ENVIRONMENTAL STANDARDS
Setting the Standards for Innovative Environmental Solutions

Data Validation Report
Tennessee Valley Authority
Johnsonville Fossil Plant
Environmental Investigation Plan
Solid Samples
Chain-of-Custody: JOF_CCR_20191001_1B

This report was updated to include the revised COC and revised data tables to reference the correct sample collection times for all samples.

This quality assurance (QA) review is based upon an examination of the data generated from the analyses of the four solid samples collected on October 1, 2019, at the Tennessee Valley Authority (TVA) Johnsonville Fossil Plant facility. These samples were collectively analyzed by Eurofins TestAmerica, of St. Louis, Missouri, for radium-226 and for radium-228 by US EPA Method 901.1 and for SPLP radium-226 by US EPA Method 903.0 and for SPLP radium-228 by US EPA Method 904.0.

This review was performed in accordance with the Environmental Investigation Plan for the Tennessee Valley Authority Johnsonville Fossil Plant Environmental Investigation (JOF EIP, Revision 4, December 2018). This review was performed with guidance from the National Functional Guidelines for Inorganic Data Review (US EPA, October 2004); the US EPA Region IV Environmental Investigations Standard Operating Procedures and Quality Assurance Manual (November 2001); and the US EPA Region IV Data Validation Standard Operating Procedures These validation guidance documents specifically address analyses performed in accordance with the Contract Laboratory Program (CLP) analytical methods and are not completely applicable to the type of analyses and analytical protocols performed for the US EPA method utilized by the laboratory for these samples. Environmental Standards, Inc. (Environmental Standards) used professional judgment to determine the usability of the analytical results and compliance relative to the US EPA method utilized by the laboratory.

Summary

The analytical results and associated laboratory quality control (QC) samples were reviewed to determine the integrity of the reported analytical results and to ensure that the data met the established data quality objectives. This QA review includes all samples in Eurofins TestAmerica Job Number 180-96768-1.

The samples that have undergone Stage 4 data validation are listed below:

Sample Identification	Laboratory Sample Identification	Job Number	Matrix	Date Sample Collected	Parameter(s) Examined
JOF-CCR-TW14-1.5/3.5-20191001	180-96768-1	180-96768-1	Solid	10/1/19	Ra-226, Ra-226[1], Ra-228, Ra-228[1], Ra-226/228, Ra-226/228[1]
JOF-CCR-TW14-6.5/8.5-20191001	180-96768-2	180-96768-1	Solid	10/1/19	Ra-226, Ra-226[1], Ra-228, Ra-228[1], Ra-226/228, Ra-226/228[1]
JOF-CCR-TW14-11.0/13.5-20191001	180-96768-3	180-96768-1	Solid	10/1/19	Ra-226, Ra-226[1], Ra-228, Ra-228[1], Ra-226/228, Ra-226/228[1]
JOF-CCR-TW14-16.5/18.5-20191001	180-96768-4	180-96768-1	Solid	10/1/19	Ra-226, Ra-226[1], Ra-228, Ra-228[1], Ra-226/228, Ra-226/228[1]

Parameters Examined

Ra-226 - Radium-226 by US EPA Method 901.1.
Ra-226[1] - SPLP Radium-226 by US EPA Method 903.0.
Ra-228 - Radium-228 by US EPA Method 901.1.
Ra-228[1] - SPLP Radium-228 by US EPA Method 904.0.
Ra-226/228 - Radium-226/228 Calculation by US EPA Method 901.1.
Ra-226/228[1] - SPLP Radium-226/228 Calculation by TAL-STL Method Ra226_Ra228.
Aq - Aqueous.

Items Reviewed	
Holding Times	Calibrations
Sample Preservation	Sample Preparation
Chain-of-Custody (COC) Records and Case Narratives	Blank Results
Laboratory Control Sample (LCS) Results	Laboratory Duplicate Results
Chemical Tracer Yield	Quantitation of Positive Results

Comments and Exceptions

- All analyses performed for the sampling event were in compliance with the requirements set forth in the EIP.

- Radium-226+228 was reported as the summation of the calculated activities for radium-226 and radium-228. The reported results for radium-226+228 for the samples included in this report may have been adjusted and/or qualified in accordance with the TVA reporting protocols and assigned an “S” reason code.

Qualifier Summary

Analytes	Job Number	Samples	Validation Qualifiers	Reason for Qualification
Ra-226/Ra-228 and Ra-226	180-96768-1	All samples	J	LD

- Any radium-226+228 result reported from the summation of one isotope activity less than the MDA (non-negative value) and one isotope activity greater than the MDA should be considered estimated and have been flagged “J” on the data tables.

Review performed by: Danielle Coles, Quality Assurance Chemist
Review reviewed by: Konstadina Vlahogiani, Senior Technical Chemist
Review approved by: Andrew L. Piasecki, Senior Quality Assurance Chemist
Review approved by: Rock J. Vitale, CEAC, Technical Director of Chemistry/Principal
Date review completed: 3/3/21

SECTION 2

ANALYTICAL RESULTS

INORGANIC DATA QUALIFIERS

U* This result should be considered “not-detected” because it was detected in a rinsate blank or laboratory blank at a similar level.

UR Unreliable reporting limit; analyte may or may not be present in sample.

R Unreliable positive result; analyte may or may not be present in sample.

J Quantitation is approximate due to limitations identified during data validation.

