0071598

SAF-RC-036
300 Area East Side Sites Anomalous Waste - Other Liquids
FINAL DATA PACKAGE

COMPLETE COPY OF DATA PACKAGE TO:

Rick Kerkow	L6-06	KW 10/24/06 INITIAL/DATE
Jeanette Duncan	H4-21	KW 10/24/06 INITIAL/DATE

COMMENTS:

SDG 222S20060954 **SAF-RC-036**

☐ Rad only ☐ Chem only X Rad & Chem

X Complete ☐ Partial

Waste Site: 618-2 Safe Contents

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NOV 14 2006
EDMC

Advanced Technologies and Laboratories International, Inc.

P.O. Box 250, T6-10
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October 11, 2006

06-ATL-151

RECEIVED
OCT 2006

Ms. J. H. Kessner
Environmental Sampling
Washington Closure Hanford
3070 George Washington Way
Richland, Washington 99354

Dear Ms. Kessner:

FINAL REPORT FOR THE 618-2 SAFE SAMPLES RECEIVED IN SEPTEMBER 2006 – SAMPLE GROUP 222S20060954

Enclosed is the final analytical report for the three samples collected from the 300-FF-2 618-2 Safe site between June 14, 2006 and July 28, 2006, in accordance with SAF number RC-036, and received at the 222-S Laboratory on September 12, 2006.

If you have any questions regarding this report, please call me at 373-4314.

Sincerely,

For RA Bushaw

Ruth A. Bushaw
Project Coordinator

Enclosure

06-ATL-151

FINAL REPORT FOR THE 618-2 SAFE SAMPLES RECEIVED IN SEPTEMBER 2006 – SAMPLE GROUP 222S20060954

Ruth A. Bushaw
Advanced Technologies and Laboratories International, Inc.

Date Published
October 2006

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222-S LABORATORY

FINAL REPORT FOR THE 618-2 SAFE SAMPLES RECEIVED IN SEPTEMBER 2006 – SAMPLE GROUP 222S20060954

1.0 INTRODUCTION

Three samples from the 300-FF-2 618-2 Safe were received at the 222-S Laboratory on September 12, 2006. The samples were analyzed in accordance with the special instructions on the chain of custody, Washington Closure Hanford Work Order AT6001 (Work Order), ATL-MP-1011, *ATL Quality Assurance Project Plan for 222-S Laboratory*, and verbal and electronic communication with the customer point of contact.

A Data Summary Report is included as Attachment 1. This attachment contains the analytes listed in Section 21.0 of the Work Order. ^{228}Ra has been reported through its daughter ^{228}Ac assuming isotopic decay equilibrium. Attachment 2 contains a table with the analysis date and time for each method. The correlation between the customer sample identification numbers and laboratory identification numbers is presented in the Sample Breakdown Diagrams included as Attachment 3. Results for other detected nonrequested analytes are included in the Opportunistic Analyte Results table in Attachment 4. Copies of the receipt paperwork are included as Attachment 5. Attachment 6 contains the signature page.

2.0 SAMPLE APPEARANCE AND HANDLING

Three samples were received from the 618-2 Safe. Each sample was contained in a 1-L plastic bottle that was only partially full. Sampling, receipt, and appearance information for the samples are presented in Table 1. The volumes listed in the sample description column are estimates based on visual examination of the samples.

Table 1. Receipt and Appearance Information.

Sample ID	Date/Time Sampled	Date/Time Received	Sample Description
J12XB1	6/14/06 0900	9/12/06 1410	Approximately 300 mL opaque brown/gray liquid with a trace of black solids that were easily suspended.
J12XB2	6/14/06 0930	9/12/06 1410	Approximately 400 mL opaque brown/gray liquid with a trace of black solids that were easily suspended.
J12Y18	7/28/06 0600	9/12/06 1410	Approximately 50 mL opaque green liquid with a trace of settled solids.

Since the samples had only a trace amount of solids that were easily suspended, they were shaken to ensure that all solids were suspended and representative 5-mL portions were removed for acid digestion prior to the inductively coupled plasma spectroscopy (ICP) and gamma energy

analysis (GEA). The mercury analysis procedure contains digestion as part of the analysis, so the preparation and analysis were performed on 1-mL portions of the samples after solids were suspended. The pH was performed on direct sample after solids were suspended.

When nitric acid was added to the samples at the start of the acid digestion, samples J12XB1 (S06M001078) and J12XB2 (S06M001079) became clear brown liquids, indicating that the solids had dissolved.

For sample J12Y18 (S06M001080), the liquid became a clear green color when the nitric acid was added, but white solids precipitated after a few minutes. These solids did not dissolve during the digestion and were filtered off. The pH of the digested sample was checked with a pH indicator strip, which indicated a pH <2. After the digested sample sat over night, more white solids precipitated. These solids were allowed to settle and were not included in the subsequent analyses.

3.0 ANALYTICAL RESULTS

The Data Summary Report in Attachment 1 presents the results for the requested analytes. In addition, results for other detected nonrequested analytes are included in Attachment 4 as "opportunistic" analytes. Since these were not requested, the quality of the results was not evaluated and the results are not discussed in this narrative.

In Attachments 1 and 4, the column labeled "A#" indicates the aliquot class or the method used for sample preparation before analysis. The "B" indicates an acid digestion of a liquid sample. The mercury analysis does not have an aliquot class because the sample preparation is performed as a part of the procedure steps. The pH does not have an aliquot class because there is no preparation prior to analysis.

