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July 19, 2006

06-ATL-112

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 MAY 2006 –  
SAMPLE GROUP 222S20060604**

Enclosed is the final analytical report for the three samples collected from the 300-FF-2 618-2 Safe site between May 8, 2006, and May 10, 2006, in accordance with SAF number RC-036, and received at the 222-S Laboratory on May 25, 2006.

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

Sincerely,

Ruth A. Bushaw  
Project Coordinator

Enclosure

06-ATL-112

Enclosure

**FINAL REPORT FOR THE 618-2 SAFE SAMPLES RECEIVED IN MAY 2006 –  
SAMPLE GROUP 222S20060604**

Consisting of 31 pages, including coversheet

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**FINAL REPORT FOR THE 618-2 SAFE  
SAMPLES RECEIVED IN MAY 2006 – SAMPLE  
GROUP 222S20060604**

**Ruth A. Bushaw**  
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**Date Published**  
July 2006

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**222-S LABORATORY**  
**FINAL REPORT FOR THE 618-2 SAFE SAMPLES**  
**RECEIVED IN MAY 2006 – SAMPLE GROUP 222S20060604**

### 1.0 INTRODUCTION

Three samples from the 300-FF-2 618-2 Safe were received at the 222-S Laboratory on May 25, 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. 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
J12461-A	5/10/06 0800	5/25/06 1415	Approximately 300 mL opaque, off-white liquid.
J120V0	5/08/06 0730	5/25/06 1415	Approximately 150 mL opaque, off-white liquid.
J120V1	5/09/06 0830	5/25/06 1415	Approximately 500 mL opaque, yellow liquid with ¼ to ½ inch of red-brown settled solids.

Sample J120V1 was centrifuged to separate the solid and liquid. The mass of solid collected during centrifugation was 22.7 g. Samples J12461-A and J120V0 did not contain sufficient solids to separate by centrifugation. However, since the samples appeared cloudy, the samples were shaken to ensure that any solids were suspended and representative portions were removed for acid digestion prior to the inductively coupled plasma spectroscopy (ICP) and gamma energy analysis (GEA). The centrifuged liquid from J120V1 was included in the liquid acid digestion batch, even though no suspended solids were observed following centrifugation. The centrifuged solid from sample J120V1 was prepared by acid digestion prior to the ICP and GEA analyses. The mercury analysis procedure contains digestion as part of the analysis.

### 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.

Due to a software limitation in the Laboratory Information Management System, the program used to generate reports calculates a relative percent difference (RPD) between sample and duplicate results for some analytes, even when one or both of the results is reported less than the detection limit. However, if either the sample or duplicate result is reported less than the detection limit, it is not appropriate to calculate an RPD, and "n/a" should be reported in the "Average" and "RPD %" columns.

In Attachments 1 and 4, the column labeled "A#" indicates the aliquot class or the method used for sample preparation before analysis. The "A" indicates acid digestion of a solid sample and "B" indicates 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 "Unit" column indicates the units for the sample results. For the solid samples, the reporting units for the blank do not all match those for the sample results. The units for the blank are µg/mL for the ICP solid 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, <sup>60</sup>Co and <sup>137</sup>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. For the metals analysis, the Work Order indicated a request for use of the Toxicity Characteristic Leaching Procedure (TCLP). However, there were insufficient solids to perform this analysis, so verbal concurrence was given by the customer point of contact to analyze total metals. Typically, if a total metals analysis is performed instead of TCLP, the regulatory levels in mg/L units are multiplied by a factor of 20 to obtain the regulatory levels in solid units. Therefore, the metal analysis detection limits were compared to 20 times the TQLs provided in the Work Order.

For the liquid samples, the reported detection limits for GEA and mercury were less than the requested TQLs. For the ICP analysis, all of the reported detection limits were less than the requested TQL except for arsenic and selenium, which were only slightly above the requested TQLs. The high detection limits were due to a required dilution of the sample during the acid digestion. Arsenic was detected in sample J12461-A at a level approximately three to four times the reported detection limit. Selenium was detected approximately two times the reported detection limit in sample J120V0.

For the centrifuged solid from sample J120V1, the reported detection limits for the GEA analytes and mercury were less than the requested TQLs. For the ICP metals analysis, all of the reported detection limits were less than the requested TQL except for arsenic, lead, and selenium. The high detection limits were due to a required dilution of the sample based on high concentrations of nonrequested analytes. There was no arsenic or selenium detected in the sample. The result reported for lead was approximately five to six times greater than the reported detection.

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
<b>Inorganic</b>		
Mercury	Direct – liquid and solid	LA-325-106 Rev. D-1
ICP	Acid digest - liquid and solid	LA-505-161 Rev. F-0
<b>Radionuclide</b>		
GEA	Acid digest - liquid and solid	LA-548-121 Rev. G-0

**Notes:**

Acid digest solid procedure: LA-505-163 Rev. E-0

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

#### 5.0 REFERENCES

ATL-MP-1011, 2006, *ATL Quality Assurance Project Plan for 222-S Laboratory*, Revisions 3 and 4, Advanced Technologies and Laboratories International, Inc., Richland, Washington.

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Attachment 1

DATA SUMMARY REPORT

Attachment 1  
 618-2 SAFE  
 Data Summary Report

Category: R

Core Number: 222S20060604

Customer Sample ID: J120V0

Sample Portion: Liquid

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err %	Qual Flags
S06M001059			Mercury	ug/mL	101	<1.00E-04	0.120	n/a	n/a	n/a	n/a	2.00E-03	n/a	
S06M001060	B		Arsenic	ug/mL	107	<0.0590	<0.590	n/a	n/a	n/a	n/a	0.590	n/a	U
S06M001060	B		Barium	ug/mL	99.3	<7.00E-03	3.29	n/a	n/a	n/a	n/a	0.0700	n/a	
S06M001060	B		Cadmium	ug/mL	98.0	<3.00E-03	0.0903	n/a	n/a	n/a	n/a	0.0300	n/a	J
S06M001060	B		Chromium	ug/mL	100	<0.0140	8.76	n/a	n/a	n/a	n/a	0.140	n/a	
S06M001060	B		Lead	ug/mL	96.8	<0.0360	3.91	n/a	n/a	n/a	n/a	0.360	n/a	
S06M001060	B		Selenium	ug/mL	100	<0.0640	0.814	n/a	n/a	n/a	n/a	0.640	n/a	J
S06M001060	B		Silver	ug/mL	95.7	<4.00E-03	6.72	n/a	n/a	n/a	n/a	0.0400	n/a	
S06M001060	B		Actinium-228	uCi/mL	n/a	<6.13E-06	<6.13E-05	n/a	n/a	n/a	n/a	6.13E-05	n/a	U
S06M001060	B		Antimony-125	uCi/mL	n/a	<3.89E-06	<3.75E-05	n/a	n/a	n/a	n/a	3.75E-05	n/a	U
S06M001060	B		Cesium-134	uCi/mL	n/a	<1.54E-06	<1.54E-05	n/a	n/a	n/a	n/a	1.54E-05	n/a	U
S06M001060	B		Cesium-137	uCi/mL	97.9	<1.91E-06	<1.85E-05	n/a	n/a	n/a	n/a	1.85E-05	n/a	U
S06M001060	B		Cobalt-60	uCi/mL	102	<1.59E-06	<1.65E-05	n/a	n/a	n/a	n/a	1.65E-05	n/a	U
S06M001060	B		Europium-152	uCi/mL	n/a	<7.90E-06	<7.27E-05	n/a	n/a	n/a	n/a	7.27E-05	n/a	U
S06M001060	B		Europium-154	uCi/mL	n/a	<4.98E-06	<6.01E-05	n/a	n/a	n/a	n/a	6.01E-05	n/a	U
S06M001060	B		Europium-155	uCi/mL	n/a	<2.23E-06	<3.04E-05	n/a	n/a	n/a	n/a	3.04E-05	n/a	U
S06M001060	B		Radium-226	uCi/mL	n/a	<2.28E-05	<2.54E-04	n/a	n/a	n/a	n/a	2.54E-04	n/a	U

