FINAL REPORT FOR THE SAMPLING OF PUREX 291-A-1 STACK CONDENSATE - SAMPLE DELIVERY GROUP 222S20110101

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222-S LABORATORY

FINAL REPORT FOR THE SAMPLING OF PUREX 291-A-1 STACK CONDENSATE - SAMPLE DELIVERY GROUP 222S20110101

1.0 INTRODUCTION

This report presents the final results for the sample received on January 20, 2011 from the PUREX Stack Condensate sampling. The sample was analyzed in accordance with CHPRC-110008, *Letter of Instruction for Analysis of the PUREX 291A1 Stack Condensate* (LOI); ATL-MP-1011, *ATL Quality Assurance Project Plan for 222-S Laboratory*; SW-846, *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods;* and the additional guidance given by the customer point of contact (POC).

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

Upon sample receipt, on January 20, 2011, it was noted that the chain of custody (COC) form listed carbon-14 analysis, which was not requested in the LOI. The customer POC concurred that the COC was incorrect, and the analysis was lined out (see correspondence in Attachment 4).

The LOI requested a turnaround time for the final report of 45 days from receipt of samples at the 222-S Laboratory. However, due to a planned outage for room upgrades, which delayed the inductively coupled plasma (ICP) analysis, an extension to 60 days was approved by the customer POC (see correspondence in Attachment 4).

On February 3, 2011, the customer POC was contacted concerning a missed holding time and lack of proper preservation/storage for the total dissolved solids analysis. The customer POC indicated that this issued did not warrant resampling (see correspondence in Attachment 4).

On February 28, 2011, the customer POC requested that the laboratory add barium and uranium analytes to the requested analyte list for ICP. Since isotopic uranium was already requested from inductively coupled plasma-mass spectrometry (ICP-MS), the customer agreed to use those results to obtain a total uranium answer (see Attachment 4).

2.0 SAMPLE RECEIPT, HANDLING, AND APPEARANCE

One liquid sample, contained in four bottles, was collected on January 20, 2011 and received at the 222-S Laboratory on the same day, in good condition, and with adequate paperwork.

3.0 HOLDING TIMES

Sampling and analysis dates and times are presented in Attachment 3. As indicated in this table, all holding times were met except for total dissolved solids (TDS). For the pH analyses, the holding time in SW-846 is indicated as immediate, which implies a field measurement. An "N/A" was entered in the table in Attachment 3 to indicate that the "immediate" measurement is not applicable to laboratory analysis. The analysis was performed within 27 hours of sample collection.

As discussed in Attachment 4, the holding time for the TDS analysis was missed because the oven typically used for analysis was not heating properly. Because of the time involved in identifying and testing an alternate oven, the analysis was performed 5 days outside of the 7-day holding time. As noted previously, the customer POC indicated that this failure to meet the required holding time did not require resampling and reanalysis.

4.0 ANALYTICAL RESULTS SUMMARY

The Data Summary Report (Attachment 1) presents the final analytical results for those analytes requested in the LOI.

The "Det Limit" column in Attachment 1 contains the method detection limit (MDL) for non-radiochemical analyses or the minimum detectable activity (MDA) for radionuclides determined by radiochemical methods.

In Attachment 1, the column labeled "A#" indicates the aliquot class or the method used for sample preparation before analysis. An "S" indicates that the sample was distilled prior to analysis. Samples without a letter identifier in the "A#" column were analyzed directly with no separate preparation method 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:

"U" indicates that the reported result is less than the MDL or MDA.

"J" indicates that the reported result should be considered an estimate because of increased uncertainty near the detection limit. The "J" flag is applied to sample concentrations that are greater than the MDL but less than the estimated quantitation limit sample activity with a counting uncertainty greater than 30%.

"c" indicates that relative percent difference (RPD) between the sample and duplicate results did not meet the customer 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 analysis was performed on direct aliquots of the sample. The pH laboratory control sample (LCS) measurement and RPD met the acceptance criteria in ATL-MP-1011 and the LOI.

4.1.2 Total Dissolved Solids

The TDS analysis was performed on direct aliquots of the sample. The LCS recovery and RPD met the criteria in the LOI. The detection limit met the higher detection limit of 50 µg/mL that was accepted by the customer (see correspondence in Attachment 4).

4.1.3 Ammonium by Ion Chromatography

The ammonium ion analysis was performed on distilled aliquots of the sample. The LCS and matrix spike (MS) recoveries and RPDs met the requested criteria. The MDL was below the detection level requested in the LOI.

A low level of ammonium ion was detected in the preparation blank. However, since the concentration in the preparation blank was less than the quantitation limit, no reanalysis was required. Since the concentration in the blank was less than 5% of the concentration detected in sample, the contamination was considered insignificant and no flag was required.

4.1.4 Inductively Coupled Plasma-Atomic Emission Spectroscopy

The ICP analysis was performed on direct aliquots of the sample. All LCS and MS recoveries and RPDs met the requirements in the LOI. No requested analytes were detected in the blanks. The recoveries for cadmium in the interference check standards analyzed at the beginning and end of the analytical run were slightly low, outside the acceptance limits of 80% - 120% recovery. This is an indication that the inter-element correction for cadmium in the interference check standard was insufficient, causing a low bias. However, since the MS recovery for cadmium was acceptable, at 97%, it is the laboratory's opinion that inter-element correct for cadmium was sufficient to produce a reliable result in this sample.. The reported detection limits met the detection levels requested in the LOI.