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

a. "J" indicates that the reported result should be considered an estimate because of increased uncertainty near the detection limit.
    1. For the ICP and mercury analyses, the "J" flag is applied to sample results that are less than 10 times the detection limit.
    2. For radiochemical methods, the "J" flag is applied to sample results when the Count Err % is greater than 30%.
b. "U" indicates that the reported result is less than the calculated detection limit.

3.1 HOLDING TIMES

Due to delays between collection and delivery of samples, the customer point of contact gave verbal guidance that the laboratory was not required to meet holding times.

3.2 QUALITY CONTROL RESULTS

3.2.1 Laboratory Control Samples

The accuracy of the analyses was evaluated from the recovery of a laboratory control sample (LCS). For the GEA, ^{60}Co and ^{137}Cs are the only isotopes present in the LCS. All LCS recoveries were acceptable in accordance with the Work Order and ATL-MP-1011.

3.2.2 Method and Preparation Blanks

No analytes were detected in the method or preparation blanks.

3.2.3 Duplicate Analysis

The Work Order requested a precision of <30% RPD. As stated in ATL-MP-1011, the RPD criterion is not applicable if the sample results are less than 10 times the detection limit for inorganic analyses or if the counting uncertainty for radionuclide analyses is >15%. The criterion is also not applicable if the sample results are less than the detection limit. All sample results met these conditions.

3.2.4 Matrix Spike

One spiked sample was analyzed in each analytical batch for the ICP and mercury analyses. For the GEA analysis, there typically is no significant interference from the matrix, so a spiked sample is not analyzed. The spike recoveries all met the accuracy requirements.

3.3 DETECTION LIMITS

The Work Order provided target quantitation limits (TQL) for all required analytes. However, only liquid units were given for the metals and only solid units were given for the GEA analytes. The customer point of contact provided verbal guidance to use the same TQL value for both solid and liquid analyses for the GEA.

The reported detection limits for GEA and mercury were less than the requested TQLs. For the ICP analysis, all of the reported detection limits for samples J12XB1 and J12XB2 were less than the requested TQL except for arsenic and selenium. For arsenic and selenium, the reported detection limits were only slightly above the requested TQLs due to a required dilution of the sample during the acid digestion. No arsenic or selenium was detected in either of these samples.

For sample J12Y18, an additional tenfold dilution of the sample in addition to the tenfold acid digest dilution was necessary for the ICP analysis due to the high concentrations of some of the analytes in the sample. This additional dilution generated detection limits that were well above the TQLs. No additional dilution was required for the GEA or mercury analyses for this sample, so the reported detection limits are less than the TQL.

The customer gave verbal concurrence that a reanalysis to lower the detection limits was not necessary.

4.0 ANALYTICAL PROCEDURES

Table 2 presents the 222-S Laboratory analytical procedures.

Table 2. Analytical Procedures.

Analysis	Preparation Procedure	Analysis Procedure
Inorganic		
pH	Direct	LA-212-106 Rev. F-0
Mercury	Direct	LA-325-106 Rev. D-1
ICP	Acid digest	LA-505-161 Rev. F-0
Radionuclide		
GEA	Acid digest	LA-548-121 Rev. G-0

Notes:
Acid digest liquid procedure: LA-505-158 Rev. H-0

5.0 REFERENCES

ATL-MP-1011, 2006, *ATL Quality Assurance Project Plan for 222-S Laboratory*, Revision 5, Advanced Technologies and Laboratories International, Inc., Richland, Washington.

Attachment 1

DATA SUMMARY REPORT

Attachment 1
618-2-SAFE-2
Data Summary Report

Core Number: 222S20060954
Customer Sample ID: J12XB1
Sample Portion: Acid Digest

Sample#	A	Analyte	Unit	Standard%	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err %	Qual Flag
S06M001078	B	Actinium-228	uCi/mL	n/a	<3.01E-06	<3.23E-05		n/a	n/a	n/a	3.23E-05	n/a	U
S06M001078	B	Antimony-125	uCi/mL	n/a	<2.01E-06	<2.13E-05	<3.99E-05	n/a	n/a	n/a	2.13E-05	n/a	U
S06M001078	B	Cesium-134	uCi/mL	n/a	<8.18E-07	<8.09E-06	<1.95E-05	n/a	n/a	n/a	8.09E-06	n/a	U
S06M001078	B	Cesium-137	uCi/mL	105	<1.07E-06	<1.08E-05	<2.05E-05	n/a	n/a	n/a	1.08E-05	n/a	U
S06M001078	B	Cobalt-60	uCi/mL	103	<8.58E-07	<8.64E-06	<1.61E-05	n/a	n/a	n/a	8.64E-06	n/a	U
S06M001078	B	Europium-152	uCi/mL	n/a	<3.57E-06	<4.14E-05	<7.93E-05	n/a	n/a	n/a	4.14E-05	n/a	U
S06M001078	B	Europium-154	uCi/mL	n/a	<2.67E-06	<2.71E-05	<4.53E-05	n/a	n/a	n/a	2.71E-05	n/a	U
S06M001078	B	Europium-155	uCi/mL	n/a	<1.28E-06	<1.87E-05	<3.31E-05	n/a	n/a	n/a	1.87E-05	n/a	U
S06M001078	B	Radium-226	uCi/mL	n/a	<1.23E-05	<1.46E-04	<2.82E-04	n/a	n/a	n/a	1.46E-04	n/a	U
S06M001078	B	Arsenic	ug/mL	101	<0.0590	<0.590	<0.590	n/a	n/a	96.3	0.590	n/a	U
S06M001078	B	Barium	ug/mL	104	<7.00E-03	1.74	1.76	1.75	1.38	96.5	0.0700	n/a	
S06M001078	B	Cadmium	ug/mL	100	<3.00E-03	<0.0300	<0.0300	n/a	n/a	94.4	0.0300	n/a	U
S06M001078	B	Chromium	ug/mL	103	<0.0140	3.10	3.16	3.13	1.80	96.9	0.140	n/a	
S06M001078	B	Lead	ug/mL	94.7	<0.0360	2.28	2.14	2.21	6.25	87.2	0.360	n/a	J
S06M001078	B	Selenium	ug/mL	97.1	<0.0640	<0.640	<0.640	n/a	n/a	96.9	0.640	n/a	U
S06M001078	B	Silver	ug/mL	88.4	<4.00E-03	<0.0400	<0.0400	n/a	n/a	83.0	0.0400	n/a	U