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Core Number = Customer Sample Delivery Group

J = Estimated result between MDL and EQL; or Count Err % > 30%

U = Result < MDL

Attachment 1  
 618-2 SAFE  
 Data Summary Report

Category: R

Core Number: 222S20060604

Customer Sample ID: J120V1

Sample Portion: Centrifuged Liquid

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err %	Qual Flags
S06M001062			Mercury	ug/mL	101	<1.00E-04	0.318	0.309	0.314	2.87	106	2.00E-03	n/a	
S06M001065	B		Arsenic	ug/mL	107	<0.0590	<0.590	n/a	n/a	n/a	n/a	0.590	n/a	U
S06M001065	B		Barium	ug/mL	99.3	<7.00E-03	0.902	n/a	n/a	n/a	n/a	0.0700	n/a	
S06M001065	B		Cadmium	ug/mL	98.0	<3.00E-03	10.3	n/a	n/a	n/a	n/a	0.0300	n/a	
S06M001065	B		Chromium	ug/mL	100	<0.0140	1.24	n/a	n/a	n/a	n/a	0.140	n/a	J
S06M001065	B		Lead	ug/mL	96.8	<0.0360	3.23	n/a	n/a	n/a	n/a	0.360	n/a	J
S06M001065	B		Selenium	ug/mL	100	<0.0640	<0.640	n/a	n/a	n/a	n/a	0.640	n/a	U
S06M001065	B		Silver	ug/mL	95.7	<4.00E-03	<0.0400	n/a	n/a	n/a	n/a	0.0400	n/a	U
S06M001065	B		Actinium-228	uCi/mL	n/a	<6.13E-06	<5.97E-05	n/a	n/a	n/a	n/a	5.97E-05	n/a	U
S06M001065	B		Antimony-125	uCi/mL	n/a	<3.89E-06	<3.78E-05	n/a	n/a	n/a	n/a	3.78E-05	n/a	U
S06M001065	B		Cesium-134	uCi/mL	n/a	<1.54E-06	<1.54E-05	n/a	n/a	n/a	n/a	1.54E-05	n/a	U
S06M001065	B		Cesium-137	uCi/mL	97.9	<1.91E-06	<1.90E-05	n/a	n/a	n/a	n/a	1.90E-05	n/a	U
S06M001065	B		Cobalt-60	uCi/mL	102	<1.59E-06	<1.64E-05	n/a	n/a	n/a	n/a	1.64E-05	n/a	U
S06M001065	B		Europium-152	uCi/mL	n/a	<7.90E-06	<7.43E-05	n/a	n/a	n/a	n/a	7.43E-05	n/a	U
S06M001065	B		Europium-154	uCi/mL	n/a	<4.98E-06	<4.65E-05	n/a	n/a	n/a	n/a	4.65E-05	n/a	U
S06M001065	B		Europium-155	uCi/mL	n/a	<2.23E-06	<3.50E-05	n/a	n/a	n/a	n/a	3.50E-05	n/a	U
S06M001065	B		Radium-226	uCi/mL	n/a	<2.28E-05	<2.35E-04	n/a	n/a	n/a	n/a	2.35E-04	n/a	U

Sample Portion: Centrifuged Solid

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err %	Qual Flags
S06M001063			Mercury	ug/g	98.0	<0.0500	19.4	18.4	18.9	4.87	106	0.0458	n/a	
S06M001066	A		Actinium-228	uCi/g	n/a	<8.83E-04	<8.53E-04	<9.36E-04	n/a	n/a	n/a	8.53E-04	n/a	U
S06M001066	A		Antimony-125	uCi/g	n/a	<5.54E-04	<5.65E-04	<5.54E-04	n/a	n/a	n/a	5.65E-04	n/a	U
S06M001066	A		Cesium-134	uCi/g	n/a	<2.29E-04	<2.27E-04	<2.16E-04	n/a	n/a	n/a	2.27E-04	n/a	U
S06M001066	A		Cesium-137	uCi/g	100	<2.79E-04	<2.84E-04	<2.99E-04	n/a	n/a	n/a	2.84E-04	n/a	U
S06M001066	A		Cobalt-60	uCi/g	101	<2.27E-04	<2.15E-04	<2.09E-04	n/a	n/a	n/a	2.15E-04	n/a	U
S06M001066	A		Europium-152	uCi/g	n/a	<1.14E-03	<1.09E-03	<1.15E-03	n/a	n/a	n/a	1.09E-03	n/a	U
S06M001066	A		Europium-154	uCi/g	n/a	<6.88E-04	<7.09E-04	<6.72E-04	n/a	n/a	n/a	7.09E-04	n/a	U
S06M001066	A		Europium-155	uCi/g	n/a	<3.28E-04	<6.89E-04	<7.06E-04	n/a	n/a	n/a	6.89E-04	n/a	U

Core Number = Customer Sample Delivery Group

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

Category: R

Core Number: 222S20060604

Customer Sample ID: J120V1

Sample Portion: Centrifuged Solid

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err %	Qual Flags
S06M001066	A		Radium-226	uCi/g	n/a	<3.36E-03	<3.68E-03	<3.54E-03	n/a	n/a	n/a	3.68E-03	n/a	U
S06M001066	A		Arsenic	ug/g	109	<0.0590	<29.3	<28.9	n/a	1.13	107	29.3	n/a	U
S06M001066	A		Barium	ug/g	100	<7.00E-03	344	303	323	12.8	97.0	3.47	n/a	
S06M001066	A		Cadmium	ug/g	99.3	<3.00E-03	10.7	10.1	10.4	5.08	101	1.49	n/a	J
S06M001066	A		Chromium	ug/g	101	<0.0140	114	122	118	6.06	99.6	6.94	n/a	
S06M001066	A		Lead	ug/g	97.7	<0.0360	104	98.0	101	5.74	93.7	17.9	n/a	J
S06M001066	A		Selenium	ug/g	99.0	<0.0640	<31.7	<31.4	n/a	1.14	104	31.7	n/a	U
S06M001066	A		Silver	ug/g	95.6	<4.00E-03	<1.98	<1.96	n/a	1.13	97.6	1.98	n/a	U

