

**Data Validation Report
Tennessee Valley Authority
Bull Run Fossil Plant
Environmental Investigation Plan
Solid Samples
Chain-of-Custody Number: BRF_CCR_20191008_1B**

This quality assurance (QA) review is based upon an examination of the data generated from the analyses of the nine solid samples and one aqueous blank collected on October 8, 2019, at the Tennessee Valley Authority (TVA) Bull Run 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 Watts Barr Fossil Plant (WBF EIP; Revision 3, November 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 180-97022-1.

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
BRF-CCR-FB04-20191008 (Field Blank)	180-97022-1	180-97022-1	Aq	10/8/19	Ra-226, Ra-228, Ra-226/228
BRF-CCR-TW14-21.0/24.0-20191008	180-97022-2	180-97022-1	Solid	10/8/19	Ra-226, Ra-226 ¹ , Ra-228, Ra-228 ¹ , Ra-226/228, Ra-226/228 ¹
BRF-CCR-TW14-26.5/28.5-20191008	180-97022-3	180-97022-1	Solid	10/8/19	Ra-226, Ra-226 ¹ , Ra-228, Ra-228 ¹ , Ra-226/228, Ra-226/228 ¹
BRF-CCR-TW14-31.5/33.5-20191008	180-97022-4	180-97022-1	Solid	10/8/19	Ra-226, Ra-226 ¹ , Ra-228, Ra-228 ¹ , Ra-226/228, Ra-226/228 ¹
BRF-CCR-TW14-36.5/38.5-20191008	180-97022-5	180-97022-1	Solid	10/8/19	Ra-226, Ra-226 ¹ , Ra-228, Ra-228 ¹ , Ra-226/228, Ra-226/228 ¹
BRF-CCR-TW14-41.0/44.0-20191008	180-97022-6	180-97022-1	Solid	10/8/19	Ra-226, Ra-226 ¹ , Ra-228, Ra-228 ¹ , Ra-226/228, Ra-226/228 ¹
BRF-CCR-TW14-47.0/49.0-20191008	180-97022-7	180-97022-1	Solid	10/8/19	Ra-226, Ra-226 ¹ , Ra-228, Ra-228 ¹ , Ra-226/228, Ra-226/228 ¹
BRF-CCR-TW14-51.5/53.5-20191008	180-97022-8	180-97022-1	Solid	10/8/19	Ra-226, Ra-226 ¹ , Ra-228, Ra-228 ¹ , Ra-226/228, Ra-226/228 ¹
BRF-CCR-TW14-56.5/58.5-20191008	180-97022-9	180-97022-1	Solid	10/8/19	Ra-226, Ra-226 ¹ , Ra-228, Ra-228 ¹ , Ra-226/228, Ra-226/228 ¹
BRF-CCR-TW14-61.5/63.5-20191008	180-97022-10	180-97022-1	Solid	10/8/19	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-226¹ - SPLP Radium-226 by US EPA Method 903.0.
- Ra-228 - Radium-228 by US EPA Method 901.1.
- Ra-228¹ - SPLP Radium-228 by US EPA Method 904.0.

Parameters Examined (Cont.):

- Ra-226/228 - Radium-226/228 Calculation by US EPA Method 901.1.
- Ra-226/228¹ - 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/ Laboratory Control Sample Duplicate (LCS/LCSD) 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 Qualifier	Reason for Qualification
SPLP Ra-226/Ra-228 and SPLP Ra-226	180-97022-1	BRF-CCR-TW14-31.5/33.5-20191008 and BRF-CCR-TW14-47.0/49.0-20191008	J	LP

- 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: 12/9/19

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.
RL	Reported result between the MDL and the RL.
T	Temperature preservation issue.
S	Radium-226+228 flagged due to reporting protocol for combined results
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.

Lab Sample ID	180-97022-1
Sys Sample Code	BRF-CCR-FB04-20191008
Sample Name	BRF-CCR-FB04-20191008
Sample Date	10/8/2019 8:14:00 AM
Location	BRF-TW14
Sample Type	FB
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
EPA 901.1	Radium 226 + radium 228	RA226/228	T	PCI/L	16.3	U	S	22.0				N	Yes	1	NA
	Radium 228	15262-20-1	T	PCI/L	-3.73	U		17.4	37.5	37.5	50.0	N	Yes	1	NA
	Radium-226	13982-63-3	T	PCI/L	16.3	U		13.4	16.9	16.9	50.0	N	Yes	1	NA

Lab Sample ID	180-97022-10
Sys Sample Code	BRF-CCR-TW14-61.5/63.5-20191008
Sample Name	BRF-CCR-TW14-61.5/63.5-20191008
Sample Date	10/8/2019 3:49:00 PM
Location	BRF-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	0.0336	U	S	0.376				N	Yes	1	NA
EPA 901.1	Radium 226 + radium 228	RA226/228	T	PCI/G	7.66			0.853				Y	Yes	1	NA
	Radium 228	15262-20-1	T	PCI/G	3.84			0.636	0.322	0.322	1.00	Y	Yes	1	NA
	Radium-226	13982-63-3	T	PCI/G	3.82			0.569	0.247	0.247	1.00	Y	Yes	1	NA
EPA 903.0	Radium-226	13982-63-3	S	PCI/L	0.0336	U		0.104	0.190	0.190	1.00	N	Yes	1	NA
EPA 904.0	Radium 228	15262-20-1	S	PCI/L	-0.154	U		0.361	0.664	0.664	1.00	N	Yes	1	NA

Lab Sample ID	180-97022-2
Sys Sample Code	BRF-CCR-TW14-21.0/24.0-20191008
Sample Name	BRF-CCR-TW14-21.0/24.0-20191008
Sample Date	10/8/2019 8:35:00 AM
Location	BRF-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	0.134	U		0.303				N	Yes	1	NA
EPA 901.1	Radium 226 + radium 228	RA226/228	T	PCI/G	8.08			0.924				Y	Yes	1	NA
	Radium 228	15262-20-1	T	PCI/G	3.57			0.629	0.340	0.340	1.00	Y	Yes	1	NA
	Radium-226	13982-63-3	T	PCI/G	4.51			0.677	0.231	0.231	1.00	Y	Yes	1	NA
EPA 903.0	Radium-226	13982-63-3	S	PCI/L	0.103	U		0.108	0.173	0.173	1.00	N	Yes	1	NA
EPA 904.0	Radium 228	15262-20-1	S	PCI/L	0.0309	U		0.283	0.502	0.502	1.00	N	Yes	1	NA