Sample Portion: Parent

Sample#	A	Analyte	Unit	Standard%	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err %	Qual Flag
S06M001074		Mercury	ug/mL	103	<1.00E-04	3.10	2.93	3.02	5.77	81.0	0.120	n/a	
S06M001074		pH	pH	n/a	n/a	1.37	1.37	1.37	n/a	n/a	0.0100	n/a	

Attachment 1
618-2-SAFE-2
Data Summary Report

Core Number: 222S20060954
Customer Sample ID: J12XB2
Sample Portion: Acid Digest

Sample#	A	Analyte	Unit	Standard%	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err %	Qual Flag
S06M001079	B	Actinium-228	uCi/mL	n/a	<3.01E-06	<3.26E-05	n/a	n/a	n/a	n/a	3.26E-05	n/a	U
S06M001079	B	Antimony-125	uCi/mL	n/a	<2.01E-06	<2.05E-05	n/a	n/a	n/a	n/a	2.05E-05	n/a	U
S06M001079	B	Cesium-134	uCi/mL	n/a	<8.18E-07	<8.45E-06	n/a	n/a	n/a	n/a	8.45E-06	n/a	U
S06M001079	B	Cesium-137	uCi/mL	105	<1.07E-06	1.54E-05	n/a	n/a	n/a	n/a	1.21E-05	49.91	J
S06M001079	B	Cobalt-60	uCi/mL	103	<8.58E-07	<7.48E-06	n/a	n/a	n/a	n/a	7.48E-06	n/a	U
S06M001079	B	Europium-152	uCi/mL	n/a	<3.57E-06	<3.97E-05	n/a	n/a	n/a	n/a	3.97E-05	n/a	U
S06M001079	B	Europium-154	uCi/mL	n/a	<2.67E-06	<2.58E-05	n/a	n/a	n/a	n/a	2.58E-05	n/a	U
S06M001079	B	Europium-155	uCi/mL	n/a	<1.28E-06	<1.90E-05	n/a	n/a	n/a	n/a	1.90E-05	n/a	U
S06M001079	B	Radium-226	uCi/mL	n/a	<1.23E-05	<9.61E-05	n/a	n/a	n/a	n/a	9.61E-05	n/a	U
S06M001079	B	Arsenic	ug/mL	101	<0.0590	<0.590	n/a	n/a	n/a	n/a	0.590	n/a	U
S06M001079	B	Barium	ug/mL	104	<7.00E-03	10.5	n/a	n/a	n/a	n/a	0.0700	n/a	
S06M001079	B	Cadmium	ug/mL	100	<3.00E-03	<0.0300	n/a	n/a	n/a	n/a	0.0300	n/a	U
S06M001079	B	Chromium	ug/mL	103	<0.0140	3.66	n/a	n/a	n/a	n/a	0.140	n/a	
S06M001079	B	Lead	ug/mL	94.7	<0.0360	1.12	n/a	n/a	n/a	n/a	0.360	n/a	J
S06M001079	B	Selenium	ug/mL	97.1	<0.0640	<0.640	n/a	n/a	n/a	n/a	0.640	n/a	U
S06M001079	B	Silver	ug/mL	88.4	<4.00E-03	<0.0400	n/a	n/a	n/a	n/a	0.0400	n/a	U

Sample Portion: Parent

Sample#	A	Analyte	Unit	Standard%	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err %	Qual Flag
S06M001075		Mercury	ug/mL	103	<1.00E-04	0.212	n/a	n/a	n/a	n/a	2.00E-03	n/a	
S06M001075		pH	pH	n/a	n/a	1.07	n/a	n/a	n/a	n/a	0.0100	n/a	

