

SAF-RC-010
ERDF Semiannual Leachate Analysis
FINAL VALIDATION PACKAGE

COMPLETE COPY OF VALIDATION PACKAGE TO:

Kathy Wendt H4-21

COMMENTS:

SDG J02082 SAF-RC-010

Waste Site: ERDF Semi-Annual Leachate Analysis
Spring 2014

Date: 9 February 2015
To: Washington Closure Hanford (technical representative)
From: ELR Consulting
Project: ERDF Semiannual Leachate Analysis - Spring 2014
Subject: Wet Chemistry - Data Package No. J02082-TAL

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. J02082 prepared by TestAmerica (TAL). A list of samples validated along with the analyses reported and the requested analytes is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analyte
J1T256	2/4/14	Water	C	See note 1
J1T257	2/4/14	Water	C	See note 1

1 - Alkalinity by 310.1, nitrate/nitrite by 353.2, total organic halides (TOX) by 9020B, specific conductance by 9050A, IC anions by 300.0, total dissolved solids by 160.1, total suspended solids by 160.2 and pH by 9040B.

Data validation was conducted in accordance with the WCH validation statement of work and WCH-173, Rev. 1, "Environmental Restoration Disposal Facility Leachate Sampling & Analysis Plan". Appendices 1 through 6 provide the following information as indicated below:

- Appendix 1. Glossary of Data Reporting Qualifiers
- Appendix 2. Summary of Data Qualification
- Appendix 3. Annotated Laboratory Reports
- Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
- Appendix 5. Data Validation Supporting Documentation
- Appendix 6. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

• Holding Times & Sample Preservation

Analytical holding times are assessed to ascertain whether the holding time requirements have been met by the laboratory. The holding time requirements are as follows: 28 days for bromide, chloride, fluoride, sulfate, specific conductivity, nitrate/nitrite, TOX; 14 days for alkalinity, TDS and TSS; 2 days for nitrate, nitrite and orthophosphate; immediate (24 hours) for pH.

If holding times are exceeded, but not by greater than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all

associated detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

Due to the holding time being exceeded by greater twice the limit, all pH results were qualified as estimates and flagged "J".

Due to the holding time being exceeded by less than twice the limit, all nitrate, nitrite and orthophosphate results were qualified as estimates and flagged "J".

All holding times were met for all parameters and samples.

- **Method Blanks**

Method blank analyses are performed to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples. No contaminants should be present in the method blank. All blank results must fall below the contract required detection limit (CRQL) to be acceptable.

All method blank results were acceptable.

Field Blanks

No equipment blank was submitted for analysis.

- **Accuracy**

Matrix Spike Analysis & Blank Spike Analysis

Matrix spike analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike recoveries must fall within the range of 75% to 125%. Samples with a spike recovery of less than 30% and a sample value below the instrument detection limit (IDL) are rejected and flagged "UR". Samples with a spike recovery of 30% to 74% and a sample result less than the IDL are qualified "UJ". Samples with a spike recovery of greater than 125% or less than 75% and a sample result greater than the IDL are qualified "J". Finally, for samples with a spike recovery greater than 125% and a sample result less than the IDL, no qualification is required.

Due to the lack of a matrix spike analysis, all specific conductance, total dissolved solids, total suspended solids and alkalinity results were qualified as estimates and flagged "J".

Due to matrix spike recoveries outside QC limits, all nitrate/nitrite (76%), nitrite (140%) and bromide (132%) results were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

- **Precision**

- Laboratory Duplicate Samples

- Laboratory duplicate sample analyses are used to measure laboratory precision and sample homogeneity. Results must be within relative percent difference (RPD) limits of plus or minus 20% for water samples. If RPD values are out of specification and the sample concentration is greater than five times the project quantitation limit (MDL) or CRQL, all associated sample results are qualified as estimated and flagged "J". If RPD values are plus or minus two times the MDL/CRQL and the sample concentration is less than five times the MDL/CRQL, all associated sample results are qualified as estimated and flagged "J/UJ". The performance criteria for aqueous laboratory duplicates are an RPD less than 20% for positive sample results greater than five times the MDL/CRQL or plus or minus the MDL/CRQL for positive sample results less than five times the MDL/CRQL. Sample results outside the criteria are qualified as estimates and flagged "J/UJ".

- All laboratory duplicate results were acceptable.

- Field Duplicate Samples

- One set of field duplicates (J1T256/J1T257) were submitted for analysis. Field duplicate results are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

- **Analytical Detection Levels**

- Reported analytical detection levels are compared against the minimum detection limits (MDLs) to ensure that laboratory detection levels meet the required criteria. All results met the MDLs.

- **Completeness**

- The completion percentage was Data package SDG No. J02082 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

The following minor deficiency was noted:

- Due to the holding time being exceeded by greater than twice the limit, all pH results were qualified as estimates and flagged "J".
- Due to the holding time being exceeded by less than twice the limit, all nitrate, nitrite and orthophosphate results were qualified as estimates and flagged "J".
- Due to the lack of a matrix spike analysis, all specific conductance, total dissolved solids, total suspended solids and alkalinity results were qualified as estimates and flagged "J".
- Due to matrix spike recoveries outside QC limits, all nitrate/nitrite (76%), nitrite (140%) and bromide (132%) results were qualified as estimates and flagged "J".

Data flagged "J" indicates that the associated concentration is an estimate, but under the WCH statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

REFERENCES

Washington Closure Hanford Contract #S00W307A00 (March 2008), *Data Validation Services*.

WCH-173, Rev 1, *Environmental Restoration Disposal Facility Leachate Sampling and Analysis Plan*, October 2014.

Appendix 1
Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with WCH procedures are as follows:

- U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.
- UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- J - Indicates the compound or analyte was analyzed for and detected. The associated concentration is an estimate, but the data are usable for decision-making purposes.
- R - Indicates the compound or analyte was analyzed for, detected, and due to an identified QC deficiency, the data are unusable.
- UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified QC deficiency.
- NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2
Summary of Data Qualification

WET CHEMISTRY DATA QUALIFICATION SUMMARY*

SDG: J02082	REVIEWER: ELR	Project: ERDF	PAGE <u>1</u> OF <u>1</u>
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Specific conductance TSS TDS Alkalinity	J	All	No MS analysis
pH nitrate nitrite orthophosphate	J	All	Hold time
nitrate/nitrite nitrite bromide	J	All	MS recovery

* - The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

Appendix 3
Annotated Laboratory Reports

Analytical Data

Client: Washington Closure Hanford

Job Number: 280-51884-1

Sdg Number: J02082

General Chemistry

Client Sample ID: J1T256
 Lab Sample ID: 280-51884-1
 Client Matrix: Water

Handwritten: 2/9/14

Date Sampled: 02/04/2014 0826
 Date Received: 02/06/2014 1045

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Nitrate Nitrite as N	76.5	N D J	mg/L	0.38	1.5	20	353.2
Analysis Batch: 280-214895		Analysis Date: 02/12/2014 2345					
Total Organic Halogens - Dup	0.069		mg/L	0.015	0.040	1.0	9020B
Analysis Batch: 280-212592		Analysis Date: 02/11/2014 0949					
Bromide	3.4	J	mg/L	0.11	0.20	1.0	9056A
Analysis Batch: 280-211762		Analysis Date: 02/06/2014 1826					
Nitrate as N	66.2	D J	mg/L	0.84	5.0	20	9056A
Analysis Batch: 280-211761		Analysis Date: 02/06/2014 2223					
Chloride	309	D	mg/L	5.1	60.0	20	9056A
Analysis Batch: 280-211762		Analysis Date: 02/06/2014 2223					
Nitrite as N	0.049	U J	mg/L	0.049	0.25	1.0	9056A
Analysis Batch: 280-211761		Analysis Date: 02/06/2014 1826					
Fluoride	0.33	B	mg/L	0.060	0.50	1.0	9056A
Analysis Batch: 280-211762		Analysis Date: 02/06/2014 1826					
Orthophosphate as P	0.19	U J	mg/L	0.19	0.50	1.0	9056A
Analysis Batch: 280-211761		Analysis Date: 02/06/2014 1826					
Sulfate	582	D	mg/L	4.6	100	20	9056A
Analysis Batch: 280-211762		Analysis Date: 02/06/2014 2223					
Alkalinity	307	J	mg/L	1.1	5.0	1.0	SM 2320B
Analysis Batch: 280-212611		Analysis Date: 02/11/2014 1323					
Total Dissolved Solids	1970	J	mg/L	9.4	20.0	1.0	SM 2540C
Analysis Batch: 280-212078		Analysis Date: 02/07/2014 1633					
Total Suspended Solids	1.1	U J	mg/L	1.1	4.0	1.0	SM 2540D
Analysis Batch: 280-212374		Analysis Date: 02/10/2014 2321					
Analyte	Result	Qual	Units	RL	RL	Dil	Method
pH	7.58	J	SU	0.100	0.100	1.0	9040B
Analysis Batch: 280-211920		Analysis Date: 02/06/2014 2107					
Specific Conductance	2670	J	umho/cm	1.00	1.00	1.0	9050A
Analysis Batch: 280-212991		Analysis Date: 02/13/2014 2032					

Analytical Data

Client: Washington Closure Hanford

Job Number: 280-51884-1

Sdg Number: J02082

General Chemistry

Client Sample ID: J1T257

Lab Sample ID: 280-51884-2

Client Matrix: Water

✓
2/9/15

Date Sampled: 02/04/2014 0826

Date Received: 02/06/2014 1045

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Nitrate Nitrite as N	135	D J	mg/L	0.38	1.5	20	353.2
	Analysis Batch: 280-214895		Analysis Date: 02/12/2014 2350				
Total Organic Halogens - Dup	0.079		mg/L	0.015	0.040	1.0	9020B
	Analysis Batch: 280-212592		Analysis Date: 02/11/2014 0949				
Bromide	3.5	N J	mg/L	0.11	0.20	1.0	9056A
	Analysis Batch: 280-211762		Analysis Date: 02/06/2014 1842				
Nitrate as N	65.6	D J	mg/L	0.84	5.0	20	9056A
	Analysis Batch: 280-211761		Analysis Date: 02/06/2014 2239				
Chloride	310	D	mg/L	5.1	60.0	20	9056A
	Analysis Batch: 280-211762		Analysis Date: 02/06/2014 2239				
Nitrite as N	0.049	U N J	mg/L	0.049	0.25	1.0	9056A
	Analysis Batch: 280-211761		Analysis Date: 02/06/2014 1842				
Fluoride	0.32	B	mg/L	0.060	0.50	1.0	9056A
	Analysis Batch: 280-211762		Analysis Date: 02/06/2014 1842				
Orthophosphate as P	0.19	U J	mg/L	0.19	0.50	1.0	9056A
	Analysis Batch: 280-211761		Analysis Date: 02/06/2014 1842				
Sulfate	576	D	mg/L	4.6	100	20	9056A
	Analysis Batch: 280-211762		Analysis Date: 02/06/2014 2239				
Alkalinity	309	J	mg/L	1.1	5.0	1.0	SM 2320B
	Analysis Batch: 280-212611		Analysis Date: 02/11/2014 1333				
Total Dissolved Solids	1970	J	mg/L	9.4	20.0	1.0	SM 2540C
	Analysis Batch: 280-212078		Analysis Date: 02/07/2014 1633				
Total Suspended Solids	2.8	U J	mg/L	2.8	10.0	1.0	SM 2540D
	Analysis Batch: 280-212374		Analysis Date: 02/10/2014 2321				
Analyte	Result	Qual	Units	RL	RL	Dil	Method
pH	7.63	J	SU	0.100	0.100	1.0	9040B
	Analysis Batch: 280-211920		Analysis Date: 02/06/2014 2107				
Specific Conductance	2700	J	umho/cm	1.00	1.00	1.0	9050A
	Analysis Batch: 280-212991		Analysis Date: 02/13/2014 2032				

Appendix 4
Laboratory Narrative and Chain-of-Custody Documentation

CASE NARRATIVE

Revision 1

Client: Washington Closure Hanford

Project: WASHINGTON CLOSURE HANFORD

Report Number: 280-51884-1

SDG #: J02082

SAF#: RC-010

Date SDG Closed: February 6, 2014

Data Deliverable: 45 Day / Summary

<u>CLIENT ID</u>	<u>LAB ID</u>	<u>ANALYSES REQUESTED</u>	<u>ANALYSES PERFORMED</u>
J1T256	280-51884-1	8260A/8010/2320/2540C/2540D/9050/9058/ 353.2/9020/9040	8260B/6010B/2320B/2540C/2540D/9050A/9058A/ 353.2/9020B/9040B
J1T257	280-51884-2	8260A/8010/2320/2540C/2540D/9050/9058/ 353.2/9020/9040	8260B/6010B/2320B/2540C/2540D/9050A/9058A/ 353.2/9020B/9040B
J1T258	280-51884-3	8260A	8260B

I certify that this data package is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed in this Case Narrative. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or a designee, as verified by the signature on the Report Cover.

With exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. All laboratory quality control samples analyzed in conjunction with the samples in this project were within established control limits, with any exceptions noted. Calculations are performed before rounding to avoid round-off errors in calculated results.

This report includes reporting limits (RLs) less than TestAmerica Denver's practical quantitation limits. These reporting limits are being used specifically at the client's request to meet the needs of this project. Please note that data are not normally reported to these levels without qualification, since they are inherently less reliable and potentially less defensible than required by the current NELAC standards.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

Revision 1 - 2/28/2014

This report has been revised to correct the Nitrate Nitrite as N data reported for samples J1T256 and J1T257. The 20X dilution factor was mistakenly not included in the original report.

RECEIPT

The samples were received on 2/6/2014 10:45 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 0.3° C.

Samples J1T256 and J1T257, requesting Nitrate as N, Nitrite as N and Orthophosphate as P 9056A analyses, were received at the laboratory after the recommended 48 hour sample holding times had expired. The client was notified on 2/7/2014.

GC/MS VOLATILES - SW846 8260B

The method required MS/MSD analysis was not performed for batch 280-213231, due to analyst oversight. The acceptable LCS analysis data indicated that the analytical system was operating within control.

No other anomalies were encountered.

TOTAL METALS - SW846 6010B

Low levels of Barium and Zinc are present in the method blank associated with batch 280-211892. Because the concentrations in the method blank are not present at a level greater than half the reporting limit, corrective action is deemed unnecessary.

It can be noted that the sample amount was greater than four times the spike amount for Calcium and Sodium in the Matrix Spike performed on sample J1T256; therefore, control limits are not applicable.

No other anomalies were encountered.

GENERAL CHEMISTRY - MCAWW 353.2 - NITRATE NITRITE as N

Each sample is analyzed to achieve the lowest possible reporting limits within the constraints of the method. Due to high constituent concentration, the Nitrate Nitrite as N analysis of samples J1T256 and J1T257 had to be performed at dilutions, and the associated results have been flagged with a "D". The reporting limits have been adjusted relative to the dilutions required.

The Matrix Spike performed on sample J1T256 exhibited the percent recovery outside the control limits, and the associated sample result has been flagged "N". There is no indication that the analytical system was operating out of control, and method accuracy has been verified by the acceptable LCS analysis data; therefore, corrective action is deemed unnecessary.

No other anomalies were encountered.

GENERAL CHEMISTRY - SW846 9020B - TOTAL ORGANIC HALOGENS

Samples exhibited elevated detection limits due to the limited sample volume used. The nominal sample amount could not be used due to the nature of the sample matrix.

No other anomalies were encountered.

GENERAL CHEMISTRY - SW846 9056A - ANIONS

The Nitrate as N, Nitrite as N and Orthophosphate as P analyses for samples J1T256 and J1T257 were performed outside the recommended 48 hour sample holding times. The holding times were expired at the time of sample receipt. The client was notified on 2/7/2014.

Each sample is analyzed to achieve the lowest possible reporting limits within the constraints of the method. Due to high constituent concentration, samples J1T256 and J1T257 required dilutions prior to the analysis of Nitrate as N, Chloride and Sulfate, and the associated results have been flagged with a "D". The reporting limits have been adjusted relative to the dilutions required.

The Matrix Spike performed on sample J1T257 exhibited percent recoveries outside the control limits for Nitrite as N and Bromide, and the associated sample results have been flagged "N". In addition, it can be noted that the Bromide matrix spike concentration was present above the instrument calibration range. There is no indication that the analytical systems were operating out of control, and method accuracy has been verified by the acceptable LCS analysis data; therefore, corrective action is deemed unnecessary.

No other anomalies were encountered.

GENERAL CHEMISTRY - SM 2320B - ALKALINITY

No anomalies were encountered.

GENERAL CHEMISTRY - SM 2540C - TOTAL DISSOLVED SOLIDS

Samples exhibited elevated detection limits due to the limited sample volume used. The nominal sample amount could not be used due to high constituent concentration.