Lab Sample ID	180-97022-3
Sys Sample Code	BRF-CCR-TW14-26.5/28.5-20191008
Sample Name	BRF-CCR-TW14-26.5/28.5-20191008
Sample Date	10/8/2019 9:04:00 AM
Location	BRF-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	0.105	U		0.324				N	Yes	1	NA
EPA 901.1	Radium 226 + radium 228	RA226/228	T	PCI/G	7.84			0.895				Y	Yes	1	NA
	Radium 228	15262-20-1	T	PCI/G	3.78			0.650	0.168	0.168	1.00	Y	Yes	1	NA
	Radium-226	13982-63-3	T	PCI/G	4.06			0.615	0.252	0.252	1.00	Y	Yes	1	NA
EPA 903.0	Radium-226	13982-63-3	S	PCI/L	0.0755	U		0.102	0.170	0.170	1.00	N	Yes	1	NA
EPA 904.0	Radium 228	15262-20-1	S	PCI/L	0.0298	U		0.308	0.543	0.543	1.00	N	Yes	1	NA

Lab Sample ID	180-97022-4
Sys Sample Code	BRF-CCR-TW14-31.5/33.5-20191008
Sample Name	BRF-CCR-TW14-31.5/33.5-20191008
Sample Date	10/8/2019 9:44:00 AM
Location	BRF-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	0.624	J	LP,S	0.374				Y	Yes	1	NA
EPA 901.1	Radium 226 + radium 228	RA226/228	T	PCI/G	7.46			0.905				Y	Yes	1	NA
	Radium 228	15262-20-1	T	PCI/G	3.63			0.634	0.178	0.178	1.00	Y	Yes	1	NA
	Radium-226	13982-63-3	T	PCI/G	3.83			0.646	0.328	0.328	1.00	Y	Yes	1	NA
EPA 903.0	Radium-226	13982-63-3	S	PCI/L	0.208	J	LP	0.131	0.182	0.182	1.00	Y	Yes	1	NA
EPA 904.0	Radium 228	15262-20-1	S	PCI/L	0.416	U		0.350	0.554	0.554	1.00	N	Yes	1	NA

Lab Sample ID	180-97022-5
Sys Sample Code	BRF-CCR-TW14-36.5/38.5-20191008
Sample Name	BRF-CCR-TW14-36.5/38.5-20191008
Sample Date	10/8/2019 10:37:00 AM
Location	BRF-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	0.0179	U	S	0.457				N	Yes	1	NA
EPA 901.1	Radium 226 + radium 228	RA226/228	T	PCI/G	8.02			0.919				Y	Yes	1	NA
	Radium 228	15262-20-1	T	PCI/G	3.53			0.596	0.404	0.404	1.00	Y	Yes	1	NA
	Radium-226	13982-63-3	T	PCI/G	4.49			0.700	0.338	0.338	1.00	Y	Yes	1	NA
EPA 903.0	Radium-226	13982-63-3	S	PCI/L	0.0179	U		0.0855	0.161	0.161	1.00	N	Yes	1	NA
EPA 904.0	Radium 228	15262-20-1	S	PCI/L	-0.104	U		0.449	0.804	0.804	1.00	N	Yes	1	NA

Lab Sample ID	180-97022-6
Sys Sample Code	BRF-CCR-TW14-41.0/44.0-20191008
Sample Name	BRF-CCR-TW14-41.0/44.0-20191008
Sample Date	10/8/2019 11:25:00 AM
Location	BRF-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	0.228	U	S	0.352				N	Yes	1	NA
EPA 901.1	Radium 226 + radium 228	RA226/228	T	PCI/G	7.47			0.862				Y	Yes	1	NA
	Radium 228	15262-20-1	T	PCI/G	3.43			0.631	0.413	0.413	1.00	Y	Yes	1	NA
	Radium-226	13982-63-3	T	PCI/G	4.04			0.588	0.238	0.238	1.00	Y	Yes	1	NA
EPA 903.0	Radium-226	13982-63-3	S	PCI/L	-0.0673	U		0.0708	0.169	0.169	1.00	N	Yes	1	NA
EPA 904.0	Radium 228	15262-20-1	S	PCI/L	0.228	U		0.345	0.577	0.577	1.00	N	Yes	1	NA

Lab Sample ID	180-97022-7
Sys Sample Code	BRF-CCR-TW14-47.0/49.0-20191008
Sample Name	BRF-CCR-TW14-47.0/49.0-20191008
Sample Date	10/8/2019 1:42:00 PM
Location	BRF-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	0.389	J	LP,S	0.463				N	Yes	1	NA
EPA 901.1	Radium 226 + radium 228	RA226/228	T	PCI/G	8.77			1.08				Y	Yes	1	NA
	Radium 228	15262-20-1	T	PCI/G	4.34			0.829	0.333	0.333	1.00	Y	Yes	1	NA
	Radium-226	13982-63-3	T	PCI/G	4.43			0.690	0.317	0.317	1.00	Y	Yes	1	NA
EPA 903.0	Radium-226	13982-63-3	S	PCI/L	0.142	J	LP	0.0950	0.126	0.126	1.00	Y	Yes	1	NA
EPA 904.0	Radium 228	15262-20-1	S	PCI/L	0.247	U		0.453	0.764	0.764	1.00	N	Yes	1	NA