Attachment 1
618-2-SAFE-2
Data Summary Report

Core Number: 222S20060954
Customer Sample ID: J12Y18
Sample Portion: Acid Digest

Sample#	A	Analyte	Unit	Standard%	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err %	Qual Flag
S06M001080	B	Actinium-228	uCi/mL	n/a	<3.01E-06	<3.44E-05	n/a	n/a	n/a	n/a	3.44E-05	n/a	U
S06M001080	B	Antimony-125	uCi/mL	n/a	<2.01E-06	<2.40E-05	n/a	n/a	n/a	n/a	2.40E-05	n/a	U
S06M001080	B	Cesium-134	uCi/mL	n/a	<8.18E-07	<8.37E-06	n/a	n/a	n/a	n/a	8.37E-06	n/a	U
S06M001080	B	Cesium-137	uCi/mL	105	<1.07E-06	<1.12E-05	n/a	n/a	n/a	n/a	1.12E-05	n/a	U
S06M001080	B	Cobalt-60	uCi/mL	103	<8.58E-07	<8.48E-06	n/a	n/a	n/a	n/a	8.48E-06	n/a	U
S06M001080	B	Europium-152	uCi/mL	n/a	<3.57E-06	<3.88E-05	n/a	n/a	n/a	n/a	3.88E-05	n/a	U
S06M001080	B	Europium-154	uCi/mL	n/a	<2.67E-06	<3.39E-05	n/a	n/a	n/a	n/a	3.39E-05	n/a	U
S06M001080	B	Europium-155	uCi/mL	n/a	<1.28E-06	<3.69E-05	n/a	n/a	n/a	n/a	3.69E-05	n/a	U
S06M001080	B	Radium-226	uCi/mL	n/a	<1.23E-05	<1.44E-04	n/a	n/a	n/a	n/a	1.44E-04	n/a	U
S06M001080	B	Arsenic	ug/mL	101	<0.0590	18.1	n/a	n/a	n/a	n/a	5.90	n/a	J
S06M001080	B	Barium	ug/mL	104	<7.00E-03	630	n/a	n/a	n/a	n/a	0.700	n/a	
S06M001080	B	Cadmium	ug/mL	100	<3.00E-03	<0.300	n/a	n/a	n/a	n/a	0.300	n/a	U
S06M001080	B	Chromium	ug/mL	103	<0.0140	<1.40	n/a	n/a	n/a	n/a	1.40	n/a	U
S06M001080	B	Lead	ug/mL	94.7	<0.0360	<3.60	n/a	n/a	n/a	n/a	3.60	n/a	U
S06M001080	B	Selenium	ug/mL	97.1	<0.0640	<6.40	n/a	n/a	n/a	n/a	6.40	n/a	U
S06M001080	B	Silver	ug/mL	88.4	<4.00E-03	<0.400	n/a	n/a	n/a	n/a	0.400	n/a	U

Sample Portion: Parent

Sample#	A	Analyte	Unit	Standard%	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err %	Qual Flag
S06M001076		Mercury	ug/mL	103	<1.00E-04	4.30E-03	n/a	n/a	n/a	n/a	2.00E-03	n/a	J
S06M001076		pH	pH	n/a	n/a	1.52	n/a	n/a	n/a	n/a	0.0100	n/a	

Attachment 2

ANALYSIS DATE AND TIME REPORT

Attachment 2. Analysis Date and Time

Customer ID	Sample Portion	Sample #	Method	Analysis Date/Time	Preparation Date
J12XB1	Liquid	S06M001074	pH	9/21/2006 13:57	n/a
J12XB1	Liquid	S06M001074	HG	9/26/2009 9:53	9/26/2006
J12XB1	Liquid	S06M001078	GEA	9/21/2006 23:22	9/20/2006
J12XB1	Liquid	S06M001078	ICP-RCRA METALS	9/25/2006 13:29	9/20/2006
J12XB2	Liquid	S06M001075	pH	9/21/2006 13:57	n/a
J12XB2	Liquid	S06M001075	HG	9/26/2009 9:56	9/26/2006
J12XB2	Liquid	S06M001079	GEA	9/22/2006 2:22	9/20/2006
J12XB2	Liquid	S06M001079	ICP-RCRA METALS	9/25/2006 13:59	9/20/2006
J12Y18	Liquid	S06M001076	pH	9/21/2006 13:57	n/a
J12Y18	Liquid	S06M001076	HG	9/26/2009 9:57	9/26/2006
J12Y18	Liquid	S06M001080	GEA	9/22/2006 7:45	9/20/2006
J12Y18	Liquid	S06M001080	ICP-RCRA METALS	9/25/2006 14:40	9/20/2006

Note: The analysis time for pH is the time the last sample in the batch was analyzed.

Attachment 3

SAMPLE BREAKDOWN DIAGRAM

618-2 SAFE2
Samples from 300 Area Safe
Group 222S20060954

J12XB1

(cool 4°C)

S06M001074

HG
pH

Acid Digest

S06M001078
ICP: As, Ba, Cd, Cr, Pb, Se, Ag
GEA: ^{125}Sb, ^{134}Cs, ^{137}Cs, ^{60}Co, ^{152}Eu, ^{154}Eu, ^{155}Eu, ^{226}Ra, ^{228}Ra

J12XB2

(cool 4°C)

S06M001075

HG
pH

Acid Digest

S06M001079
ICP: As, Ba, Cd, Cr, Pb, Se, Ag
GEA: ^{125}Sb, ^{134}Cs, ^{137}Cs, ^{60}Co, ^{152}Eu, ^{154}Eu, ^{155}Eu, ^{226}Ra, ^{228}Ra

J12Y18

(cool 4°C)

S06M001076

HG
pH

Acid Digest

S06M001080
ICP: As, Ba, Cd, Cr, Pb, Se, Ag
GEA: ^{125}Sb, ^{134}Cs, ^{137}Cs, ^{60}Co, ^{152}Eu, ^{154}Eu, ^{155}Eu, ^{226}Ra, ^{228}Ra