4.1.5 Inductively Coupled Plasma-Mass Spectrometry

The ICP-MS analysis was performed on direct aliquots of the sample. The requested analytes were ^{237}Np, ^{233}U, ^{234}U, ^{235}U, ^{236}U, and ^{238}U. The LCS and MS standards consisted of ^{237}Np, ^{233}U, ^{235}U, and ^{238}U.

Direct is the most accurate type of calibration; however, standard material is not commercially available for all 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. The 222-S

Laboratory currently does not have standards available for calibration, calibration checks, or matrix spikes for ^{234}U or ^{236}U. The results for these isotopes are considered semi-quantitative.

The LCS and MS recoveries and RPDs for all analytes met the requested criteria. A low level of ^{236}U was detected in the ending method blank. The concentration detected was at the MDL but less than the quantitation limit, so reanalysis was not required. Since the concentration in the blank was less than 5% of the concentration detected in sample, the contamination was considered insignificant and no flag was required. The LOI listed detection levels for ^{235}U and ^{238}U. These detection limits were met.

4.2 RADIOCHEMICAL ANALYSIS

4.2.1 Total Alpha/Total Beta

The total alpha/total beta analysis for solids was performed on direct aliquots of the sample. The LCS and MS recoveries and RPDs met the criteria in the LOI. No alpha or beta activity was detected in the method blank. The reported MDAs met the detection levels listed in the LOI.

4.2.2 Gamma Energy Analysis

The gamma energy analysis (GEA) was performed on direct aliquots of the sample. The requested isotopes for GEA were ^{60}Co, ^{94}Nb, $^{106}Ru/Rh$, ^{125}Sb, ^{134}Cs, ^{137}Cs, $^{144}Ce/Pr$, ^{152}Eu, ^{154}Eu, ^{155}Eu, and ^{226}Ra. The LCS contains only ^{60}Co and ^{137}Cs. The LCS recoveries and RPDs, where applicable, met the requested criteria. No isotopes were detected in the preparation or method blanks.

The MDAs for ^{60}Co, ^{94}Nb, and ^{134}Cs met the detection level in the LOI. The MDAs for the other requested isotopes did not meet the requested detection level because of the presence of ^{137}Cs in the sample. The laboratory chose a sample size to obtain the lowest possible MDA.

4.2.3 Tritium

The tritium analysis was performed on direct aliquots of the sample. The LCS and MS recoveries and RPD met the requested criteria. No tritium was detected in the method blank. The MDA met the detection level in the LOI.

4.2.4 Strontium-90

The ^{90}Sr analysis was performed on direct aliquots of the sample. The LCS recovery and RPD met the requested criteria. No ^{90}Sr was detected in the method blank. The MDA met the detection level in the LOI.

4.2.5 Americium-241 and Curium-243/244

The ^{241}Am and $^{243/244}Cm$ analysis was performed on direct aliquots of the sample. The LCS contained only ^{241}Am. The LCS recovery and RPD met the requested criteria. Since no $^{243/244}Cm$ was detected in the sample, calculation of an RPD was not applicable. No ^{241}Am or $^{243/244}Cm$ activity was detected in the method blank. Since the results were above the quantitation limit, the required detection limits were not applicable.

4.2.6 Plutonium-238 and Plutonium-239/240

The ^{238}Pu and $^{239/240}$Pu analysis was performed on direct aliquots of the sample. The LCS contained only $^{239/240}$Pu. The LCS recovery met the requested criteria. The $^{239/240}$Pu results were less than the detection limits; therefore, calculation of an RPD was not applicable. The RPD for ^{238}Pu was greater than 20% and failed to meet the criteria in the LOI. The customer POC was contacted and concurred that no reanalysis was required. A "c" flag was applied to the ^{238}Pu result. No ^{238}Pu or $^{239/240}$Pu activity was detected in the method blank. The reported MDAs met the detection level in the LOI.

5.0 PROCEDURES

Table 1 lists the analytical procedures used for analysis of the PUREX 291-A-1 Stack Condensate sample.

Table 1. Analytical Procedures

Analysis	Preparation Method	Analysis Procedure
Inorganic Analyses		
pH (9040C)	Direct	LA-212-106, Rev. H-0-A
Total dissolved solids (2540C)	Direct	LA-510-115, Rev. G-0
IC (EPA Method 300.7) ammonium	LA-544-112, Rev. E-0	LA-533-101, Rev. Q-0
ICP/AES (6010C) metals	LA-505-161, Rev. J-0-A	LA-505-161, Rev. J-0-A
ICP/MS actinides	LA-506-102, Rev. F-1	LA-506-102, Rev. F-1
Radiochemical Analyses		
Total alpha/total beta	LA-508-101, Rev. M-0	LA-508-101, Rev. M-0
GEA	LA-548-121, Rev. J-0	LA-548-121, Rev. J-0
Tritium – Distillation/liquid scintillation counting	LA-218-114, Rev. G-0	LA-218-114, Rev. G-0
^{90}Sr – Separation/beta counting	LA-220-104, Rev. J-0-A	LA-220-104, Rev. J-0-A
^{241}Am, $^{239/240}$Pu, ^{238}Pu – Separation/alpha energy analysis	LA-953-104, Rev. H-1	LA-953-104, Rev. H-1

6.0 REFERENCES

ATL-MP-1011, 2010, *ATL Quality Assurance Project Plan for 222-S Laboratory*, Rev. 9-A, Advanced Technologies and Laboratories International, Inc., Richland, Washington.

Letter, from L. E. Harville, CHPRC, to R. A. Bushaw, ATL, *Letter of Instruction for Analysis of the PUREX 291-A-1 Stack Condensate*, CHPRC-110008, dated January 12, 2011.