No other anomalies were encountered.

GENERAL CHEMISTRY - SM 2540D - TOTAL SUSPENDED SOLIDS

Due to the limited sample volume submitted by the client, the initial volume used for sample J1T257 and the batch duplicate analysis of sample J1T257 deviated from the standard procedure. The specified volume is 250 mLs; however, only 100 mLs were available for each. The reporting limits have been elevated accordingly.

No other anomalies were encountered.

GENERAL CHEMISTRY - SW846 9040B - PH

SU = standard units

No anomalies were encountered.

GENERAL CHEMISTRY - SW846 9050A - SPECIFIC CONDUCTANCE

No anomalies were encountered.

Appendix 5
Data Validation Supporting Documentation

GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT:	ERDF		DATA PACKAGE: J02082		
VALIDATOR:	ELR	LAB: TAC	DATE: 2/8/15		
			SDG: J02082		
ANALYSES PERFORMED					
Anions/IC	TOC	TOX	TPH-418.1	Oil and Grease	Alkalinity
Ammonia	BOD/COD	Chloride	Chromium-VI	pH	NO₃/NO₂
Sulfate	TDS TSS	TKN	Phosphate		
		SC			
SAMPLES/MATRIX					
J1T256		J1T257			
Water					

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present? Yes **No** N/A

Comments: _____

2. INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)

Initial calibrations performed on all instruments? Yes No **N/A**

Initial calibrations acceptable? Yes No **N/A**

ICV and CCV checks performed on all instruments?..... Yes No **N/A**

ICV and CCV checks acceptable?..... Yes No **N/A**

Standards traceable? Yes No **N/A**

Standards expired?..... Yes No **N/A**

Calculation check acceptable?..... Yes No **N/A**

Comments: _____

GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

3. BLANKS (Levels B, C, D, and E)

- ICB and CCB checks performed for all applicable analyses? (Levels D, E)..... Yes No N/A
- ICB and CCB results acceptable? (Levels D, E) Yes No N/A
- Laboratory blanks analyzed? Yes No N/A
- Laboratory blank results acceptable?..... Yes No N/A
- Field blanks analyzed? (Levels C, D, E) Yes No N/A
- Field blank results acceptable? (Levels C, D, E)..... Yes No N/A
- Transcription/calculation errors? (Levels D, E)..... Yes No N/A

Comments: _____
_____ *no FB* _____

4. ACCURACY (Levels C, D, and E)

- Spike samples analyzed? Yes No N/A
- Spike recoveries acceptable? Yes No N/A
- Spike standards NIST traceable? (Levels D, E)..... Yes No N/A
- Spike standards expired? (Levels D, E)..... Yes No N/A
- LCS/BSS samples analyzed?..... Yes No N/A
- LCS/BSS results acceptable?..... Yes No N/A
- Standards traceable? (Levels D, E)..... Yes No N/A
- Standards expired? (Levels D, E) Yes No N/A
- Transcription/calculation errors? (Levels D, E)..... Yes No N/A
- Performance audit sample(s) analyzed? Yes No N/A
- Performance audit sample results acceptable?..... Yes No N/A

Comments: *MS - NO₂/NO₃, nitrate, Bromide - J* _____
_____ *MS - 4 missing - Jell* _____
_____ *n. PA* _____

GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

5. PRECISION (Levels C, D, and E)

- Duplicate RPD values acceptable? Yes No N/A
- Duplicate results acceptable? Yes No N/A
- MS/MSD standards NIST traceable? (Levels D, E) Yes No N/A
- MS/MSD standards expired? (Levels D, E) Yes No N/A
- Field duplicate RPD values acceptable? Yes No N/A
- Field split RPD values acceptable? Yes No N/A
- Transcription/calculation errors? (Levels D, E) Yes No N/A

Comments: _____

6. HOLDING TIMES (all levels)

- Samples properly preserved? Yes No N/A
- Sample holding times acceptable? Yes No N/A

Comments: pH 5.2x
nitrate/nitrite/ortho < 20 - Tall

GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

7. RESULT QUANTITATION AND DETECTION LIMITS (all levels)

- Results reported for all requested analyses? Yes No N/A
- Results supported in the raw data? (Levels D, E)..... Yes No N/A
- Samples properly prepared? (Levels D, E)..... Yes No N/A
- Detection limits meet RDL? Yes No N/A
- Transcription/calculation errors? (Levels D, E)..... Yes No N/A

Comments: _____

Appendix 6

Additional Documentation Requested by Client

Quality Control Results

Client: Washington Closure Hanford

Job Number: 280-51884-1
Sdg Number: J02082

Method Blank - Batch: 280-214895

Method: 353.2
Preparation: N/A

Lab Sample ID: MB 280-214895/67
Client Matrix: Water
Dilution: 1.0
Analysis Date: 02/12/2014 2233
Prep Date: N/A
Leach Date: N/A

Analysis Batch: 280-214895
Prep Batch: N/A
Leach Batch: N/A
Units: mg/L

Instrument ID: WC_Alp 2
Lab File ID: C:\FLOW_4\0212NXNT.R5
Initial Weight/Volume:
Final Weight/Volume:

Analyte	Result	Qual	MDL	RL
Nitrate Nitrite as N	0.019	U	0.019	0.075

Method Blank - Batch: 280-214895

Method: 353.2
Preparation: N/A

Lab Sample ID: MB 280-214895/106
Client Matrix: Water
Dilution: 1.0
Analysis Date: 02/12/2014 2332
Prep Date: N/A
Leach Date: N/A

Analysis Batch: 280-214895
Prep Batch: N/A
Leach Batch: N/A
Units: mg/L

Instrument ID: WC_Alp 2
Lab File ID: C:\FLOW_4\0212NXNT.R5
Initial Weight/Volume:
Final Weight/Volume:

Analyte	Result	Qual	MDL	RL
Nitrate Nitrite as N	0.019	U	0.019	0.075

Quality Control Results

Client: Washington Closure Hanford

Job Number: 280-51884-1
Sdg Number: J02082

Method Reporting Limit Check - Batch: 280-214895

Method: 353.2
Preparation: N/A

Lab Sample ID:	MRL 280-214895/18	Analysis Batch:	280-214895	Instrument ID:	WC_Alp 2
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	C:\FLOW_4\0212NXNT.R5
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	100 mL
Analysis Date:	02/12/2014 2103	Units:	mg/L	Final Weight/Volume:	100 mL
Prep Date:	N/A				
Leach Date:	N/A				

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Nitrate Nitrite as N	0.100	0.111	111	50 - 150	

Lab Control Sample - Batch: 280-214895

Method: 353.2
Preparation: N/A

Lab Sample ID:	LCS 280-214895/107	Analysis Batch:	280-214895	Instrument ID:	WC_Alp 2
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	C:\FLOW_4\0212NXNT.R5
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	100 mL
Analysis Date:	02/12/2014 2333	Units:	mg/L	Final Weight/Volume:	100 mL
Prep Date:	N/A				
Leach Date:	N/A				

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Nitrate Nitrite as N	5.00	5.12	102	90 - 110	

Matrix Spike - Batch: 280-214895

Method: 353.2
Preparation: N/A

Lab Sample ID:	280-51884-1	Analysis Batch:	280-214895	Instrument ID:	WC_Alp 2
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	C:\FLOW_4\0212NXNT.R5
Dilution:	20	Leach Batch:	N/A	Initial Weight/Volume:	5 mL
Analysis Date:	02/12/2014 2348	Units:	mg/L	Final Weight/Volume:	5 mL
Prep Date:	N/A				
Leach Date:	N/A				

Analyte	Sample Result/Qual	Spike Amount	Result	% Rec.	Limit	Qual
Nitrate Nitrite as N	76.5	80.0	137.5	76	90 - 110	N

Quality Control Results

Client: Washington Closure Hanford

Job Number: 280-51884-1
Sdg Number: J02082

Duplicate - Batch: 280-214895

Method: 353.2
Preparation: N/A

Lab Sample ID: 280-51884-1
Client Matrix: Water
Dilution: 20
Analysis Date: 02/12/2014 2347
Prep Date: N/A
Leach Date: N/A

Analysis Batch: 280-214895
Prep Batch: N/A
Leach Batch: N/A
Units: mg/L

Instrument ID: WC_Alp 2
Lab File ID: C:\FLOW_4\0212NXNT.RS
Initial Weight/Volume:
Final Weight/Volume:

Analyte	Sample Result/Qual	Result	RPD	Limit	Qual
Nitrate Nitrite as N	76.5	82.14	7	20	

Quality Control Results

Client: Washington Closure Hanford

Job Number: 280-51884-1
Sdg Number: J02082

Method Blank - Batch: 280-212592

Method: 9020B
Preparation: N/A

Lab Sample ID: MB 280-212592/2	Analysis Batch: 280-212592	Instrument ID: WC_Thermo3
Client Matrix: Water	Prep Batch: N/A	Lab File ID: N/A
Dilution: 1.0	Leach Batch: N/A	Initial Weight/Volume: 100 mL
Analysis Date: 02/11/2014 0949	Units: mg/L	Final Weight/Volume: 100 mL
Prep Date: N/A		
Leach Date: N/A		

Analyte	Result	Qual	MDL	RL
Total Organic Halogens - Dup	0.0077	U	0.0077	0.020

Lab Control Sample - Batch: 280-212592

Method: 9020B
Preparation: N/A

Lab Sample ID: LCS 280-212592/4	Analysis Batch: 280-212592	Instrument ID: WC_Thermo3
Client Matrix: Water	Prep Batch: N/A	Lab File ID: N/A
Dilution: 1.0	Leach Batch: N/A	Initial Weight/Volume: 100 mL
Analysis Date: 02/11/2014 0949	Units: mg/L	Final Weight/Volume: 100 mL
Prep Date: N/A		
Leach Date: N/A		

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Total Organic Halogens - Dup	0.100	0.106	106	78 - 114	

Matrix Spike - Batch: 280-212592

Method: 9020B
Preparation: N/A

Lab Sample ID: 280-51884-1	Analysis Batch: 280-212592	Instrument ID: WC_Thermo3
Client Matrix: Water	Prep Batch: N/A	Lab File ID: N/A
Dilution: 1.0	Leach Batch: N/A	Initial Weight/Volume: 50 mL
Analysis Date: 02/11/2014 0949	Units: mg/L	Final Weight/Volume: 100 mL
Prep Date: N/A		
Leach Date: N/A		

Analyte	Sample Result/Qual	Spike Amount	Result	% Rec.	Limit	Qual
Total Organic Halogens - Dup	0.069	0.100	0.153	85	78 - 114	

Quality Control Results

Client: Washington Closure Hanford

Job Number: 280-51884-1
Sdg Number: J02082

Duplicate - Batch: 280-212592

**Method: 9020B
Preparation: N/A**

Lab Sample ID: 280-51884-1
Client Matrix: Water
Dilution: 1.0
Analysis Date: 02/11/2014 0949
Prep Date: N/A
Leach Date: N/A

Analysis Batch: 280-212592
Prep Batch: N/A
Leach Batch: N/A
Units: mg/L

Instrument ID: WC_Thermo3
Lab File ID: N/A
Initial Weight/Volume: 50 mL
Final Weight/Volume: 100 mL

Analyte	Sample Result/Qual	Result	RPD	Limit	Qual
Total Organic Halogens - Dup	0.069	0.0670	2	23	

Quality Control Results

Client: Washington Closure Hanford

Job Number: 280-51884-1
Sdg Number: J02082

**Lab Control Sample/
Lab Control Sample Duplicate Recovery Report - Batch: 280-211920**

**Method: 9040B
Preparation: N/A**

LCS Lab Sample ID: LCS 280-211920/4
Client Matrix: Water
Dilution: 1.0
Analysis Date: 02/06/2014 2107
Prep Date: N/A
Leach Date: N/A

Analysis Batch: 280-211920
Prep Batch: N/A
Leach Batch: N/A
Units: SU

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 1 mL

LCSD Lab Sample ID: LCSD 280-211920/5
Client Matrix: Water
Dilution: 1.0
Analysis Date: 02/06/2014 2107
Prep Date: N/A
Leach Date: N/A

Analysis Batch: 280-211920
Prep Batch: N/A
Leach Batch: N/A
Units: SU

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 1 mL

Analyte	% Rec.		Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
	LCS	LCSD					
pH	100	100	99 - 101	0	5		

**Laboratory Control/
Laboratory Duplicate Data Report - Batch: 280-211920**

**Method: 9040B
Preparation: N/A**

LCS Lab Sample ID: LCS 280-211920/4
Client Matrix: Water
Dilution: 1.0
Analysis Date: 02/06/2014 2107
Prep Date: N/A
Leach Date: N/A

Units: SU

LCSD Lab Sample ID: LCSD 280-211920/5
Client Matrix: Water
Dilution: 1.0
Analysis Date: 02/06/2014 2107
Prep Date: N/A
Leach Date: N/A

Analyte	LCS Spike Amount	LCSD Spike Amount	LCS Result/Qual	LCSD Result/Qual
pH	7.00	7.00	7.020	7.020

Duplicate - Batch: 280-211920

**Method: 9040B
Preparation: N/A**

Lab Sample ID: 280-51884-1
Client Matrix: Water
Dilution: 1.0
Analysis Date: 02/06/2014 2107
Prep Date: N/A
Leach Date: N/A

Analysis Batch: 280-211920
Prep Batch: N/A
Leach Batch: N/A
Units: SU

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 1 mL

Analyte	Sample Result/Qual	Result	RPD	Limit	Qual
pH	7.58	7.590	0.1	5	

Quality Control Results

Client: Washington Closure Hanford

Job Number: 280-51884-1
Sdg Number: J02082

Method Blank - Batch: 280-212991

Method: 9050A
Preparation: N/A

Lab Sample ID: MB 280-212991/5
Client Matrix: Water
Dilution: 1.0
Analysis Date: 02/13/2014 2032
Prep Date: N/A
Leach Date: N/A

Analysis Batch: 280-212991
Prep Batch: N/A
Leach Batch: N/A
Units: umho/cm

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 25 mL

Analyte	Result	Qual	RL	RL
Specific Conductance	1.00	U	1.00	1.00

**Lab Control Sample/
Lab Control Sample Duplicate Recovery Report - Batch: 280-212991**

Method: 9050A
Preparation: N/A

LCS Lab Sample ID: LCS 280-212991/3
Client Matrix: Water
Dilution: 1.0
Analysis Date: 02/13/2014 2032
Prep Date: N/A
Leach Date: N/A

Analysis Batch: 280-212991
Prep Batch: N/A
Leach Batch: N/A
Units: umho/cm

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 25 mL

LCSD Lab Sample ID: LCSD 280-212991/4
Client Matrix: Water
Dilution: 1.0
Analysis Date: 02/13/2014 2032
Prep Date: N/A
Leach Date: N/A

Analysis Batch: 280-212991
Prep Batch: N/A
Leach Batch: N/A
Units: umho/cm

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 25 mL

Analyte	% Rec.		Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
	LCS	LCSD					
Specific Conductance	93	99	90 - 110	5	10		

**Laboratory Control/
Laboratory Duplicate Data Report - Batch: 280-212991**

Method: 9050A
Preparation: N/A

LCS Lab Sample ID: LCS 280-212991/3
Client Matrix: Water
Dilution: 1.0
Analysis Date: 02/13/2014 2032
Prep Date: N/A
Leach Date: N/A

Units: umho/cm

LCSD Lab Sample ID: LCSD 280-212991/4
Client Matrix: Water
Dilution: 1.0
Analysis Date: 02/13/2014 2032
Prep Date: N/A
Leach Date: N/A

Analyte	LCS Spike Amount	LCSD Spike Amount	LCS Result/Qual	LCSD Result/Qual
Specific Conductance	1410	1410	1314	1388

Quality Control Results

Client: Washington Closure Hanford

Job Number: 280-51884-1
Sdg Number: J02082

Duplicate - Batch: 280-212991

Method: 9050A
Preparation: N/A

Lab Sample ID:	280-51884-1	Analysis Batch:	280-212991	Instrument ID:	No Equipment Assigned
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	N/A
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	
Analysis Date:	02/13/2014 2032	Units:	umho/cm	Final Weight/Volume:	25 mL
Prep Date:	N/A				
Leach Date:	N/A				

Analyte	Sample Result/Qual	Result	RPD	Limit	Qual
Specific Conductance	2670	2755	3	10	

Quality Control Results

Client: Washington Closure Hanford

Job Number: 280-51884-1
Sdg Number: J02082

Method Blank - Batch: 280-211761

Method: 9056A
Preparation: N/A

Lab Sample ID: MB 280-211761/15
Client Matrix: Water
Dilution: 1.0
Analysis Date: 02/06/2014 1810
Prep Date: N/A
Leach Date: N/A