Lab Sample ID	180-97022-8
Sys Sample Code	BRF-CCR-TW14-51.5/53.5-20191008
Sample Name	BRF-CCR-TW14-51.5/53.5-20191008
Sample Date	10/8/2019 2:25:00 PM
Location	BRF-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	0.425	U		0.324				N	Yes	1	NA
EPA 901.1	Radium 226 + radium 228	RA226/228	T	PCI/G	7.68			0.962				Y	Yes	1	NA
	Radium 228	15262-20-1	T	PCI/G	4.08			0.758	0.327	0.327	1.00	Y	Yes	1	NA
	Radium-226	13982-63-3	T	PCI/G	3.60			0.592	0.288	0.288	1.00	Y	Yes	1	NA
EPA 903.0	Radium-226	13982-63-3	S	PCI/L	0.107	U		0.0953	0.145	0.145	1.00	N	Yes	1	NA
EPA 904.0	Radium 228	15262-20-1	S	PCI/L	0.318	U		0.310	0.500	0.500	1.00	N	Yes	1	NA

Lab Sample ID	180-97022-9
Sys Sample Code	BRF-CCR-TW14-56.5/58.5-20191008
Sample Name	BRF-CCR-TW14-56.5/58.5-20191008
Sample Date	10/8/2019 3:04:00 PM
Location	BRF-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	0.229	U		0.381				N	Yes	1	NA
EPA 901.1	Radium 226 + radium 228	RA226/228	T	PCI/G	6.48			0.848				Y	Yes	1	NA
	Radium 228	15262-20-1	T	PCI/G	2.85			0.596	0.394	0.394	1.00	Y	Yes	1	NA
	Radium-226	13982-63-3	T	PCI/G	3.63			0.603	0.324	0.324	1.00	Y	Yes	1	NA
EPA 903.0	Radium-226	13982-63-3	S	PCI/L	0.102	U		0.105	0.167	0.167	1.00	N	Yes	1	NA
EPA 904.0	Radium 228	15262-20-1	S	PCI/L	0.127	U		0.366	0.631	0.631	1.00	N	Yes	1	NA

SECTION 3

SUPPORTING DOCUMENTATION FOR QUALIFIERS



RADIOLOGICAL ANALYSIS SUPPORT DOCUMENTATION

ESI project name: TVA-BRF EI
 Sample Collection Dates: 10/8/19
 Job Number: 20188395.A000
 Project Manager: AJC
 Laboratory: TestAmerica-St. Louis

Reviewed by: Danielle Coles
 Approved by: Dina V
 Completion Date: 12/5/19

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

			<u>Sample No.</u>	<u>Lab Control No.</u>
Deliverable:	Level IV (Full) (X)		180-97022-1	
	Limited ()			
	Other:			

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

	Criteria Examined in Detail				Problems Identified				Support Documentation Attachments				
	Check (√) if Yes or Footnote Letter for Comments Below				Check (√) if Yes or Footnote Letter for Comments Below				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			X				X			
Tracer/Chemical Yield		X	X										
Duplicate Analysis: () Field (X) Lab	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: BRF_CCR_20191008_1B

Job ID: 180-97022-1

Client Sample ID: BRF-CCR-FB04-20191008 ~ TW14

Lab Sample ID: 180-97022-1

Date Collected: 10/08/19 08:14

Matrix: Water

Date Received: 10/09/19 09:00

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

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium 226 and 228 (positive only)	16.3	U <i>15</i>	21.9	22.0			pCi/L	10/15/19 20:57	11/07/19 19:04	1
Radium-226	16.3	U	13.3	13.4	50.0	16.9	pCi/L	10/15/19 20:57	11/07/19 19:04	1
Radium-228	-3.73	U	17.4	17.4	50.0	37.5	pCi/L	10/15/19 20:57	11/07/19 19:04	1



Client Sample Results

Client: Environmental Standards Inc.
Project/Site: BRF_CCR_20191008_1B

Job ID: 180-97022-1

Client Sample ID: BRF-CCR-TW14-31.5/33.5-20191008 ~ TW14

Lab Sample ID: 180-97022-4

Date Collected: 10/08/19 09:44

Matrix: Solid

Date Received: 10/09/19 09:00

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)	7.46		0.724	0.905			pCi/g	10/16/19 15:32	11/14/19 15:54	1
Radium-226	3.83		0.509	0.646	1.00	0.328	pCi/g	10/16/19 15:32	11/14/19 15:54	1
Radium-228	3.63		0.515	0.634		0.178	pCi/g	10/16/19 15:32	11/14/19 15:54	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 <i>J,LP</i>	0.208		0.129	0.131	1.00	0.182	pCi/L	11/01/19 11:27	11/19/19 07:05	1

Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Ba Carrier	74.3 ✓		40 - 110	11/01/19 11:27	11/19/19 07:05	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	0.416	U	0.347	0.350	1.00	0.554	pCi/L	11/01/19 12:00	11/12/19 18:34	1

Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Ba Carrier	74.3		40 - 110	11/01/19 12:00	11/12/19 18:34	1
Y Carrier	86.7 ✓		40 - 110	11/01/19 12:00	11/12/19 18:34	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	0.624	<i>J,S</i>	0.370	0.374	5.00		pCi/L		11/20/19 09:42	1

Eurofins TestAmerica, Pittsburgh



Client Sample Results

Client: Environmental Standards Inc.
Project/Site: BRF_CCR_20191008_1B

Job ID: 180-97022-1

Client Sample ID: BRF-CCR-TW14-36.5/38.5-20191008 ~ TW14

Lab Sample ID: 180-97022-5

Date Collected: 10/08/19 10:37

Matrix: Solid

Date Received: 10/09/19 09:00

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

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Radium 226 and 228 (positive only)	8.02		0.706	0.919			pCi/g	10/16/19 15:32	11/14/19 15:55	1
Radium-226	4.49		0.522	0.700	1.00	0.338	pCi/g	10/16/19 15:32	11/14/19 15:55	1
Radium-228	3.53		0.475	0.596		0.404	pCi/g	10/16/19 15:32	11/14/19 15:55	1

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

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Radium-226	0.0179	U	0.0855	0.0855	1.00	0.161	pCi/L	11/01/19 11:27	11/19/19 07:05	1
<i>Carrier</i>	<i>%Yield</i>	<i>Qualifier</i>	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
<i>Ba Carrier</i>	81.1 ✓		40 - 110					11/01/19 11:27	11/19/19 07:05	1