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

Category: R

Core Number: 222S20060604

Customer Sample ID: J12461-A

Sample Portion: Liquid

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err %	Qual Flags
S06M001056			Mercury	ug/mL	101	<1.00E-04	0.0740	n/a	n/a	n/a	n/a	1.00E-04	n/a	
S06M001057	B		Arsenic	ug/mL	107	<0.0590	1.66	1.92	1.79	14.7	109	0.590	n/a	J
S06M001057	B		Barium	ug/mL	99.3	<7.00E-03	0.135	0.123	0.129	9.16	98.4	0.0700	n/a	J
S06M001057	B		Cadmium	ug/mL	98.0	<3.00E-03	0.0506	0.0515	0.0510	1.76	97.0	0.0300	n/a	J
S06M001057	B		Chromium	ug/mL	100	<0.0140	23.1	22.9	23.0	0.821	98.0	0.140	n/a	
S06M001057	B		Lead	ug/mL	96.8	<0.0360	0.385	0.400	0.392	3.72	96.1	0.360	n/a	J
S06M001057	B		Selenium	ug/mL	100	<0.0640	<0.640	<0.640	n/a	0.0	101	0.640	n/a	U
S06M001057	B		Silver	ug/mL	95.7	<4.00E-03	<0.0400	<0.0400	n/a	0.0	89.1	0.0400	n/a	U
S06M001057	B		Actinium-228	uCi/mL	n/a	<6.13E-06	<6.36E-05	<5.98E-05	n/a	n/a	n/a	6.36E-05	n/a	U
S06M001057	B		Antimony-125	uCi/mL	n/a	<3.89E-06	<3.81E-05	<3.68E-05	n/a	n/a	n/a	3.81E-05	n/a	U
S06M001057	B		Cesium-134	uCi/mL	n/a	<1.54E-06	<1.60E-05	<1.49E-05	n/a	n/a	n/a	1.60E-05	n/a	U
S06M001057	B		Cesium-137	uCi/mL	97.9	<1.91E-06	<1.89E-05	<1.89E-05	n/a	n/a	n/a	1.89E-05	n/a	U
S06M001057	B		Cobalt-60	uCi/mL	102	<1.59E-06	<1.55E-05	<1.60E-05	n/a	n/a	n/a	1.55E-05	n/a	U
S06M001057	B		Europium-152	uCi/mL	n/a	<7.90E-06	<7.38E-05	<7.49E-05	n/a	n/a	n/a	7.38E-05	n/a	U
S06M001057	B		Europium-154	uCi/mL	n/a	<4.98E-06	<6.41E-05	<6.09E-05	n/a	n/a	n/a	6.41E-05	n/a	U
S06M001057	B		Europium-155	uCi/mL	n/a	<2.23E-06	<2.46E-05	<2.49E-05	n/a	n/a	n/a	2.46E-05	n/a	U
S06M001057	B		Radium-226	uCi/mL	n/a	<2.28E-05	<2.37E-04	<2.44E-04	n/a	n/a	n/a	2.37E-04	n/a	U

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Attachment 2

ANALYSIS DATE AND TIME REPORT

## Attachment 2. Analysis Date and Time

Customer ID	Sample Portion	Sample #	Method	Analysis Date/Time	Preparation Date
J12461-A	Liquid	S06M001056	HG	6/8/2006 10:55	
J12461-A	Liquid	S06M001057	GEA	6/19/2006 14:33	6/6/2006
J12461-A	Liquid	S06M001057	ICP-RCRA METALS	6/6/2006 10:58	6/6/2006
J120V0	Liquid	S06M001059	HG	6/8/2006 10:55	
J120V0	Liquid	S06M001060	GEA	6/20/2006 3:15	6/6/2006
J120V0	Liquid	S06M001060	ICP-RCRA METALS	6/6/2006 11:17	6/6/2006
J120V1	Parent	S06M001061	CENTRIFUGE	5/26/2006 14:36	
J120V1	Centrifuged Liquid	S06M001062	HG	6/8/2006 10:55	
J120V1	Centrifuged Liquid	S06M001065	GEA	6/20/2006 6:07	6/6/2006
J120V1	Centrifuged Liquid	S06M001065	ICP-RCRA METALS	6/6/2006 11:22	6/6/2006
J120V1	Centrifuged Solid	S06M001063	HG	6/13/2006 8:10	
J120V1	Centrifuged Solid	S06M001066	GEA	6/8/2006 14:20	6/6/2006
J120V1	Centrifuged Solid	S06M001066	ICP-RCRA METALS	6/7/2006 14:22	6/6/2006

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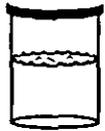
Attachment 3

**SAMPLE BREAKDOWN DIAGRAM**

618-2 SAFE  
 Samples from 300 Area Safe  
 Group 22S20060604

J12461-A

(cool 4°C)



S06M001056

Hg

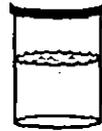


S06M001057

ICP: As, Ba, Cd,  
 Cr, Pb, Se, Ag  
 GEA: <sup>125</sup>Sb, <sup>134</sup>Cs,  
<sup>137</sup>Cs, <sup>60</sup>Co, <sup>152</sup>Eu,  
<sup>154</sup>Eu, <sup>155</sup>Eu, <sup>226</sup>Ra,  
<sup>228</sup>Ra

J120V0

(cool 4°C)



S06M001059

Hg



S06M001060

ICP: As, Ba, Cd,  
 Cr, Pb, Se, Ag  
 GEA: <sup>125</sup>Sb, <sup>134</sup>Cs,  
<sup>137</sup>Cs, <sup>60</sup>Co, <sup>152</sup>Eu,  
<sup>154</sup>Eu, <sup>155</sup>Eu, <sup>226</sup>Ra,  
<sup>228</sup>Ra

J120V1

(cool 4°C)



S06M001061

Centrifuge



Grab Sample  
 (Centrifuge Liquids)

Grab Sample  
 (Centrifuged Solids)



S06M001062

Hg



S06M001065

ICP: As, Ba, Cd,  
 Cr, Pb, Se, Ag  
 GEA: <sup>125</sup>Sb, <sup>134</sup>Cs,  
<sup>137</sup>Cs, <sup>60</sup>Co, <sup>152</sup>Eu,  
<sup>154</sup>Eu, <sup>155</sup>Eu, <sup>226</sup>Ra,  
<sup>228</sup>Ra



S06M001063

Hg



S06M001066

ICP: As, Ba, Cd,  
 Cr, Pb, Se, Ag  
 GEA: <sup>125</sup>Sb, <sup>134</sup>Cs,  
<sup>137</sup>Cs, <sup>60</sup>Co, <sup>152</sup>Eu,  
<sup>154</sup>Eu, <sup>155</sup>Eu, <sup>226</sup>Ra,  
<sup>228</sup>Ra