Analysis Batch: 280-211761
Prep Batch: N/A
Leach Batch: N/A
Units: mg/L

Instrument ID: WC_IonChrom10
Lab File ID: Info 2_DENPC179_Anions
Initial Weight/Volume: 10 mL
Final Weight/Volume: 10 mL

Analyte	Result	Qual	MDL	RL
Nitrate as N	0.042	U	0.042	0.25
Nitrite as N	0.049	U	0.049	0.25
Orthophosphate as P	0.19	U	0.19	0.50

Method Reporting Limit Check - Batch: 280-211761

Method: 9056A
Preparation: N/A

Lab Sample ID: MRL 280-211761/10
Client Matrix: Water
Dilution: 1.0
Analysis Date: 02/06/2014 1009
Prep Date: N/A
Leach Date: N/A

Analysis Batch: 280-211761
Prep Batch: N/A
Leach Batch: N/A
Units: mg/L

Instrument ID: WC_IonChrom10
Lab File ID: Info 2_DENPC179_Anions
Initial Weight/Volume: 10 mL
Final Weight/Volume: 10 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Nitrate as N	0.200	0.235	117	50 - 150	B
Nitrite as N	0.200	0.220	110	50 - 150	B
Orthophosphate as P	0.200	0.19	77	50 - 150	U

Quality Control Results

Client: Washington Closure Hanford

Job Number: 280-51884-1
Sdg Number: J02082

**Lab Control Sample/
Lab Control Sample Duplicate Recovery Report - Batch: 280-211761**

**Method: 9056A
Preparation: N/A**

LCS Lab Sample ID: LCS 280-211761/11
Client Matrix: Water
Dilution: 1.0
Analysis Date: 02/06/2014 1025
Prep Date: N/A
Leach Date: N/A

Analysis Batch: 280-211761
Prep Batch: N/A
Leach Batch: N/A
Units: mg/L

Instrument ID: WC_IonChrom10
Lab File ID: Info 2_DENPC179_Anions
Initial Weight/Volume: 10 mL
Final Weight/Volume: 10 mL
5 uL

LCSD Lab Sample ID: LCSD 280-211761/12
Client Matrix: Water
Dilution: 1.0
Analysis Date: 02/06/2014 1040
Prep Date: N/A
Leach Date: N/A

Analysis Batch: 280-211761
Prep Batch: N/A
Leach Batch: N/A
Units: mg/L

Instrument ID: WC_IonChrom10
Lab File ID: Info 2_DENPC179_Anions
Initial Weight/Volume: 10 mL
Final Weight/Volume: 10 mL
5 uL

Analyte	% Rec.		Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
	LCS	LCSD					
Nitrate as N	98	98	90 - 110	0	10		
Nitrite as N	100	100	90 - 110	0	10		
Orthophosphate as P	96	96	90 - 110	0	10		

**Laboratory Control/
Laboratory Duplicate Data Report - Batch: 280-211761**

**Method: 9056A
Preparation: N/A**

LCS Lab Sample ID: LCS 280-211761/11
Client Matrix: Water
Dilution: 1.0
Analysis Date: 02/06/2014 1025
Prep Date: N/A
Leach Date: N/A

Units: mg/L

LCSD Lab Sample ID: LCSD 280-211761/12
Client Matrix: Water
Dilution: 1.0
Analysis Date: 02/06/2014 1040
Prep Date: N/A
Leach Date: N/A

Analyte	LCS Spike Amount	LCSD Spike Amount	LCS Result/Qual	LCSD Result/Qual
Nitrate as N	5.00	5.00	4.88	4.88
Nitrite as N	5.00	5.00	4.98	4.98
Orthophosphate as P	5.00	5.00	4.80	4.79

Quality Control Results

Client: Washington Closure Hanford

Job Number: 280-51884-1
Sdg Number: J02082

Matrix Spike - Batch: 280-211761

Method: 9056A
Preparation: N/A

Lab Sample ID:	280-51884-2	Analysis Batch:	280-211761	Instrument ID:	WC_IonChrom10
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	Info 2_DENPC179_Anions
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	10 mL
Analysis Date:	02/06/2014 1913	Units:	mg/L	Final Weight/Volume:	10 mL
Prep Date:	N/A				5 uL
Leach Date:	N/A				

Analyte	Sample Result/Qual	Spike Amount	Result	% Rec.	Limit	Qual
Nitrite as N	0.049 U	5.00	7.00	140	80 - 120	N
Orthophosphate as P	0.19 U	5.00	4.39	88	80 - 120	

Matrix Spike - Batch: 280-211761

Method: 9056A
Preparation: N/A

Lab Sample ID:	280-51884-2	Analysis Batch:	280-211761	Instrument ID:	WC_IonChrom10
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	Info 2_DENPC179_Anions
Dilution:	20	Leach Batch:	N/A	Initial Weight/Volume:	10 mL
Analysis Date:	02/06/2014 2311	Units:	mg/L	Final Weight/Volume:	10 mL
Prep Date:	N/A				5 uL
Leach Date:	N/A				

Analyte	Sample Result/Qual	Spike Amount	Result	% Rec.	Limit	Qual
Nitrate as N	65.6	100	172.1	106	80 - 120	D

Quality Control Results

Client: Washington Closure Hanford

Job Number: 280-51884-1
Sdg Number: J02082

Duplicate - Batch: 280-211761

Method: 9056A
Preparation: N/A

Lab Sample ID:	280-51884-2	Analysis Batch:	280-211761	Instrument ID:	WC_IonChrom10
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	Info 2_DENPC179_Anions
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	10 mL
Analysis Date:	02/06/2014 1857	Units:	mg/L	Final Weight/Volume:	10 mL
Prep Date:	N/A				5 uL
Leach Date:	N/A				

Analyte	Sample Result/Qual	Result	RPD	Limit	Qual
Nitrite as N	0.049 U	0.049	NC	15	U
Orthophosphate as P	0.19 U	0.19	NC	15	U

Duplicate - Batch: 280-211761

Method: 9056A
Preparation: N/A

Lab Sample ID:	280-51884-2	Analysis Batch:	280-211761	Instrument ID:	WC_IonChrom10
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	Info 2_DENPC179_Anions
Dilution:	20	Leach Batch:	N/A	Initial Weight/Volume:	10 mL
Analysis Date:	02/06/2014 2255	Units:	mg/L	Final Weight/Volume:	10 mL
Prep Date:	N/A				5 uL
Leach Date:	N/A				

Analyte	Sample Result/Qual	Result	RPD	Limit	Qual
Nitrate as N	65.6	65.41	0.4	15	D

Quality Control Results

Client: Washington Closure Hanford

Job Number: 280-51884-1
Sdg Number: J02082

Method Blank - Batch: 280-211762

Method: 9056A
Preparation: N/A

Lab Sample ID:	MB 280-211762/15	Analysis Batch:	280-211762	Instrument ID:	WC_IonChrom10
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	Info 2_DENPC179_Anions
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	10 mL
Analysis Date:	02/06/2014 1810	Units:	mg/L	Final Weight/Volume:	10 mL
Prep Date:	N/A				
Leach Date:	N/A				

Analyte	Result	Qual	MDL	RL
Bromide	0.11	U	0.11	0.20
Chloride	0.25	U	0.25	3.0
Fluoride	0.060	U	0.060	0.50
Sulfate	0.23	U	0.23	5.0

Method Reporting Limit Check - Batch: 280-211762

Method: 9056A
Preparation: N/A

Lab Sample ID:	MRL 280-211762/10	Analysis Batch:	280-211762	Instrument ID:	WC_IonChrom10
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	Info 2_DENPC179_Anions
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	10 mL
Analysis Date:	02/06/2014 1009	Units:	mg/L	Final Weight/Volume:	10 mL
Prep Date:	N/A				
Leach Date:	N/A				

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Bromide	0.200	0.226	113	50 - 150	
Chloride	1.00	1.06	106	50 - 150	B
Fluoride	0.200	0.221	111	50 - 150	B
Sulfate	1.00	1.21	121	50 - 150	B

Quality Control Results

Client: Washington Closure Hanford

Job Number: 280-51884-1
Sdg Number: J02082

**Lab Control Sample/
Lab Control Sample Duplicate Recovery Report - Batch: 280-211762**

**Method: 9056A
Preparation: N/A**

LCS Lab Sample ID:	LCS 280-211762/11	Analysis Batch:	280-211762	Instrument ID:	WC_IonChrom10
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	Info 2_DENPC179_Anions
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	10 mL
Analysis Date:	02/06/2014 1025	Units:	mg/L	Final Weight/Volume:	10 mL
Prep Date:	N/A				5 uL
Leach Date:	N/A				

LCSD Lab Sample ID:	LCSD 280-211762/12	Analysis Batch:	280-211762	Instrument ID:	WC_IonChrom10
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	Info 2_DENPC179_Anions
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	10 mL
Analysis Date:	02/06/2014 1040	Units:	mg/L	Final Weight/Volume:	10 mL
Prep Date:	N/A				5 uL
Leach Date:	N/A				

Analyte	% Rec.		Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
	LCS	LCSD					
Bromide	94	94	90 - 110	0	10		
Chloride	100	99	90 - 110	0	10		
Fluoride	98	98	90 - 110	0	10		
Sulfate	99	99	90 - 110	0	10		

**Laboratory Control/
Laboratory Duplicate Data Report - Batch: 280-211762**

**Method: 9056A
Preparation: N/A**

LCS Lab Sample ID:	LCS 280-211762/11	Units:	mg/L	LCSD Lab Sample ID:	LCSD 280-211762/12
Client Matrix:	Water			Client Matrix:	Water
Dilution:	1.0			Dilution:	1.0
Analysis Date:	02/06/2014 1025			Analysis Date:	02/06/2014 1040
Prep Date:	N/A			Prep Date:	N/A
Leach Date:	N/A			Leach Date:	N/A

Analyte	LCS Spike Amount	LCSD Spike Amount	LCS Result/Qual	LCSD Result/Qual
Bromide	5.00	5.00	4.68	4.68
Chloride	25.0	25.0	24.89	24.87
Fluoride	5.00	5.00	4.92	4.91
Sulfate	25.0	25.0	24.67	24.66

Quality Control Results

Client: Washington Closure Hanford

Job Number: 280-51884-1

Sdg Number: J02082

Matrix Spike - Batch: 280-211762

Method: 9056A
Preparation: N/A

Lab Sample ID:	280-51884-2	Analysis Batch:	280-211762	Instrument ID:	WC_IonChrom10
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	Info 2_DENPC179_Anions
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	10 mL
Analysis Date:	02/06/2014 1913	Units:	mg/L	Final Weight/Volume:	10 mL
Prep Date:	N/A				5 uL
Leach Date:	N/A				

Analyte	Sample Result/Qual	Spike Amount	Result	% Rec.	Limit	Qual
Bromide	3.5	5.00	10.09	132	80 - 120	> N
Fluoride	0.32 B	5.00	5.17	97	80 - 120	

Matrix Spike - Batch: 280-211762

Method: 9056A
Preparation: N/A

Lab Sample ID:	280-51884-2	Analysis Batch:	280-211762	Instrument ID:	WC_IonChrom10
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	Info 2_DENPC179_Anions
Dilution:	20	Leach Batch:	N/A	Initial Weight/Volume:	10 mL
Analysis Date:	02/06/2014 2311	Units:	mg/L	Final Weight/Volume:	10 mL
Prep Date:	N/A				5 uL
Leach Date:	N/A				

Analyte	Sample Result/Qual	Spike Amount	Result	% Rec.	Limit	Qual
Chloride	310	500	832.4	105	80 - 120	D
Sulfate	576	500	1115	108	80 - 120	D >

Quality Control Results

Client: Washington Closure Hanford

Job Number: 280-51884-1
Sdg Number: J02082

Duplicate - Batch: 280-211762

Method: 9056A
Preparation: N/A

Lab Sample ID:	280-51884-2	Analysis Batch:	280-211762	Instrument ID:	WC_IonChrom10
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	Info 2_DENPC179_Anions
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	10 mL
Analysis Date:	02/06/2014 1857	Units:	mg/L	Final Weight/Volume:	10 mL
Prep Date:	N/A				5 uL
Leach Date:	N/A				

Analyte	Sample Result/Qual	Result	RPD	Limit	Qual
Bromide	3.5	3.56	3	15	
Fluoride	0.32 B	0.327	3	15	B

Duplicate - Batch: 280-211762

Method: 9056A
Preparation: N/A

Lab Sample ID:	280-51884-2	Analysis Batch:	280-211762	Instrument ID:	WC_IonChrom10
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	Info 2_DENPC179_Anions
Dilution:	20	Leach Batch:	N/A	Initial Weight/Volume:	10 mL
Analysis Date:	02/06/2014 2255	Units:	mg/L	Final Weight/Volume:	10 mL
Prep Date:	N/A				5 uL
Leach Date:	N/A				

Analyte	Sample Result/Qual	Result	RPD	Limit	Qual
Chloride	310	311.2	0.5	15	D
Sulfate	576	579.2	0.5	15	D

Quality Control Results

Client: Washington Closure Hanford

Job Number: 280-51884-1
Sdg Number: J02082

Method Blank - Batch: 280-212611

Method: SM 2320B
Preparation: N/A

Lab Sample ID:	MB 280-212611/6	Analysis Batch:	280-212611	Instrument ID:	WC-AT3
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	021114a.TXT
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	
Analysis Date:	02/11/2014 1319	Units:	mg/L	Final Weight/Volume:	
Prep Date:	N/A				
Leach Date:	N/A				

Analyte	Result	Qual	MDL	RL
Alkalinity	1.1	U	1.1	5.0

**Lab Control Sample/
Lab Control Sample Duplicate Recovery Report - Batch: 280-212611**

Method: SM 2320B
Preparation: N/A

LCS Lab Sample ID:	LCS 280-212611/4	Analysis Batch:	280-212611	Instrument ID:	WC-AT3
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	021114a.TXT
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	
Analysis Date:	02/11/2014 1309	Units:	mg/L	Final Weight/Volume:	
Prep Date:	N/A				
Leach Date:	N/A				

LCSD Lab Sample ID:	LCSD 280-212611/5	Analysis Batch:	280-212611	Instrument ID:	WC-AT3
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	021114a.TXT
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	
Analysis Date:	02/11/2014 1315	Units:	mg/L	Final Weight/Volume:	
Prep Date:	N/A				
Leach Date:	N/A				

Analyte	% Rec.		Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
	LCS	LCSD					
Alkalinity	105	106	90 - 110	1	10		

**Laboratory Control/
Laboratory Duplicate Data Report - Batch: 280-212611**

Method: SM 2320B
Preparation: N/A

LCS Lab Sample ID:	LCS 280-212611/4	Units:	mg/L	LCSD Lab Sample ID:	LCSD 280-212611/5
Client Matrix:	Water			Client Matrix:	Water
Dilution:	1.0			Dilution:	1.0
Analysis Date:	02/11/2014 1309			Analysis Date:	02/11/2014 1315
Prep Date:	N/A			Prep Date:	N/A
Leach Date:	N/A			Leach Date:	N/A

Analyte	LCS Spike Amount	LCSD Spike Amount	LCS Result/Qual	LCSD Result/Qual
Alkalinity	200	200	210.5	211.7

Quality Control Results

Client: Washington Closure Hanford

Job Number: 280-51884-1
Sdg Number: J02082

Duplicate - Batch: 280-212611

Method: SM 2320B
Preparation: N/A

Lab Sample ID:	280-51884-1	Analysis Batch:	280-212611	Instrument ID:	WC-AT3
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	021114a.TXT
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	
Analysis Date:	02/11/2014 1328	Units:	mg/L	Final Weight/Volume:	
Prep Date:	N/A				
Leach Date:	N/A				

Analyte	Sample Result/Qual	Result	RPD	Limit	Qual
Alkalinity	307	304.9	0.5	10	

Quality Control Results

Client: Washington Closure Hanford

Job Number: 280-51884-1
Sdg Number: J02082

Method Blank - Batch: 280-212078

Method: SM 2540C
Preparation: N/A

Lab Sample ID:	MB 280-212078/1	Analysis Batch:	280-212078	Instrument ID:	No Equipment Assigned
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	N/A
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	100 mL
Analysis Date:	02/07/2014 1633	Units:	mg/L	Final Weight/Volume:	100 mL
Prep Date:	N/A				
Leach Date:	N/A				

Analyte	Result	Qual	MDL	RL
Total Dissolved Solids	4.7	U	4.7	10.0

Lab Control Sample - Batch: 280-212078

Method: SM 2540C
Preparation: N/A

Lab Sample ID:	LCS 280-212078/2	Analysis Batch:	280-212078	Instrument ID:	No Equipment Assigned
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	N/A
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	100 mL
Analysis Date:	02/07/2014 1633	Units:	mg/L	Final Weight/Volume:	100 mL
Prep Date:	N/A				
Leach Date:	N/A				