UJ This analyte was not detected, but the reporting limit may or may not be higher due to a bias identified during data validation.

REASON CODES AND EXPLANATIONS

Reason Code	Explanation
BE	Equipment blank contamination. The result should be considered “not-detected.”
BF	Field blank contamination. The result should be considered “not-detected.”
BL	Laboratory blank contamination. The result should be considered “not-detected.”
BN	Negative laboratory blank contamination.
C	Initial and/or Continuing Calibration issue, indeterminate bias.
C+	Initial and/or Continuing Calibration issue. The result may be biased high.
C-	Initial and/or Continuing Calibration issue. The result may be biased low.
FD	Field duplicate imprecision.
FG	Total versus Dissolved Imprecision.
H	Holding time exceeded.
I	Internal standard recovery outside of acceptance limits.
L	LCS and LCSD recoveries outside of acceptance limits, indeterminate bias.
L+	LCS and/or LCSD recoveries outside of acceptance limits. The result may be biased high.
L-	LCS and/or LCSD recoveries outside of acceptance limits. The result may be biased low.
LD	Laboratory duplicate imprecision.
LP	LCS/LCSD imprecision.
M	MS and MSD recoveries outside of acceptance limits, indeterminate bias.
M+	MS and/or MSD recoveries outside of acceptance limits. The result may be biased high.
M-	MS and/or MSD recoveries outside of acceptance limits. The result may be biased low.
MP	MS/MSD imprecision.
P	Post-digestion spike recoveries outside of acceptance limits, indeterminate bias.
P+	Post-digestion spike recovery outside of acceptance limits. The result may be biased high.
P-	Post-digestion spike recovery outside of acceptance limits. The result may be biased low.
Q	Chemical Preservation issue.
R	RL standards outside of acceptance limits, indeterminate bias.
R+	RL standard(s) outside of acceptance limits. The result may be biased high.
R-	RL standard(s) outside of acceptance limits. The result may be biased low.
S	Radium-226+228 flagged due to reporting protocol for combined results.
T	Temperature preservation issue.
SD	Serial Dilution imprecision.
X	Percent solids < 50%.
Y+	Chemical Yield outside of acceptance limits. The result may be biased high.
Y-	Chemical yield outside of acceptance limits. The result may be biased low.
Z	ICP or ICP/MS Interference.
ZZ	Other.

TVA CCR Program
Facility: Johnsonville Fossil Plant
SDG: 180967681

Lab Sample ID	180-96768-1
Sys Sample Code	JOF-CCR-TW14-1.5/3.5-20191001
Sample Name	JOF-CCR-TW14-1.5/3.5-20191001
Sample Date	10/1/2019 2:18:00 PM
Location	JOF-TW14
Sample Type	N
Parent Sample	

Analytic Method	Chemical Name	CAS Rn	Fraction	Result Unit	Final Result	Final Qual	Reason code	Uncertainty	Final MDL	Final RL	Final QL	Final Detect	Final Report	DF	Basis
CALC	Radium 226 + radium 228	RA226/228	S	PCI/L	0.300	U	S	0.290				N	Yes	1	NA
EPA 901.1	Radium 226 + radium 228	RA226/228	T	PCI/G	4.69	J	LD	0.721				Y	Yes	1	NA
	Radium 228	15262-20-1	T	PCI/G	1.98			0.506	0.202	0.202	1.00	Y	Yes	1	NA
	Radium-226	13982-63-3	T	PCI/G	2.71	J	LD	0.514	0.250	0.250	1.00	Y	Yes	1	NA
EPA 903.0	Radium-226	13982-63-3	S	PCI/L	-0.0389	U		0.0697	0.152	0.152	1.00	N	Yes	1	NA
EPA 904.0	Radium 228	15262-20-1	S	PCI/L	0.300	U		0.281	0.452	0.452	1.00	N	Yes	1	NA

TVA CCR Program
Facility: Johnsonville Fossil Plant
SDG: 180967681

Lab Sample ID	180-96768-2
Sys Sample Code	JOF-CCR-TW14-6.5/8.5-20191001
Sample Name	JOF-CCR-TW14-6.5/8.5-20191001
Sample Date	10/1/2019 2:48:00 PM
Location	JOF-TW14
Sample Type	N
Parent Sample	

Analytic Method	Chemical Name	CAS Rn	Fraction	Result Unit	Final Result	Final Qual	Reason code	Uncertainty	Final MDL	Final RL	Final QL	Final Detect	Final Report	DF	Basis
CALC	Radium 226 + radium 228	RA226/228	S	PCI/L	0.310	U		0.312				N	Yes	1	NA
EPA 901.1	Radium 226 + radium 228	RA226/228	T	PCI/G	6.84	J	LD	0.857				Y	Yes	1	NA
	Radium 228	15262-20-1	T	PCI/G	2.45			0.514	0.272	0.272	1.00	Y	Yes	1	NA
	Radium-226	13982-63-3	T	PCI/G	4.39	J	LD	0.686	0.349	0.349	1.00	Y	Yes	1	NA
EPA 903.0	Radium-226	13982-63-3	S	PCI/L	0.0120	U		0.0709	0.136	0.136	1.00	N	Yes	1	NA
EPA 904.0	Radium 228	15262-20-1	S	PCI/L	0.298	U		0.304	0.494	0.494	1.00	N	Yes	1	NA