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

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Radium-228	-0.104	U	0.449	0.449	1.00	0.804	pCi/L	11/01/19 12:00	11/12/19 18:36	1
<i>Carrier</i>	<i>%Yield</i>	<i>Qualifier</i>	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
<i>Ba Carrier</i>	81.7		40 - 110					11/01/19 12:00	11/12/19 18:36	1
<i>Y Carrier</i>	68.4 ✓		40 - 110					11/01/19 12:00	11/12/19 18:36	1

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

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Radium 226 and 228	0.0179	U, S	0.457	0.457	5.00		pCi/L		11/20/19 09:42	1



Client Sample Results

Client: Environmental Standards Inc.
 Project/Site: BRF_CCR_20191008_1B

Job ID: 180-97022-1

Client Sample ID: BRF-CCR-TW14-41.0/44.0-20191008 ~ TW14

Lab Sample ID: 180-97022-6

Date Collected: 10/08/19 11:25

Matrix: Solid

Date Received: 10/09/19 09:00

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

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Radium 226 and 228 (positive only)	7.47		0.667	0.862			pCi/g	10/16/19 15:32	11/14/19 16:27	1
Radium-226	4.04		0.412	0.588	1.00	0.238	pCi/g	10/16/19 15:32	11/14/19 16:27	1
Radium-228	3.43		0.525	0.631		0.413	pCi/g	10/16/19 15:32	11/14/19 16:27	1

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

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Radium-226	-0.0673	U	0.0706	0.0708	1.00	0.169	pCi/L	11/01/19 11:27	11/19/19 07:05	1

Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Ba Carrier	80.2		40 - 110	11/01/19 11:27	11/19/19 07:05	1

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

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Radium-228	0.228	U	0.344	0.345	1.00	0.577	pCi/L	11/01/19 12:00	11/12/19 18:36	1

Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Ba Carrier	80.2		40 - 110	11/01/19 12:00	11/12/19 18:36	1
Y Carrier	85.2		40 - 110	11/01/19 12:00	11/12/19 18:36	1

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

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Radium 226 and 228	0.228	U, S	0.351	0.352	5.00		pCi/L		11/20/19 09:42	1



Client Sample Results

Client: Environmental Standards Inc.
Project/Site: BRF_CCR_20191008_1B

Job ID: 180-97022-1

Client Sample ID: BRF-CCR-TW14-47.0/49.0-20191008 ~ TW14

Lab Sample ID: 180-97022-7

Date Collected: 10/08/19 13:42

Matrix: Solid

Date Received: 10/09/19 09:00

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

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Radium 226 and 228 (positive only)	8.77		0.875	1.08			pCi/g	10/16/19 15:32	11/14/19 16:28	1
Radium-226	4.43		0.522	0.690	1.00	0.317	pCi/g	10/16/19 15:32	11/14/19 16:28	1
Radium-228	4.34		0.702	0.829		0.333	pCi/g	10/16/19 15:32	11/14/19 16:28	1

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

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Radium-226 <i>J,LP</i>	0.142		0.0941	0.0950	1.00	0.126	pCi/L	11/01/19 11:27	11/19/19 07:05	1

Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Ba Carrier	76.8 ✓		40 - 110	11/01/19 11:27	11/19/19 07:05	1

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

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Radium-228	0.247	U	0.453	0.453	1.00	0.764	pCi/L	11/01/19 12:00	11/12/19 18:37	1

Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Ba Carrier	76.8		40 - 110	11/01/19 12:00	11/12/19 18:37	1
Y Carrier	73.3 ✓		40 - 110	11/01/19 12:00	11/12/19 18:37	1

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

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Radium 226 and 228	0.389 <i>J,S</i>		0.463	0.463	5.00		pCi/L		11/20/19 09:42	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: BRF_CCR_20191008_1B

Job ID: 180-97022-1

Client Sample ID: BRF-CCR-TW14-61.5/63.5-20191008 ~ TW14

Lab Sample ID: 180-97022-10

Date Collected: 10/08/19 15:49

Matrix: Solid

Date Received: 10/09/19 09:00

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)	7.66		0.645	0.853			pCi/g	10/16/19 15:32	11/14/19 17:08	1
Radium-226	3.82		0.407	0.569	1.00	0.247	pCi/g	10/16/19 15:32	11/14/19 17:08	1
Radium-228	3.84		0.501	0.636		0.322	pCi/g	10/16/19 15:32	11/14/19 17:08	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	0.0336	U	0.104	0.104	1.00	0.190	pCi/L	11/01/19 11:27	11/19/19 07:06	1

Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Ba Carrier	75.4	✓	40 - 110	11/01/19 11:27	11/19/19 07:06	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	-0.154	U	0.361	0.361	1.00	0.664	pCi/L	11/01/19 12:00	11/12/19 18:37	1

Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Ba Carrier	75.4		40 - 110	11/01/19 12:00	11/12/19 18:37	1
Y Carrier	80.0	✓	40 - 110	11/01/19 12:00	11/12/19 18:37	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	0.0336	U, S	0.376	0.376	5.00		pCi/L		11/20/19 09:42	1



QC Sample Results

Client: Environmental Standards Inc.
Project/Site: BRF_CCR_20191008_1B

Job ID: 180-97022-1

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

Lab Sample ID: 180-97022-2 DU
Matrix: Solid
Analysis Batch: 450358

Client Sample ID: BRF-CCR-TW14-21.0/24.0-20191008 ~ TW14
Prep Type: Total/NA
Prep Batch: 446486

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER	Limit
										Limit	Limit
Radium 226 and 228 (positive only)	8.08		7.355		0.828			pCi/g	1.17	0.41	
Radium-226	4.51		3.933		0.544	1.00	0.210	pCi/g	1.33	0.47	1
Radium-228	3.57		3.422		0.624		0.354	pCi/g	0.34	0.12	1

Method: 903.0 - Radium-226 (GFPC)

Lab Sample ID: MB 160-448541/21-A
Matrix: Solid
Analysis Batch: 451139

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 448541

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	-0.03367	U	0.0795	0.0795	1.00	0.170	pCi/L	11/01/19 11:27	11/19/19 08:51	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	80.2		40 - 110					11/01/19 11:27	11/19/19 08:51	1