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Attachment 4

**OPPORTUNISTIC ANALYTE RESULTS**

**Attachment 4**  
**618-2 SAFE**  
**Opportunistic Analyte Results**

Category: O

Core Number: 222S20060604

Customer Sample ID: J120V0

Sample Portion: Liquid

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err %	Qual Flags
S06M001060	B		Aluminium	ug/mL	99.4	<0.0270	21.8	n/a	n/a	n/a	n/a	0.270	n/a	
S06M001060	B		Antimony	ug/mL	97.0	<0.0280	6.63	n/a	n/a	n/a	n/a	0.280	n/a	
S06M001060	B		Bismuth	ug/mL	93.9	<0.102	1.46	n/a	n/a	n/a	n/a	1.02	n/a	J
S06M001060	B		Boron	ug/mL	96.1	<0.0180	15.8	n/a	n/a	n/a	n/a	0.180	n/a	
S06M001060	B		Calcium	ug/mL	116	<0.0800	11.5	n/a	n/a	n/a	n/a	0.800	n/a	
S06M001060	B		Cerium	ug/mL	99.3	<0.0150	2.29	n/a	n/a	n/a	n/a	0.150	n/a	
S06M001060	B		Cobalt	ug/mL	98.5	<8.00E-03	0.118	n/a	n/a	n/a	n/a	0.0800	n/a	J
S06M001060	B		Copper	ug/mL	98.9	<0.0140	0.398	n/a	n/a	n/a	n/a	0.140	n/a	J
S06M001060	B		Europium	ug/mL	95.9	<1.00E-03	0.590	n/a	n/a	n/a	n/a	0.0100	n/a	
S06M001060	B		Iron	ug/mL	99.0	<0.0130	132	n/a	n/a	n/a	n/a	0.130	n/a	
S06M001060	B		Lanthanum	ug/mL	98.5	<8.00E-03	3.36E+03	n/a	n/a	n/a	n/a	0.0800	n/a	
S06M001060	B		Manganese	ug/mL	98.3	<7.00E-03	112	n/a	n/a	n/a	n/a	0.0700	n/a	
S06M001060	B		Neodymium	ug/mL	98.2	<8.00E-03	1.03	n/a	n/a	n/a	n/a	0.0800	n/a	
S06M001060	B		Nickel	ug/mL	99.0	<0.0220	4.61	n/a	n/a	n/a	n/a	0.220	n/a	
S06M001060	B		Phosphorus	ug/mL	98.6	<0.0430	9.57	n/a	n/a	n/a	n/a	0.430	n/a	
S06M001060	B		Potassium	ug/mL	97.2	<0.295	233	n/a	n/a	n/a	n/a	2.95	n/a	
S06M001060	B		Silicon	ug/mL	90.7	<0.0460	23.9	n/a	n/a	n/a	n/a	0.460	n/a	
S06M001060	B		Sodium	ug/mL	99.3	<0.0420	38.6	n/a	n/a	n/a	n/a	0.420	n/a	
S06M001060	B		Strontium	ug/mL	100	<7.00E-03	0.157	n/a	n/a	n/a	n/a	0.0700	n/a	J
S06M001060	B		Sulfur	ug/mL	94.4	<0.0580	95.5	n/a	n/a	n/a	n/a	0.580	n/a	
S06M001060	B		Thallium	ug/mL	n/a	<0.0560	0.936	n/a	n/a	n/a	n/a	0.560	n/a	J
S06M001060	B		Thorium	ug/mL	90.5	<9.00E-03	1.36	n/a	n/a	n/a	n/a	0.0900	n/a	
S06M001060	B		Titanium	ug/mL	100	<2.00E-03	0.0665	n/a	n/a	n/a	n/a	0.0200	n/a	J
S06M001060	B		Zinc	ug/mL	94.3	<4.00E-03	1.04	n/a	n/a	n/a	n/a	0.0400	n/a	
S06M001060	B		Zirconium	ug/mL	93.1	<2.00E-03	1.17	n/a	n/a	n/a	n/a	0.0200	n/a	
S06M001060	B		Americium-241	uCi/mL	n/a	<1.25E-06	1.14E-04	n/a	n/a	n/a	n/a	3.41E-05	19.85	
S06M001060	B		Plutonium-239	uCi/mL	n/a	<8.66E-03	1.73	n/a	n/a	n/a	n/a	0.120	5.72	
S06M001060	B		Sodium-22	uCi/mL	n/a	<1.71E-06	1.93E-05	n/a	n/a	n/a	n/a	1.41E-05	49.55	J

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Core Number = Customer Sample Delivery Group

J = Estimated result between MDL and EQL; or Count Err % > 30%

U = Result < MDL

**Attachment 4**  
**618-2 SAFE**  
**Opportunistic Analyte Results**

Category: O

Core Number: 222S20060604

Customer Sample ID: J120V1

Sample Portion: Centrifuged Liquid

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err %	Qual Flags
S06M001065	B		Aluminium	ug/mL	99.4	<0.0270	1.25E+03	n/a	n/a	n/a	n/a	0.270	n/a	
S06M001065	B		Boron	ug/mL	96.1	<0.0180	1.91	n/a	n/a	n/a	n/a	0.180	n/a	
S06M001065	B		Calcium	ug/mL	116	<0.0800	789	n/a	n/a	n/a	n/a	0.800	n/a	
S06M001065	B		Cerium	ug/mL	99.3	<0.0150	0.264	n/a	n/a	n/a	n/a	0.150	n/a	J
S06M001065	B		Cobalt	ug/mL	98.5	<8.00E-03	12.4	n/a	n/a	n/a	n/a	0.0800	n/a	
S06M001065	B		Copper	ug/mL	98.9	<0.0140	130	n/a	n/a	n/a	n/a	0.140	n/a	
S06M001065	B		Europium	ug/mL	95.9	<1.00E-03	0.0813	n/a	n/a	n/a	n/a	0.0100	n/a	J
S06M001065	B		Iron	ug/mL	99.0	<0.0130	28.3	n/a	n/a	n/a	n/a	0.130	n/a	
S06M001065	B		Lanthanum	ug/mL	98.5	<8.00E-03	0.151	n/a	n/a	n/a	n/a	0.0800	n/a	J
S06M001065	B		Lithium	ug/mL	100	<9.00E-03	0.749	n/a	n/a	n/a	n/a	0.0900	n/a	J
S06M001065	B		Magnesium	ug/mL	94.3	<0.0150	520	n/a	n/a	n/a	n/a	0.150	n/a	
S06M001065	B		Manganese	ug/mL	98.3	<7.00E-03	22.4	n/a	n/a	n/a	n/a	0.0700	n/a	
S06M001065	B		Molybdenum	ug/mL	99.9	<3.00E-03	0.0449	n/a	n/a	n/a	n/a	0.0300	n/a	J
S06M001065	B		Neodymium	ug/mL	98.2	<8.00E-03	0.139	n/a	n/a	n/a	n/a	0.0800	n/a	J
S06M001065	B		Nickel	ug/mL	99.0	<0.0220	10.4	n/a	n/a	n/a	n/a	0.220	n/a	
S06M001065	B		Phosphorus	ug/mL	98.6	<0.0430	2.19	n/a	n/a	n/a	n/a	0.430	n/a	J
S06M001065	B		Potassium	ug/mL	97.2	<0.295	1.15E+03	n/a	n/a	n/a	n/a	2.95	n/a	
S06M001065	B		Silicon	ug/mL	90.7	<0.0460	9.37	n/a	n/a	n/a	n/a	0.460	n/a	
S06M001065	B		Sodium	ug/mL	99.3	<0.0420	4.34E+03	n/a	n/a	n/a	n/a	0.420	n/a	
S06M001065	B		Strontium	ug/mL	100	<7.00E-03	2.76	n/a	n/a	n/a	n/a	0.0700	n/a	
S06M001065	B		Sulfur	ug/mL	94.4	<0.0580	200	n/a	n/a	n/a	n/a	0.580	n/a	
S06M001065	B		Thorium	ug/mL	90.5	<9.00E-03	0.0946	n/a	n/a	n/a	n/a	0.0900	n/a	J
S06M001065	B		Uranium	ug/mL	94.0	<0.0310	1.57	n/a	n/a	n/a	n/a	0.310	n/a	J
S06M001065	B		Yttrium	ug/mL	97.9	<0.0110	0.121	n/a	n/a	n/a	n/a	0.110	n/a	J
S06M001065	B		Zinc	ug/mL	94.3	<4.00E-03	77.1	n/a	n/a	n/a	n/a	0.0400	n/a	
S06M001065	B		Zirconium	ug/mL	93.1	<2.00E-03	0.0249	n/a	n/a	n/a	n/a	0.0200	n/a	J
S06M001065	B		Americium-241	uCi/mL	n/a	<1.25E-06	0.102	n/a	n/a	n/a	n/a	2.01E-04	5.27	
S06M001065	B		Plutonium-239	uCi/mL	n/a	<8.66E-03	0.363	n/a	n/a	n/a	n/a	0.0625	9.38	