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Total Dissolved Solids	500	500.0	100	86 - 110	

Duplicate - Batch: 280-212078

Method: SM 2540C
Preparation: N/A

Lab Sample ID:	280-51884-1	Analysis Batch:	280-212078	Instrument ID:	No Equipment Assigned
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	N/A
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	50 mL
Analysis Date:	02/07/2014 1633	Units:	mg/L	Final Weight/Volume:	100 mL
Prep Date:	N/A				
Leach Date:	N/A				

Analyte	Sample Result/Qual	Result	RPD	Limit	Qual
Total Dissolved Solids	1970	1972	0	10	

Quality Control Results

Client: Washington Closure Hanford

Job Number: 280-51884-1

Sdg Number: J02082

Method Blank - Batch: 280-212374

Method: SM 2540D

Preparation: N/A

Lab Sample ID: MB 280-212374/1	Analysis Batch: 280-212374	Instrument ID: No Equipment Assigned
Client Matrix: Water	Prep Batch: N/A	Lab File ID: N/A
Dilution: 1.0	Leach Batch: N/A	Initial Weight/Volume: 250 mL
Analysis Date: 02/10/2014 2321	Units: mg/L	Final Weight/Volume: 250 mL
Prep Date: N/A		
Leach Date: N/A		

Analyte	Result	Qual	MDL	RL
Total Suspended Solids	1.1	U	1.1	4.0

Lab Control Sample - Batch: 280-212374

Method: SM 2540D

Preparation: N/A

Lab Sample ID: LCS 280-212374/2	Analysis Batch: 280-212374	Instrument ID: No Equipment Assigned
Client Matrix: Water	Prep Batch: N/A	Lab File ID: N/A
Dilution: 1.0	Leach Batch: N/A	Initial Weight/Volume: 100 mL
Analysis Date: 02/10/2014 2321	Units: mg/L	Final Weight/Volume: 250 mL
Prep Date: N/A		
Leach Date: N/A		

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Total Suspended Solids	100	96.00	96	86 - 114	

Duplicate - Batch: 280-212374

Method: SM 2540D

Preparation: N/A

Lab Sample ID: 280-51884-2	Analysis Batch: 280-212374	Instrument ID: No Equipment Assigned
Client Matrix: Water	Prep Batch: N/A	Lab File ID: N/A
Dilution: 1.0	Leach Batch: N/A	Initial Weight/Volume: 100 mL
Analysis Date: 02/10/2014 2321	Units: mg/L	Final Weight/Volume: 250 mL
Prep Date: N/A		
Leach Date: N/A		

Analyte	Sample Result/Qual	Result	RPD	Limit	Qual
Total Suspended Solids	2.8 U	2.8	NC	10	U

Date: 9 February 2015
To: Washington Closure Hanford (technical representative)
From: ELR Consulting
Project: ERDF Semiannual Leachate Analysis - Spring 2014
Subject: Volatile Organic - Data Package No. J02082-TAL

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. J02082 prepared by TestAmerica (TAL). A list of samples validated along with the analyses reported and the requested analytes is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analyte
J1T256	2/4/14	Water	C	See note 1
J1T257	2/4/14	Water	C	See note 1
J1T258	2/4/14	Water	C	See note 1

1 – Volatile organics by 8260B.

Data validation was conducted in accordance with the WCH validation statement of work and WCH-173, Rev. 1, "Environmental Restoration Disposal Facility Leachate Sampling & Analysis Plan". Appendices 1 through 6 provide the following information as indicated below:

- Appendix 1. Glossary of Data Reporting Qualifiers
- Appendix 2. Summary of Data Qualification
- Appendix 3. Annotated Laboratory Reports
- Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
- Appendix 5. Data Validation Supporting Documentation
- Appendix 6. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

• Holding Times & Sample Preservation

Analytical holding times are assessed to ascertain whether the holding time requirements were met by the laboratory. Samples must be prepared and analyzed within 14 days.

If holding times are exceeded, but not by greater than twice the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than twice the limit, all associated detected sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

All holding times were acceptable.

- **Blanks**

Method blank analyses are conducted to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples of a given matrix. No contaminants should be present in the method blank. Analytical results for analytes present in any sample at less than five times the concentration of that analyte found in the associated blank are qualified as estimated and flagged "UJ".

All method blank results were acceptable.

Field Blanks

One field (trip) blank (J1T258) was submitted for analysis. No analytes were detected in the field blank.

- **Accuracy**

Matrix Spike/Matrix Spike Duplicate & Laboratory Control Sample

Matrix spike/matrix spike duplicate and laboratory control sample (LCS) analyses are used to assess the analytical accuracy of the reported data. The matrix spike/matrix spike duplicate is used to assess the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike/matrix spike duplicate analyses are performed in duplicate using the target compounds for which percent recoveries must be within established laboratory quality control limits. If spike recoveries are outside control limits (50-150% or w/in laboratory specified limits), detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Undetected sample results with spike recoveries outside control limits are qualified as estimates and flagged "UJ". Sample results greater than five times the spike concentration require no qualification.

Due to the lack of a matrix spike analysis, all volatile organic results were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

Surrogate Recovery

The analyses of surrogate compounds provide a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the EPA CLP program. If two surrogates of the same class of compounds (base/neutral or acid) are out of control limits, all associated sample results greater than the contract required quantitation limit (CRQL) are qualified as estimates and flagged "J". Sample results less than the CRQL and below the lower control limit

are qualified as estimates and flagged "UJ". Sample results less than the CRQL with recoveries above the upper control limit require no qualification. If a surrogate recovery is less than 10%, detects are qualified as estimates and flagged "J" and nondetects are rejected and flagged "UR".

All surrogate results were acceptable.

- **Precision**

- Matrix Spike/Matrix Spike Duplicate Samples

- Matrix spike/matrix spike duplicate results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed by the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. For samples analyzed using SW-846 protocol, results must be within RPD limits of +/- 20% for water samples and +/- 35% for solid samples. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

- Due to the lack of a duplicate analysis, all volatile organic results were qualified as estimates and flagged "J".

- All other precision results were acceptable.

- Field Duplicate Samples

- One set of field duplicates (J1T256/J1T257) were submitted for analysis. Field duplicate results are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

- **Analytical Detection Levels**

- Reported analytical detection levels are compared against the required detection limits (RDLs) to ensure that laboratory detection levels meet the required criteria. All results met the RDL.

· **Completeness**

Data package No. J02082 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

The following minor deficiencies were noted:

- Due to the lack of a matrix spike analysis, all volatile organic results were qualified as estimates and flagged "J".
- Due to the lack of a matrix spike analysis, all volatile organic results were qualified as estimates and flagged "J".

Data flagged "J" indicates that the associated concentration is an estimate, but under the WCH statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

REFERENCES

Washington Closure Hanford Contract #S00W307A00 (March 2008), *Data Validation Services*.

WCH-173, Rev 1, *Environmental Restoration Disposal Facility Leachate Sampling and Analysis Plan*, October 2014.

Appendix 1
Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validator in compliance with the WCH validation SOW are as follows:

- U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for dilution and moisture content by the laboratory.
- UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.
- NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2
Summary of Data Qualification

INORGANIC DATA QUALIFICATION SUMMARY*

SDG: J02082	REVIEWER: ELR	Project: ERDF	PAGE <u>1</u> OF <u>1</u>
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
All	J	All	No MS or duplicate analysis

* - The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

Appendix 3
Annotated Laboratory Reports

Analytical Data

Client: Washington Closure Hanford

Job Number: 280-51884-1
Sdg Number: J02082

Client Sample ID: J1T256
Lab Sample ID: 280-51884-1
Client Matrix: Water

Date Sampled: 02/04/2014 0826
Date Received: 02/06/2014 1045

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-213231	Instrument ID:	VMS_MS1
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	MS2289.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	02/17/2014 1758			Final Weight/Volume:	20 mL
Prep Date:	02/17/2014 1758				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Carbon tetrachloride	0.19	UJ	0.19	1.0
Trichloroethene	0.16	UJ	0.16	1.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	108		70 - 127
Toluene-d8 (Surr)	90		80 - 125
4-Bromofluorobenzene (Surr)	114		78 - 120
Dibromofluoromethane (Surr)	108		77 - 120

Handwritten: ✓
2/15/15

Analytical Data

Client: Washington Closure Hanford

Job Number: 280-51884-1
Sdg Number: J02082

Client Sample ID: J1T256
Lab Sample ID: 280-51884-1
Client Matrix: Water

Date Sampled: 02/04/2014 0826
Date Received: 02/06/2014 1045

8260B Volatile Organic Compounds (GC/MS)

Analysis Method: 8260B Analysis Batch: 280-213231 Instrument ID: VMS_MS1
Prep Method: 5030B Prep Batch: N/A Lab File ID: MS2289.D
Dilution: 1.0 Initial Weight/Volume: 20 mL
Analysis Date: 02/17/2014 1758 Final Weight/Volume: 20 mL
Prep Date: 02/17/2014 1758

Tentatively Identified Compounds Number TIC's Found: 10

Cas Number	Analyte	RT	Est. Result (ug/L)	Qualifier
2317-91-1	Ethene, 1-chloro-1-fluoro-	4.18	93000	N J
79-04-9	Acetyl chloride, chloro-	5.06	200	N J
1615-75-4	Ethane, 1-chloro-1-fluoro-	5.25	150	N J
75-43-4	Dichlorofluoromethane	5.51	1.8	J N
75-69-4	Trichlorofluoromethane	5.63	1.0	J N
1717-00-6	1,1-Dichloro-1-fluoroethane	5.84	1200	N J
67-64-1	Acetone	6.05	13	N J
18173-64-3	tert-Butyldimethylsilanol	7.06	140	N J
556-67-2	Cyclotetrasiloxane, octamethyl-	11.32	15	N J
3789-85-3	Benzoic acid, 2-[(trimethylsilyl)oxy]-	12.96	10	N J

W 2/15/15

Analytical Data

Client: Washington Closure Hanford

Job Number: 280-51884-1
Sdg Number: J02082

Client Sample ID: J1T257

Lab Sample ID: 280-51884-2
Client Matrix: Water

Date Sampled: 02/04/2014 0826
Date Received: 02/06/2014 1045

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-213231	Instrument ID:	VMS_MS1
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	MS2290.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	02/17/2014 1820			Final Weight/Volume:	20 mL
Prep Date:	02/17/2014 1820				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Carbon tetrachloride	0.19	U	0.19	1.0
Trichloroethene	0.16	U	0.16	1.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	103		70 - 127
Toluene-d8 (Surr)	86		80 - 125
4-Bromofluorobenzene (Surr)	111		78 - 120
Dibromofluoromethane (Surr)	104		77 - 120

W 2/15/15

Analytical Data

Client: Washington Closure Hanford

Job Number: 280-51884-1

Sdg Number: J02082

Client Sample ID: J1T257

Lab Sample ID: 280-51884-2

Date Sampled: 02/04/2014 0826

Client Matrix: Water

Date Received: 02/06/2014 1045

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-213231	Instrument ID:	VMS_MS1
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	MS2290.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	02/17/2014 1820			Final Weight/Volume:	20 mL
Prep Date:	02/17/2014 1820				

Tentatively Identified Compounds Number TIC's Found: 10

Cas Number	Analyte	RT	Est. Result (ug/L)	Qualifier
	Unknown	5.04	90	N J
1615-75-4	Ethane, 1-chloro-1-fluoro-	5.24	140	N J
75-43-4	Dichlorofluoromethane	5.51	2.0	J N
75-69-4	Trichlorofluoromethane	5.62	1.0	J N
1717-00-6	1,1-Dichloro-1-fluoroethane	5.84	1300	N J
67-64-1	Acetone	6.04	11	J N
75-35-4	1,1-Dichloroethene	6.12	0.91	J N
1066-40-6	Silanol, trimethyl-	7.06	160	N J
556-67-2	Cyclotetrasiloxane, octamethyl-	11.32	14	N J
2078-13-9	Benzoic acid, 4-[(trimethylsilyl)oxy]-,	12.96	7.6	N J

W
2/13/15

Analytical Data

Client: Washington Closure Hanford

Job Number: 280-51884-1
Sdg Number: J02082

Client Sample ID: J1T258
Lab Sample ID: 280-51884-3
Client Matrix: Water

Date Sampled: 02/04/2014 0823
Date Received: 02/06/2014 1045

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-213231	Instrument ID:	VMS_MS1
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	MS2291.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	02/17/2014 1841			Final Weight/Volume:	20 mL
Prep Date:	02/17/2014 1841				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Carbon tetrachloride	0.19	U	0.19	1.0
Trichloroethene	0.16	U	0.16	1.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	101		70 - 127
Toluene-d8 (Surr)	91		80 - 125
4-Bromofluorobenzene (Surr)	99		78 - 120
Dibromofluoromethane (Surr)	102		77 - 120

W 2/15/15

Analytical Data

Client: Washington Closure Hanford

Job Number: 280-51884-1
Sdg Number: J02082

Client Sample ID: J1T258

Lab Sample ID: 280-51884-3

Date Sampled: 02/04/2014 0823

Client Matrix: Water

Date Received: 02/06/2014 1045

8260B Volatile Organic Compounds (GC/MS)

Analysis Method: 8260B
Prep Method: 5030B
Dilution: 1.0
Analysis Date: 02/17/2014 1841
Prep Date: 02/17/2014 1841

Analysis Batch: 280-213231
Prep Batch: N/A

Instrument ID: VMS_MS1
Lab File ID: MS2291.D
Initial Weight/Volume: 20 mL
Final Weight/Volume: 20 mL

Tentatively Identified Compounds

Number TIC's Found: 4

Cas Number	Analyte	RT	Est. Result (ug/L)	Qualifier
	Unknown	5.09	210	NJ
67-64-1	Acetone	6.05	28	JN
1066-40-6	Silanol, trimethyl-	7.07	180	NJ
108-90-7	Chlorobenzene	10.59	0.17	JN

*V
2/15/15*

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

CASE NARRATIVE

Revision 1

Client: Washington Closure Hanford

Project: WASHINGTON CLOSURE HANFORD

Report Number: 280-51884-1

SDG #: J02082

SAF#: RC-010

Date SDG Closed: February 6, 2014

Data Deliverable: 45 Day / Summary

<u>CLIENT ID</u>	<u>LAB ID</u>	<u>ANALYSES REQUESTED</u>	<u>ANALYSES PERFORMED</u>
J1T256	280-51884-1	8280A/8010/2320/2540C/2540D/9050/9056/ 353.2/9020/9040	8280B/8010B/2320B/2540C/2540D/9050A/9056A/ 353.2/9020B/9040B
J1T257	280-51884-2	8280A/8010/2320/2540C/2540D/9050/9056/ 353.2/9020/9040	8280B/8010B/2320B/2540C/2540D/9050A/9056A/ 353.2/9020B/9040B
J1T258	280-51884-3	8280A	8280B

I certify that this data package is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed in this Case Narrative. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or a designee, as verified by the signature on the Report Cover.

With exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. All laboratory quality control samples analyzed in conjunction with the samples in this project were within established control limits, with any exceptions noted. Calculations are performed before rounding to avoid round-off errors in calculated results.

This report includes reporting limits (RLs) less than TestAmerica Denver's practical quantitation limits. These reporting limits are being used specifically at the client's request to meet the needs of this project. Please note that data are not normally reported to these levels without qualification, since they are inherently less reliable and potentially less defensible than required by the current NELAC standards.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

Revision 1 - 2/28/2014

This report has been revised to correct the Nitrate Nitrite as N data reported for samples J1T256 and J1T257. The 20X dilution factor was mistakenly not included in the original report.

RECEIPT

The samples were received on 2/6/2014 10:45 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 0.3° C.

Samples J1T256 and J1T257, requesting Nitrate as N, Nitrite as N and Orthophosphate as P 9056A analyses, were received at the laboratory after the recommended 48 hour sample holding times had expired. The client was notified on 2/7/2014.

GC/MS VOLATILES - SW846 8280B

The method required MS/MSD analysis was not performed for batch 280-213231, due to analyst oversight. The acceptable LCS analysis data indicated that the analytical system was operating within control.

No other anomalies were encountered.

TOTAL METALS - SW846 8010B

Low levels of Barium and Zinc are present in the method blank associated with batch 280-211892. Because the concentrations in the method blank are not present at a level greater than half the reporting limit, corrective action is deemed unnecessary.

It can be noted that the sample amount was greater than four times the spike amount for Calcium and Sodium in the Matrix Spike performed on sample J1T256; therefore, control limits are not applicable.

No other anomalies were encountered.