TVA CCR Program
Facility: Johnsonville Fossil Plant
SDG: 180967681

Lab Sample ID	180-96768-3
Sys Sample Code	JOF-CCR-TW14-11.0/13.5-20191001
Sample Name	JOF-CCR-TW14-11.0/13.5-20191001
Sample Date	10/1/2019 3:13:00 PM
Location	JOF-TW14
Sample Type	N
Parent Sample	

Analytic Method	Chemical Name	CAS Rn	Fraction	Result Unit	Final Result	Final Qual	Reason code	Uncertainty	Final MDL	Final RL	Final QL	Final Detect	Final Report	DF	Basis
CALC	Radium 226 + radium 228	RA226/228	S	PCI/L	0.205	U	S	0.264				N	Yes	1	NA
EPA 901.1	Radium 226 + radium 228	RA226/228	T	PCI/G	6.86	J	LD	0.957				Y	Yes	1	NA
	Radium 228	15262-20-1	T	PCI/G	2.94			0.693	0.360	0.360	1.00	Y	Yes	1	NA
	Radium-226	13982-63-3	T	PCI/G	3.92	J	LD	0.660	0.285	0.285	1.00	Y	Yes	1	NA
EPA 903.0	Radium-226	13982-63-3	S	PCI/L	-0.0441	U		0.0629	0.142	0.142	1.00	N	Yes	1	NA
EPA 904.0	Radium 228	15262-20-1	S	PCI/L	0.205	U		0.256	0.423	0.423	1.00	N	Yes	1	NA

TVA CCR Program
Facility: Johnsonville Fossil Plant
SDG: 180967681

Lab Sample ID	180-96768-4
Sys Sample Code	JOF-CCR-TW14-16.5/18.5-20191001
Sample Name	JOF-CCR-TW14-16.5/18.5-20191001
Sample Date	10/1/2019 3:42:00 PM
Location	JOF-TW14
Sample Type	N
Parent Sample	

Analytic Method	Chemical Name	CAS Rn	Fraction	Result Unit	Final Result	Final Qual	Reason code	Uncertainty	Final MDL	Final RL	Final QL	Final Detect	Final Report	DF	Basis
CALC	Radium 226 + radium 228	RA226/228	S	PCI/L	0.454	J	S	0.292				Y	Yes	1	NA
EPA 901.1	Radium 226 + radium 228	RA226/228	T	PCI/G	5.69	J	LD	0.673				Y	Yes	1	NA
	Radium 228	15262-20-1	T	PCI/G	2.72			0.499	0.120	0.120	1.00	Y	Yes	1	NA
	Radium-226	13982-63-3	T	PCI/G	2.97	J	LD	0.451	0.196	0.196	1.00	Y	Yes	1	NA
EPA 903.0	Radium-226	13982-63-3	S	PCI/L	0.00238	U		0.0745	0.145	0.145	1.00	N	Yes	1	NA
EPA 904.0	Radium 228	15262-20-1	S	PCI/L	0.452			0.282	0.425	0.425	1.00	Y	Yes	1	NA

SECTION 3

SUPPORTING DOCUMENTATION FOR QUALIFIERS

ENVIRONMENTAL STANDARDS

RADIOLOGICAL ANALYSIS SUPPORT DOCUMENTATION

ESI project name:	TVA-JOF EI	Reviewed by:	Danielle Coles
Sample Collection Dates:	10/1/19	Approved by:	
Job Number:	20188360.A000	Completion Date:	
Project Manager:	AJC		
Laboratory:	TestAmerica-St. Louis		

Applicable Sample No's (X) — Refer to Table 1 in the Quality Assurance Review

			Sample No.	Lab Control No.
Deliverable:	Level IV (Full)	(X)	180-96768-1	
	Limited	( )		
	Other:			

The following table indicates criteria that were examined, the identified problems, and support documentation attachments

	Criteria Examined in Detail Check (√) if Yes or Footnote Letter for Comments Below					Problems Identified Check (√) if Yes or Footnote Letter for Comments Below					Support Documentation Attachments Check (√) if Yes or Footnote Letter for Comments Below				
	901.1	903.0	904.0			901.1	903.0	904.0			901.1	903.0	904.0		
Holding Times	X	X	X												
Blank Analysis Results	X	X	X												
Laboratory Control Standard (LCS)	X	X	X												
Tracer/Chemical Yield		X	X												
Duplicate Analysis: ( ) Field (X) Lab	X					X					X				
Matrix Spike Results															
Quantitation of Results	X	X	X												
Detection Limit															
Efficiency/Energy Calibrations	X	X	X												
Initial Calibration Verifications	X														
Annual Calibration Verifications															
Continuing Calibration Checks	X	X	X												
Continuing Calibration Backgrounds	X	X	X												
Sample Preservation	X	X	X												
Condition on Receipt	X	X	X												
Others:															

Comments: All results are usable unless otherwise qualified.