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

PUREX Stack Condensate
Data Summary Report

Sample Group: 20110101

Customer Group or SDG Number: 222S20110101

Customer Sample ID: S11006-01

Sample Portion: Bottle 1

Sample# R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
S11M000028		7429-90-5	Aluminum	ug/mL	104	<0.0300	6.38	6.38	6.38	0.103	102	0.0600	n/a	
S11M000028		7440-39-3	Barium	ug/mL	104	<3.00E-03	0.183	0.182	0.183	0.279	99.7	6.00E-03	n/a	
S11M000028		7440-41-7	Beryllium	ug/mL	102	<1.00E-03	<2.00E-03	<2.00E-03	n/a	n/a	94.3	2.00E-03	n/a	U
S11M000028		7440-70-2	Calcium	ug/mL	107	<0.0500	336	337	337	0.297	86.8	0.100	n/a	
S11M000028		7440-43-9	Cadmium	ug/mL	106	<5.00E-03	0.0350	0.0347	0.0348	0.890	97.0	0.0100	n/a	J
S11M000028		7440-48-4	Cobalt	ug/mL	104	<0.0100	<0.0200	<0.0200	n/a	n/a	96.7	0.0200	n/a	U
S11M000028		7440-47-3	Chromium	ug/mL	106	<5.00E-03	<0.0100	<0.0100	n/a	n/a	96.8	0.0100	n/a	U
S11M000028		7439-96-5	Manganese	ug/mL	103	<3.00E-03	0.866	0.865	0.865	0.0324	96.7	6.00E-03	n/a	
S11M000028		7440-23-5	Sodium	ug/mL	108	<0.100	100	103	101	2.67	120	0.200	n/a	
S11M000028		7440-02-0	Nickel	ug/mL	105	<0.0200	0.197	0.184	0.191	7.02	97.4	0.0400	n/a	J
S11M000028		7439-92-1	Lead	ug/mL	107	<0.0500	<0.100	0.119	n/a	n/a	102	0.100	n/a	U
S11M000028		7440-62-2	Vanadium	ug/mL	105	<5.00E-03	<0.0100	<0.0100	n/a	n/a	98.1	0.0100	n/a	U
S11M000028		7440-66-6	Zinc	ug/mL	103	<5.00E-03	2.10	2.10	2.10	0.0666	98.4	0.0100	n/a	
S11M000028		13968-55-3	Uranium-233	ug/mL	100	<2.00E-07	<2.00E-04	<2.00E-04	n/a	n/a	101	2.00E-04	n/a	U
S11M000028		13966-29-5	Uranium-234	ug/mL	n/a	<5.00E-09	5.04E-05	4.49E-05	4.77E-05	11.5	n/a	5.00E-06	n/a	
S11M000028		15117-96-1	Uranium-235	ug/mL	101	<1.00E-08	5.64E-03	5.52E-03	5.58E-03	2.06	104	1.00E-05	n/a	
S11M000028		13982-70-2	Uranium-236	ug/mL	n/a	<4.00E-09	3.38E-04	3.19E-04	3.28E-04	5.63	n/a	4.00E-06	n/a	
S11M000028		13994-20-2	Neptunium-237	ug/mL	100	<1.00E-07	0.0317	0.0311	0.0314	2.07	101	1.00E-04	n/a	
S11M000028		U-238	Uranium-238	ug/mL	100	<5.00E-07	0.675	0.667	0.671	1.25	102	5.00E-04	n/a	

Sample Portion: Bottle 2

Sample# R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
S11M000029		12587-46-1	Gross alpha	uCi/mL	96.5	<1.75E-05	5.26E-03	5.23E-03	5.24E-03	0.632	95.7	8.14E-06	2.98	
S11M000029		12587-47-2	Gross beta	uCi/mL	105	<2.02E-05	0.223	0.218	0.220	2.17	95.6	2.02E-05	0.36	
S11M000029		CM-243/244	Curium-243/244	uCi/mL	n/a	<2.19E-04	<3.57E-04	<3.63E-04	n/a	n/a	n/a	3.57E-04	n/a	U
S11M000029		14596-10-2	Americium-241	uCi/mL	97.4	<5.48E-04	5.80E-03	5.66E-03	5.73E-03	2.44	n/a	8.93E-04	4.6	
S11M000029		10198-40-0	Cobalt-60	uCi/mL	99.8	<2.69E-05	<3.96E-05	<4.03E-05	n/a	n/a	n/a	3.96E-05	n/a	U
S11M000029		14681-63-1	Niobium-94	uCi/mL	n/a	<2.23E-05	<4.32E-05	<4.30E-05	n/a	n/a	n/a	4.32E-05	n/a	U