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Core Number = Customer Sample Delivery Group

J = Estimated result between MDL and EQL; or Count Err % > 30%

U = Result < MDL

**Attachment 4  
 618-2 SAFE  
 Opportunistic Analyte Results**

Category: O

Core Number: 222S20060604

Customer Sample ID: J120V1

Sample Portion: Centrifuged Solid

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err %	Qual Flags
S06M001066	A		Americium-241	uCi/g	n/a	<1.92E-04	2.32	2.35	2.34	1.55	n/a	3.65E-03	5.28	
S06M001066	A		Plutonium-239	uCi/g	n/a	<1.29	22.8	26.5	24.7	15.1	n/a	1.11	6.55	
S06M001066	A		Aluminium	ug/g	105	<0.0270	1.54E+04	1.85E+04	1.69E+04	17.9	n/a	13.4	n/a	
S06M001066	A		Calcium	ug/g	118	<0.0800	785	761	773	3.09	125	39.7	n/a	
S06M001066	A		Cobalt	ug/g	100	<8.00E-03	11.4	11.5	11.4	1.02	99.6	3.97	n/a	J
S06M001066	A		Copper	ug/g	99.7	<0.0140	596	605	600	1.42	91.0	6.94	n/a	
S06M001066	A		Europium	ug/g	95.7	<1.00E-03	2.17	2.38	2.27	9.35	92.9	0.496	n/a	J
S06M001066	A		Iron	ug/g	99.9	<0.0130	8.97E+03	1.08E+04	9.88E+03	18.5	n/a	6.45	n/a	
S06M001066	A		Magnesium	ug/g	95.0	<0.0150	665	639	652	4.01	93.7	7.44	n/a	
S06M001066	A		Manganese	ug/g	99.7	<7.00E-03	32.8	31.9	32.3	2.49	97.9	3.47	n/a	J
S06M001066	A		Molybdenum	ug/g	101	<3.00E-03	3.76	2.71	3.24	32.4	98.4	1.49	n/a	J
S06M001066	A		Nickel	ug/g	100	<0.0220	24.5	22.1	23.3	10.5	99.1	10.9	n/a	J
S06M001066	A		Phosphorus	ug/g	102	<0.0430	130	129	130	1.30	n/a	21.3	n/a	J
S06M001066	A		Potassium	ug/g	94.2	<0.295	1.00E+03	7.90E+02	8.96E+02	23.6	91	146	n/a	J
S06M001066	A		Silicon	ug/g	n/a	<0.0460	778	612	695	23.9	n/a	22.8	n/a	
S06M001066	A		Sodium	ug/g	99.8	<0.0420	3.51E+03	3.53E+03	3.52E+03	0.425	n/a	20.8	n/a	
S06M001066	A		Strontium	ug/g	101	<7.00E-03	5.19	4.95	5.07	4.75	101	3.47	n/a	J
S06M001066	A		Sulfur	ug/g	95.2	<0.0580	2.41E+03	3.07E+03	2.74E+03	24.1	n/a	28.8	n/a	
S06M001066	A		Thorium	ug/g	91.0	<9.00E-03	8.28	14.2	11.3	52.9	90.2	4.46	n/a	J
S06M001066	A		Titanium	ug/g	101	<2.00E-03	73.7	65.0	69.4	12.5	96.9	0.992	n/a	
S06M001066	A		Uranium	ug/g	95.4	<0.0310	47.0	36.8	41.9	24.3	91.0	15.4	n/a	J
S06M001066	A		Zinc	ug/g	95.3	<4.00E-03	116	114	115	1.96	95.6	1.98	n/a	
S06M001066	A		Zirconium	ug/g	94.3	<2.00E-03	2.53	1.61	2.07	44.7	91.3	0.992	n/a	J

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Core Number = Customer Sample Delivery Group

J = Estimated result between MDL and EQL; or Count Err % > 30%

U = Result < MDL

**Attachment 4**  
**618-2 SAFE**  
**Opportunistic Analyte Results**

Category: O

Core Number: 222S20060604

Customer Sample ID: J12461-A

Sample Portion: Liquid

Sample#	R	AF	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err %	Qual Flags
S06M001057	B		Aluminium	ug/mL	99.4	<0.0270	34.3	33.8	34.1	1.36	97.6	0.270	n/a	
S06M001057	B		Antimony	ug/mL	97.0	<0.0280	1.58	1.62	1.60	2.39	98.0	0.280	n/a	J
S06M001057	B		Bismuth	ug/mL	93.9	<0.102	13.0	14.0	13.5	7.02	93.0	1.02	n/a	
S06M001057	B		Boron	ug/mL	96.1	<0.0180	8.02	7.96	7.99	0.692	95.0	0.180	n/a	
S06M001057	B		Calcium	ug/mL	116	<0.0800	23.8	23.5	23.6	1.37	113	0.800	n/a	
S06M001057	B		Cerium	ug/mL	99.3	<0.0150	0.413	0.476	0.444	14.2	98.8	0.150	n/a	J
S06M001057	B		Cobalt	ug/mL	98.5	<8.00E-03	0.115	<0.0800	0.0974	35.6	97.4	0.0800	n/a	J
S06M001057	B		Copper	ug/mL	98.9	<0.0140	0.228	0.226	0.227	1.15	98.2	0.140	n/a	J
S06M001057	B		Europium	ug/mL	95.9	<1.00E-03	0.226	0.228	0.227	0.839	95.2	0.0100	n/a	
S06M001057	B		Iron	ug/mL	99.0	<0.0130	390	386	388	1.07	79.1	0.130	n/a	
S06M001057	B		Lanthanum	ug/mL	98.5	<8.00E-03	852	831	841	2.42	n/a	0.0800	n/a	
S06M001057	B		Magnesium	ug/mL	94.3	<0.0150	11.2	11.0	11.1	1.44	93.9	0.150	n/a	
S06M001057	B		Manganese	ug/mL	98.3	<7.00E-03	14.8	14.7	14.8	1.07	97.2	0.0700	n/a	
S06M001057	B		Neodymium	ug/mL	98.2	<8.00E-03	0.244	0.246	0.245	0.816	97.5	0.0800	n/a	J
S06M001057	B		Nickel	ug/mL	99.0	<0.0220	3.77	3.53	3.65	6.78	97.2	0.220	n/a	
S06M001057	B		Phosphorus	ug/mL	98.6	<0.0430	5.96	6.10	6.03	2.38	98.5	0.430	n/a	
S06M001057	B		Potassium	ug/mL	97.2	<0.295	197	194	196	1.70	93.2	2.95	n/a	
S06M001057	B		Silicon	ug/mL	90.7	<0.0460	119	98.3	109	19.1	91.4	0.460	n/a	
S06M001057	B		Sodium	ug/mL	99.3	<0.0420	532	522	527	1.93	n/a	0.420	n/a	
S06M001057	B		Sulfur	ug/mL	94.4	<0.0580	143	139	141	2.43	86.0	0.580	n/a	
S06M001057	B		Thallium	ug/mL	n/a	<0.0560	0.965	0.891	0.928	7.98	n/a	0.560	n/a	J
S06M001057	B		Thorium	ug/mL	90.5	<9.00E-03	0.501	0.481	0.491	4.10	88.9	0.0900	n/a	J
S06M001057	B		Titanium	ug/mL	100	<2.00E-03	0.280	0.278	0.279	0.896	99.6	0.0200	n/a	
S06M001057	B		Uranium	ug/mL	94.0	<0.0310	1.42	1.60	1.51	12.2	93.7	0.310	n/a	J
S06M001057	B		Zinc	ug/mL	94.3	<4.00E-03	0.335	0.352	0.343	4.84	93.5	0.0400	n/a	J
S06M001057	B		Zirconium	ug/mL	93.1	<2.00E-03	4.45	4.37	4.41	1.80	92.1	0.0200	n/a	
S06M001057	B		Plutonium-239	uCi/mL	n/a	<8.66E-03	0.371	0.412	0.391	10.3	n/a	0.104	10.17	
S06M001057	B		Sodium-22	uCi/mL	n/a	<1.71E-06	2.42E-05	1.90E-05	2.16E-05	24.4	n/a	1.57E-05	44.25	J