Attachment 4

OPPORTUNISTIC ANALYTE RESULTS

Attachment 4
618-2-SAFE-2
Data Summary Report

Core Number: 222S20060954
Customer Sample ID: J12XB1
Sample Portion: Acid Digest

Sample#	A	Analyte	Unit	Standard%	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err %	Qual Flag
S06M001078	B	Americium-241	uCi/mL	n/a	<7.41E-07	1.04E-03	1.10E-03	1.07E-03	5.32	n/a	1.62E-05	5.53	
S06M001078	B	Plutonium-239	uCi/mL	n/a	<3.96E-03	1.03	1.08	1.05	4.46	n/a	0.0490	5.01	
S06M001078	B	Uranium-235	uCi/mL	n/a	<7.43E-07	<8.87E-06	<1.71E-05	n/a	n/a	n/a	8.87E-06	n/a	U
S06M001078	B	Aluminium	ug/mL	94.5	<0.0270	42.6	42.9	42.7	0.698	89.1	0.270	n/a	
S06M001078	B	Antimony	ug/mL	101	<0.0280	<0.280	<0.280	n/a	n/a	94.2	0.280	n/a	U
S06M001078	B	Beryllium	ug/mL	111	<1.20E-03	<0.0120	<0.0120	n/a	n/a	105	0.0120	n/a	U
S06M001078	B	Bismuth	ug/mL	96.4	<0.102	<1.02	<1.02	n/a	n/a	91.1	1.02	n/a	U
S06M001078	B	Boron	ug/mL	97.6	<0.0180	1.83	1.84	1.84	0.637	93.7	0.180	n/a	
S06M001078	B	Calcium	ug/mL	108	<0.0800	25.0	25.1	25.0	0.428	102	0.800	n/a	
S06M001078	B	Cerium	ug/mL	105	<0.0150	<0.150	<0.150	n/a	n/a	98.3	0.150	n/a	U
S06M001078	B	Cobalt	ug/mL	101	<8.00E-03	<0.0800	<0.0800	n/a	n/a	94.9	0.0800	n/a	U
S06M001078	B	Copper	ug/mL	101	<0.0140	0.337	0.338	0.337	0.237	96.2	0.140	n/a	J
S06M001078	B	Europium	ug/mL	100	<1.00E-03	0.0417	0.0448	0.0432	7.17	94.0	0.0100	n/a	J
S06M001078	B	Iron	ug/mL	102	<0.0130	115	116	116	0.854	93.3	0.130	n/a	
S06M001078	B	Lanthanum	ug/mL	105	<8.00E-03	<0.0800	<0.0800	n/a	n/a	97.8	0.0800	n/a	U
S06M001078	B	Magnesium	ug/mL	99.2	<0.0150	9.28	9.27	9.27	0.141	92.8	0.150	n/a	
S06M001078	B	Manganese	ug/mL	101	<7.00E-03	2.39	2.41	2.40	0.864	95.0	0.0700	n/a	
S06M001078	B	Molybdenum	ug/mL	103	<3.00E-03	0.0973	0.0965	0.0969	0.826	97.0	0.0300	n/a	J
S06M001078	B	Neodymium	ug/mL	96.4	<8.00E-03	<0.0800	<0.0800	n/a	n/a	90.9	0.0800	n/a	U
S06M001078	B	Nickel	ug/mL	100	<0.0220	1.33	1.31	1.32	1.41	94.7	0.220	n/a	J
S06M001078	B	Phosphorus	ug/mL	101	<0.0430	1.87	2.05	1.96	9.31	96.4	0.430	n/a	J
S06M001078	B	Samarium	ug/mL	102	<0.0170	<0.170	<0.170	n/a	0.0	96.1	0.170	n/a	U
S06M001078	B	Silicon	ug/mL	97.9	<0.0460	28.9	29.3	29.1	1.46	94.7	0.460	n/a	
S06M001078	B	Sodium	ug/mL	107	<0.0420	59.7	60.5	60.1	1.24	93.6	0.420	n/a	
S06M001078	B	Strontium	ug/mL	104	<7.00E-03	1.46	1.48	1.47	1.31	97.2	0.0700	n/a	
S06M001078	B	Sulfur	ug/mL	95.9	<0.0580	169	169	169	0.192	94.3	0.580	n/a	
S06M001078	B	Thorium	ug/mL	94.4	<9.00E-03	0.884	0.916	0.900	3.60	89.0	0.0900	n/a	J
S06M001078	B	Titanium	ug/mL	102	<2.00E-03	0.372	0.386	0.379	3.61	96.7	0.0200	n/a	
S06M001078	B	Uranium	ug/mL	107	<0.0310	120	123	121	1.77	96.1	0.310	n/a	
S06M001078	B	Yttrium	ug/mL	99.7	<0.0110	<0.110	<0.110	n/a	n/a	94.1	0.110	n/a	U
S06M001078	B	Zinc	ug/mL	96.9	<4.00E-03	170	171	171	0.411	95.8	0.0400	n/a	
S06M001078	B	Zirconium	ug/mL	100	<2.00E-03	<0.0200	<0.0200	n/a	0.0	94.2	0.0200	n/a	U