NA = Not Analyzed, ND = Not Detected

U - Less Than Detection Limit J - Estimated c - RPD Outside Range

PUREX Stack Condensate
Data Summary Report

Sample Group: 20110101

Customer Group or SDG Number: 222S20110101

Customer Sample ID: S11006-01

Sample Portion: Bottle 2

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
S11M000029			RU/RH-106	Ruthenium/Rhodium-106	uCi/mL	n/a	<3.99E-04	<1.67E-03	<1.63E-03	n/a	n/a	n/a	1.67E-03	n/a	U
S11M000029			14234-35-6	Antimony-125	uCi/mL	n/a	<6.16E-05	<4.81E-04	<4.80E-04	n/a	n/a	n/a	4.81E-04	n/a	U
S11M000029			13967-70-9	Cesium-134	uCi/mL	n/a	<2.69E-05	<8.53E-05	<8.61E-05	n/a	n/a	n/a	8.53E-05	n/a	U
S11M000029			10045-97-3	Cesium-137	uCi/mL	96.9	<3.18E-05	0.0844	0.0842	0.0843	0.273	n/a	1.36E-04	4.62	
S11M000029			CE/PR-144	Cerium/Praseodymium-144	uCi/mL	n/a	<1.79E-04	<9.80E-04	<9.86E-04	n/a	n/a	n/a	9.80E-04	n/a	U
S11M000029			14683-23-9	Europium-152	uCi/mL	n/a	<1.30E-04	<1.79E-04	<1.69E-04	n/a	n/a	n/a	1.79E-04	n/a	U
S11M000029			15585-10-1	Europium-154	uCi/mL	n/a	<7.37E-05	<1.32E-04	<1.30E-04	n/a	n/a	n/a	1.32E-04	n/a	U
S11M000029			14391-16-3	Europium-155	uCi/mL	n/a	<4.08E-05	<2.22E-04	<2.22E-04	n/a	n/a	n/a	2.22E-04	n/a	U
S11M000029			13982-63-3	Radium-226	uCi/mL	n/a	<4.11E-04	<2.33E-03	<2.32E-03	n/a	n/a	n/a	2.33E-03	n/a	U
S11M000029			PU-239/240	Plutonium-239/240	uCi/mL	102	<7.12E-06	<3.84E-06	<4.30E-06	n/a	n/a	n/a	3.84E-06	n/a	U
S11M000029			13981-16-3	Plutonium-238	uCi/mL	n/a	<7.12E-06	8.41E-06	1.07E-05	9.58E-06	24.3	n/a	3.84E-06	9.82	c
S11M000029			SR-89/90	Strontium-89/90	uCi/mL	99.5	<6.51E-05	0.0768	0.0772	0.0770	0.633	n/a	2.16E-05	0.823	

Sample Portion: Bottle 3

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
S11M000030			PH	pH	unitless	n/a	n/a	4.03	4.05	4.04	0.495	n/a	0.0100	n/a	
S11M000030			TDS	Total dissolved solids	g/mL	105	n/a	3.58E-03	3.31E-03	3.44E-03	7.84	n/a	5.00E-05	n/a	
S11M000030			10028-17-8	Tritium	uCi/mL	98.3	<1.52E-06	1.11E-04	1.10E-04	1.10E-04	0.905	98.7	1.52E-06	3.066	

Sample Portion: Bottle 4

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
S11M000032		S	14798-03-9	Ammonium	ug/mL	97.9	0.0200	562	582	572	3.53	115	0.600	n/a	

NA = Not Analyzed, ND = Not Detected

U - Less Than Detection Limit

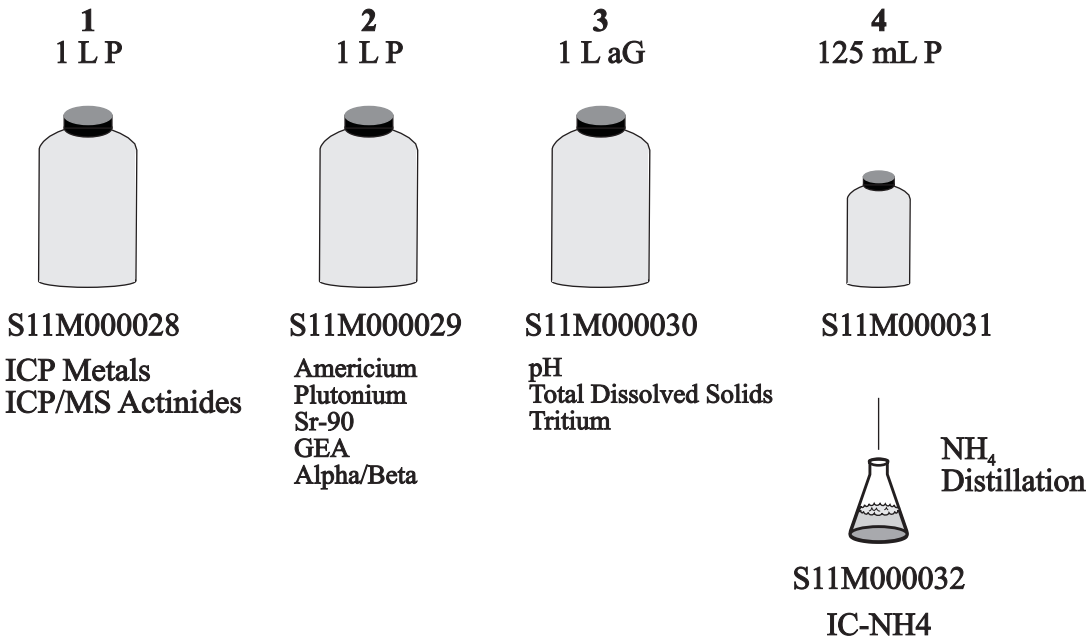
J - Estimated

c - RPD Outside Range

Attachment 2

SAMPLE BREAKDOWN DIAGRAMS

S11006-01


1
1 L P
S11M000028
ICP Metals
ICP/MS Actinides
2
1 L P
S11M000029
Americium
Plutonium
Sr-90
GEA
Alpha/Beta
3
1 L aG
S11M000030
pH
Total Dissolved Solids
Tritium
4
125 mL P
S11M000031
NH4
Distillation
S11M000032
IC-NH4