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Core Number = Customer Sample Delivery Group

J = Estimated result between MDL and EQL; or Count Err % > 30%

U = Result < MDL

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Attachment 5

**SAMPLE RECEIPT PAPERWORK**

GRIP# 20060604

Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				RC-036-006 Page 1 of 1	
Collector R Fahberg/ R Kerkow		Company Contact R Kerkow		Telephone No. 531-0635		Project Coordinator KESSNER, JH	
Project Designation 300 Area East Side Sites Anomalous Waste - Other Liquids		Sampling Location 300-FF-2 618-2 Safe Cotents		SAF No. RC-036		Price Code Data Turnaround WORK ORDER AT6001	
Ice Chest No. Viking Type A #08/98250010		Field Logbook No. EL 1365-11		COA RG61822F20		Method of Shipment Government Vehicle	
Shipped To 222-S Lab Operations / PNNL 5-17-06		Offsite Property No. NA		RSR# 185717		Bill of Lading/Air Bill No. NA	
POSSIBLE SAMPLE HAZARDS/REMARKS Radioactive DOT TYPE A Pu-239 and Am-241 Special Handling and/or Storage None				Preservation None	None		
				Type of Container P	P		
				No. of Container(s) 1	105		
				Volume 1000mL	1000mL		
				Gamma Spectroscopy	ICP Metals - 6010A (Add-on)		
SAMPLE ANALYSIS							
SDG# 222S 20060604							
Sample No.	Matrix *	Sample Date	Sample Time				
J12461-A	OTHER LIQUID	5-10-06	0800	X	X	222-S	
<del>J12461-B</del>	<del>OTHER LIQUID</del>	<del>5-10-06</del>	<del>0800</del>			<del>PNNL</del>	<del>5/17/06 RK</del>
506M060056							
CHAIN OF POSSESSION				SPECIAL INSTRUCTIONS			
Relinquished By/Removed From R Kerkow / R Kerkow		Date/Time 5-10-06 1530		Received By/Stored In 300FF2 RNSA CORNEX		Date/Time 5-10-06 1530	
Relinquished By/Removed From 300FF2 RNSA CORNEX		Date/Time 5-17-06 0900		Received By/Stored In R Kerkow / R Kerkow		Date/Time 5-17-06 0900	
Relinquished By/Removed From R Kerkow / R Kerkow		Date/Time 5-17-06 0950		Received By/Stored In DAVID S. JONAS		Date/Time 5/17/06 0950	
Relinquished By/Removed From DAVID S. JONAS		Date/Time 5/25/06 1415		Received By/Stored In R Kerkow		Date/Time 5/25/06 1415	
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time	
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time	
LABORATORY SECTION		Received By		Title		Date/Time	
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By		Date/Time	

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GRP# 20060604

Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				RC-036-005 Page 1 of 1	
Collector R Fahberg/ R Kerkow		Company Contact R Kerkow		Telephone No. 531-0635		Project Coordinator KESSNER, JII	
Project Designation 300 Area East Side Sites Anomalous Waste - Other Liquids		Sampling Location 300-FF-2 618-2 Safe Contents		SAF No. RC-036		Price Code <i>WORK ORDER #</i> Data Turnaround Air Quality <input type="checkbox"/> <i>AT6001</i>	
Ice Chest No. <i>Viking Type A # 08/90050010</i>		Field Logbook No. FL 1365-11		COA RG61822F20		Method of Shipment Government Vehicle	
Shipped To 222-S Lab Operations		Offsite Property No. NA		<i>RSR # 185717-185712-Dis 5/17/06</i>		Bill of Lading/Air Bill No. NA	
POSSIBLE SAMPLE HAZARDS/REMARKS <i>Radioactive - DOT TYPE A Pu-239 and Am-241 Special Handling and/or Storage None</i>				Preservation	None	None	
				Type of Container	P	P	
				No. of Container(s)	1	0	
				Volume	1000mL	1000mL	
SAMPLE ANALYSIS <i>SDG# 222S20060604</i>				Gamma Spectroscopy	ICP Metals - 6010A (Add-on)		
Sample No.	Matrix *	Sample Date	Sample Time				
J120V0	OTHER LIQUID	5-8-06	0730	X	X		
<i>506M001059</i>							
CHAIN OF POSSESSION				Sign/Print Names		SPECIAL INSTRUCTIONS	
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time	
<i>R. Fahberg</i>		<i>5-8-06</i>		<i>300FF2 RMSH CONDEX</i>		<i>5-8-06 0830</i>	
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time	
<i>300 FF2 - RMSA CONDEX</i>		<i>5-17-06</i>		<i>R. Kerkow / R. Kerkow</i>		<i>5-17-06 0900</i>	
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time	
<i>R. Kerkow / R. Kerkow</i>		<i>5-17-06</i>		<i>DAVID ST. JOHN</i>		<i>5-17-06 0950</i>	
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time	
<i>DAVID ST. JOHN</i>		<i>5/23/06 1415</i>		<i>DAVID ST. JOHN</i>		<i>5/23/06 1415</i>	
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time	
LABORATORY SECTION		Received By		Title		Date/Time	
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By		Date/Time	