Lab Sample ID: LCS 160-448541/1-A
Matrix: Solid
Analysis Batch: 451139

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 448541

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	Limits
Radium-226	11.4	11.84		1.27	1.00	0.178	pCi/L	104	75 - 125
Carrier	%Yield	LCS Qualifier	Limits						
Ba Carrier	71.5		40 - 110						

Lab Sample ID: LCSD 160-448541/2-A
Matrix: Solid
Analysis Batch: 451139

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 448541

Analyte	Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	Limits	RER	Limit
											Limit
Radium-226	11.4	9.586		1.06	1.00	0.191	pCi/L	84	75 - 125	0.97	1
Carrier	%Yield	LCSD Qualifier	Limits								
Ba Carrier	72.6		40 - 110								

Euofins TestAmerica, Pittsburgh

SECTION 4

CASE NARRATIVE AND CHAIN-OF-CUSTODY RECORD

Case Narrative

Client: Environmental Standards Inc.
Project/Site: BRF_CCR_20191008_1B

Job ID: 180-97022-1

Job ID: 180-97022-1

Laboratory: Eurofins TestAmerica, Pittsburgh

Narrative

Job Narrative 180-97022-1

Receipt

The samples were received on 10/10/2019 9:00 AM; the samples arrived in good condition, properly preserved and on ice. The temperatures of the 4 coolers at receipt time were 2.6° C, 3.2° C, 3.4° C and 3.7° C. ✓

RAD

Method 901.1: Gamma Prep Batch 160-446346

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 ✓

BRF-CCR-FB04-20191008 ~ TW14 (180-97022-1), (LCS 160-446346/2-A), (MB 160-446346/1-A) and (180-97022-A-1-B DU)

Method 901.1: Gamma Prep Batch 160-446486

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 ✓

BRF-CCR-TW14-21.0/24.0-20191008 ~ TW14 (180-97022-2), BRF-CCR-TW14-26.5/28.5-20191008 ~ TW14 (180-97022-3),
BRF-CCR-TW14-31.5/33.5-20191008 ~ TW14 (180-97022-4), BRF-CCR-TW14-36.5/38.5-20191008 ~ TW14 (180-97022-5),
BRF-CCR-TW14-41.0/44.0-20191008 ~ TW14 (180-97022-6), BRF-CCR-TW14-47.0/49.0-20191008 ~ TW14 (180-97022-7),
BRF-CCR-TW14-51.5/53.5-20191008 ~ TW14 (180-97022-8), BRF-CCR-TW14-56.5/58.5-20191008 ~ TW14 (180-97022-9),
BRF-CCR-TW14-61.5/63.5-20191008 ~ TW14 (180-97022-10) and (180-97022-A-2-C DU)

Method 903.0: Radium-226 Prep Batch 160-448541

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.

BRF-CCR-TW14-21.0/24.0-20191008 ~ TW14 (180-97022-2), BRF-CCR-TW14-26.5/28.5-20191008 ~ TW14 (180-97022-3),
BRF-CCR-TW14-31.5/33.5-20191008 ~ TW14 (180-97022-4), BRF-CCR-TW14-36.5/38.5-20191008 ~ TW14 (180-97022-5),
BRF-CCR-TW14-41.0/44.0-20191008 ~ TW14 (180-97022-6), BRF-CCR-TW14-47.0/49.0-20191008 ~ TW14 (180-97022-7),
BRF-CCR-TW14-51.5/53.5-20191008 ~ TW14 (180-97022-8), BRF-CCR-TW14-56.5/58.5-20191008 ~ TW14 (180-97022-9),
BRF-CCR-TW14-61.5/63.5-20191008 ~ TW14 (180-97022-10), (LCS 160-448541/1-A), (LCSD 160-448541/2-A) and (MB 160-448541/21-A)

Method 904.0: Radium-228 Prep Batch 160-448542



Case Narrative

Client: Environmental Standards Inc.
Project/Site: BRF_CCR_20191008_1B

Job ID: 180-97022-1



Job ID: 180-97022-1 (Continued)

Laboratory: Eurofins TestAmerica, Pittsburgh (Continued)

The laboratory control sample (LCS) spike recovery (129%) is outside of the upper control limit of 125% indicating potentially biased results. Associated samples are non-detect (activity < MDC), indicating no adverse affects to the sample results. The results are reported with this narrative. *ok, req'd*

BRF-CCR-TW14-21.0/24.0-20191008 ~ TW14 (180-97022-2), BRF-CCR-TW14-26.5/28.5-20191008 ~ TW14 (180-97022-3), BRF-CCR-TW14-31.5/33.5-20191008 ~ TW14 (180-97022-4), BRF-CCR-TW14-36.5/38.5-20191008 ~ TW14 (180-97022-5), BRF-CCR-TW14-41.0/44.0-20191008 ~ TW14 (180-97022-6), BRF-CCR-TW14-47.0/49.0-20191008 ~ TW14 (180-97022-7), BRF-CCR-TW14-51.5/53.5-20191008 ~ TW14 (180-97022-8), BRF-CCR-TW14-56.5/58.5-20191008 ~ TW14 (180-97022-9), BRF-CCR-TW14-61.5/63.5-20191008 ~ TW14 (180-97022-10), (LCS 160-448542/1-A), (LCSD 160-448542/2-A) and (MB 160-448542/21-A)

Method 904.0: Radium-228 Prep Batch 160-448542

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.