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: JOF_CCR_20191001_1B

Job ID: 180-96768-1

Client Sample ID: JOF-CCR-TW14-1.5/3.5-20191001 ~ JOF-TW14

Lab Sample ID: 180-96768-1

Date Collected: 10/01/19 14:12
Date Received: 10/04/19 09:00

Matrix: Solid

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228 (positive only)	4.69		0.633	0.721			pCi/g	10/09/19 11:02	10/30/19 06:45	1
Radium-226 J, LD	2.71		0.430	0.514	1.00	0.250	pCi/g	10/09/19 11:02	10/30/19 06:45	1
Radium-228	1.98		0.464	0.506		0.202	pCi/g	10/09/19 11:02	10/30/19 06:45	1

Method: 903.0 - Radium-226 (GFPC) - SPLP East

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	-0.0389	U	0.0696	0.0697	1.00	0.152	pCi/L	10/23/19 18:47	11/06/19 20:21	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*89.2*		*40 - 110*	*10/23/19 18:47*	*11/06/19 20:21*	*1*

Method: 904.0 - Radium-228 (GFPC) - SPLP East

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.300	U	0.280	0.281	1.00	0.452	pCi/L	10/23/19 19:39	10/30/19 12:52	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*89.2*		*40 - 110*	*10/23/19 19:39*	*10/30/19 12:52*	*1*
Y Carrier	*83.7*		*40 - 110*	*10/23/19 19:39*	*10/30/19 12:52*	*1*

Method: Ra226_Ra228 - Combined Radium-226 and Radium-228 - SPLP East

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	0.300	U, S	0.289	0.290	5.00		pCi/L		11/08/19 10:04	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: JOF_CCR_20191001_1B

Job ID: 180-96768-1

Client Sample ID: JOF-CCR-TW14-6.5/8.5-20191001 ~ JOF-TW14

Lab Sample ID: 180-96768-2

Date Collected: 10/01/19 14:36
Date Received: 10/04/19 09:00

Matrix: Solid

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228 (positive only)	6.84		0.688	0.857			pCi/g	10/09/19 11:02	10/30/19 07:25	1
Radium-226 J, LD	4.39		0.520	0.686	1.00	0.349	pCi/g	10/09/19 11:02	10/30/19 07:25	1
Radium-228	2.45		0.450	0.514		0.272	pCi/g	10/09/19 11:02	10/30/19 07:25	1

Method: 903.0 - Radium-226 (GFPC) - SPLP East

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0120	U	0.0709	0.0709	1.00	0.136	pCi/L	10/23/19 18:47	11/06/19 20:21	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*88.0*		*40 - 110*	*10/23/19 18:47*	*11/06/19 20:21*	*1*

Method: 904.0 - Radium-228 (GFPC) - SPLP East

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.298	U	0.303	0.304	1.00	0.494	pCi/L	10/23/19 19:39	10/30/19 12:52	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*88.0*		*40 - 110*	*10/23/19 19:39*	*10/30/19 12:52*	*1*
Y Carrier	*78.9*		*40 - 110*	*10/23/19 19:39*	*10/30/19 12:52*	*1*

Method: Ra226_Ra228 - Combined Radium-226 and Radium-228 - SPLP East

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	0.310	U	0.311	0.312	5.00		pCi/L		11/08/19 10:04	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: JOF_CCR_20191001_1B

Job ID: 180-96768-1

Client Sample ID: JOF-CCR-TW14-11.0/13.5-20191001 ~ JOF-TW14

Lab Sample ID: 180-96768-3

Date Collected: 10/01/19 15:10
Date Received: 10/04/19 09:00

Matrix: Solid

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228 (positive only)	6.86		0.812	0.957			pCi/g	10/09/19 11:02	10/30/19 07:24	1
Radium-226 J, LP	3.92		0.519	0.660	1.00	0.285	pCi/g	10/09/19 11:02	10/30/19 07:24	1
Radium-228	2.94		0.625	0.693		0.360	pCi/g	10/09/19 11:02	10/30/19 07:24	1

Method: 903.0 - Radium-226 (GFPC) - SPLP East

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	-0.0441	U	0.0628	0.0629	1.00	0.142	pCi/L	10/23/19 18:47	11/06/19 20:21	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*93.1*		*40 - 110*	*10/23/19 18:47*	*11/06/19 20:21*	*1*

Method: 904.0 - Radium-228 (GFPC) - SPLP East

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.205	U	0.256	0.256	1.00	0.423	pCi/L	10/23/19 19:39	10/30/19 12:52	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*93.1*		*40 - 110*	*10/23/19 19:39*	*10/30/19 12:52*	*1*
Y Carrier	*81.5*		*40 - 110*	*10/23/19 19:39*	*10/30/19 12:52*	*1*

Method: Ra226_Ra228 - Combined Radium-226 and Radium-228 - SPLP East

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	0.205	U, S	0.264	0.264	5.00		pCi/L		11/08/19 10:04	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: JOF_CCR_20191001_1B

Job ID: 180-96768-1

Client Sample ID: JOF-CCR-TW14-16.5/18.5-20191001 ~ JOF-TW14

Lab Sample ID: 180-96768-4

Date Collected: 10/01/19 15:36
Date Received: 10/04/19 09:00

Matrix: Solid

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228 (positive only)	5.69		0.529	0.673			pCi/g	10/09/19 11:02	10/30/19 12:46	1
Radium-226 J, LD	2.97		0.328	0.451	1.00	0.196	pCi/g	10/09/19 11:02	10/30/19 12:46	1
Radium-228	2.72		0.415	0.499		0.120	pCi/g	10/09/19 11:02	10/30/19 12:46	1

Method: 903.0 - Radium-226 (GFPC) - SPLP East

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.00238	U	0.0745	0.0745	1.00	0.145	pCi/L	10/23/19 18:47	11/06/19 20:21	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*90.1*		*40 - 110*	*10/23/19 18:47*	*11/06/19 20:21*	*1*