Attachment 3

HOLDING TIME REPORT

Hold Time Report

Group	Sample	Matrix	Method	Prep Method	Sample Date	Received Date	Prep Date	Analysis Date	Missed Holding Time?
20110101	S11M000030	LIQUID	PH (9040C)		01/20/11 11:10	01/20/11 13:15	N/A	01/21/11 14:30	N/A
20110101	S11M000030	LIQUID	TOTAL DISSOLVED SOLIDS (2540C)		01/20/11 11:10	01/20/11 13:15	N/A	02/01/11 15:40	**Y**
20110101	S11M000032	LIQUID	IC - ammonium (EPA 300.7)	Distillation	01/20/11 11:10	01/20/11 13:15	01/20/11 21:32	01/21/11 00:25	N
20110101	S11M000028	LIQUID	ICP Metals (6010C)		01/20/11 11:10	01/20/11 13:15	N/A	03/01/11 17:50	N
20110101	S11M000028	LIQUID	MS ACTINIDES		01/20/11 11:10	01/20/11 13:15	N/A	02/08/11 19:34	N
20110101	S11M000029	LIQUID	ALPHA/BETA		01/20/11 11:10	01/20/11 13:15	N/A	01/26/11 15:30	N
20110101	S11M000029	LIQUID	AMERICIUM		01/20/11 11:10	01/20/11 13:15	N/A	02/03/11 10:30	N
20110101	S11M000029	LIQUID	GEA		01/20/11 11:10	01/20/11 13:15	N/A	01/25/11 19:04	N
20110101	S11M000029	LIQUID	PLUTONIUM		01/20/11 11:10	01/20/11 13:15	N/A	02/01/11 14:20	N
20110101	S11M000029	LIQUID	SR-90		01/20/11 11:10	01/20/11 13:15	N/A	01/27/11 13:25	N
20110101	S11M000030	LIQUID	TRITIUM		01/20/11 11:10	01/20/11 13:15	N/A	01/26/11 14:15	N

Attachment 4

CORRESPONDENCE

Bushaw, Ruth A

From: Carter, George J
Sent: Thursday, January 20, 2011 2:18 PM
To: Bushaw, Ruth A
Subject: RE: Chain of Custody Question

Yes. My proof reading must be slipping.

Thanks,
George

From: Bushaw, Ruth A
Sent: Thursday, January 20, 2011 2:17 PM
To: Carter, George J
Subject: Chain of Custody Question

George,

When Mark updated the analysis table in the LOI, we forgot to remove C-14 from the table in step 2.1 that indicates what bottles to collect. Therefore, C-14 is now listed on the chain of custody form. I can line that out on your behave based on an email reply, if that is what you want me to do.

Thanks,

Ruth A. Bushaw
Project Manager
Advanced Technologies and Laboratories International, Inc.
Contractor to the Office of River Protection
U.S. Department of Energy
222-S Laboratory
office: 509-373-4314
cell: 509-554-4978

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Bushaw, Ruth A

From: Carter, George J
Sent: Thursday, January 20, 2011 2:16 PM
To: Bushaw, Ruth A
Cc: Halgren, Dale L; Hansen, Daniel R; Schroeder, Robert W; Bushaw, Thomas H; Bowman, Mark W; Hogan, James G; Polzin, David L (Dave); Harville, L E (Harv)
Subject: RE: PUREX Stack Condensate Sample

Ruth – The tank is filling and needs to be pumped, so we will work to your 60 day schedule by using portable totes until we can get ETF approval. Do you have enough sample since half of the quantity was obtained? - George

---

From: Bushaw, Ruth A
Sent: Thursday, January 20, 2011 2:07 PM
To: Carter, George J; Bowman, Mark W
Cc: Halgren, Dale L; Hansen, Daniel R; Schroeder, Robert W; Bushaw, Thomas H
Subject: RE: PUREX Stack Condensate Sample
Importance: High

George,

Concerning the ICP issues, with receipt today, the 45-day turnaround time due date would be 3/6/2011. Since that is a Sunday, we would expect to have to issue the report by COB on 3/3/2011. This means that I need to ask the lab to complete all analyses by 2/23/2011. Our latest status on getting the ICP back on line is that we aren't expecting to be able to run samples until 2/22/2011. Therefore, I will need to ask for an extension from the 45-day turnaround time for these samples. Would a 60-day turnaround time be acceptable?

I can provide you preliminary results for all of the other tests after the chemist and I review the results, but I would qualify them as preliminary until the final report is reviewed because sometimes errors are discovered on the final review.

Thanks,

Ruth A. Bushaw
Project Manager
Advanced Technologies and Laboratories International, Inc.
Contractor to the Office of River Protection
U.S. Department of Energy 222-S Laboratory
373-4314

From: Carter, George J
Sent: Thursday, January 20, 2011 1:27 PM
To: Bowman, Mark W
Cc: Bushaw, Ruth A; Halgren, Dale L
Subject: RE: PUREX Stack Condensate Sample

Mark - Thanks! Just a quick update, we sampled this morning and found clear, pH neutral, liquid. However, the bottles had ~2 mR/hr and took some effort to package for 0.5 mR/hr transport. The samplers made it happen… I know the lab has some ICP issues, so will attempt to run some Micro-Shield estimates for our temporary 250 gal totes.

Thanks,
George

From: Bowman, Mark W
Sent: Thursday, January 20, 2011 1:23 PM
To: Carter, George J
Cc: Bushaw, Ruth A; Halgren, Dale L
Subject: RE: PUREX Stack Condensate Sample

No

From: Carter, George J
Sent: Thursday, January 20, 2011 1:09 PM
To: Bowman, Mark W; Halgren, Dale L
Cc: Bushaw, Ruth A
Subject: FW: PUREX Stack Condensate Sample

Mark/Dale - Does ETF need the PUREX Condensate data in HEIS?