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GRP# 20060604

Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				RC-036-007 Page 1 of 1	
Collector R Fahberg/ R Kerkow		Company Contact R Kerkow		Telephone No. 531-0635		Project Coordinator KESSNER, JH	
Project Designation 300 Area East Side Sites Anomalous Waste - Other Liquids		Sampling Location 300-FF-2 618-2 Burial Ground		SAF No. RC-036		Price Code Data Turnaround Work order d Air Quality <input type="checkbox"/> AT6001	
Ice Chest No. Viking Type A # C848C5001D		Field Logbook No. EL 1365-11		COA RG61822F20		Method of Shipment Government Vehicle	
Shipped To 222-S Lab Operations		Offsite Property No. NA		RSP No. 185717		Bill of Lading/Air Bill No. NA	
POSSIBLE SAMPLE HAZARDS/REMARKS Radioactive DOT Type A Pu-239 and Am-241 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)		
SDG #20060604							
Sample No.	Matrix *	Sample Date	Sample Time				
J120V1	OTHER LIQUID	5-09-06	0830	X			
506M001061							
CHAIN OF POSSESSION				Sign/Print Names		SPECIAL INSTRUCTIONS	
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time	
R Kerkow/R Kerkow		1000 5-9-06		300FF2 RMSA Connex		1000 5-9-06	
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time	
300-FF2 RMSA Connex		0900 5-17-06		R Kerkow/R Kerkow		0900 5-17-06	
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time	
R Kerkow/R Kerkow		0950 5-17-06		Liquid Storage		0950 5/17/06	
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time	
R Kerkow		5/23/06 1415		R Kerkow		5/23/06 14:15	
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time	
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time	
LABORATORY SECTION		Received By		Title		Date/Time	
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By		Date/Time	

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<b>1. SHIP FROM U.S. DEPT. OF ENERGY C/O</b> Company <u>Washington Closure Hanford</u> Address <u>300-FF-2 FR</u> City, State, Zip <u>Richland, WA 99352</u> Contact <u>David St. John</u> Phone <u>509-372-9144</u>		<b>RADIOACTIVE SHIPMENT RECORD</b>																																					
		<b>1070113</b> Page   of																																					
		Ship <input checked="" type="checkbox"/> Prepaid <input type="checkbox"/> Collect																																					
		Via <input checked="" type="checkbox"/> Motor <input type="checkbox"/> Air Psgr <input type="checkbox"/> UPS <input type="checkbox"/> Rail <input type="checkbox"/> Air Cargo <input type="checkbox"/> Site Carrier																																					
<b>2. SHIP TO</b> Company <u>Advanced Technology Labs</u> Address <u>222-S Laboratory 200-West</u> City, State, Zip <u>Richland, WA 99352</u> Attention <u>Ruth Bushaw</u> Phone <u>509-373-4314</u>		<b>6. Markings Applied</b> Radioactive - LSA <input type="checkbox"/> Radioactive - SCO <input type="checkbox"/> Type A <input checked="" type="checkbox"/> Type B with trefoil <input type="checkbox"/> <b>8. LSA Description</b> LSA-I <input type="checkbox"/> LSA-II <input type="checkbox"/> LSA-III <input type="checkbox"/> SCO-I <input type="checkbox"/> SCO-II <input type="checkbox"/> <b>10. Labels Applied</b> Empty <input type="checkbox"/> Radioactive White - I <input checked="" type="checkbox"/> Radioactive Yellow - II <input type="checkbox"/> Radioactive Yellow - III <input type="checkbox"/> Subsidiary Hazard <input type="checkbox"/>																																					
<b>5. HM Proper Shipping Name:</b> _____ 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 <u>Type A package, non special form fissile excepted</u> 7 UN2915		<b>7. For Normal Form only Identify</b> Physical Form <input checked="" type="checkbox"/> Liquid <input type="checkbox"/> Gas <input type="checkbox"/> Solid Chemical Form <input checked="" type="checkbox"/> Elemental <input type="checkbox"/> Metal <input type="checkbox"/> Nitrate <input type="checkbox"/> Oxide <input type="checkbox"/> Mixture <input type="checkbox"/> Other																																					
		<b>9. EMERGENCY RESPONSE</b> Telephone <u>509-373-3800</u> Emergency Response Guide(s) <u>163</u>																																					
		Highway Route Controlled Quantity <input type="checkbox"/> Exclusive Use Shipment <input type="checkbox"/> with instructions Placards Applied <input type="checkbox"/> If Rail Specify: Fissile Excepted, Grams <u>215347</u> <input checked="" type="checkbox"/> Excepted Package Statement <input type="checkbox"/>																																					
Warning - Fissile Material Controlled Shipment. Do Not Load More Than <u>N/A</u> Packages Per Vehicle. In Loading and Storage Areas, Keep at Least 20 Feet From Other Packages Bearing Radioactive Labels.																																							
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>11. No. Pkg.</th> <th>Model Package</th> <th>COC/Spec</th> <th>Serial No.</th> <th>Seal No.</th> <th>Isotopes</th> <th>T.I.</th> <th>Net Package</th> <th>Gr. Wt. Kg.</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Viking 005C</td> <td>Type A</td> <td>98050010</td> <td>Tape P-239, Am-241</td> <td></td> <td>0.0</td> <td>47</td> <td>37</td> </tr> <tr> <td colspan="9">                     3 ea 1-Liter poly bottles (partially filled) inside sealed poly bag, inside Viking Type A package per manufacturer's instructions 1100 Internal Total                 </td> </tr> <tr> <td colspan="6">(Shipper may describe package in detail on one of the unused lines above) <u>SAF RC-036</u></td> <td>TOTALS</td> <td>0.0</td> <td>47 37kg</td> </tr> </tbody> </table>				11. No. Pkg.	Model Package	COC/Spec	Serial No.	Seal No.	Isotopes	T.I.	Net Package	Gr. Wt. Kg.	1	Viking 005C	Type A	98050010	Tape P-239, Am-241		0.0	47	37	3 ea 1-Liter poly bottles (partially filled) inside sealed poly bag, inside Viking Type A package per manufacturer's instructions 1100 Internal Total									(Shipper may describe package in detail on one of the unused lines above) <u>SAF RC-036</u>						TOTALS	0.0	47 37kg
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(Shipper may describe package in detail on one of the unused lines above) <u>SAF RC-036</u>						TOTALS	0.0	47 37kg																															
<b>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.</b> Certifier's Signature <u>David St John</u> On behalf of DOE-RL Date <u>05/25/06</u> Organization <u>WCH-AFS</u> Complete Cost Code (Inc. End Function) <u>R96182 2F20</u>																																							
<b>13. Surface Dose Rate of Package</b> <input checked="" type="checkbox"/> <0.005 or _____ mSv/hr <0.5 or _____ mrem/hr (N+5 Y)		<b>Dose Rate @ 1 Meter from Surface of Package</b> <input checked="" type="checkbox"/> <0.005 or _____ mSv/hr <0.5 or _____ mrem/hr (N+5 Y)																																					
Smears of Outer Container <input checked="" type="checkbox"/> <0.41 Bq (22 dpm) & γ /cm <sup>2</sup> <input checked="" type="checkbox"/> <0.04 Bq (2.2 dpm) α /cm <sup>2</sup> <input checked="" type="checkbox"/> <Tbl. 2-2 HSRM Onsite Limits		<b>TRUCK LOAD OR EXCLUSIVE USE</b> Surface <input checked="" type="checkbox"/> <2 mSv/hr (200 mrem/hr) @ 2 meters <input checked="" type="checkbox"/> <0.1 mSv/hr (10 mrem/hr) @ Cab <input checked="" type="checkbox"/> <0.02 mSv/hr (2 mrem/hr) or sleeper (Using N+5 Y)																																					
Additional Data and Instructions (inc. Readings on Internal Packaging) Signature - Radiation Monitoring _____		Bldg. <u>300 FF2</u> Survey No. <u>M-052906-S</u> Date <u>05/25/06</u>																																					
<b>14. TRANSPORTER</b> Vehicle Number <u>441-4928A</u> DRIVER SIGNATURE <u>David St John</u>		<b>RECEIVER</b> RECEIVER SIGNATURE <u>R. Bushaw</u> Date <u>5/25/06 1415</u>																																					
<b>15. OFFSITE AUTHORIZATION</b> Shipment has been inspected and verified to be in compliance with DOT regulations Authorized Signature <u>N/A</u> Printed Name _____ Date _____																																							
<b>16. AUTHORIZATION FOR SHIPMENT</b> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td rowspan="2"> <b>AIR TRANSPORT CERTIFICATION</b>  <input checked="" type="checkbox"/> N/A                 </td> <td> <b>CARGO AIRCRAFT</b>  <input type="checkbox"/> Cargo Aircraft Only Labels Applied                 </td> <td> <b>PASSENGER AIRCRAFT</b>  <input type="checkbox"/> Ltd Qty  <input type="checkbox"/> &lt;3 T.I.                 </td> <td> <input type="checkbox"/> Research/Medical Diagnosis  <input type="checkbox"/> Human Medical Research                 </td> <td rowspan="2">                 Pkg. Dimensions (cm)             </td> </tr> <tr> <td colspan="3">                 Pkg. Dimensions (cm)             </td> </tr> </table>				<b>AIR TRANSPORT CERTIFICATION</b> <input checked="" type="checkbox"/> N/A	<b>CARGO AIRCRAFT</b> <input type="checkbox"/> Cargo Aircraft Only Labels Applied	<b>PASSENGER AIRCRAFT</b> <input type="checkbox"/> Ltd Qty <input type="checkbox"/> <3 T.I.	<input type="checkbox"/> Research/Medical Diagnosis <input type="checkbox"/> Human Medical Research	Pkg. Dimensions (cm)	Pkg. Dimensions (cm)																														
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	Pkg. Dimensions (cm)																																						
<b>17. OFFSITE AUTHORIZATION</b> Tracking No. <u>N/A</u> Date Shipped _____ Routing _____ ETA _____ Surveyed By _____ Date _____ Approved for Shipment Offsite _____ Date _____																																							