Attachment 4
618-2-SAFE-2
Data Summary Report

Core Number: 222S20060954
Customer Sample ID: J12XB2
Sample Portion: Acid Digest

Sample#	A	Analyte	Unit	Standard%	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err %	Qual Flag
S06M001079	B	Americium-241	uCi/mL	n/a	<7.41E-07	0.0109	n/a	n/a	n/a	n/a	6.67E-05	5.30	
S06M001079	B	Plutonium-239	uCi/mL	n/a	<3.96E-03	1.01	n/a	n/a	n/a	n/a	0.0478	4.86	
S06M001079	B	Uranium-235	uCi/mL	n/a	<7.43E-07	<5.84E-06	n/a	n/a	n/a	n/a	5.84E-06	n/a	U
S06M001079	B	Aluminium	ug/mL	94.5	<0.0270	20.9	n/a	n/a	n/a	n/a	0.270	n/a	
S06M001079	B	Antimony	ug/mL	101	<0.0280	<0.280	n/a	n/a	n/a	n/a	0.280	n/a	U
S06M001079	B	Beryllium	ug/mL	111	<1.20E-03	<0.0120	n/a	n/a	n/a	n/a	0.0120	n/a	U
S06M001079	B	Bismuth	ug/mL	96.4	<0.102	<1.02	n/a	n/a	n/a	n/a	1.02	n/a	U
S06M001079	B	Boron	ug/mL	97.6	<0.0180	1.65	n/a	n/a	n/a	n/a	0.180	n/a	J
S06M001079	B	Calcium	ug/mL	108	<0.0800	35.2	n/a	n/a	n/a	n/a	0.800	n/a	
S06M001079	B	Cerium	ug/mL	105	<0.0150	0.170	n/a	n/a	n/a	n/a	0.150	n/a	J
S06M001079	B	Cobalt	ug/mL	101	<8.00E-03	0.104	n/a	n/a	n/a	n/a	0.0800	n/a	J
S06M001079	B	Copper	ug/mL	101	<0.0140	0.263	n/a	n/a	n/a	n/a	0.140	n/a	J
S06M001079	B	Europium	ug/mL	100	<1.00E-03	0.0469	n/a	n/a	n/a	n/a	0.0100	n/a	J
S06M001079	B	Iron	ug/mL	102	<0.0130	28.4	n/a	n/a	n/a	n/a	0.130	n/a	
S06M001079	B	Lanthanum	ug/mL	105	<8.00E-03	<0.0800	n/a	n/a	n/a	n/a	0.0800	n/a	U
S06M001079	B	Magnesium	ug/mL	99.2	<0.0150	6.46	n/a	n/a	n/a	n/a	0.150	n/a	
S06M001079	B	Manganese	ug/mL	101	<7.00E-03	1.30	n/a	n/a	n/a	n/a	0.0700	n/a	
S06M001079	B	Molybdenum	ug/mL	103	<3.00E-03	0.142	n/a	n/a	n/a	n/a	0.0300	n/a	J
S06M001079	B	Neodymium	ug/mL	96.4	<8.00E-03	<0.0800	n/a	n/a	n/a	n/a	0.0800	n/a	U
S06M001079	B	Nickel	ug/mL	100	<0.0220	3.72	n/a	n/a	n/a	n/a	0.220	n/a	
S06M001079	B	Phosphorus	ug/mL	101	<0.0430	0.563	n/a	n/a	n/a	n/a	0.430	n/a	J
S06M001079	B	Samarium	ug/mL	102	<0.0170	<0.170	n/a	n/a	n/a	n/a	0.170	n/a	U
S06M001079	B	Silicon	ug/mL	97.9	<0.0460	20.7	n/a	n/a	n/a	n/a	0.460	n/a	
S06M001079	B	Sodium	ug/mL	107	<0.0420	7.41	n/a	n/a	n/a	n/a	0.420	n/a	
S06M001079	B	Strontium	ug/mL	104	<7.00E-03	1.29	n/a	n/a	n/a	n/a	0.0700	n/a	
S06M001079	B	Sulfur	ug/mL	95.9	<0.0580	64.1	n/a	n/a	n/a	n/a	0.580	n/a	
S06M001079	B	Thorium	ug/mL	94.4	<9.00E-03	0.792	n/a	n/a	n/a	n/a	0.0900	n/a	J
S06M001079	B	Titanium	ug/mL	102	<2.00E-03	0.246	n/a	n/a	n/a	n/a	0.0200	n/a	
S06M001079	B	Uranium	ug/mL	107	<0.0310	80.0	n/a	n/a	n/a	n/a	0.310	n/a	
S06M001079	B	Yttrium	ug/mL	99.7	<0.0110	<0.110	n/a	n/a	n/a	n/a	0.110	n/a	U
S06M001079	B	Zinc	ug/mL	96.9	<4.00E-03	67.7	n/a	n/a	n/a	n/a	0.0400	n/a	
S06M001079	B	Zirconium	ug/mL	100	<2.00E-03	<0.0200	n/a	n/a	n/a	n/a	0.0200	n/a	U