Thanks,
George

From: Bushaw, Ruth A
Sent: Thursday, January 20, 2011 12:28 PM
To: Carter, George J
Subject: PUREX Stack Condensate Sample

George,

Will the results for these samples have to be uploaded to the HEIS database?

Thanks,
Ruth A. Bushaw

Project Manager
Advanced Technologies and Laboratories International, Inc.
Contractor to the Office of River Protection
U.S. Department of Energy
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Bushaw, Ruth A

From: Halgren, Dale L
Sent: Monday, January 31, 2011 8:17 AM
To: Bushaw, Ruth A; Bowman, Mark W
Cc: Carter, George J; Schroeder, Robert W; Dang, Brian V
Subject: RE: Acceptance Criteria for TDS for PUREX Stack Condensate

Hello Ruth,

We can accept a DL of 50 ug/mL. Based on the previous results for this waste stream we would expect the concentration to be much higher than that.

Thanks,
Dale Halgren
LWFS Engineering
CH2MHILL PRC
o 509-376-9988
c 509-628-6411

From: Bushaw, Ruth A
Sent: Friday, January 28, 2011 2:54 PM
To: Bowman, Mark W; Halgren, Dale L
Cc: Carter, George J; Schroeder, Robert W; Dang, Brian V
Subject: Acceptance Criteria for TDS for PUREX Stack Condensate
Importance: High

Mark and Dale,

The LOI for the PUREX Stack Condensate sample requests a detection limit of 10 μg/mL for the TDS (total dissolved solids) measurement. We need to use 250 mL of sample to achieve that detection limit and we currently are having difficulty finding an oven in the lab to handle a beaker large enough to run that much sample. We might be better able to handle a 50 mL sample size. This will give a detection limit of 50 μg/mL. Will this be acceptable to meet your decision needs?

Thanks,
Ruth A. Bushaw
Project Manager
Advanced Technologies and Laboratories International, Inc.
Contractor to the Office of River Protection
U.S. Department of Energy
222-S Laboratory
office: 509-373-4314
cell: 509-554-4978

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Bushaw, Ruth A

From: Halgren, Dale L
Sent: Monday, February 07, 2011 9:32 AM
To: Bushaw, Ruth A; Carter, George J
Cc: Bowman, Mark W
Subject: RE: Plutonium Results for PUREX Stack Condensate

OK, let's go forward with the data flagged as specified.

Thanks,
Dale Halgren
o 509-376-9988
c 509-628-6411

From: Bushaw, Ruth A
Sent: Thursday, February 03, 2011 1:42 PM
To: Halgren, Dale L; Carter, George J
Cc: Bowman, Mark W
Subject: RE: Plutonium Results for PUREX Stack Condensate

Dale,

The count rate for the Pu-238 was quite low. The uncertainty with low count rates makes RPDs questionable. Therefore, we can't say that one result is any more representative than the other. I would think it would be most conservative to use the higher result in your acceptance evaluation. If using the duplicate result is acceptable for your evaluation, I will accept these results. However, since the level of the tracer provides a counting uncertainty < 15%, we will need to apply a "c" flag to the sample result for Pu-238 to indicate that the RPD was outside of your requested limits.

Since it is unusual, in normal processes, to detect Pu-238 at a higher activity than Pu-239/240, remember that some of the reported Pu-238 activity could be from leak through of Am-241. The activity of Am-241 in this sample was significantly higher (~ 5 - 6 E-3 µCi/mL). Unfortunately, we don't have an easy way to determine if there is leak through because the other methods that we have for detecting Am-241 don't have sufficient detection limits to detect the level of activity that might have leaked through into the plutonium fraction to get mounted.

Thanks,
Ruth A. Bushaw
Project Manager
Advanced Technologies and Laboratories International, Inc.
Contractor to the Office of River Protection
U.S. Department of Energy 222-S Laboratory
373-4314

From: Halgren, Dale L

Sent: Thursday, February 03, 2011 1:00 PM
To: Carter, George J; Bushaw, Ruth A
Cc: Bowman, Mark W
Subject: RE: Plutonium Results for PUREX Stack Condensate

Are there any theories on the high RPD? Does any of the other QA/QC point to one result being more likely to be the most representative? I would say we could accept the data as noted but I would use the higher duplicate result for the acceptance evaluation unless there is some information to justify using the smaller value.

Thanks,
Dale Halgren
o 509-376-9988
c 509-628-6411

From: Carter, George J
Sent: Thursday, February 03, 2011 10:34 AM
To: Bushaw, Ruth A
Cc: Halgren, Dale L; Bowman, Mark W
Subject: RE: Plutonium Results for PUREX Stack Condensate

Ruth – I need Mark and Dale to evaluate for acceptance of our condensate. I'll keep my fingers crossed…
My PC is being worked on, so I may be off-line for the rest of the week… Please continue to keep Mark and Dale copied on anything significant.

Thanks,
George

From: Bushaw, Ruth A
Sent: Thursday, February 03, 2011 10:27 AM
To: Carter, George J
Cc: Halgren, Dale L; Bowman, Mark W
Subject: Plutonium Results for PUREX Stack Condensate
Importance: High

George,

For the plutonium analysis of the PUREX Stack Condensate sample, the chem tech chose a sample size based on a quick check of the gross alpha activity and no plutonium was detected. However, since the reported "less than" result of < 3.87E-05 μCi/mL was above your requested detection limit of 1.0E-05 μCi/mL, I asked them to rerun with a larger sample size.