Method: 904.0 - Radium-228 (GFPC) - SPLP East

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.452		0.278	0.282	1.00	0.425	pCi/L	10/23/19 19:39	10/30/19 12:52	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*90.1*		*40 - 110*	*10/23/19 19:39*	*10/30/19 12:52*	*1*
Y Carrier	*80.7*		*40 - 110*	*10/23/19 19:39*	*10/30/19 12:52*	*1*

Method: Ra226_Ra228 - Combined Radium-226 and Radium-228 - SPLP East

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	0.454	J,S	0.288	0.292	5.00		pCi/L		11/08/19 10:04	1

QC Sample Results

Client: Environmental Standards Inc.
Project/Site: JOF_CCR_20191001_1B

Job ID: 180-96768-1

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-445555/1-A
Matrix: Solid
Analysis Batch: 448213

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 445555

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228 (positive only)	0.0000	U	0.163	0.163			pCi/g	10/09/19 11:02	10/30/19 06:43	1
Radium-226	-0.05391	U	0.0848	0.0849	1.00	0.287	pCi/g	10/09/19 11:02	10/30/19 06:43	1
Radium-228	-0.01458	U	0.139	0.139		0.229	pCi/g	10/09/19 11:02	10/30/19 06:43	1

clear

Lab Sample ID: LCS 160-445555/2-A
Matrix: Solid
Analysis Batch: 448212

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 445555

80-120%

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Americium-241	96.6	102.0		12.0		1.26	pCi/g	106	87 - 116
Cesium-137	27.4	31.32		3.29		0.273	pCi/g	114	87 - 120
Cobalt-60	11.0	11.83		1.24		0.147	pCi/g	108	87 - 115

Lab Sample ID: 180-96768-1 DU
Matrix: Solid
Analysis Batch: 448213

Client Sample ID: JOF-CCR-TW14-1.5/3.5-20191001 ~ JOF-TW14
Prep Type: Total/NA
Prep Batch: 445555

2

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Radium 226 and 228 (positive only)	4.69		3.576		0.477			pCi/g	0.93	
Radium-226	2.71		1.934		0.318	1.00	0.164	pCi/g	2.56 0.93	1
Radium-228	1.98		1.642		0.356		0.114	pCi/g	1.10 0.39	1

J, LD: 1-4

Method: 903.0 - Radium-226 (GFPC)

Lab Sample ID: MB 160-447494/22-A
Matrix: Solid
Analysis Batch: 449238

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 447494

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.02997	U	0.0776	0.0777	1.00	0.140	pCi/L	10/23/19 19:20	11/06/19 22:09	1

clear

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	98.2		*40 - 110*	*10/23/19 19:20*	*11/06/19 22:09*	*1*

Lab Sample ID: LCS 160-447494/1-A
Matrix: Solid
Analysis Batch: 449238

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 447494

80-120%

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Radium-226	11.4	10.49		1.11	1.00	0.135	pCi/L	92	75 - 125

SECTION 4

CASE NARRATIVE AND CHAIN-OF-CUSTODY RECORD

Job ID: 180-96768-1

Laboratory: Eurofins TestAmerica, Pittsburgh

Narrative

Job Narrative
180-96768-1

Receipt
The samples were received on 10/4/2019 9:00 AM; the samples arrived in good condition, properly preserved and on ice. The temperature of the cooler at receipt was 1.1° C.

RAD
Method 901.1: Gamma Prep Batch 160-445555
Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative.

Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.

Many isotopes requested for analysis do not have any gamma emissions, or the gamma emissions they do have are very poor. Often, such analytes are reported by gamma spectrometry assuming secular equilibrium with a longer-lived parent. The client should ensure that such inference is acceptable for their sample based upon process knowledge. The following assumptions were made for this report:

Inferred from	Reported to Analyte
Ac-228	Ra-228
Bi-214	Ra-226

JOF-CCR-TW14-1.5/3.5-20191001 ~ JOF-TW14 (180-96768-1), JOF-CCR-TW14-6.5/8.5-20191001 ~ JOF-TW14 (180-96768-2), JOF-CCR-TW14-11.0/13.5-20191001 ~ JOF-TW14 (180-96768-3), JOF-CCR-TW14-16.5/18.5-20191001 ~ JOF-TW14 (180-96768-4), (LCS 160-445555/2-A), (MB 160-445555/1-A) and (180-96768-A-1-C DU)

Method 903.0: Radium-226 Prep Batch 160-447494
Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative.

Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.
JOF-CCR-TW14-1.5/3.5-20191001 ~ JOF-TW14 (180-96768-1), JOF-CCR-TW14-6.5/8.5-20191001 ~ JOF-TW14 (180-96768-2), JOF-CCR-TW14-11.0/13.5-20191001 ~ JOF-TW14 (180-96768-3), JOF-CCR-TW14-16.5/18.5-20191001 ~ JOF-TW14 (180-96768-4), (LCS 160-447494/1-A), (MB 160-447494/22-A), (180-96778-A-2-I) and (180-96778-A-2-J DU)