Attachment 4
618-2-SAFE-2
Data Summary Report

Core Number: 222S20060954
Customer Sample ID: J12Y18
Sample Portion: Acid Digest

Sample#	A	Analyte	Unit	Standard%	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err %	Qual Flag
S06M001080	B	Americium-241	uCi/mL	n/a	<7.41E-07	2.12E-04	n/a	n/a	n/a	n/a	1.92E-05	7.13	
S06M001080	B	Plutonium-239	uCi/mL	n/a	<3.96E-03	6.89	n/a	n/a	n/a	n/a	0.107	3.03	
S06M001080	B	Uranium-235	uCi/mL	n/a	<7.43E-07	1.30E-04	n/a	n/a	n/a	n/a	8.75E-06	6.17	
S06M001080	B	Aluminium	ug/mL	94.5	<0.0270	544	n/a	n/a	n/a	n/a	2.70	n/a	
S06M001080	B	Antimony	ug/mL	101	<0.0280	57.6	n/a	n/a	n/a	n/a	2.80	n/a	
S06M001080	B	Beryllium	ug/mL	111	<1.20E-03	0.567	n/a	n/a	n/a	n/a	0.120	n/a	J
S06M001080	B	Bismuth	ug/mL	96.4	<0.102	40.9	n/a	n/a	n/a	n/a	10.2	n/a	J
S06M001080	B	Boron	ug/mL	97.6	<0.0180	545	n/a	n/a	n/a	n/a	1.80	n/a	
S06M001080	B	Calcium	ug/mL	108	<0.0800	653	n/a	n/a	n/a	n/a	8.00	n/a	
S06M001080	B	Cerium	ug/mL	105	<0.0150	1.37E+03	n/a	n/a	n/a	n/a	1.50	n/a	
S06M001080	B	Cobalt	ug/mL	101	<8.00E-03	<0.800	n/a	n/a	n/a	n/a	0.800	n/a	U
S06M001080	B	Copper	ug/mL	101	<0.0140	<1.40	n/a	n/a	n/a	n/a	1.40	n/a	U
S06M001080	B	Europium	ug/mL	100	<1.00E-03	2.16	n/a	n/a	n/a	n/a	0.100	n/a	
S06M001080	B	Iron	ug/mL	102	<0.0130	18.9	n/a	n/a	n/a	n/a	1.30	n/a	
S06M001080	B	Lanthanum	ug/mL	105	<8.00E-03	1.14E+04	n/a	n/a	n/a	n/a	0.800	n/a	
S06M001080	B	Magnesium	ug/mL	99.2	<0.0150	417	n/a	n/a	n/a	n/a	1.50	n/a	
S06M001080	B	Manganese	ug/mL	101	<7.00E-03	1.62	n/a	n/a	n/a	n/a	0.700	n/a	J
S06M001080	B	Molybdenum	ug/mL	103	<3.00E-03	1.28	n/a	n/a	n/a	n/a	0.300	n/a	J
S06M001080	B	Neodymium	ug/mL	96.4	<8.00E-03	10.3	n/a	n/a	n/a	n/a	0.800	n/a	
S06M001080	B	Nickel	ug/mL	100	<0.0220	<2.20	n/a	n/a	n/a	n/a	2.20	n/a	U
S06M001080	B	Phosphorus	ug/mL	101	<0.0430	15.7	n/a	n/a	n/a	n/a	4.30	n/a	J
S06M001080	B	Samarium	ug/mL	102	<0.0170	7.86	n/a	n/a	n/a	n/a	1.70	n/a	J
S06M001080	B	Silicon	ug/mL	97.9	<0.0460	968	n/a	n/a	n/a	n/a	4.60	n/a	
S06M001080	B	Sodium	ug/mL	107	<0.0420	2.17E+03	n/a	n/a	n/a	n/a	4.20	n/a	
S06M001080	B	Strontium	ug/mL	104	<7.00E-03	137	n/a	n/a	n/a	n/a	0.700	n/a	
S06M001080	B	Sulfur	ug/mL	95.9	<0.0580	33.2	n/a	n/a	n/a	n/a	5.80	n/a	J
S06M001080	B	Thorium	ug/mL	94.4	<9.00E-03	91.6	n/a	n/a	n/a	n/a	0.900	n/a	
S06M001080	B	Titanium	ug/mL	102	<2.00E-03	10.1	n/a	n/a	n/a	n/a	0.200	n/a	
S06M001080	B	Uranium	ug/mL	107	<0.0310	8.10E+03	n/a	n/a	n/a	n/a	3.10	n/a	
S06M001080	B	Yttrium	ug/mL	99.7	<0.0110	5.39	n/a	n/a	n/a	n/a	1.10	n/a	J
S06M001080	B	Zinc	ug/mL	96.9	<4.00E-03	1.18E+03	n/a	n/a	n/a	n/a	0.400	n/a	
S06M001080	B	Zirconium	ug/mL	100	<2.00E-03	596	n/a	n/a	n/a	n/a	0.200	n/a	

Attachment 5

SAMPLE RECEIPT PAPERWORK

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		RC-036-012	Page 1 of 1
Collector R Fahlberg/ R Kerkow	Company Contact R Kerkow	Telephone No. 531-0635	Project Coordinator KESSNER, JH	Price Code Air Quality ☐
Project Designation 300 Area East Side Sites Anomalous Waste - Other Liquids	Sampling Location 300-FF-2 618-2 Safe Cotents		SAF No. RC-036	Data Turnaround
Ice Chest No. Viking TYPEA #050010	Field Logbook No. EL 1365-11	COA RG61822F20	Method of Shipment Government Vehicle	
Shipped To 222-S Lab Operations	Offsite Property No. NA		Bill of Lading/Air Bill No. NA	

POSSIBLE SAMPLE HAZARDS/REMARKS

Radioactive DOT TYPEA

Special Handling and/or Storage

None

Preservation	None	None									
Type of Container	P	P									
No. of Container(s)	1	0									
Volume	1000mL	1000mL									
SAMPLE ANALYSIS	Gamma Spectroscopy	ICP Metals - 6010A (Add-on)									SAMPLE VOLUME APPROX.

Sample No.	Matrix *	Sample Date	Sample Time										
J12XB1 S06M001074	OTHER LIQUID	06-14-06	0900	X	X								300 mL 1
J12XB2 S06M001075	OTHER LIQUID	06-14-06	0930	X	X								400 mL 2
J12Y18 S06M001076	OTHER LIQUID	07-28-06	0600	X	X								50 mL X

CHAIN OF POSSESSION		Sign/Print Names	
Relinquished By/Removed From R Fahlberg	Date/Time 9/12/06 1410	Received By/Stored In R Stark	Date/Time 9/12/06 1410
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS

Intire Contents of Sample Is In One Container

Matrix *
S=Soil
SD=Sediment
SO=Solid
SI=Sludge
W = Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (08/29/2005)

06-ATL-151

06-ATL-151

RADIOACTIVE SHIPMENT RECORD 106942 3. Page 1 of 1

1. SHIP FROM U.S. DEPT. OF ENERGY C/O
Company: Washington Closure Hanford
Address: 300-FF-2 ER Project Site, 300-Area
City, State, Zip: Richland, WA 99352
Contact: David St. John
Phone: 509-372-9144

