMENT AUTHORIZATION NUMBER KL018

7. EMERGENCY RESPONSE
Telephone 1-509-373-3800
Emergency Response Guide(s) 163

HM 8. Proper Shipping Name: X Radioactive Material, Type A package — PRI HAZ 7 — SUB HAZ — UN ID UN2915

9. No. Pkg.	Model Package	COC/Spec	Serial No.	Seal No.	Isotopes	C.S.I.	T.I.	Bq/Package	Gr. Wt. Kg.
1	Viking	DOT 7A TYPE A	S/N 12	02583	Pu238Pu239Pu240Pu241Am241	N/A	N/A	5.85E-5 TBq	9 Kg

10. Identify for Normal Form Only
Physical Form Solid
Chemical Form Oxide

11.
☐ Highway Route Controlled Quantity
☒ Exclusive Use Shipment with instructions
☐ Placards Applied
☒ Fissile Excepted, Grams 7.89E-04
☒ UN ID Marking UN 2915

12. LABELS APPLIED Radioactive Yellow - II

13. ADDITIONAL LABELS / MARKINGS

HM 8. Proper Shipping Name: — PRI HAZ — SUB HAZ — UN ID

9. No. Pkg.	Model Package	COC/Spec	Serial No.	Seal No.	Isotopes	C.S.I.	T.I.	Bq/Package	Gr. Wt. Kg.

10. Identify for Normal Form Only
Physical Form
Chemical Form

11.
☐ Highway Route Controlled Quantity
☐ Exclusive Use Shipment with instructions
☐ Placards Applied
☐ Fissile Excepted, Grams
☐ UN ID Marking

12. LABELS APPLIED

13. ADDITIONAL LABELS / MARKINGS

HM 8. Proper Shipping Name: — PRI HAZ — SUB HAZ — UN ID

9. No. Pkg.	Model Package	COC/Spec	Serial No.	Seal No.	Isotopes	C.S.I.	T.I.	Bq/Package	Gr. Wt. Kg.

10. Identify for Normal Form Only
Physical Form
Chemical Form

11.
☐ Highway Route Controlled Quantity
☐ Exclusive Use Shipment with instructions
☐ Placards Applied
☐ Fissile Excepted, Grams
☐ UN ID Marking

12. LABELS APPLIED

13. ADDITIONAL LABELS / MARKINGS

14. Shipment DE-Ci: 2.079E-04

Shipment Totals	C.S.I.	T.I.	Bq/Package	Gr. Wt. Kg.
	N/A	N/A	5.85E-5 TBq	9

15. Surface Dose Rate of Package
☐ <0.005 or _____ mSv/hr
<0.5 or <0.2 mrem/hr (N+ß γ)

Dose Rate @ 1 Meter from Surface of Package
☐ <0.005 or _____ mSv/hr
<0.5 or <0.2 mrem/hr (N+ß γ)

Smears of Outer Container
☐ <4.0 Bq (220 dpm) ß γ /cm²
☐ <0.4 Bq (22 dpm) α /cm²
☑ <Tbl. 2-2 HNF-5173 Limits

TRUCK LOAD OR EXCLUSIVE USE
Surface ☑ <2 mSv/hr (200 mrem/hr)
@ 2 meters ☑ <0.1 mSv/hr (10 mrem/hr)
@ Cab or sleeper ☑ <0.02 mSv/hr (2 mrem/hr) (Using N+ß γ)

Additional Data and Instructions (inc. Readings on Internal Packaging)
Cesar Nunez Cesar Nunez

Bldg. 2345Z | Survey No. Z-100706004 | Date 07-06-10

16. TRANSPORTER
Vehicle Number H068B-7162
DRIVER SIGNATURE Nick Bass — PRINT NAME Nick Bass

17. RECEIVER
RECEIVER SIGNATURE RtSteele — PRINT NAME RtSteele — Date 7.6.10

18. This is to certify that the above named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.
Certifier's Signature Scott Weiss — Print Name Scott Weiss — On behalf of DOE-RL — Date 7-6-10 — Organization CSG