Method 903.0: Radium-226 Prep Batch 160-447494

Ra-226 is reported without a 21-day waiting period to ensure short-lived alpha-emitting radium isotopes (e.g. Ra-224) have decayed out. The Ra-226 result should be considered to be potentially high biased. Associated samples have activity below the RL. The results are reported with this narrative.
JOF-CCR-TW14-1.5/3.5-20191001 ~ JOF-TW14 (180-96768-1), JOF-CCR-TW14-6.5/8.5-20191001 ~ JOF-TW14 (180-96768-2), JOF-CCR-TW14-11.0/13.5-20191001 ~ JOF-TW14 (180-96768-3), JOF-CCR-TW14-16.5/18.5-20191001 ~ JOF-TW14 (180-96768-4), (LCS 160-447494/1-A), (MB 160-447494/22-A), (180-96778-A-2-I) and (180-96778-A-2-J DU)

Method 903.0: Radium-226 Prep Batch: 160-447494
The sample duplicate precision for sample 180-96778-A-2-J DU (32161/1.20/3.29) was outside control limits (40/1/3). The activity was below the RL and MDC for the sample and duplicate. The associated Laboratory Control Sample and sample duplicate 180-96864-A-4-J DU precision met acceptance criteria. The data is reported.
JOF-CCR-TW14-1.5/3.5-20191001 ~ JOF-TW14 (180-96768-1), JOF-CCR-TW14-6.5/8.5-20191001 ~ JOF-TW14 (180-96768-2), JOF-CCR-TW14-11.0/13.5-20191001 ~ JOF-TW14 (180-96768-3), JOF-CCR-TW14-16.5/18.5-20191001 ~ JOF-TW14 (180-96768-4), (LCS 160-447494/1-A), (MB 160-447494/22-A), (180-96778-A-2-I) and (180-96778-A-2-J DU)

Method 904.0: Ra-228 Prep Batch 160-447498
Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative.

Job ID: 180-96768-1 (Continued)

Laboratory: Eurofins TestAmerica, Pittsburgh (Continued)

Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.
JOF-CCR-TW14-1.5/3.5-20191001 ~ JOF-TW14 (180-96768-1), JOF-CCR-TW14-6.5/8.5-20191001 ~ JOF-TW14 (180-96768-2), JOF-CCR-TW14-11.0/13.5-20191001 ~ JOF-TW14 (180-96768-3), JOF-CCR-TW14-16.5/18.5-20191001 ~ JOF-TW14 (180-96768-4), (LCS 160-447498/1-A), (MB 160-447498/22-A), (180-96778-A-2-K) and (180-96778-A-2-L DU)

Method Fill_Geo-21: Gamma Prep Batch 160-445555: samples JOF-CCR-TW14-1.5/3.5-20191001 ~ JOF-TW14 (180-96768-1), JOF-CCR-TW14-6.5/8.5-20191001 ~ JOF-TW14 (180-96768-2), JOF-CCR-TW14-11.0/13.5-20191001 ~ JOF-TW14 (180-96768-3), JOF-CCR-TW14-16.5/18.5-20191001 ~ JOF-TW14 (180-96768-4) and (180-96768-A-1-A DU) are a light powdered soil which exhibits low density.

okay, no qual

Method PrecSep_0: Radium 228 Prep Batch 160-447498:
The following samples had white cloudy discoloration:JOF-CCR-TW14-1.5/3.5-20191001 ~ JOF-TW14 (180-96768-1), JOF-CCR-TW14-6.5/8.5-20191001 ~ JOF-TW14 (180-96768-2) and JOF-CCR-TW14-16.5/18.5-20191001 ~ JOF-TW14 (180-96768-4).

Method PrecSep STD: Radium 226 Prep Batch 160-447494:
The following samples had white cloudy discoloration:JOF-CCR-TW14-1.5/3.5-20191001 ~ JOF-TW14 (180-96768-1), JOF-CCR-TW14-6.5/8.5-20191001 ~ JOF-TW14 (180-96768-2) and JOF-CCR-TW14-16.5/18.5-20191001 ~ JOF-TW14 (180-96768-4).

General Chemistry
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Sample Summary

Client: Environmental Standards Inc.
Project/Site: JOF_CCR_20191001_1B

Job ID: 180-96768-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
180-96768-1	JOF-CCR-TW14-1.5/3.5-20191001 ~ JOF-TW14	Solid	10/01/19 14:12	10/04/19 09:00	
180-96768-2	JOF-CCR-TW14-6.5/8.5-20191001 ~ JOF-TW14	Solid	10/01/19 14:36	10/04/19 09:00	
180-96768-3	JOF-CCR-TW14-11.0/13.5-20191001 ~ JOF-TW14	Solid	10/01/19 15:10	10/04/19 09:00	
180-96768-4	JOF-CCR-TW14-16.5/18.5-20191001 ~ JOF-TW14	Solid	10/01/19 15:36	10/04/19 09:00	

Shipping and Receiving Documents

Tennessee Valley Authority

Chain-of-Custody / Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed and accurate

COOLER No.:	1 of 1
COC No:	JOF_CCR 20191001 1E
1 of 1 Pages	[redacted]
Task Desc:	JOF_CCR

Required Ship to Lab:

Lab Name:	TestAmerica Pittsburgh
Lab Address:	301 Alpha Drive Pittsburgh, PA 15238
Lab Manager Contact Information	
Lab PM:	Gail Lage
Phone/Fax:	615-301-5741/615-726-3404
Lab Email:	Gail.Lage@testamericainc.com

Required Project Information:

Site ID #:	Johnsonville Fossil Plant
Project #:	
Site Address:	535 Steam Plant Road
City:	New Johnsonville, State, Zip: TN 37134
Site PM Name:	Roy Quinn
Phone/Fax:	423-751-3753
Site PM Email:	rquinn@tva.gov