BRF-CCR-TW14-21.0/24.0-20191008 ~ TW14 (180-97022-2), BRF-CCR-TW14-26.5/28.5-20191008 ~ TW14 (180-97022-3), BRF-CCR-TW14-31.5/33.5-20191008 ~ TW14 (180-97022-4), BRF-CCR-TW14-36.5/38.5-20191008 ~ TW14 (180-97022-5), BRF-CCR-TW14-41.0/44.0-20191008 ~ TW14 (180-97022-6), BRF-CCR-TW14-47.0/49.0-20191008 ~ TW14 (180-97022-7), BRF-CCR-TW14-51.5/53.5-20191008 ~ TW14 (180-97022-8), BRF-CCR-TW14-56.5/58.5-20191008 ~ TW14 (180-97022-9), BRF-CCR-TW14-61.5/63.5-20191008 ~ TW14 (180-97022-10), (LCS 160-448542/1-A), (LCSD 160-448542/2-A) and (MB 160-448542/21-A)

Method Fill_Geo-21: Gamma Prep Batch 160-446486: Samples BRF-CCR-TW14-21.0/24.0-20191008 ~ TW14 (180-97022-2), BRF-CCR-TW14-26.5/28.5-20191008 ~ TW14 (180-97022-3), BRF-CCR-TW14-31.5/33.5-20191008 ~ TW14 (180-97022-4), BRF-CCR-TW14-36.5/38.5-20191008 ~ TW14 (180-97022-5), BRF-CCR-TW14-41.0/44.0-20191008 ~ TW14 (180-97022-6), BRF-CCR-TW14-47.0/49.0-20191008 ~ TW14 (180-97022-7), BRF-CCR-TW14-51.5/53.5-20191008 ~ TW14 (180-97022-8), BRF-CCR-TW14-56.5/58.5-20191008 ~ TW14 (180-97022-9), BRF-CCR-TW14-61.5/63.5-20191008 ~ TW14 (180-97022-10) and (180-97022-A-2-A DU) are powdery soil which exhibits low density.

Method PrecSep_0: Radium 228 Prep batch 160-448542:

Insufficient sample volume was available to perform a sample duplicate for the following samples: BRF-CCR-TW14-21.0/24.0-20191008 ~ TW14 (180-97022-2), BRF-CCR-TW14-26.5/28.5-20191008 ~ TW14 (180-97022-3), BRF-CCR-TW14-31.5/33.5-20191008 ~ TW14 (180-97022-4), BRF-CCR-TW14-36.5/38.5-20191008 ~ TW14 (180-97022-5), BRF-CCR-TW14-41.0/44.0-20191008 ~ TW14 (180-97022-6), BRF-CCR-TW14-47.0/49.0-20191008 ~ TW14 (180-97022-7), BRF-CCR-TW14-51.5/53.5-20191008 ~ TW14 (180-97022-8), BRF-CCR-TW14-56.5/58.5-20191008 ~ TW14 (180-97022-9) and BRF-CCR-TW14-61.5/63.5-20191008 ~ TW14 (180-97022-10). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

Method PrecSep_0: Radium 228 Prep batch 160-448542:

Yttrium carrier recovery is outside the upper control limit (110%) for the following sample: BRF-CCR-TW14-31.5/33.5-20191008 ~ TW14 (180-97022-4). The final Yttrium precipitation appeared larger than the QC associated with this batch, indicating the possibility of matrix interference. *↓ see below, re qual*

Method PrecSep_0: Radium 228 Prep Batch 160-448542:

Double the amount of Y Carrier_00038 was inadvertently added to the following sample: BRF-CCR-TW14-31.5/33.5-20191008 ~ TW14 (180-97022-4).

Method PrecSep STD: Radium 226 Prep Batch 160-448541:

Insufficient sample volume was available to perform a sample duplicate for the following samples: BRF-CCR-TW14-21.0/24.0-20191008 ~ TW14 (180-97022-2), BRF-CCR-TW14-26.5/28.5-20191008 ~ TW14 (180-97022-3), BRF-CCR-TW14-31.5/33.5-20191008 ~ TW14 (180-97022-4), BRF-CCR-TW14-36.5/38.5-20191008 ~ TW14 (180-97022-5), BRF-CCR-TW14-41.0/44.0-20191008 ~ TW14 (180-97022-6), BRF-CCR-TW14-47.0/49.0-20191008 ~ TW14 (180-97022-7), BRF-CCR-TW14-51.5/53.5-20191008 ~ TW14 (180-97022-8), BRF-CCR-TW14-56.5/58.5-20191008 ~ TW14 (180-97022-9) and BRF-CCR-TW14-61.5/63.5-20191008 ~ TW14 (180-97022-10). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

Case Narrative

Client: Environmental Standards Inc.
Project/Site: BRF_CCR_20191008_1B

Job ID: 180-97022-1

Job ID: 180-97022-1 (Continued)

Laboratory: Eurofins TestAmerica, Pittsburgh (Continued)

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: BRF_CCR_20191008_1B

Job ID: 180-97022-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
180-97022-1	BRF-CCR-FB04-20191008 ~ TW14	Water	10/08/19 08:14 ✓	10/09/19 09:00	
180-97022-2	BRF-CCR-TW14-21.0/24.0-20191008 ~ TW14	Solid	10/08/19 08:35 ✓	10/10/19 09:00	
180-97022-3	BRF-CCR-TW14-26.5/28.5-20191008 ~ TW14	Solid	10/08/19 09:04 ✓	10/10/19 09:00	
180-97022-4	BRF-CCR-TW14-31.5/33.5-20191008 ~ TW14	Solid	10/08/19 09:44 ✓	10/09/19 09:00	
180-97022-5	BRF-CCR-TW14-36.5/38.5-20191008 ~ TW14	Solid	10/08/19 10:37 ✓	10/09/19 09:00	
180-97022-6	BRF-CCR-TW14-41.0/44.0-20191008 ~ TW14	Solid	10/08/19 11:25 ✓	10/09/19 09:00	
180-97022-7	BRF-CCR-TW14-47.0/49.0-20191008 ~ TW14	Solid	10/08/19 13:42 ✓	10/09/19 09:00	
180-97022-8	BRF-CCR-TW14-51.5/53.5-20191008 ~ TW14	Solid	10/08/19 14:25 ✓	10/09/19 09:00	
180-97022-9	BRF-CCR-TW14-56.5/58.5-20191008 ~ TW14	Solid	10/08/19 15:04 ✓	10/09/19 09:00	
180-97022-10	BRF-CCR-TW14-61.5/63.5-20191008 ~ TW14	Solid	10/08/19 15:49 ✓	10/09/19 09:00	



Shipping and Receiving Documents

TVA Environmental Investigations



Tennessee Valley Authority

COOLER No.: () of 4
 COC No: **BRF_CCR_20191008_1B**
 1 of 1 Pages
 Task Desc: **BRF_CCR**