GENERAL CHEMISTRY - MCAWW 353.2 - NITRATE NITRITE as N

Each sample is analyzed to achieve the lowest possible reporting limits within the constraints of the method. Due to high constituent concentration, the Nitrate Nitrite as N analysis of samples J1T256 and J1T257 had to be performed at dilutions, and the associated results have been flagged with a "D". The reporting limits have been adjusted relative to the dilutions required.

The Matrix Spike performed on sample J1T256 exhibited the percent recovery outside the control limits, and the associated sample result has been flagged "N". There is no indication that the analytical system was operating out of control, and method accuracy has been verified by the acceptable LCS analysis data; therefore, corrective action is deemed unnecessary.

No other anomalies were encountered.

GENERAL CHEMISTRY - SW846 9020B - TOTAL ORGANIC HALOGENS

Samples exhibited elevated detection limits due to the limited sample volume used. The nominal sample amount could not be used due to the nature of the sample matrix.

No other anomalies were encountered.

GENERAL CHEMISTRY - SW846 9056A - ANIONS

The Nitrate as N, Nitrite as N and Orthophosphate as P analyses for samples J1T256 and J1T257 were performed outside the recommended 48 hour sample holding times. The holding times were expired at the time of sample receipt. The client was notified on 2/7/2014.

Each sample is analyzed to achieve the lowest possible reporting limits within the constraints of the method. Due to high constituent concentration, samples J1T256 and J1T257 required dilutions prior to the analysis of Nitrate as N, Chloride and Sulfate, and the associated results have been flagged with a "D". The reporting limits have been adjusted relative to the dilutions required.

The Matrix Spike performed on sample J1T257 exhibited percent recoveries outside the control limits for Nitrite as N and Bromide, and the associated sample results have been flagged "N". In addition, it can be noted that the Bromide matrix spike concentration was present above the instrument calibration range. There is no indication that the analytical systems were operating out of control, and method accuracy has been verified by the acceptable LCS analysis data; therefore, corrective action is deemed unnecessary.

No other anomalies were encountered.

GENERAL CHEMISTRY - SM 2320B - ALKALINITY

No anomalies were encountered.

GENERAL CHEMISTRY - SM 2540C - TOTAL DISSOLVED SOLIDS

Samples exhibited elevated detection limits due to the limited sample volume used. The nominal sample amount could not be used due to high constituent concentration.

No other anomalies were encountered.

GENERAL CHEMISTRY - SM 2540D - TOTAL SUSPENDED SOLIDS

Due to the limited sample volume submitted by the client, the initial volume used for sample J1T257 and the batch duplicate analysis of sample J1T257 deviated from the standard procedure. The specified volume is 250 mLs; however, only 100 mLs were available for each. The reporting limits have been elevated accordingly.

No other anomalies were encountered.

GENERAL CHEMISTRY - SW846 9040B - PH

SU = standard units

No anomalies were encountered.

GENERAL CHEMISTRY - SW846 9050A - SPECIFIC CONDUCTANCE

No anomalies were encountered.

Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				RC-010-032	Page 1 of 1
Collector M Downing	Company Contact Joan Kessner	Telephone No. 375-4688	Project Coordinator KESSNER, JH		Price Code 7N	Data Turnaround 45 Days	
Project Designation ERDF Leachate Tank	Sampling Location ERDF Leachate tank #4, fall 2013		SAF No. RC-010				
Ice Chest No. WCH-11-009	Field Logbook No. EL-1626-03 ⁰⁴⁵ 2/3/14	COA RERDF22560	Method of Shipment Commercial Carrier <i>fed EX</i>				
Shipped To TestAmerica Denver	Offsite Property No. A131056		Bill of Lading/Air Bill No. <i>See O5PC</i>				

Other Labs Shipped To TestAmerica Richland	Preservation	HNO3 to pH <2	Cool 4C	Cool 4C	H2SO4 to pH <2	H2SO4 to pH <2	Cool 4C	Cool 4C	Cool 4C	None	HCl or H2SO4 to pH <2
	Type of Container	G/P	G/P	G ²	G/P	aGs*	G/P	G/P	P	P	aGs*
POSSIBLE SAMPLE HAZARDS/REMARKS <i>Potentially radioactive, less than DOT</i> <i>Some sample containers preserved w/ acid</i>	No. of Container(s)	1	1	1	1	1	1	1	1	1	3
	Volume	500mL	500mL	500mL	500mL	1000mL	500mL	500mL	250mL	125mL	40mL
Special Handling and/or Storage	Sample Analysis	See item (1) in Special Instructions	Alkalinity - 2320	See item (2) in Special Instructions	NO2/NO3 - 353.2	TOX - 9020	TDS - 2540C	TSS - 2540D	Conductivity - 9050	pH (Water) - 9040	VOA - 8260A (TCL) (Carbon tetrachloride, Trichloroethene)

Sample No.	Matrix	Sample Date	Sample Time									
J10256	WATER	02-04-14	0826	✓	✓	✓	✓	✓	✓	✓	✓	✓
J10257	WATER	02-04-14	0826	✓	✓	✓	✓	✓	✓	✓	✓	✓
53												

CHAIN OF POSSESSION		Sign/Print Names	
Relinquished By/Removed From <i>M Downing</i>	Date/Time 2/4/14 09:13	Received By/Stored In <i>Joan Kessner</i>	Date/Time 2/4/14 09:13
Relinquished By/Removed From <i>Joan Kessner</i>	Date/Time 2/4/14 12:21	Received By/Stored In <i>fed EX</i>	Date/Time 2/6/14 10:45
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

SPECIAL INSTRUCTIONS

(1) ICP Metals - 6010TR (Client List) (Arsenic, Barium, Beryllium, Calcium, Chromium, Lead, Potassium, Selenium, Silicon, Sodium, Thallium, Tin, Vanadium, Zinc)
(2) IC Anions - 9056 Modified (Bromide, Chloride, Fluoride, Nitrogen in Nitrates, Nitrogen in Nitrite, Phosphorous in phosphates, Sulfate)

J02082
D.B. 02-06-14

REVIEWED BY
K. Wood via email
DATE
2-4-14

Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				RC-010-033	Page 1 of 1
Collector M Downing	Company Contact Joan Kessner	Telephone No. 375-4688	Project Coordinator KESSNER, JH	Price Code 7N	Data Turnaround 45 Days		
Project Designation ERDF Leachate Tank	Sampling Location ERDF Leachate tank #4, fall 2013	SAF No. RC-010					
Case Chart No. WCH-11-009	Field Logbook No. 2/3/14 EL-1626-0203	COA RERDF22560	Method of Shipment Commercial Carrier - Fed Ex				
Shipped To TestAmerica Denver	Offsite Property No. 2-4-14 and A131056 A131056	Bill of Lading/Air Bill No. see OSPC					
Other Labs Shipped To NA	Preservation HCl or H2SO4 to pH <2	Type of Container #G6	No. of Container(s) 3	Volume 40mL	Sample Analysis VOA - 8280A (TCL) (Carbon tetrachloride, Trichloroethene)		
POSSIBLE SAMPLE HAZARDS/REMARKS Potentially radioactive, less than DOT Samples preserved w/ acid Special Handling and/or Storage							
Page 5 of 52	Sample No.	Matrix	Sample Date	Sample Time			
	J17258	WATER	2-4-14	0823	✓		
CHAIN OF POSSESSION				SPECIAL INSTRUCTIONS			
Relinquished By/Removed From M Downing / J. Downing WSDO		Date/Time 2-4-14/0913		Received By/Stored In D. B. Owsen / D. B. Owsen		Date/Time 2/4/14 0913	
Relinquished By/Removed From D. B. Owsen		Date/Time 2/4/14 1221		Received By/Stored In Fed Ex		Date/Time	
Relinquished By/Removed From		Date/Time		Received By/Stored In S. J. ...		Date/Time 2/6/14 10:45	
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time	
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time	
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time	
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time	
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time	
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By		Date/Time	

J02082
D.B. 02-06-14

REVIEWED BY
K. Wood via email
DATE
2-4-14

Appendix 5
Data Validation Supporting Documentation

GC/MS ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT:	ERDF		DATA PACKAGE: J02082		
VALIDATOR:	ELR	LAB: TAL	DATE: 2/8/15		
			SDG: J02082		
ANALYSES PERFORMED					
SW-846 8260		SW-846 8260 (TCLP)	SW-846 8270		SW-846 8270 (TCLP)
SAMPLES/MATRIX					
	JIT254	JIT257	JIT258		
					Water

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present? Yes No N/A

Comments: _____

2. INSTRUMENT TUNING AND CALIBRATION (Levels D and E)

GC/MS tuning/performance check acceptable? Yes No N/A

Initial calibrations acceptable? Yes No N/A

Continuing calibrations acceptable? Yes No N/A

Standards traceable? Yes No N/A

Standards expired? Yes No N/A

Calculation check acceptable? Yes No N/A

Comments: _____

GC/MS ORGANIC DATA VALIDATION CHECKLIST

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E) Yes No N/A
Calibration blank results acceptable? (Levels D, E) Yes No N/A
Laboratory blanks analyzed? Yes No N/A
Laboratory blank results acceptable? Yes No N/A
Field/trip blanks analyzed? (Levels C, D, E) Yes No N/A
Field/trip blank results acceptable? (Levels C, D, E) Yes No N/A
Transcription/calculation errors? (Levels D, E) Yes No N/A

Comments: _____

4. ACCURACY (Levels C, D, and E)

Surrogates/system monitoring compounds analyzed? Yes No N/A
Surrogate/system monitoring compound recoveries acceptable? Yes No N/A
Surrogates traceable? (Levels D, E) Yes No N/A
Surrogates expired? (Levels D, E) Yes No N/A
MS/MSD samples analyzed? Yes No N/A
MS/MSD results acceptable? 2(a) Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E) Yes No N/A
MS/MSD standards? (Levels D, E) Yes No N/A
LCS/BSS samples analyzed? Yes No N/A
LCS/BSS results acceptable? Yes No N/A
Standards traceable? (Levels D, E) Yes No N/A
Standards expired? (Levels D, E) Yes No N/A
Transcription/calculation errors? (Levels D, E) Yes No N/A
Performance audit sample(s) analyzed? Yes No N/A
Performance audit sample results acceptable? Yes No N/A

Comments: No ms - J cell

No PA

GC/MS ORGANIC DATA VALIDATION CHECKLIST

5. PRECISION (Levels C, D, and E)

MS/MSD samples analyzed? Yes No N/A
MS/MSD RPD values acceptable? Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E) Yes No N/A
MS/MSD standards expired? (Levels D, E) Yes No N/A
Field duplicate RPD values acceptable? Yes No N/A
Field split RPD values acceptable? Yes No N/A
Transcription/calculation errors? (Levels D, E) Yes No N/A

Comments: no dup - J all

6. SYSTEM PERFORMANCE (Levels D and E)

Internal standards analyzed? Yes No N/A
Internal standard areas acceptable? Yes No N/A
Internal standard retention times acceptable? Yes No N/A
Standards traceable? Yes No N/A
Standards expired? Yes No N/A
Transcription/calculation errors? Yes No N/A

Comments: _____

7. HOLDING TIMES (all levels)

Samples properly preserved? Yes No N/A
Sample holding times acceptable? Yes No N/A

Comments: _____

GC/MS ORGANIC DATA VALIDATION CHECKLIST

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E)	Yes	No	N/A
Compound quantitation acceptable? (Levels D, E)	Yes	No	N/A
Results reported for all requested analyses?	Yes	No	N/A
Results supported in the raw data? (Levels D, E)	Yes	No	N/A
Samples properly prepared? (Levels D, E)	Yes	No	N/A
Laboratory properly identified and coded all TIC? (Levels D, E)	Yes	No	N/A
Detection limits meet RDL?	Yes	No	N/A
Transcription/calculation errors? (Levels D, E)	Yes	No	N/A

Comments: _____

9. SAMPLE CLEANUP (Levels D and E)

GPC cleanup performed?	Yes	No	N/A
GPC check performed?	Yes	No	N/A
GPC check recoveries acceptable?	Yes	No	N/A
GPC calibration performed?	Yes	No	N/A
GPC calibration check performed?	Yes	No	N/A
GPC calibration check retention times acceptable?	Yes	No	N/A
Check/calibration materials traceable?	Yes	No	N/A
Check/calibration materials Expired?	Yes	No	N/A
Analytical batch QC given similar cleanup?	Yes	No	N/A
Transcription/Calculation Errors?	Yes	No	N/A

Comments: _____

Appendix 6

Additional Documentation Requested by Client

Quality Control Results

Client: Washington Closure Hanford

Job Number: 280-51884-1
Sdg Number: J02082

Method Blank - Batch: 280-213231

Method: 8260B
Preparation: 5030B

Lab Sample ID:	MB 280-213231/5	Analysis Batch:	280-213231	Instrument ID:	VMS_MS1
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	MS2272.D
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	20 mL
Analysis Date:	02/17/2014 1132	Units:	ug/L	Final Weight/Volume:	20 mL
Prep Date:	02/17/2014 1132				
Leach Date:	N/A				

Analyte	Result	Qual	MDL	RL
Carbon tetrachloride	0.19	U	0.19	1.0
Trichloroethene	0.16	U	0.16	1.0

Surrogate	% Rec	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	96	70 - 127
Toluene-d8 (Surr)	92	80 - 125
4-Bromofluorobenzene (Surr)	105	78 - 120
Dibromofluoromethane (Surr)	98	77 - 120

Method Blank TICs- Batch: 280-213231

Cas Number	Analyte	RT	Est. Result (ug/L)	Qual
75-37-6	Ethane, 1,1-difluoro-	4.42	39.8	N J
	Unknown	4.86	31.0	N J
75-07-0	Acetaldehyde	5.06	185	N J
1066-40-6	Silanol, trimethyl-	7.07	48.7	N J
556-67-2	Cyclotetrasiloxane, octamethyl-	11.32	12.3	N J
3789-85-3	Benzoic acid, 2-[(trimethylsilyloxy)-,	12.96	4.20	N J

Lab Control Sample - Batch: 280-213231

Method: 8260B
Preparation: 5030B

Lab Sample ID:	LCS 280-213231/4	Analysis Batch:	280-213231	Instrument ID:	VMS_MS1
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	MS2271.D
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	20 mL
Analysis Date:	02/17/2014 1110	Units:	ug/L	Final Weight/Volume:	20 mL
Prep Date:	02/17/2014 1110				
Leach Date:	N/A				

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Carbon tetrachloride	5.00	4.26	85	67 - 135	
Trichloroethene	5.00	4.04	81	73 - 135	

Surrogate	% Rec	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	104	70 - 127
Toluene-d8 (Surr)	98	80 - 125
4-Bromofluorobenzene (Surr)	104	78 - 120
Dibromofluoromethane (Surr)	101	77 - 120

Date: 9 February 2015
To: Washington Closure Hanford (technical representative)
From: ELR Consulting
Project: ERDF Semiannual Leachate Analysis - Spring 2014
Subject: Inorganic - Data Package No. J02082-TAL

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. J02082 prepared by TestAmerica (TAL). A list of samples validated along with the analyses reported and the requested analytes is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analyte
J1T256	2/4/14	Water	C	See note 1
J1T257	2/4/14	Water	C	See note 1

1 - ICP metals by 6010B.

Data validation was conducted in accordance with the WCH validation statement of work and WCH-173, Rev. 1. "Environmental Restoration Disposal Facility Leachate Sampling and Analysis Plan". Appendices 1 through 6 provide the following information as indicated below:

- Appendix 1. Glossary of Data Reporting Qualifiers
- Appendix 2. Summary of Data Qualification
- Appendix 3. Annotated Laboratory Reports
- Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
- Appendix 5. Data Validation Supporting Documentation
- Appendix 6. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

· **Holding Times & Sample Preservation**

Analytical holding times for ICP metals are assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Samples must be analyzed within six (6) months for ICP metals.

All holding times were met.

· **Blanks**

Preparation (Method) Blanks

At least one preparation blank, consisting of deionized distilled water processed through each sample preparation and analysis procedure, must be prepared and analyzed with every sample delivery group. In the case of positive blank results, samples with

digestate concentrations (in ug/L) less than five times the preparation blank value have had their associated values qualified as non-detected and flagged "U". Samples with concentrations of greater than five times the highest blank concentration do not require qualification.

In the case of negative blank results, if the absolute value exceeds the Contract Required Detection Limit (CRDL), all nondetects are rejected and flagged "UR" and all detects that are less than ten times the absolute value of the associated preparation blank result are qualified as estimates and flagged "J". If the absolute value of the negative preparation blank is greater than the IDL and less than or equal to the CRDL, all nondetects are qualified as estimates and flagged "UJ" and all detects less than ten times the absolute value of the blank are qualified as estimates and flagged "J". If the sample results are greater than ten times the absolute value of the preparation blank, no qualification is necessary.