Required Sampler Information

Sampler:	Catherine S. Burton, PG
Sampling Company:	Stantec
Address:	3052 Beaumont Centre Circle
City/State:	Lexington, KY Phone: 8593362791
Sampling Team Number:	1
Send EDD/Hard Copy to:	tva_deliverables@stantec.com

Analysis Turnaround Time

CALENDAR DAYS / WORKING DAYS

TAT if different from Below _____

- 24 Hours
- 3 Business Days
- 5 Business Days
- 10 Business Days

ITEMS #	SAMPLE ID Samples IDs MUST BE UNIQUE	SAMPLE LOCATION	Sample Depth: Start Depth	Sample Depth: End Depth	MATRIX CODE	G= GRAB C=COMP	SAMPLE TYPE	SAMPLE DATE	SAMPLE TIME	# OF CONTAINERS	Comments/ Lab Sample I.D.	MS/MSD	Analysis: CCR_MATERIALS_RAD	Analysis: CCR_MATERIALS_BLANKS_RAD
1	JOF-CCR-TW14-1.5/3.5-20191001	JOF-TW14	1.5	3.5	CCR	G	N	10/1/2019	1412	2			X	
2	JOF-CCR-TW14-6.5/8.5-20191001	JOF-TW14	6.5	8.5	CCR	G	N	10/1/2019	1436	2			X	
3	JOF-CCR-TW14-11.0/13.5-20191001	JOF-TW14	11.0	13.5	CCR	G	N	10/1/2019	1510	2			X	
4	JOF-CCR-TW14-16.5/18.5-20191001	JOF-TW14	16.5	18.5	CCR	G	N	10/1/2019	1536	2			X	
5														
6														
7														
8														
9														
10														
11														
12														
13														

Filtered: N N

Preserve: None HCl

CSB 10/02/2019

CSB 10/02/2019

CSB 10/02/2019

CSB 10/02/2019

Additional Comments/Special Instructions:

Additional volume collected should be used for laboratory duplicate analysis.

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Catherine S. Burton Catherine S. Burton 10/02/19 CSB			[illegible] Stantec	10/2/19	0912
[illegible] TA-NAS	10-2-19	1439	[illegible]	10/2/19	[illegible]

SHIPPING METHOD	SAMPLER NAME AND SIGNATURE
	Catherine S. Burton Catherine S. Burton
	Richard Roland

Sample Receipt Conditions

Temperature in °C	Sample on Ice?	Sample Intact?	Trip Blank?
Yes / No	Yes / No	Yes / No	Yes / No
Yes / No	Yes / No	Yes / No	Yes / No
Yes / No	Yes / No	Yes / No	Yes / No

not

4820 8847 9883 Temp 1.1 CF=01.1 Temp +10

180-96768 Chain of Custody

Form TVA 30057A

eurofins | Environment Testing
TestAmerica

Part # 15947-0-1-9A RIR2 EXP

Quality Environmental Containers
800-255-3850 • www.qecinc.com

ORIGIN ID:RNCA (615) 726-0177
SHIPPING MGR
NS TESTAMERICA
OSTER CREIGHTON
LLE, TN 37204
STATES US

SHIP DATE: 02OCT19
ACTWGT: 10.00 LB MAN
CAD: 820425/CAFE3211

BILL RECIPIENT

PPING/RECEIVING
STAMERICA LABORATORIES, INC.
ALPHA DRIVE
C PARK
TSBURGH PA 15238

7068 REF 8490 103649

180-96768 Waybill

FedEx

THU - 03 OCT 10:30A
PRIORITY OVERNIGH

TRK# 0201 4820 8847 9883

NA AGCA

15238
PA-US PI

Uncorrected temp
Thermometer ID
CF 0 Initials TB
PT-WI-SR-001 effective 11/8/18

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive RIDC Park
Pittsburgh, PA 15238
Phone: 412-963-7058 Fax: 412-963-2468

Chain of Custody Record

eurofins
Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Rumble, Jennifer L	Carrier Tracking No(s):	COC No: 180-375494.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: jennifer.rumble@testamericainc.com	State of Origin: Tennessee	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note):		Job #: 180-96768-1
Address: 13715 Rider Trail North, ,	Due Date Requested: 11/5/2019			
City: Earth City	TAT Requested (days):			
State, Zip: MO, 63045				
Phone: 314-298-8566(Tel) 314-298-8757(Fax)	PO #:			
Email:	WO #:			
Project Name: JOF_CCR_20191001_1B	Project #: 18020000			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)
Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	901.1_Ra/Dry_Grind Positive Combined Radium-226/228	Ra26_28GFP_PE_P/ Radium-226/228	903.0/1312_E_M Ra-226	904.0/1312_E_M Ra-228	Total Number of containers	Special Instructions/Note:
			Preservation Code:									
JOF-CCR-TW14-1.5/3.5-20191001 ~ JOF-TW14 (180-96768-1)	10/1/19	14:12 Central		Solid			X	X	X	X	2	TVA - Batch alone. Quarantine zone soil. Contact PM if insufficient volume for Tuna
JOF-CCR-TW14-6.5/8.5-20191001 ~ JOF-TW14 (180-96768-2)	10/1/19	14:36 Central		Solid			X	X	X	X	2	TVA - Batch alone. Quarantine zone soil. Contact PM if insufficient volume for Tuna
JOF-CCR-TW14-11.0/13.5-20191001 ~ JOF-TW14 (180-96768-3	10/1/19	15:10 Central		Solid			X	X	X	X	2	TVA - Batch alone. Quarantine zone soil. Contact PM if insufficient volume for Tuna
JOF-CCR-TW14-16.5/18.5-20191001 ~ JOF-TW14 (180-96768-4	10/1/19	15:36 Central		Solid			X	X	X	X	2	TVA - Batch alone. Quarantine zone soil. Contact PM if insufficient volume for Tuna

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to TestAmerica Laboratories, Inc.