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

Required Ship to Lab:		Required Project Information:		Required Sampler Information:	
Lab Name:	TestAmerica Pittsburgh	Site ID #:	Bull Run Fossil Plant	Sampler:	S. Bolden & M. Edmunds
Lab Address:	301 Alpha Drive Pittsburgh, PA 15238	Project #:	18019024	Sampling Company:	Stantec
Lab Manager Contact Information		Site Address:	1265 Edgemoor Road	Address:	Warehouse Row North 1110 Market Street, Chattanooga, TN 37718
Lab Mgr:	Gail Lage	City:	Clinton	City/State:	Chattanooga, TN (432) 320-1421
Phone/Fax:	615-301-5741/615-726-3404	State, Zip:	TN, 37718	Phone:	(432) 320-1421
Lab Email:	Gail.Lage@testamericainc.com	Site PM Name:	Roy Quinn	Sampling Team Number:	1
		Phone/Fax:	423-751-3753	Send EDDHard Copy to:	See online address on site visit
		Site PM Email:	roy.quinn@trc.gov		

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

ITEM #	SAMPLE ID Samples IDs MUST BE UNIQUE	SAMPLE LOCATION	Sample Depth		MATRIX CODE	G= GRAB C=COMP	SAMPLE TYPE	SAMPLE DATE	SAMPLE TIME	# OF CONTAINERS	Comments/ Lab Sample I.D.	KRM/MSD	ANALYSIS METHOD	PRESERVE TIME
			Depth Unit	Subst Unit										
	BRF-CCR-FB04-20191008	TW14	NA	NA	AQ	G	FB	10/8/2019	0814	3				
	BRF-CCR-TW14-21.0/24.0-20191008	TW14	21.0	24.0	CCR	G	N	10/8/2019	0835	2	CEC sample			
	BRF-CCR-TW14-26.5/28.5-20191008	TW14	26.5	28.5	CCR	G	N	10/8/2019	0904	2				
	BRF-CCR-TW14-31.5/33.5-20191008	TW14	31.5	33.5	CCR	G	N	10/8/2019	0944	3				
	BRF-CCR-TW14-36.5/38.5-20191008	TW14	36.5	38.5	CCR	G	N	10/8/2019	1037	2				
	BRF-CCR-TW14-41.0/44.0-20191008	TW14	41.0	44.0	CCR	G	N	10/8/2019	1125	2	CEC sample			
	BRF-CCR-TW14-47.0/49.0-20191008	TW14	47.0	49.0	CCR	G	N	10/8/2019	1342	2				
	BRF-CCR-TW14-51.5/53.5-20191008	TW14	51.5	53.5	CCR	G	N	10/8/2019	1425	2				
	BRF-CCR-TW14-56.5/58.5-20191008	TW14	56.5	58.5	CCR	G	N	10/8/2019	1504	2				
	BRF-CCR-TW14-61.5/63.5-20191008	TW14	61.5	63.5	CCR	G	N	10/8/2019	1549	2				

Additional Comments/Special Instructions:
 Additional volume collected should be used for laboratory duplicate analysis.
 10/10/2019

RELINQUISHED BY	AFFILIATION	DATE	TIME	ACCEPTED BY	AFFILIATION	DATE	TIME
Susana Bolden	(Stantec)	10/08/2019	1730	M. J. W.	(TVA)	10/9/2019	900
		10/08/2019					
		10/08/2019					

Sample Receipt Conditions			
<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No
<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No
<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No
<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No
<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No
<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No
<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No
<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No

SHIPPER'S METHOD: Courier

SAMPLER NAME AND SIGNATURE: Susana Bolden, Matthew Edmunds

Temperature in °C: _____

Sample on Ice? Sample Intact? Trip Blank?



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11/20/2019



Tennessee Valley Authority

TVA Environmental Investigations

COOLER No.:	4	of	4
COC No.:	BRF_CCR_20191008_1B		
	1 of 1 Pages		
Task Desc.:	BRF_CCR		

Chain-of-Custody / Analytical Request Document

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

Required Ship to Lab:		Required Project Information:		Required Sampler Information:	
Lab Name:	TestAmerica Pittsburgh	Site ID #:	Bull Run Fossil Plant	Sampler:	S. Bolden & M. Edmunds
Lab Address:	301 Alpha Drive Pittsburgh, PA 15238	Project #:	16019624	Sampling Company:	Slantec
		Site Address:	1265 Edgemoor Road	Address:	Warehouse Row North 1110 Market Street,
		City:	Clinton	City/State:	Chattanooga, TN
		State, Zip:	TN, 37716	Phone:	(423) 320-1421
Lab Manager Contact Information:		Site PM Name:	Roy Quinn	SA 10/08/2019	
Lab PM:	Gail Laga	Phone/Fax:	423-751-3753	Sampling Team Number:	1
Phone/Fax:	615-301-5741/615-726-3404	Site PM Email:	robquinn@slantec.com	Send EDD/Hard Copy to:	Dr. Robert Adams@slantec.com
Lab Email:	Gail.Laga@tesamericainc.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		MATRIX CODE	G= GRAB C=COMP	SAMPLE TYPE	SAMPLE DATE	SAMPLE TIME	# OF CONTAINERS	Comments/ Lab Sample I.D.	ANALYSIS REQUESTED	PRESERVE NAME	PRESERVE DATE
			Start Depth	End Depth										
1	BRF-CCR-FB04-20191008	TW14	NA	NA	AQ	G	FB	10/8/2019	0814	3				
2	BRF-CCR-TW14-21.0/24.0-20191008	TW14	21.0	24.0	CCR	G	N	10/8/2019	0835	2	CEC sample	X	SA 10/08/2019	
3	BRF-CCR-TW14-26.5/28.5-20191008	TW14	26.5	28.5	CCR	G	N	10/8/2019	0904	2		X		
4	BRF-CCR-TW14-31.5/33.5-20191008	TW14	31.5	33.5	CCR	G	N	10/8/2019	0944	3		X		
5	BRF-CCR-TW14-36.5/38.5-20191008	TW14	36.5	38.5	CCR	G	N	10/8/2019	1037	2		X		
6	BRF-CCR-TW14-41.0/44.0-20191008	TW14	41.0	44.0	CCR	G	N	10/8/2019	1125	2	CEC sample	X		
7	BRF-CCR-TW14-47.0/49.0-20191008	TW14	47.0	49.0	CCR	G	N	10/8/2019	1342	2		X		
8	BRF-CCR-TW14-51.5/53.5-20191008	TW14	51.5	53.5	CCR	G	N	10/8/2019	1425	2		X		
9	BRF-CCR-TW14-56.5/58.5-20191008	TW14	56.5	58.5	CCR	G	N	10/8/2019	1504	2		X		
10	BRF-CCR-TW14-61.5/63.5-20191008	TW14	61.5	63.5	CCR	G	N	10/8/2019	1549	2		X		