In the reanalysis, even though a small peak was observed for Pu-239/240, it was below our level of quantification and is reported as < 3.84E-06 μCi/mL. However, we now have a positive result for Pu-238, which could possibly (but not very likely) be due to a slight leak through of Am-241 during the separation. The Pu-238 result is 8.41E-06 μCi/mL, with a detection limit of 3.84E-06 μCi/mL. The problem with this analysis

is that the duplicate result for Pu-238 of 1.07E-05 μCi/mL gives an RPD of 24.3%, which doesn't meet your criteria of ≤ 20%. Since the sample results are at or below your requested detection limit, will these be acceptable without a reanalysis?

Thanks,

Ruth A. Bushaw
Project Manager
Advanced Technologies and Laboratories International, Inc.
Contractor to the Office of River Protection
U.S. Department of Energy
222-S Laboratory
office: 509-373-4314
cell: 509-554-4978

Bushaw, Ruth A

From: Halgren, Dale L
Sent: Monday, February 14, 2011 10:13 AM
To: Carter, George J; Bushaw, Ruth A
Cc: Bowman, Mark W; Wyse, Eric J; Hansen, Daniel R
Subject: RE: Solids and Ammonium Results for PUREX Stack Condensate

The TDS results should be reported with the appropriate QA flags noted in the report. The preservation issue described does not warrant resampling from our evaluation perspective.

Thanks,
Dale Halgren
o 509-376-9988
c 509-628-6411

From: Carter, George J
Sent: Monday, February 07, 2011 9:40 AM
To: Bushaw, Ruth A
Cc: Halgren, Dale L; Bowman, Mark W; Wyse, Eric J; Hansen, Daniel R
Subject: RE: Solids and Ammonium Results for PUREX Stack Condensate

Ruth,

It should be understood that this sample is from a vented tank collecting water for decades. I was surprised at the clarity of the sample to be honest. With the understanding that the tank is 20-ft below grade and at about 56 degrees, I need to ask if this is an issue with your lab procedures and/or with ETF acceptance.
In that, do we need to resample?

Thanks,
George

From: Bushaw, Ruth A
Sent: Thursday, February 03, 2011 4:18 PM
To: Bushaw, Ruth A; Carter, George J
Cc: Halgren, Dale L; Bowman, Mark W; Wyse, Eric J; Hansen, Daniel R
Subject: RE: Solids and Ammonium Results for PUREX Stack Condensate

I forgot to provide the preliminary ammonium results.

The sample result was ~ 562 µg/mL ammonium. The duplicate was ~ 582 µg/mL ammonium, with an RPD of 3.5%.

Thanks,
Ruth A. Bushaw
Project Manager

Advanced Technologies and Laboratories International, Inc.
Contractor to the Office of River Protection
U.S. Department of Energy 222-S Laboratory
373-4314

From: Bushaw, Ruth A
Sent: Thursday, February 03, 2011 3:55 PM
To: Carter, George J
Cc: Halgren, Dale L; Bowman, Mark W; Wyse, Eric J; Hansen, Daniel R
Subject: Solids and Ammonium Results for PUREX Stack Condensate
Importance: High

George,

As I previously indicated to you, we recently discovered that the oven that we had for performing the TDS analysis was not functioning properly. Since we rarely get requests for this analysis on samples with radioactivity, we had not yet identified another oven in a hood to use for this analysis. Because of the time involved in identifying and testing a different oven, we ran the analysis 5 days outside of the 7-day holding time. The Laboratory procedure references Method 2540C, *Standard Methods for Examination of Water and Waste Water*, which indicates that the samples require cooling to 4 °C to reduce microbiological decomposition of the solids and that the samples should be analyzed within 7 days. The COC indicated no preservation required and the samples were not delivered in an ice chest. The laboratory failed to cool the samples upon receipt. The laboratory is unable to evaluate the potential affect of microbial action. In addition, the laboratory's opinion is that cooling the sample could potentially lead to precipitation of dissolved solids, which would be detrimental to this analysis.

I attached a copy of the COC and sample receipt checklist for your review.

The TDS results we obtained were 0.00358 g/mL (3580 μg/mL) with a detection limit of 5.0E-5 g/mL (50 μg/mL). The duplicate result was 0.0031 g/mL with an RPD of 7.8%.

<< File: PUREX Stack Condensate Receipt Paperwork.pdf >>

Thanks,

Ruth A. Bushaw

Project Manager
Advanced Technologies and Laboratories International, Inc.
Contractor to the Office of River Protection
U.S. Department of Energy
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Bushaw, Ruth A

To: Halgren, Dale L
Subject: RE: ICP Analysis for PUREX Stack Condensate

From: Halgren, Dale L
Sent: Monday, March 14, 2011 1:55 PM
To: Bushaw, Ruth A
Subject: RE: ICP Analysis for PUREX Stack Condensate

Ruth,

Reporting as described below will be fine.

Thanks,
Dale Halgren
o 509-376-9988
c 509-628-6411

From: Bushaw, Ruth A
Sent: Monday, February 28, 2011 3:49 PM
To: Halgren, Dale L
Cc: Carter, George J
Subject: RE: ICP Analysis for PUREX Stack Condensate

You'll have isotopic uranium results from the ICP/MS. If we were to report total uranium from the ICP/MS, the chemist said that she uses the U-238 result to closely approximate total uranium.

Therefore, I will only add Ba to the ICP list.
Thanks,
Ruth A. Bushaw

Project Manager
Advanced Technologies and Laboratories International, Inc.
Contractor to the Office of River Protection
U.S. Department of Energy 222-S Laboratory
373-4314

From: Halgren, Dale L
Sent: Monday, February 28, 2011 3:44 PM
To: Bushaw, Ruth A
Cc: Carter, George J
Subject: FW: ICP Analysis for PUREX Stack Condensate
Importance: High

Hello Ruth,

Please add Ba and U unless the total uranium was being done by some other method.