Due to method blank contamination, all zinc results were qualified as undetected and flagged "UJ".

All other preparation blank results were acceptable.

Field Blanks

No field blanks were submitted for analysis.

· **Accuracy**

Matrix Spike and Laboratory Control Sample

Matrix spike (MS) and laboratory control sample (LCS) analyses are used to assess the analytical accuracy of the reported data. The matrix spike is used to assess the effect of the matrix on the ability to accurately quantify sample concentrations. Recoveries must fall within the range of 75% to 125%. Samples with a recovery of less than 25% and a sample result below the instrument detection limit (IDL) are rejected and flagged "UR". Samples with a recovery of 30% to 74% and a sample result less than the IDL are qualified "UJ". Samples with a recovery of greater than 125% or less than 75% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a spike recovery greater than 125% and a sample result less than the IDL, no qualification is required.

All accuracy results were acceptable.

· **Precision**

Laboratory Duplicate Samples

Laboratory duplicate sample analyses are used to measure laboratory precision and sample homogeneity. Results must be within relative percent difference (RPD) limits of

plus or minus 20% for water samples. If RPD values are out of specification and the sample concentration is greater than five times the CRDL, all associated sample results are qualified as estimated and flagged "J". If RPD values are plus or minus two times the CRDL and the sample concentration is less than five times the CRDL, all associated sample results are qualified as estimated and flagged "J/UJ". The performance criteria for aqueous laboratory duplicates are an RPD less than 20% for positive sample results greater than five times the CRDL or plus or minus the CRDL for positive sample results less than five times the CRDL. Sample results outside the criteria are qualified as estimates and flagged "J/UJ".

All laboratory duplicate results were acceptable.

Field Duplicate Samples

One set of field duplicates (J1T256/J1T257) were submitted for analysis. Field duplicate results are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

Analytical Detection Levels

Reported analytical detection levels are compared against the required quantitation limits (RQLs) to ensure that laboratory detection levels meet the required criteria. All reported laboratory detection levels met the analyte specific RQL.

Completeness

Data package No. J02082 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

The following minor deficiency was noted:

- Due to method blank contamination, all zinc results were qualified as undetected and flagged "UJ".

Data flagged "J" indicates that the associated concentration is an estimate, but under the WCH statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

REFERENCES

Washington Closure Hanford Contract #S00W307A00 (March 2008), *Data Validation Services*.

WCH-173, Rev 1, *Environmental Restoration Disposal Facility Leachate Sampling and Analysis Plan*, October 2014.

Appendix 1
Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with WCH validation SOW are as follows:

- U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.
- UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- J - *Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.*
- BJ - Applied to inorganic analyses only. Indicates the analyte concentration was greater than the IDL but less than the CRDL and is considered an estimated value.
- R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.
- NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2
Summary of Data Qualification

INORGANIC DATA QUALIFICATION SUMMARY*

SDG: J02082	REVIEWER: ELR	Project: ERDF	PAGE <u>1</u> OF <u>1</u>
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Zinc	UJ	All	Method blank contamination

* - The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

Appendix 3
Annotated Laboratory Reports

Analytical Data

Client: Washington Closure Hanford

Job Number: 280-51884-1

Sdg Number: J02082

Client Sample ID: J1T256

Lab Sample ID: 280-51884-1

Date Sampled: 02/04/2014 0826

Client Matrix: Water

Date Received: 02/06/2014 1045

6010B Metals (ICP)

Analysis Method: 6010B Analysis Batch: 280-212832 Instrument ID: MT_026
Prep Method: 3010A Prep Batch: 280-211892 Lab File ID: 26a021214b.asc
Dilution: 1.0 Initial Weight/Volume: 50 mL
Analysis Date: 02/12/2014 1708 Final Weight/Volume: 50 mL
Prep Date: 02/10/2014 0700

Analyte	Result (mg/L)	Qualifier	MDL	RL
Arsenic	0.0066	B	0.0044	0.010
Barium	0.090		0.00058	0.0050
Beryllium	0.00047	U	0.00047	0.0010
Calcium	292		0.035	0.20
Chromium	0.054		0.00066	0.0020
Lead	0.0026	U	0.0026	0.0050
Potassium	20.0		0.24	3.0
Selenium	0.014		0.0049	0.010
Silicon	21.0		0.035	0.50
Sodium	235		0.092	0.50
Thallium	0.0049	U	0.0049	0.015
Tin	0.0058	U	0.0058	0.10
Vanadium	0.018		0.0011	0.010
Zinc	0.0053	B C U	0.0045	0.010

Handwritten signature and date: 2/15/15

Analytical Data

Client: Washington Closure Hanford

Job Number: 280-51884-1
Sdg Number: J02082

Client Sample ID: J1T257

Lab Sample ID: 280-51884-2

Date Sampled: 02/04/2014 0826

Client Matrix: Water

Date Received: 02/06/2014 1045

6010B Metals (ICP)

Analysis Method:	6010B	Analysis Batch:	280-212832	Instrument ID:	MT_026
Prep Method:	3010A	Prep Batch:	280-211892	Lab File ID:	26a021214b.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	02/12/2014 1717			Final Weight/Volume:	50 mL
Prep Date:	02/10/2014 0700				

Analyte	Result (mg/L)	Qualifier	MDL	RL
Arsenic	0.0066	B	0.0044	0.010
Barium	0.089		0.00058	0.0050
Beryllium	0.00047	U	0.00047	0.0010
Calcium	286		0.035	0.20
Chromium	0.053		0.00066	0.0020
Lead	0.0026	U	0.0026	0.0050
Potassium	19.9		0.24	3.0
Selenium	0.0097	B	0.0049	0.010
Silicon	20.5		0.035	0.50
Sodium	233		0.092	0.50
Thallium	0.0049	U	0.0049	0.015
Tin	0.0058	U	0.0058	0.10
Vanadium	0.018		0.0011	0.010
Zinc	0.0060	B C US	0.0045	0.010

W 2/15

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

CASE NARRATIVE

Revision 1

Client: Washington Closure Hanford

Project: WASHINGTON CLOSURE HANFORD

Report Number: 280-51884-1

SDG #: J02082

SAF#: RC-010

Date SDG Closed: February 6, 2014

Data Deliverable: 45 Day / Summary

<u>CLIENT ID</u>	<u>LAB ID</u>	<u>ANALYSES REQUESTED</u>	<u>ANALYSES PERFORMED</u>
J1T256	280-51884-1	8260A/6010/2320/2540C/2540D/9050/9056/ 353.2/9020/9040	8260B/6010B/2320B/2540C/2540D/9050A/9056A/ 353.2/9020B/9040B
J1T257	280-51884-2	8260A/6010/2320/2540C/2540D/9050/9056/ 353.2/9020/9040	8260B/6010B/2320B/2540C/2540D/9050A/9056A/ 353.2/9020B/9040B
J1T258	280-51884-3	8260A	8260B

I certify that this data package is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed in this Case Narrative. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or a designee, as verified by the signature on the Report Cover.

With exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. All laboratory quality control samples analyzed in conjunction with the samples in this project were within established control limits, with any exceptions noted. Calculations are performed before rounding to avoid round-off errors in calculated results.

This report includes reporting limits (RLs) less than TestAmerica Denver's practical quantitation limits. These reporting limits are being used specifically at the client's request to meet the needs of this project. Please note that data are not normally reported to these levels without qualification, since they are inherently less reliable and potentially less defensible than required by the current NELAC standards.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

Revision 1 - 2/28/2014

This report has been revised to correct the Nitrate Nitrite as N data reported for samples J1T256 and J1T257. The 20X dilution factor was mistakenly not included in the original report.

RECEIPT

The samples were received on 2/6/2014 10:45 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 0.3° C.

Samples J1T256 and J1T257, requesting Nitrate as N, Nitrite as N and Orthophosphate as P 9056A analyses, were received at the laboratory after the recommended 48 hour sample holding times had expired. The client was notified on 2/7/2014.

GC/MS VOLATILES - SW846 8260B

The method required MS/MSD analysis was not performed for batch 280-213231, due to analyst oversight. The acceptable LCS analysis data indicated that the analytical system was operating within control.

No other anomalies were encountered.

TOTAL METALS - SW846 6010B

Low levels of Barium and Zinc are present in the method blank associated with batch 280-211892. Because the concentrations in the method blank are not present at a level greater than half the reporting limit, corrective action is deemed unnecessary.

It can be noted that the sample amount was greater than four times the spike amount for Calcium and Sodium in the Matrix Spike performed on sample J1T256; therefore, control limits are not applicable.

No other anomalies were encountered.

GENERAL CHEMISTRY - MCAWW 353.2 - NITRATE NITRITE as N

Each sample is analyzed to achieve the lowest possible reporting limits within the constraints of the method. Due to high constituent concentration, the Nitrate Nitrite as N analysis of samples J1T256 and J1T257 had to be performed at dilutions, and the associated results have been flagged with a "D". The reporting limits have been adjusted relative to the dilutions required.

The Matrix Spike performed on sample J1T256 exhibited the percent recovery outside the control limits, and the associated sample result has been flagged "N". There is no indication that the analytical system was operating out of control, and method accuracy has been verified by the acceptable LCS analysis data; therefore, corrective action is deemed unnecessary.

No other anomalies were encountered.

GENERAL CHEMISTRY - SW846 9020B - TOTAL ORGANIC HALOGENS

Samples exhibited elevated detection limits due to the limited sample volume used. The nominal sample amount could not be used due to the nature of the sample matrix.

No other anomalies were encountered.

GENERAL CHEMISTRY - SW846 9056A - ANIONS

The Nitrate as N, Nitrite as N and Orthophosphate as P analyses for samples J1T256 and J1T257 were performed outside the recommended 48 hour sample holding times. The holding times were expired at the time of sample receipt. The client was notified on 2/7/2014.

Each sample is analyzed to achieve the lowest possible reporting limits within the constraints of the method. Due to high constituent concentration, samples J1T256 and J1T257 required dilutions prior to the analysis of Nitrate as N, Chloride and Sulfate, and the associated results have been flagged with a "D". The reporting limits have been adjusted relative to the dilutions required.

The Matrix Spike performed on sample J1T257 exhibited percent recoveries outside the control limits for Nitrite as N and Bromide, and the associated sample results have been flagged "N". In addition, it can be noted that the Bromide matrix spike concentration was present above the instrument calibration range. There is no indication that the analytical systems were operating out of control, and method accuracy has been verified by the acceptable LCS analysis data; therefore, corrective action is deemed unnecessary.

No other anomalies were encountered.

GENERAL CHEMISTRY - SM 2320B - ALKALINITY

No anomalies were encountered.

GENERAL CHEMISTRY - SM 2540C - TOTAL DISSOLVED SOLIDS

Samples exhibited elevated detection limits due to the limited sample volume used. The nominal sample amount could not be used due to high constituent concentration.

No other anomalies were encountered.

GENERAL CHEMISTRY - SM 2540D - TOTAL SUSPENDED SOLIDS

Due to the limited sample volume submitted by the client, the initial volume used for sample J1T257 and the batch duplicate analysis of sample J1T257 deviated from the standard procedure. The specified volume is 250 mLs; however, only 100 mLs were available for each. The reporting limits have been elevated accordingly.

No other anomalies were encountered.

GENERAL CHEMISTRY - SW846 9040B - PH

SU = standard units

No anomalies were encountered.

GENERAL CHEMISTRY - SW846 9050A - SPECIFIC CONDUCTANCE

No anomalies were encountered.

Washington Closure Hanford				CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST							RC-010-032		Page 1 of 1		
Collector M Downing				Company Contact Joan Kessner			Telephone No. 375-4688		Project Coordinator KESSNER, JH		Price Code 7N		Data Turnaround 45 Days		
Project Designation ERDF Leachate Tank				Sampling Location ERDF Leachate tank #4, fall 2013				SAF No. RC-010							
Ice Chest No. WCH-11-009				Field Logbook No. EL-1626-0203 2/3/14		COA RERDF22560		Method of Shipment Commercial Carrier fed EX							
Shipped To TestAmerica Denver				Offsite Property No. A131056				Bill of Lading/Air Bill No. See O5PC							
Other Labs Shipped To TestAmerica Richland				Preservation	HNO3 to pH <2	Cool 4C	Cool 4C	H2SO4 to pH <2	H2SO4 to pH <2	Cool 4C	Cool 4C	Cool 4C	None	HCl or H2SO4 to pH <2	
				Type of Container	G/P	G/P	G ³	G/P	aGs*	G/P	G/P	P	P	aGs*	
POSSIBLE SAMPLE HAZARDS/REMARKS Potentially radioactive, less than DOT Some sample containers preserved w/ acid				No. of Container(s)	1	1	1	1	1	1	1	1	1	3	
				Volume	500mL	500mL	500mL	500mL	1000mL	500mL	500mL	250mL	125mL	40mL	
Special Handling and/or Storage				Sample Analysis	See item (1) in Special Instructions	Alkalinity - 2320	See item (2) in Special Instructions	NO2/NO3 - 353.2	TOX - 9020	TDS - 2540C	TSS - 2540D	Conductivity - 9050	pH (Water) - 9040	VOA - 8260A (TCL) (Carbon tetrachloride, Trichloroethene)	
				Page 1 of 1	Sample No.	Matrix	Sample Date	Sample Time							
J10256	WATER	02-04-14	0826	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
J10257	WATER	02-04-14	0826	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
52															
CHAIN OF POSSESSION				Sign/Print Names				SPECIAL INSTRUCTIONS							
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		(1) ICP Metals - 6010TR (Client List) (Arsenic, Barium, Beryllium, Calcium, Chromium, Lead, Potassium, Selenium, Silicon, Sodium, Thallium, Tin, Vanadium, Zinc) (2) IC Anions - 9056 Modified (Bromide, Chloride, Fluoride, Nitrogen in Nitrate, Nitrogen in Nitrite, Phosphorous in phosphate, Sulfate)							
M Downing		2/4/14 09:13		Joan Kessner		2/4/14 09:13									
Joan Kessner		2/4/14 12:21		fed EX											
[Signature]				[Signature]		2/16/14 10:45									
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By		Date/Time		J02082 D.B. 02-06-14 							

Appendix 5

Data Validation Supporting Documentation Documentation

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT:	ERDF		DATA PACKAGE: J02082		
VALIDATOR:	EVR	LAB: LLF	DATE: 2/8/15		
			SDG: J02082		
ANALYSES PERFORMED					
SW-846/ICP	SW-846/GFAA	SW-846/Hg	SW-846 Cyanide		
SAMPLES/MATRIX					
J1T256		J1T257			
Woben					

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present? Yes **No** N/A

Comments: _____

2. INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)

Initial calibrations performed on all instruments? Yes No **N/A**
 Initial calibrations acceptable? Yes No **N/A**
 ICP interference checks acceptable?..... Yes No **N/A**
 ICV and CCV checks performed on all instruments?..... Yes No **N/A**
 ICV and CCV checks acceptable?..... Yes No **N/A**
 Standards traceable? Yes No **N/A**
 Standards expired?..... Yes No **N/A**
 Calculation check acceptable?..... Yes No **N/A**

Comments: _____

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

3. BLANKS (Levels B, C, D, and E)

ICB and CCB checks performed for all applicable analyses? (Levels D, E)..... Yes No N/A
ICB and CCB results acceptable? (Levels D, E) Yes No N/A
Laboratory blanks analyzed? Yes No N/A
Laboratory blank results acceptable?..... Yes No N/A
Field blanks analyzed? (Levels C, D, E) Yes No N/A
Field blank results acceptable? (Levels C, D, E) Yes No N/A
Transcription/calculation errors? (Levels D, E)..... Yes No N/A

Comments: Zinc - UJ all

_____ no FD

4. ACCURACY (Levels C, D, and E)

MS/MSD samples analyzed?..... Yes No N/A
MS/MSD results acceptable?..... Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E) Yes No N/A
MS/MSD standards expired? (Levels D, E) Yes No N/A
LCS/BSS samples analyzed?..... Yes No N/A
LCS/BSS results acceptable?..... Yes No N/A
Standards traceable? (Levels D, E)..... Yes No N/A
Standards expired? (Levels D, E) Yes No N/A
Transcription/calculation errors? (Levels D, E)..... Yes No N/A
Performance audit sample(s) analyzed? Yes No N/A
Performance audit sample results acceptable?..... Yes No N/A

Comments: _____
_____ no BAS

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

5. PRECISION (Levels C, D, and E)

- Duplicate RPD values acceptable? Yes No N/A
- Duplicate results acceptable? Yes No N/A
- MS/MSD standards NIST traceable? (Levels D, E) Yes No N/A
- MS/MSD standards expired? (Levels D, E) Yes No N/A
- Field duplicate RPD values acceptable? Yes No N/A
- Field split RPD values acceptable? Yes No N/A
- Transcription/calculation errors? (Levels D, E) Yes No N/A

Comments: _____

6. ICP QUALITY CONTROL (Levels D and E)

- ICP serial dilution samples analyzed? Yes No N/A
- ICP serial dilution %D values acceptable? Yes No N/A
- ICP post digestion spike required? Yes No N/A
- ICP post digestion spike values acceptable? Yes No N/A
- Standards traceable? Yes No N/A
- Standards expired? Yes No N/A
- Transcription/calculation errors? Yes No N/A

Comments: _____

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

7. FURNACE AA QUALITY CONTROL (Levels D and E)

Duplicate injections performed as required?	Yes	No	N/A
Duplicate injection %RSD values acceptable?	Yes	No	N/A
Analytical spikes performed as required?	Yes	No	N/A
Analytical spike recoveries acceptable?	Yes	No	N/A
Standards traceable?	Yes	No	N/A
Standards expired?	Yes	No	N/A
MSA performed as required?	Yes	No	N/A
MSA results acceptable?	Yes	No	N/A
Transcription/calculation errors?	Yes	No	N/A
Comments:			
.....			
.....			
.....			