### GENERATOR KNOWLEDGE INFORMATION

1. Chain of Custody Number RC-036-007 CACN/COA R46182 2F20 Customer Identification Number AT-6001

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

MSDS Available?  No  Yes Hanford MSDS No. NA

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: _____	_____	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> Unknown
U Codes: _____	_____	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> Unknown
K Codes: _____	_____	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> Unknown
F Codes: _____	_____	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> Unknown

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

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

UNKNOWN

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

(\*State mixture rule for ignitability)

WT01: <input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> Unknown	WP01: <input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> Unknown
WT02: <input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> Unknown	WP02: <input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> Unknown
W001: <input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> Unknown	WP03: <input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> Unknown
List constituents and concentrations:	F003:* <input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> 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)

<input type="checkbox"/> PCB Liquid Waste	<input type="checkbox"/> PCB Bulk Product Waste	<input type="checkbox"/> PCB Transformer ≥500 ppm	<input checked="" type="radio"/> Unknown
<input type="checkbox"/> PCB Remediation Waste	<input type="checkbox"/> PCB R&D Waste	<input type="checkbox"/> PCB contaminated electrical equipment (capacitor/ballast) <500 ppm	
<input type="checkbox"/> PCB Spill Material	<input type="checkbox"/> PCB Item	<input type="checkbox"/> Other PCB Waste (list) <u>NA</u>	

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 Rick Keikow / Richard Keik Date 5/25/06

**222-S Laboratory  
Sample Receipt and Chain of Custody Verification Checklist**

COC #: RC-036-005, 006, 007      Date Samples Received: 5/25/06  
 Customer Project Name: 618-2 SAFE      Number of Samples: 3  
 Sample Custodian: RH

**Sample Custodian to Complete:**

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

Notify the PC immediately if any problems are noted.

**PC to Complete:**

Samples acceptable for release? Yes      PC Initials RWB      Date 5/26/06

If no, comment on communication and resolution:  
*Chain of custody only listed GEA and ICP metals. Work order listed SVOC, Hg and ppt. Customer gave verbal agreement to work according to COC w/ Hg added - will follow-up with email. LaBurdette*

**From:** Weiss, Richard L [richard.weiss@wch-rcc.com]  
**Sent:** Thursday, May 25, 2006 4:25 PM  
**To:** Bushaw, Ruth A; Kessner, Joan H  
**Subject:** RE: 618-2 SAFE Samples - Issue with the Chain of Custody Instructions  
Ruth,

The project no longer needs the SVOA, please cancel that. Mercury should be run to complete the metals "suite" as well as GEA. The need for the PCB screen is understood and accepted.

Rich

---

**From:** Bushaw, Ruth A [mailto:Ruth\_A\_Bushaw@RL.gov]  
**Sent:** Thursday, May 25, 2006 2:55 PM  
**To:** Weiss, Richard L; Kessner, Joan H  
**Subject:** 618-2 SAFE Samples - Issue with the Chain of Custody Instructions  
**Importance:** High

Rich and Joan,

We received the three samples from the 618-2 SAFE project this afternoon. However, upon review of the chain of custody, I noticed that it only lists GEA and ICP metals analysis. I am waiting to log in the samples until I get assurance from you that you have not changed your request from what the work order lists. I am expecting to run SVOC, ICP metals, Hg, and GEA. Please let me know as soon as possible. In the mean time, I will set up to centrifuge the sample the has about 1/4 inch of solid in the bottom of the bottle. Also, since the GKI was marked as "Unknown" for PCB TSCA status, I will have to run a PCB screen on the solid and on one liquid sample.

Please respond back ASAP so that the remaining analyses will not be delayed. I will scan and email the COCs, but they will not have the SDG number listed on them. I will send that later.

Thanks,

*Ruth A. Bushaw*

Project Coordinator  
222-S Laboratory  
373-4314

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06-ATL-112

Attachment 6

SIGNATURE PAGE

## CORRESPONDENCE DISTRIBUTION COVERSHEET

Author	Addressee	Correspondence No.
R. A. Bushaw	J. H. Kessner, H9-02	06-ATL-112
(509) 373-4314	(509) 375-4688	July 19, 2006

Subject: FINAL REPORT FOR THE 618-2 SAFE SAMPLES RECEIVED IN MAY 2006 –  
SAMPLE GROUP 222S20060604

## DISTRIBUTION

Approval	Date	Name	MSIN	Attach
		ATL Correspondence Control	R1-27	H
		<u>Advanced Technologies and Laboratories International, Inc.</u>		
<u>Jha</u>	<u>7-19-06</u>	H. L. Anastos	T6-10	X
<u>R. A. Bushaw</u>	<u>7-19-06</u>	R. A. Bushaw	T6-10	X
		J. G. Hwang	T6-10	X
		W. L. Robbins	TS-10	C
		ATL Correspondence File	T6-10	H
		Project Files	T6-10	H

Notes: C = Cover Letter only

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