Ship: ☒ Prepaid ☐ Collect 4.
Via: ☒ Motor Vehicle ☐ Air Psgr ☐ UPS ☐ Rail ☐ Air Cargo ☐ Site Carrier
SHIPMENT AUTHORIZATION NUMBER

2. SHIP TO
Company: Advanced Technology Labs
Address: 222-S Laboratory, 200-West
City, State, Zip: Richland, WA 99352
Attention: Ruth Bushaw
Phone: 509-373-4314

Markings Applied 6.
- Radioactive - LSA ☐
- Radioactive - SCO ☐
- Type A ☒
- Type B with trefoil ☐

LSA Description 8.
- LSA-I ☒
- LSA-II ☐
- LSA-III ☐
- SCO-I ☐
- SCO-II ☐

Labels Applied 10.
- Empty ☐
- Radioactive White - I ☒
- Radioactive Yellow - II ☐
- Radioactive Yellow - III ☐
- Subsidiary Hazard ☐

For Normal Form only 7.
Identify: Sample for analysis
Physical Form: ☒ Liquid ☐ Gas ☐ Solid
Chemical Form: ☒ Elemental ☐ Metal ☐ Nitrate ☐ Oxide ☐ Mixture ☐ Other

EMERGENCY RESPONSE 9.
Telephone: 373-3800
Emergency Response Guide(s): 163

Highway Route Controlled Quantity ☐
Exclusive Use Shipment with Instructions ☐
Placards Applied ☐
If Rail Specify:
Fissile Excepted, Grams <15gms ☒
Excepted Package Statement ☐

5. HM Proper Shipping Name: Radioactive Material,

	excepted package - empty packaging	7	UN2910
	excepted package - instruments or articles	7	UN2910
	excepted package - limited quantity of material	7	UN2910
	excepted package - articles manufactured from natural or depleted uranium or natural thorium	7	UN2910
	Special Form, n.o.s.	7	UN2974
	Low Specific Activity, n.o.s.	7	UN2912
	n.o.s.	7	UN2982
	Fissile, n.o.s.	7	UN2918
	Surface Contaminated Object	7	UN2913
X	Radioactive material, Type A package, non-special form Fissile excepted	7	UN2915

Warning – Fissile Material Controlled Shipment. Do Not Load More Than N/A Packages Per Vehicle. In Loading and Storage Areas, Keep at Least 20 Feet From Other Packages Bearing Radioactive Labels.

11.

No. Pkg.	Model Package	COC/Spec	Serial No.	Seal No.	Isotopes	T.I.	Bq/Package (MBq)	Gr. Wt. Kg.
1	Viking 005C	TYPE A	050010	Tape	Pu-239 Am-241	0.0	197	37
3 sample containers each inside sealed poly bags and packaged inside Viking Package per manufacturers instructions 550 ml total inside								
(Shipper may describe package in detail on one of the unused lines above)					RC-036 TOTALS	0.0	197	37

12. 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: David St. John On behalf of DOE-RL | Date: 01/12/2006 | Organization: WCH-APS | Complete Cost Code (Inc. End Function): R46182 2F20

13. Surface Dose Rate of Package: ☐ <0.005 or ____ mSv/hr; <0.5 or ____ mrem/hr (N+ß γ)
Dose Rate @ 1 Meter from Surface of Package: ☐ <0.005 or ____ mSv/hr; <0.5 or ____ mrem/hr (N+ß γ)
Smears of Outer Container: ☒ <0.41 Bq (22 dpm) ß γ /cm²; ☒ <0.04 Bq (2.2 dpm) α /cm²; ☐ <Tbl. 2-2 HSRCM Onsite 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)
Signature - Radiation Monitoring: Tom Salazy | Bldg. 300 FF2 | Survey No. M-091206-15 | Date 9.12.06

14. TRANSPORTER
Vehicle Number: 462-3177B | DRIVER SIGNATURE: Robert Fuller
RECEIVER
RECEIVER SIGNATURE: [signature] | Date 9/12/06 1410

15. OFFSITE AUTHORIZATION
Shipment has been inspected and verified to be in compliance with DOT regulations.
Authorized Signature | Printed Name | Date

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

17. OFFSITE AUTHORIZATION

Tracking No.	Date Shipped	Routing	ETA
Surveyed By	Date	Approved for Shipment Offsite	Date

54-6000-088 (06/97)

3-Sample from 618-2 "Safe"

GENERATOR KNOWLEDGE INFORMATION

1. Chain of Custody Number _____ CACN/COA _____ Customer Identification Number _____

2. List generator knowledge or description of process that produced sample. Or list description of sample source:

MSDS Available? ⊗ No ○ Yes Hanford MSDS No. _____

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 _____ (i.e.; peroxide former, explosive, air reactive)	○ Yes	○ No	⊗ Unknown
D004-D043 (identify applicable waste codes and concentrations):					○ Yes	○ No	⊗ Unknown

unlikely

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):

None known

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

None known

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 PCBs unlikely

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 [signature] Date 8-30-06

A-6002-990 (08/03)

Attachment 6

SIGNATURE PAGE

CORRESPONDENCE DISTRIBUTION COVERSHEET

Author	Addressee	Correspondence No.
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Subject: FINAL REPORT FOR THE 618-2 SAFE SAMPLES RECEIVED IN SEPTEMBER 2006 – SAMPLE GROUP 222S20060954

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