8. HOLDING TIMES (all levels)

Samples properly preserved?	Yes	No	N/A
Sample holding times acceptable?	Yes	No	N/A
Comments:			
.....			
.....			
.....			
.....			

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

9. RESULT QUANTITATION AND DETECTION LIMITS (all levels)

- Results reported for all requested analyses? Yes No N/A
- Results supported in the raw data? (Levels D, E) Yes No N/A
- Samples properly prepared? (Levels D, E) Yes No N/A
- Detection limits meet RDL? Yes No N/A
- Transcription/calculation errors? (Levels D, E) Yes No N/A

Comments: _____

Appendix 6
Additional Documentation Requested by Client

Quality Control Results

Client: Washington Closure Hanford

Job Number: 280-51884-1
Sdg Number: J02082

Method Blank - Batch: 280-211892

**Method: 6010B
Preparation: 3010A**

Lab Sample ID: MB 280-211892/1-A
Client Matrix: Water
Dilution: 1.0
Analysis Date: 02/12/2014 1703
Prep Date: 02/10/2014 0700
Leach Date: N/A

Analysis Batch: 280-212832
Prep Batch: 280-211892
Leach Batch: N/A
Units: mg/L

Instrument ID: MT_026
Lab File ID: 26a021214b.asc
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

Analyte	Result	Qual	MDL	RL
Arsenic	0.0044	U	0.0044	0.010
Barium	0.000990	B	0.00058	0.0050
Beryllium	0.00047	U	0.00047	0.0010
Calcium	0.035	U	0.035	0.20
Chromium	0.00066	U	0.00066	0.0020
Lead	0.0026	U	0.0026	0.0050
Potassium	0.24	U	0.24	3.0
Selenium	0.0049	U	0.0049	0.010
Silicon	0.035	U	0.035	0.50
Sodium	0.092	U	0.092	0.50
Thallium	0.0049	U	0.0049	0.015
Tin	0.0058	U	0.0058	0.10
Vanadium	0.0011	U	0.0011	0.010
Zinc	0.00462	B	0.0045	0.010

Lab Control Sample - Batch: 280-211892

**Method: 6010B
Preparation: 3010A**

Lab Sample ID: LCS 280-211892/2-A
Client Matrix: Water
Dilution: 1.0
Analysis Date: 02/12/2014 1705
Prep Date: 02/10/2014 0700
Leach Date: N/A

Analysis Batch: 280-212832
Prep Batch: 280-211892
Leach Batch: N/A
Units: mg/L

Instrument ID: MT_026
Lab File ID: 26a021214b.asc
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Arsenic	1.00	0.995	100	88 - 110	
Barium	2.00	2.05	103	90 - 112	
Beryllium	0.0500	0.0491	98	89 - 113	
Calcium	50.0	49.69	99	90 - 111	
Chromium	0.200	0.203	101	90 - 113	
Lead	0.500	0.501	100	89 - 110	
Potassium	50.0	50.50	101	89 - 114	
Selenium	2.00	1.97	98	85 - 112	
Silicon	10.0	10.29	103	90 - 110	
Sodium	50.0	51.48	103	90 - 115	
Thallium	2.00	1.98	99	88 - 110	
Tin	2.00	1.99	100	85 - 113	
Vanadium	0.500	0.497	99	90 - 111	
Zinc	0.500	0.495	99	85 - 111	

Quality Control Results

Client: Washington Closure Hanford

Job Number: 280-51884-1
Sdg Number: J02082

Matrix Spike - Batch: 280-211892

**Method: 6010B
Preparation: 3010A**

Lab Sample ID:	280-51884-1	Analysis Batch:	280-212832	Instrument ID:	MT_026
Client Matrix:	Water	Prep Batch:	280-211892	Lab File ID:	26a021214b.asc
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	50 mL
Analysis Date:	02/12/2014 1713	Units:	mg/L	Final Weight/Volume:	50 mL
Prep Date:	02/10/2014 0700				
Leach Date:	N/A				

Analyte	Sample Result/Qual	Spike Amount	Result	% Rec.	Limit	Qual
Arsenic	0.0066 B	1.00	1.04	104	84 - 124	
Barium	0.090	2.00	2.12	102	85 - 120	
Beryllium	0.00047 U	0.0500	0.0485	97	79 - 121	
Calcium	292	50.0	334.7	86	48 - 153	4
Chromium	0.054	0.200	0.255	101	73 - 135	
Lead	0.0026 U	0.500	0.479	96	89 - 121	
Potassium	20.0	50.0	71.69	103	76 - 132	
Selenium	0.014	2.00	2.02	100	71 - 140	
Silicon	21.0	10.0	30.80	98	79 - 140	
Sodium	235	50.0	284.9	100	70 - 203	4
Thallium	0.0049 U	2.00	1.81	90	90 - 116	
Tin	0.0058 U	2.00	1.94	97	77 - 126	
Vanadium	0.018	0.500	0.510	98	85 - 120	
Zinc	0.0053 B	0.500	0.480	95	60 - 137	

Quality Control Results

Client: Washington Closure Hanford

Job Number: 280-51884-1
Sdg Number: J02082

Duplicate - Batch: 280-211892

**Method: 6010B
Preparation: 3010A**

Lab Sample ID:	280-51884-1	Analysis Batch:	280-212832	Instrument ID:	MT_026
Client Matrix:	Water	Prep Batch:	280-211892	Lab File ID:	26a021214b.asc
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	50 mL
Analysis Date:	02/12/2014 1715	Units:	mg/L	Final Weight/Volume:	50 mL
Prep Date:	02/10/2014 0700				
Leach Date:	N/A				

Analyte	Sample Result/Qual	Result	RPD	Limit	Qual
Arsenic	0.0066 B	0.00662	0.9	25	B
Barium	0.090	0.0889	2	25	
Beryllium	0.00047 U	0.00047	NC	25	U
Calcium	292	288.0	1	25	
Chromium	0.054	0.0531	2	25	
Lead	0.0026 U	0.0026	NC	25	U
Potassium	20.0	19.98	0.3	25	
Selenium	0.014	0.0133	2	25	
Silicon	21.0	20.63	2	25	
Sodium	235	232.6	1	40	
Thallium	0.0049 U	0.0049	NC	25	U
Tin	0.0058 U	0.0058	NC	25	U
Vanadium	0.018	0.0177	2	25	
Zinc	0.0053 B	0.00586	10	25	B

Date: 9 February 2015
 To: Washington Closure Hanford (technical representative)
 From: ELR Consulting
 Project: ERDF Semiannual Leachate Analysis - Spring 2014
 Subject: Radiochemistry - Data Package No. J02082-TAL

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. J02082 prepared by TestAmerica (TAL). A list of samples validated along with the analyses reported and the requested analytes is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analyte
J1T256	2/4/14	Water	C	See note 1
J1T257	2/4/14	Water	C	See note 1

1 – Gross alpha/beta, tritium, carbon-14, technetium-99, iodine-129, total uranium, total radium & gamma spectroscopy.

Data validation was conducted in accordance with the WCH validation statement of work and WCH-173, Rev. 1. "Environmental Restoration Disposal Facility Leachate Sampling and Analysis Plan". Appendices 1 through 6 provide the following information as indicated below:

- Appendix 1. Glossary of Data Reporting Qualifiers
- Appendix 2. Summary of Data Qualification
- Appendix 3. Annotated Laboratory Reports
- Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
- Appendix 5. Data Validation Supporting Documentation
- Appendix 6. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

· Holding Times

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for radiochemical analysis is 6 months.

All holding times were acceptable.

· Laboratory (Method) Blanks

Laboratory Blanks

Blank samples are analyzed to determine if positive results are due to laboratory reagent, sample container, or detector contamination. If blank analysis results indicate

the presence of an analyte above the required detection limit (RDL), the following qualifiers are applied: All positive sample results less than five times the highest blank concentration are qualified as estimates and flagged "J"; sample results below the minimum detectable activity (MDA) are qualified as undetected and flagged "U"; sample results above the MDA and greater than five times the highest blank concentration are not qualified.

All laboratory blank results were acceptable.

Field (Trip) Blank

No field blanks were submitted for analysis.

Accuracy

Accuracy is evaluated by analyzing distilled water or field samples spiked with known amounts of radionuclides. The sample activity as determined by analysis is compared to the known activity to assess accuracy. The acceptable laboratory control sample (LCS) and matrix spike (MS) recovery range is 75-125% (80-120 for total radium). In addition, samples may be spiked with a radiochemical tracer to assist in isolating the radioisotope of interest with the yield of the tracer being used in calculating sample activity. The acceptable range for tracer recovery is 20% to 105%. Spike sample results outside the above ranges result in associated sample results being qualified as estimates, rejected, or not qualified, depending on the activity of the individual sample.

Due to the lack of a matrix spike analysis, all carbon-14 and tritium results were qualified as estimates and flagged "J".

Due to an LCS recovery outside QC limits, all technetium-99 (74%) results were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

Precision

Analytical precision is expressed by the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. Precision may also be assessed using unspiked duplicate sample analyses. If both sample and replicate activities are greater than five times the contract required detection limit (CRDL) and the RPD is less than 20 percent, the results are acceptable. If either activities are less than five times the CRDL, a control limit of less than or equal to two times the CRDL is used for soil samples and less than or equal to the CRDL for water samples. If either the original or replicate value is below the CRDL, the applicable control limits are less than or equal to the CRDL for water samples and less than or equal to two times the CRDL for soil samples. If the RPD is outside the applicable

control limit, associated results are qualified as estimated detects or estimated non-detects.

All duplicate results were acceptable.

Field Duplicate Samples

One set of field duplicates (J1T256/J1T257) were submitted for analysis. Field duplicate results are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

· **Detection Levels**

Reported analytical detection levels are compared against the project MDAs to ensure that laboratory detection levels meet the required criteria. All analytes met the MDA.

· **Completeness**

Data package SDG No. J02082 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

The following minor deficiency was noted:

- Due to the lack of a matrix spike analysis, all carbon-14 and tritium results were qualified as estimates and flagged "J".
- Due to an LCS recovery outside QC limits, all technetium-99 (74%) results were qualified as estimates and flagged "J".

Data flagged "J" indicates that the associated concentration is an estimate, but under the WCH statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

REFERENCES

Washington Closure Hanford Contract #S00W307A00 (March 2008), *Data Validation Services*.

WCH-173, Rev 1, *Environmental Restoration Disposal Facility Leachate Sampling and Analysis Plan*, October 2014.

Appendix 1
Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the WCH statement of work are as follows:

- U - Indicates the compound or analyte was analyzed for and not detected above the minimum detectable activity (MDA) in the sample. The value reported is the sample result corrected for sample dilution and moisture content by the laboratory. The data is usable for decision making purposes.
- UJ - Indicates the compound or analyte was analyzed for and not detected at concentrations above the minimum detectable activity (MDA) in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate, but is usable for decision making purposes.
- J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.
- R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

Appendix 2
Summary of Data Qualification

RADIOCHEMISTRY DATA QUALIFICATION SUMMARY*

SDG: J02082	REVIEWER: ELR	Project: ERDF	PAGE <u>1</u> OF <u>1</u>
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Carbon-14	J	All	No MS analysis
Tritium			
Technetium-99	J	All	LCS recovery

* - The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

Appendix 3
Annotated Laboratory Reports

Sample Results Summary

Date: 28-Feb-14

TestAmerica Inc TARL

Ordered by Method, Batch No., Client Sample ID.

Report No. : 58937

V 2/26/14

SDG No: J02082

Batch	Client Id Work Order	Parameter	Result +/- Uncertainty (2s)	Qual	Units	Tracer Yield	MDL	CRDL	RPD
4036043	C14_CHEM_L3C								
	J1T256								
	M20XF1AK	C-14	2.18E+02 +/- 1.8E+01	J	pCi/L	100%	1.74E+01	2.00E+02	
	J1T256 DUP								
	M20XF1AP	C-14	2.23E+02 +/- 1.9E+01		pCi/L	100%	1.74E+01	2.00E+02	2.0
	J1T257								
	M20XG1AK	C-14	2.10E+02 +/- 1.8E+01	J	pCi/L	100%	1.74E+01	2.00E+02	
4036033	GAMMA_GS								
	J1T256								
	M20XF1AE	CO-60	1.60E+00 +/- 1.6E+00	U	pCi/L		3.31E+00	2.50E+01	
		CS-137	7.73E-01 +/- 1.4E+00	U	pCi/L		2.66E+00	1.50E+01	
		EU-152	3.68E-01 +/- 3.8E+00	U	pCi/L		6.67E+00	5.00E+01	
		EU-154	1.21E+00 +/- 3.7E+00	U	pCi/L		7.27E+00	5.00E+01	
		EU-155	3.14E-01 +/- 3.1E+00	U	pCi/L		5.39E+00	5.00E+01	
		K-40	2.91E+01 +/- 4.3E+01	U	pCi/L		2.53E+01		
	J1T256 DUP								
	M20XF1AL	CO-60	6.52E-01 +/- 1.4E+00	U	pCi/L		2.77E+00	2.50E+01	84.2
		CS-137	2.68E-01 +/- 9.9E-01	U	pCi/L		1.85E+00	1.50E+01	97.2
		EU-152	1.30E+00 +/- 2.2E+00	U	pCi/L		4.04E+00	5.00E+01	112.4
		EU-154	9.40E-01 +/- 2.8E+00	U	pCi/L		5.69E+00	5.00E+01	25.0
		EU-155	1.97E+00 +/- 1.5E+00	U	pCi/L		2.86E+00	5.00E+01	145.0
		K-40	3.11E+01 +/- 1.7E+01	U	pCi/L		3.67E+01		6.8
	J1T257								
	M20XG1AE	CO-60	3.71E+00 +/- 1.7E+00	U	pCi/L		3.63E+00	2.50E+01	
		CS-137	4.07E-01 +/- 7.7E-01	U	pCi/L		1.52E+00	1.50E+01	
		EU-152	9.61E-01 +/- 2.0E+00	U	pCi/L		3.66E+00	5.00E+01	
		EU-154	-3.30E-01 +/- 3.2E+00	U	pCi/L		5.94E+00	5.00E+01	
		EU-155	4.40E-01 +/- 1.7E+00	U	pCi/L		2.92E+00	5.00E+01	
		K-40	3.93E+01 +/- 1.9E+01		pCi/L		2.20E+01		
4036037	I129_SEP_LEPS_GS								
	J1T256								
	M20XF1AH	I129	9.84E-01 +/- 9.3E-01	U	pCi/L	95%	1.99E+00	1.00E+00	
	J1T257								
	M20XG1AH	I129	2.19E-01 +/- 6.5E-01	U	pCi/L	96%	1.38E+00	1.00E+00	
	J1T257 DUP								
	M20XG1AM	I129	-5.80E-01 +/- 8.8E-01	U	pCi/L	98%	1.47E+00	1.00E+00	-442.2
4036035	RATOT_AEAGEA								
	J1T258								
	M20XF2AJ	TOTAL ALPHA RA	3.44E-01 +/- 3.4E-01	U	pCi/L	90%	5.96E-01	1.00E+00	

TestAmerica Inc RPD - Relative Percent Difference.
 rptTALRchSaSum U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or
 mary2 V5.3.0.1 not identified by gamma scan software.
 A2002

Date: 28-Feb-14

Sample Results Summary
TestAmerica Inc TARL
 Ordered by Method, Batch No., Client Sample ID.