Thanks,
Dale Halgren
o 509-376-9988
c 509-628-6411

From: Bowman, Mark W
Sent: Monday, February 28, 2011 12:32 PM
To: Halgren, Dale L
Subject: FW: ICP Analysis for PUREX Stack Condensate
Importance: High

Dale, could you help Ruth out?

From: Bushaw, Ruth A
Sent: Monday, February 28, 2011 9:43 AM
To: Bowman, Mark W; Carter, George J
Subject: ICP Analysis for PUREX Stack Condensate
Importance: High

Mark,

I left you a voice mail, but thought I would also send an email. For the PUREX Stack Condensate sample, you edited the list in the LOI to show only the following ICP metals: Al, Be, Cd, Ca, Cr, Co, Mn, Ni, Pb, Na, V, and Zn. Is there any chance that you will change your mind and want to look at results for other analytes if we detect them? I typically do not report "opportunistic" analytes with these types of samples. If you truly only care about the analytes listed above, I will remove all other analytes from the method. This will make the analysis a little quicker and easier if we don't have to make sure that the QC passes for all the other non-requested analytes. Also, the upload is easier. However, if you come back later and want us to report some other analyte, it's more difficult to get that added back in.

Please let me know soon because they are getting closer to being ready to run samples and I want the LIMS setup properly before they batch the samples.

Thanks,

Ruth A. Bushaw
Project Manager
Advanced Technologies and Laboratories International, Inc.
Contractor to the Office of River Protection
U.S. Department of Energy
222-S Laboratory
office: 509-373-4314
cell: 509-554-4978

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Attachment 5

RECEIPT PAPERWORK

ATL	SAMPLE RECEIPT AND CHAIN OF CUSTODY VERIFICATION CHECKLIST	LO-090-101 Rev GG.0

Date Samples Received: 1.20.11 Group #: 20110101

Number of Samples: 4

Sample Custodian: RHtad

Sample Custodian to Complete:

Action	OK? (Y/N)	N/A	Comments
RSA/COC provided?	Y		
RSR provided?	Y		
Verify GKI is complete	Y		
Check that outer custody seal is intact, if present		✓	RT 1.20.11 No custody seal was present
Record cooler temperature in centigrade, as appropriate		✓	☐ 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	Y		
• Sampling location or origin	Y		
• Container type, size, and number	Y		
• Analysis request is clear	Y		
• Signature of persons relinquishing and receiving samples	Y		
• Date and/or 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 PM immediately if any problems are noted. (A "No" answer requires Project Manager resolution.)

PM to Complete:

Samples acceptable for release? Yes PM Initials RAB Date 1/20/2011

If No, comment on communication and resolution:

Other Comments:

A-6005-342 (REV 0)

CHPRC

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C # 103407

Page 1 of 1

Collector K Patterson	Contact/Requestor CARTER, GEORGE	Tel. No. 373-2141 MSIN S2-42 FAX
SAF Number S11-006	Sample Origin Purex 291 CONDENSAT	Purchase Order/Charge Code 300250
Project Title PUREX Tank Condensate	Logbook # HNF-N-507-16	Ice Chest # N/A Temp.
Shipped To (Lab) 222-S	Method of Shipment Gov. Vehicle	Bill of Lading/Air Bill No. N/A
Protocol RCRA	Data Turnaround 30 Days	Offsite Property No. N/A

Sample No.	Lab. ID	*	Date	Time	No/Type Container	Sample Analysis	Perservative
✓ S11006-01	S11M000031	L	1-20-11	1110	(1) 125 P	Ammonium	H2SO4
✓ S11006-01	S11M000028 S11M000029	L	1	1	(2) 1000 P	Metals, ICPAES, ICPMS, and Radiochemistry	HNO3
✓ S11006-01	S11M000030	L	1	1	(1) 1000 aG	pH, TDS, H-3, C-14 Not requested in SAP. Changed per email from customer. RAB 1/20/2011	NONE

POSSIBLE SAMPLE HAZARDS/REMARKS List all known wastes. MSDS Yes ☐ No ☐	SPECIAL INSTRUCTIONS Hold Time

Relinquished By Print	Sign	Date/Time	Received By Print	Sign	Date/Time
K Patterson	K Patterson	1-20-11 1315	RTSteele	RTSteele	1-20-11 1315
Relinquished By		Date/Time	Received By		Date/Time
Relinquished By		Date/Time	Received By		Date/Time
Relinquished By		Date/Time	Received By		Date/Time

Matrix *

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

FINAL SAMPLE DISPOSITION	Disposal Method e.g. Return to customer, per lab procedure, used in process.	Disposed By	Date/Time

DFNW-SS-010

GENERATOR KNOWLEDGE INFORMATION

1. Chain of Custody Number _____ CACN/COA 300250/FA60 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

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

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

NONE

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

WT01:	○ Yes	⊘ No	○ Unknown		WP01:	○ Yes	⊘ No	○ Unknown
WT02:	○ Yes	⊘ No	○ Unknown		WP02:	○ Yes	⊘ No	○ Unknown
W001:	○ Yes	⊘ No	○ Unknown		WP03:	○ Yes	⊘ No	○ Unknown
List constituents and concentrations:					F003:*	○ Yes	⊘ No	○ Unknown

(*State mixture rule for ignitability)

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 GJ CARTER GJ Carter Date 12/20/10

A-6002-990 (08/03)