19. AUTHORIZATION FOR SHIPMENT
AIR TRANSPORT CERTIFICATION ☐ N/A
CARGO AIRCRAFT: ☐ Cargo Aircraft Only Labels Applied
PASSENGER AIRCRAFT: ☐ Ltd Qty ☐ Research/Medical Diagnosis ☐ <3 T.I. ☐ Human Medical Research
Pkg. Dimensions (cm)

20. OFFSITE AUTHORIZATION
Survey No. | Date Shipped | Routing | ETA
Approved for Shipment Offsite | Date

A-6003-214.1 (REV 2)

GENERATOR KNOWLEDGE INFORMATION

1.. Chain of Custody Number F10-142-001 & 2 CACN/COA 301890 Customer Identification Number GB200

2. List generator knowledge or description of process that produced sample. Or list description of sample source:
Solid Samples of Glove Box 200 located in 235D Building at PFP

MSDS Available? (•) No ( ) Yes Hanford MSDS No. N/A

3. List all waste codes and constituents associated with the waste or media that was sampled, regardless of CERCLA status.

a) Does the sample contain any of the following listed waste codes?
By checking "unknown" the customer understands that no knowledge is available following a careful search.

	List Federal Waste Code(s):	List Constituent(s):			
P Codes:			( ) Yes	(•) No	( ) Unknown
U Codes:			( ) Yes	(•) No	( ) Unknown
K Codes:			( ) Yes	(•) No	( ) Unknown
F Codes:			( ) Yes	(•) No	( ) Unknown

b) List applicable characteristic waste codes, flash point, pH, constituents, and concentrations as appropriate.

D001:	[ ] FP <100°F	[ ] FP ≥100 <140°F	[ ] DOT Oxidizer	( ) Yes	( ) No	(•) Unknown
D002:	[ ] pH ≤2	[ ] pH ≥12.5	[ ] Solid Corrosive (WSC2)	( ) Yes	( ) No	(•) Unknown
D003:	[ ] Cyanide	[ ] Sulfide	[ ] Water Reactive	[ ] Other _____	( ) Yes	( ) No	(•) Unknown
D004-D043 (Identify applicable waste codes and concentrations):				(i.e., peroxide former, explosive, air reactive)	( ) Yes	( ) No	(•) Unknown

c) If characteristic, list any known underlying hazardous constituents (UHCs) reasonably expected to be present, and their concentrations that may be present above the LDR treatment standard (40 CFR 268.48):
Unknown

d) List any known Land Disposal Restrictions (LDR) subcategories, if applicable (40 CFR 268.40):

e) List any applicable Washington State dangerous waste codes: (not required if federally regulated)

WT01:	( ) Yes	(•) No	( ) Unknown
WT02:	( ) Yes	(•) No	( ) Unknown
W001:	( ) Yes	(•) No	( ) Unknown

List constituents and concentrations:

(*State mixture rule for ignitability).

WP01:	( ) Yes	(•) No	( ) Unknown
WP02:	( ) Yes	(•) No	( ) Unknown
WP03:	( ) Yes	(•) No	( ) Unknown
F003:*	( ) Yes	(•) No	( ) Unknown

4. Is this material TSCA regulated for PCBs? ( ) Yes (•) No ( ) Unknown ( ) Analysis Requested

List concentration if applicable: _____

If yes, what is the source of the PCBs? (see TSCA PCB Hanford Site User Guide, DOE/RL-2001-50)

[ ] PCB Liquid Waste [ ] PCB Bulk Product Waste [ ] PCB Transformer ≥500 ppm [ ] Unknown
[ ] PCB Remediation Waste [ ] PCB R&D Waste [ ] PCB contaminated electrical equipment (capacitor/ballast) <500 ppm
[ ] PCB Spill Material [ ] PCB Item [ ] Other PCB Waste (list) _____

5. Is this material TRU? (•) Yes ( ) No ( ) Unknown

6. ACCURACY OF INFORMATION

Based on my inquiry of those individuals immediately responsible for obtaining this information, that to the best of my knowledge, the information entered in this document is true, accurate, and complete.

Print & Sign Bob Cathel Bob Cathel Date 5/12/10

A-6002-990 (08/03)