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For ____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by	Date/Time	Company	Received by	Date/Time	Company
[signature]	10/7/19 1700	PDS	[signature]	10/8/19 09:15	TAEST
Relinquished by	Date/Time	Company	Received by	Date/Time	Company
Relinquished by	Date/Time	Company	Received by	Date/Time	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Ver: 01/16/2019

Tennessee Valley Authority

Chain-of-Custody / Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed and accurate

COOLER No.:	1 of 1
COC No:	JOF_CCR_20191001_1B
1 of 1 Pages	
Task Desc:	JOF_CCR

Rec'd BD 8/3/2020

Required Ship to Lab:
Lab Name: TestAmerica Pittsburgh
Lab Address: 301 Alpha Drive, Pittsburgh, PA 15238

Lab Manager Contact Information
Lab PM: Gail Lage
Phone/Fax: 615-301-5741/615-726-3404
Lab Email: Gail.Lage@testamericainc.com

Required Project Information:
Site ID #: Johnsonville Fossil Plant
Project #:
Site Address: 535 Steam Plant Road
City: New Johnsonville State, Zip: TN, 37134
Site PM Name: Roy Quinn
Phone/Fax: 423-751-3753
Site PM Email: rquinn@tva.gov

Required Sampler Information
Sampler: Catherine S. Burton, PG
Sampling Company: Stantec
Address: 3052 Beaumont Centre Circle
City/State: Lexington, KY Phone: 8593382791
Sampling Team Number: 1
Send EDD/Hard Copy to: tva_deliverables@envstd.com

Analysis Turnaround Time
CALENDAR DAYS / WORKING DAYS
TAT if different from Below _____
24 Hours
3 Business Days
5 Business Days
10 Business Days

ITEMS #	SAMPLE ID Samples IDs MUST BE UNIQUE	SAMPLE LOCATION	Sample Depth Start Depth (Depth Unit)	Sample Depth End Depth (Select Unit)	MATRIX CODE	G= GRAB C=COMP	SAMPLE TYPE	SAMPLE DATE	SAMPLE TIME	# OF CONTAINERS	Comments/ Lab Sample I.D.	MS/MSD	Analysis: CCR_MATERIALS_RAD (Preserve: None, Filtered: N)	Analysis: CCR_MATERIALS_BLANKS_RAD (Preserve: HNO3, Filtered: N)
1	JOF-CCR-TW14-1.5/3.5-20191001	JOF-TW14	1.5	3.5	CCR	G	N	10/1/2019	~~1412~~ 1418	2			X	
2	JOF-CCR-TW14-6.5/8.5-20191001	JOF-TW14	6.5	8.5	CCR	G	N	10/1/2019	~~1436~~ 1443	2			X	
3	JOF-CCR-TW14-11.0/13.5-20191001	JOF-TW14	11.0	13.5	CCR	G	N	10/1/2019	~~1510~~ 1513	2			X	
4	JOF-CCR-TW14-16.5/18.5-20191001	JOF-TW14	16.5	18.5	CCR	G	N	10/1/2019	~~1536~~ 1543	2			X	
5														
6														
7														
8														
9														
10														
11														
12														
13														

BD 8/3/2020

CSB 10/02/2019

CSB 10/02/2019

CSB 10/02/2019

CSB 10/02/2019

Additional Comments/Special Instructions:
Additional volume collected should be used for laboratory duplicate analysis.

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Catherine S. Burton Catherine S. Burton 10/02/2019 0916			[illegible] Stantec	10/2/19	0912
B. Bryg TA-NAS 10-2-19 1439			[illegible] TAL	10/4/19	900

SHIPPING METHOD:	SAMPLER NAME AND SIGNATURE
	Catherine S. Burton Catherine S. Burton
	Richard McDonald / [illegible]

Sample Receipt Conditions

Temperature in °C	Sample on Ice?	Sample Intact?	Trip Blank?
Yes / No	Yes / No	Yes / No	Yes / No
Yes / No	Yes / No	Yes / No	Yes / No
Yes / No	Yes / No	Yes / No	Yes / No
Yes / No	Yes / No	Yes / No	Yes / No

4820 8847 9983 Temp 1.1 CF=01.1 Temp #10

180-96768 Chain of Custody

Form TVA 30067A

Login Sample Receipt Checklist

Client: Environmental Standards Inc.

Job Number: 180-96768-1

Login Number: 96768
List Number: 1
Creator: Kovitch, Christina M

List Source: Eurofins TestAmerica, Pittsburgh

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Environmental Standards Inc.

Job Number: 180-96768-1

Login Number: 96768
List Number: 2
Creator: Harris, Lorin C

List Source: Eurofins TestAmerica, St. Louis
List Creation: 10/08/19 11:36 AM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	False	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	