Report No. : 58937

K 2915

SDG No: J02082

Batch	Client Id Work Order	Parameter	Result +/- Uncertainty (2σ)	Qual	Units	Tracer Yield	MDL	CRDL	RPD
4036035	RATOT_AEAGEA								
	J1T257								
	M20XG1AJ	TOTAL ALPHA RA	4.02E-01 +/- 4.7E-01	U	pCi/L	94%	8.79E-01	1.00E+00	
	J1T257 DUP								
	M20XG1AL	TOTAL ALPHA RA	-1.57E-01 +/- 2.9E-01	U	pCi/L	84%	9.61E-01	1.00E+00	455.3
4036039	9310_ALPHABETA_GPC								
	J1T256								
	M20XF1AC	BETA	3.96E+02 +/- 5.0E+01		pCi/L	100%	7.53E+00	4.00E+00	
	J1T256 DUP								
	M20XF1AM	BETA	4.10E+02 +/- 5.2E+01		pCi/L	100%	7.09E+00	4.00E+00	3.3
	J1T257								
	M20XG1AC	BETA	3.90E+02 +/- 5.2E+01		pCi/L	100%	7.74E+00	4.00E+00	
4036040	9310_ALPHABETA_GPC								
	J1T256								
	M20XF1AA	ALPHA	3.50E+02 +/- 9.3E+01		pCi/L	100%	1.15E+01	3.00E+00	
	J1T257								
	M20XG1AA	ALPHA	3.80E+02 +/- 9.8E+01		pCi/L	100%	1.12E+01	3.00E+00	
	J1T257 DUP								
	M20XG1AN	ALPHA	3.76E+02 +/- 9.7E+01		pCi/L	100%	9.80E+00	3.00E+00	1.1
4036041	TRITIUM_DIST_LSC								
	J1T256								
	M20XF1AD	H-3	9.54E+04 +/- 3.0E+03	J	pCi/L	100%	3.44E+02	4.00E+02	
	J1T256 DUP								
	M20XF1AN	H-3	9.53E+04 +/- 3.0E+03		pCi/L	100%	3.42E+02	4.00E+02	0.1
	J1T257								
	M20XG1AD	H-3	9.69E+04 +/- 3.1E+03	J	pCi/L	100%	3.45E+02	4.00E+02	
4036044	TC99_SEP_LSC								
	J1T256								
	M20XF1AF	Tc-99	3.09E+02 +/- 2.2E+01	J	pCi/L	100%	9.93E+00	1.50E+01	
	J1T256 DUP								
	M20XF1AQ	Tc-99	2.79E+02 +/- 2.0E+01		pCi/L	100%	9.63E+00	1.50E+01	10.0
	J1T257								
	M20XG1AF	Tc-99	3.00E+02 +/- 2.2E+01	J	pCi/L	100%	9.93E+00	1.50E+01	
4036045	UTOT_KPA								
	J1T256								
	M20XF1AG	TOTAL-URANIUM	1.35E+00 +/- 1.6E-01		mg/L		8.35E-05	1.40E-01	
	J1T256 DUP								
	M20XF1AR	TOTAL-URANIUM	1.31E+00 +/- 1.5E-01		mg/L		8.38E-05	1.40E-01	3.3
	J1T257								
	M20XG1AG	TOTAL-URANIUM	1.37E+00 +/- 1.6E-01		mg/L		8.03E-05	1.40E-01	

TestAmerica Inc
 rptTALRchSaSummary2 V6.3.0.1
 A2002

RPD - Relative Percent Difference.
 U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

Certificate of Analysis

Washington Hanford Closure
2620 Fermi Avenue
Richland, WA 99354

February 28, 2014

Attention: Joan Kessner

SAF Number	:	RC-010
Date SDG Closed	:	February 4, 2014
Number of Samples	:	Two (2)
Sample Type	:	Water
SDG Number	:	J02082
Data Deliverable	:	45- Day / Summary

CASE NARRATIVE

I. Introduction

On February 4, 2014, two water samples were received at TestAmerica for radiochemical analysis. Upon receipt, the samples were assigned the following laboratory ID number to correspond with the Washington Closure Hanford (WCH) specific ID:

<u>WCH ID#</u>	<u>TARL ID#</u>	<u>MATRIX</u>	<u>DATE OF RECEIPT</u>
J1T256	M20XF	WATER	2/04/14
J1T257	M20XG	WATER	2/04/14

II. Sample Receipt

The samples were received in good condition and no anomalies were noted during check-in.

III. Analytical Results/Methodology

The analytical results for this report are presented by laboratory sample ID. Each set of data includes sample identification information, analytical results and the appropriate associated statistical errors.

The requested analyses were:

Gas Proportional Counting
Gross Alpha by method RL-GPC-001
Gross Beta by method RL-GPC-001
Total Radium by method RL-RA-002

Gamma Spectroscopy

Gamma Spec by method RL-GAM-001

Iodine-129 by method RL-GAM-002

Liquid Scintillation Counting

Technetium-99 by method RL-LSC-013

Tritium by method RL-LSC-005

Carbon-14 by method RL-LSC-008

Laser Induced Phosphorimetry

Total Uranium by method RL-KPA-003

IV. Quality Control

The analytical results for each analysis performed includes a minimum of one laboratory control sample (LCS), one method (reagent) blank, and one duplicate sample analysis. Any exceptions have been noted in the "Comments" section.

QC and sample results are reported in the same units.

V. Comments

Gas Proportional Counting

Gross Alpha by method RL-GPC-001:

The achieved MDA for the samples and sample duplicate exceeded the CRDL due to reduced aliquot sizes based on the weight screens. The samples were counted for the longest time frame appropriate to this analysis. Except as noted; the LCS, batch blank, samples and sample duplicate (J1T257) results are within contractual requirements.

Gross Beta by method RL-GPC-001:

The achieved MDA for the samples and sample duplicate exceeded the CRDL due to reduced aliquot sizes based on the weight screens. The samples were counted for the longest time frame appropriate to this analysis. Except as noted; the LCS, batch blank, samples and sample duplicate (J1T256) results are within contractual requirements.

Total Radium by method RL-RA-002:

The achieved MDA for sample J1T256 exceeded the CRDL; the sample was recounted for a longer count time for an acceptable result. Except as noted; the LCS, batch blank, samples and sample duplicate (J1T257) results are within contractual requirements.

Gamma Spectroscopy

Gamma Spec by method RL-GAM-001:

The LCS, batch blank, samples and sample duplicate (J1T256) results are within contractual requirements.

Iodine-129 by method RL-GAM-002:

The LCS, batch blank, samples and sample duplicate (J1T257) results are within contractual requirements.

Liquid Scintillation Counting

Technetium-99 by method RL-LSC-013:

The LCS, batch blank, samples, sample duplicate (J1T256) and sample matrix spike (J1T257) results are within contractual requirements.

Washington Closure Hanford
February 28, 2014

Tritium by method RL-LSC-005:

The negative batch blank result is greater than 3 times the uncertainty. All other batch QC is within the acceptance limits. Except as noted; the LCS, batch blank, samples and sample duplicate (J1T256) results are within contractual requirements.

Carbon-14 by method RL-LSC-008:

The LCS, batch blank, samples and sample duplicate (J1T256) results are within contractual requirements.

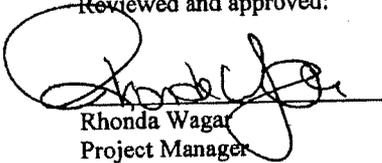
Total Uranium

Total Uranium by method RL-KPA-003:

The lifetimes on both LCS samples are slightly elevated; both LCS samples calculated with acceptable results. Except as noted; the LCS, batch blank, samples, sample duplicate (J1T256) and sample matrix spike (J1T257) results are within contractual requirements.

I certify that this Certificate of Analysis is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager, or a designee as verified by the following signature.

Reviewed and approved:


Rhonda Wagar
Project Manager

Appendix 5
Data Validation Supporting Documentation

**APPENDIX A
RADIOCHEMICAL DATA VALIDATION CHECKLIST**

VALIDATION LEVEL:	A	B	C	D	E
PROJECT:	ERDF		DATA PACKAGE:	J02082	
VALIDATOR:	BLR	LAB:	TAL	DATE:	2/8/15
			SDG:	J02082	
ANALYSES PERFORMED					
<input checked="" type="checkbox"/> Gross Alpha/Beta	<input type="checkbox"/> Strontium-90	<input checked="" type="checkbox"/> Technetium-99	<input type="checkbox"/> Alpha Spectroscopy	<input checked="" type="checkbox"/> Gamma Spectroscopy	
<input checked="" type="checkbox"/> Total Uranium	<input type="checkbox"/> Radium-22	<input checked="" type="checkbox"/> Tritium	KCl4	X1-129	PR
SAMPLES/MATRIX					
JIT256		JIT257			
				Water	

1. Completeness N/A

Technical verification forms present? Yes No N/A

Comments: _____

2. Initial Calibration (Levels D, E) N/A

Instruments/detectors calibrated? Yes No N/A

Initial calibration acceptable? Yes No N/A

Standards NIST traceable? Yes No N/A

Standards Expired? Yes No N/A

Calculation check acceptable? Yes No N/A

Comments: _____

3. Continuing Calibration (Levels D, E)

N/A

Calibration checked within required frequency? Yes No N/A

Calibration check acceptable? Yes No N/A

Calibration check standards traceable? Yes No N/A

Calibration check standards expired? Yes No N/A

Calculation check acceptable? Yes No N/A

Comments: _____

4. Background Counts (Levels D, E)

N/A

Background Counts checked within required frequency? Yes No N/A

Background Counts acceptable? Yes No N/A

Calculation check acceptable? Yes No N/A

Comments: _____

Chemical carrier expired? (Levels D, E) Yes No N/A

Transcription/Calculation errors? (Levels D, E)..... Yes No N/A

Comments: _____

8. Tracer Recovery (Levels C, D, E) N/A

Tracer added? Yes No N/A

Tracer recovery acceptable? Yes No N/A

Tracer traceable? (Levels D, E) Yes No N/A

Tracer expired? (Levels D, E)..... Yes No N/A

Transcription/Calculation errors? (Levels D, E)..... Yes No N/A

Comments: _____

9. Matrix Spikes (Levels C, D, E)..... N/A

Matrix spike analyzed? Yes No N/A

Spike recoveries acceptable? Yes No N/A

Spike source traceable? (Levels D, E) Yes No N/A

Spike source expired? Levels D, E)..... Yes No N/A

Transcription/Calculation Errors? (Levels D, E) Yes No N/A

Comments: no MS - J all

10. Duplicates (Levels C, D, E)..... N/A
Duplicates Analyzed at required frequency? Yes No N/A
RPD Values Acceptable?..... Yes No N/A
Transcription/Calculation Errors? (Levels D, E)..... Yes No N/A

Comments: _____

11. Field QC Samples (Levels C, D E)..... N/A
Field duplicate sample(s) analyzed? Yes No N/A
Field duplicate RPD values acceptable?..... Yes No N/A
Field split sample(s) analyzed?..... Yes No N/A
Field split RPD values acceptable?..... Yes No N/A
Performance audit sample(s) analyzed?..... Yes No N/A
Performance audit sample results acceptable?..... Yes No N/A

Comments: no PAS on E3 _____

12. Holding Times (All levels)
Are sample holding times acceptable?..... Yes No N/A

Comments: _____

13. Results and Detection Limits (All Levels)..... N/A

Results reported for all required sample analyses?..... Yes No N/A

Results supported in raw data?(Levels D, E)..... Yes No N/A

Results Acceptable? (Levels D, E) Yes No N/A

Transcription/Calculation errors? (Levels D, E)..... Yes No N/A

MDA's meet required detection limits? Yes No N/A

Transcription/calculation errors? (Levels D, E)..... Yes No N/A

Comments: _____

Appendix 6
Additional Documentation Requested by Client

QC Results Summary

Date: 28-Feb-14

TestAmerica Inc TARI

Ordered by Method, Batch No, QC Type,.

Report No. : 58937

SDG No.: J02082

Batch	Work Order	Parameter	Result +/- Uncertainty (2s)	Qual	Units	Tracer Yield	LCS Recovery	Bias	MDL
C14_CHEM_LSC									
4036043	BLANK QC,								
	M20031AA	C-14	-1.10E+01 +- 8.3E+00	U	pCi/L	100%			1.74E+01
4036043	LCS,								
	M20031AC	C-14	4.84E+02 +- 3.2E+01		pCi/L	100%	101%	0.0	1.73E+01
GAMMA_GS									
4036033	BLANK QC,								
	M200M1AA	CO-60	-4.01E-01 +- 9.8E-01	U	pCi/L				1.74E+00
		CS-137	8.36E-01 +- 1.1E+00	U	pCi/L				2.03E+00
		EU-152	1.97E+00 +- 2.3E+00	U	pCi/L				4.28E+00
		EU-154	-3.17E+00 +- 3.1E+00	U	pCi/L				4.88E+00
		EU-155	1.86E-01 +- 1.1E+00	U	pCi/L				2.09E+00
		K-40	-3.01E+01 +- 3.0E+01	U	pCi/L				6.17E+01
4036033	LCS,								
	M200M1AC	CO-60	3.56E+01 +- 6.0E+00		pCi/L		92%	-0.1	2.42E+00
		CS-137	4.86E+01 +- 7.5E+00		pCi/L		96%	0.0	2.39E+00
		EU-152	7.66E+01 +- 1.2E+01		pCi/L		100%	0.0	5.54E+00
I129_SEP_LEPS_GS									
4036037	BLANK QC,								
	M200T1AA	I129	-6.46E-01 +- 6.7E-01	U	pCi/L	98%			1.01E+00
4036037	LCS,								
	M200T1AC	I129	1.73E+01 +- 3.3E+00		pCi/L	98%	104%	0.0	1.89E+00
RATOT_AEGEA									
4036035	BLANK QC,								
	M200Q1AA	TOTAL ALPHA RA	2.26E-01 +- 3.9E-01	U	pCi/L	82%			8.28E-01
4036035	LCS,								
	M200Q1AC	TOTAL ALPHA RA	6.83E+00 +- 2.0E+00		pCi/L	89%	108%	0.1	6.78E-01
9310_ALPHABETA_GPC									
4036039	BLANK QC,								
	M200X1AA	BETA	1.45E+00 +- 9.6E-01	U	pCi/L	100%			1.61E+00
4036039	LCS,								
	M200X1AC	BETA	2.41E+01 +- 3.5E+00		pCi/L	100%	106%	0.1	1.65E+00
9310_ALPHABETA_GPC									
4036040	BLANK QC,								
	M20001AA	ALPHA	5.78E-01 +- 4.8E-01	U	pCi/L	100%			7.34E-01
4036040	LCS,								
	M20001AC	ALPHA	3.61E+01 +- 9.2E+00		pCi/L	100%	88%	-0.1	6.74E-01
TRITIUM_DIST_LSC									
4036041	BLANK QC,								
	M20011AA	H-3	-2.41E+02 +- 1.5E+02	U	pCi/L	100%			3.58E+02
4036041	LCS,								
	M20011AC	H-3	2.45E+03 +- 2.6E+02		pCi/L	100%	90%	-0.1	3.61E+02
TC99_SEP_LSC									

TestAmerica Inc Bias - (Result/Expected)-1 as defined by ANSI N13.30.
 rptSTLRchQcSummary V5.3.0.1 U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or A2002 not identified by gamma scan software.

QC Results Summary

Date: 28-Feb-14

TestAmerica Inc TARL

Ordered by Method, Batch No, QC Type,.

Report No. : 58937

SDG No.: J02082

Batch	Work Order	Parameter	Result +/- Uncertainty (2s)	Qual	Units	Tracer Yield	LCS Recovery	Bias	MDL
4036044	BLANK QC, M20041AA	Tc-99	2.32E+00 +/- 5.6E+00	U	pCi/L	100%			1.00E+01
4036044	LCS, M20041AC	Tc-99	3.98E+02 +/- 2.7E+01		pCi/L	100%	74%	-0.3	9.82E+00
4036044	MATRIX SPIKE, J1T257 M20XG1AP	Tc-99	2.91E+03 +/- 1.8E+02		pCi/L	100%	80%	-0.2	1.01E+01
UTOT_KPA									
4036045	BLANK QC, M20051AA	TOTAL-URANIUM	2.95E-05 +/- 3.6E-06	U	mg/L				8.15E-05
4036045	LCS, M20051AC	TOTAL-URANIUM	3.49E-02 +/- 4.1E-03		mg/L		98%	0.0	8.32E-05
	M20051AD	TOTAL-URANIUM	3.75E-03 +/- 3.8E-04		mg/L		104%	0.0	8.32E-05
4036045	MATRIX SPIKE, J1T257 M20XG1AQ	TOTAL-URANIUM	2.06E-02 +/- 2.3E-01	U	mg/L		57%	-0.4	8.38E-05
No. of Results: 28									

TestAmerica Inc
rptSTLRchQcSummary V5.3.0.1
A2002

Bias - (Result/Expected)-1 as defined by ANSI N13.30.
U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.