Additional Comments/Special Instructions:

Additional volume collected should be used for laboratory duplicate analysis.

SA 10/01/2019

SA 10/08/2019

PREPARED BY - AFFILIATION	DATE	TIME	ACCEPTED BY - AFFILIATION	DATE	TIME	Sample Receipt Conditions					
Suzana Bolden (Slantec)	10/08/2019	1730	[Signature]	10/11/2019	9:00	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
	SA 10/08/2019					<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	SA 10/08/2019					<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	SA 10/08/2019					<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	SA 10/08/2019					<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	SA 10/08/2019					<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No

SHIPPER METHOD	SAMPLER NAME AND SIGNATURE	Temperature in °C	Samples on Ice?	Sample Intact?	Trip Blank?
Carrier	Suzana Bolden Matthew Edmunds				

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1/12/2019

TVA Environmental Investigations



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.: 3 of 4
 COC No: BRF CCR 20191008 1B
 1 of 1 Pages
 Task Desc: BRF_CCR

Required Ship to Lab:		Required Project Information:		Required Sampler Information:	
Lab Name:	TesAmerica Pittsburgh	Site ID #:	Bull Run Fossil Plant	Sampler:	S. Bolden, & M. Edmunds
Lab Address:	301 Alpha Drive Pittsburgh, PA 15238	Project #:	18018824	Sampling Company:	Stanlec
Lab Manager Contact Information:		Site Address:	1285 Edgemoor Road	Address:	Warehouse Row North 1110 Market Street
Lab PM:	Gail Lage	City:	Clinton TN, 37718	City/State:	Chattanooga TN, 37401
Phone/Fax:	815-301-5741/615-726-3404	Site PM Name:	Roy Quinn	Phone:	(432) 320-1421
Lab Email:	Gail.Lage@tesamericainc.com	Phone/Fax:	423-751-3753	Sampling Team Number:	1
		Site PM Email:	roy.quinn@stanlec.com	Send EDD/Hard Copy to:	Do not duplicate CCR data

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

ITDAS #	SAMPLE ID Samples IDs MUST BE UNIQUE	SAMPLE LOCATION	Sample Depth		MATRIX CODE	G= GRAB C=COMP	SAMPLE TYPE	SAMPLE DATE	SAMPLE TIME	# OF CONTAINERS	Comments/ Lab Sample I.D.	MSASD
			Start Depth	Select Unit								
1	BRF-CCR-FB04-20191008	TW14	NA	NA	AQ	G	FB	10/8/2019	0814	3		
2	BRF-CCR-TW14-21.0/24.0-20191008	TW14	21.0	24.0	CCR	G	N	10/8/2019	0835	2	CEC sample	
3	BRF-CCR-TW14-26.5/28.5-20191008	TW14	26.5	28.5	CCR	G	N	10/8/2019	0904	2		
4	BRF-CCR-TW14-31.5/33.5-20191008	TW14	31.5	33.5	CCR	G	N	10/8/2019	0944	3		
5	BRF-CCR-TW14-36.5/38.5-20191008	TW14	36.5	38.5	CCR	G	N	10/8/2019	1037	2		
6	BRF-CCR-TW14-41.0/44.0-20191008	TW14	41.0	44.0	CCR	G	N	10/8/2019	1125	2	CEC sample	
7	BRF-CCR-TW14-47.0/49.0-20191008	TW14	47.0	49.0	CCR	G	N	10/8/2019	1342	2		
8	BRF-CCR-TW14-51.5/53.5-20191008	TW14	51.5	53.5	CCR	G	N	10/8/2019	1425	2		
9	BRF-CCR-TW14-56.5/58.5-20191008	TW14	56.5	58.5	CCR	G	N	10/8/2019	1504	2		
10	BRF-CCR-TW14-61.5/63.5-20191008	TW14	61.5	63.5	CCR	G	N	10/8/2019	1549	2		

Problem	
CCO MATERIALS	
CCO MATERIALS BUSINESS	
CCO MATERIALS BUSINESS	

Additional Comments/Special Instructions:
 Additional volume collected should be used for laboratory duplicate analysis.
 58 10/09/2019

RECEIVED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Suzana Bolden (Stanlec)	10/08/2019	1730			
	58 10/08/2019				
	58 10/09/2019				
	58 10/09/2019				

Sample Receipt Conditions			
Temp	<input type="checkbox"/> Yes <input type="checkbox"/> No	Temp	<input type="checkbox"/> Yes <input type="checkbox"/> No
Temp	<input type="checkbox"/> Yes <input type="checkbox"/> No	Temp	<input type="checkbox"/> Yes <input type="checkbox"/> No
Temp	<input type="checkbox"/> Yes <input type="checkbox"/> No	Temp	<input type="checkbox"/> Yes <input type="checkbox"/> No
Temp	<input type="checkbox"/> Yes <input type="checkbox"/> No	Temp	<input type="checkbox"/> Yes <input type="checkbox"/> No
Temp	<input type="checkbox"/> Yes <input type="checkbox"/> No	Temp	<input type="checkbox"/> Yes <input type="checkbox"/> No

SHIPPER METHOD: Courier
 SAMPLER NAME AND SIGNATURE: Suzana Bolden, Matthew Edmunds



180-97022 Chain of Custody

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11/20/2019



180-97022 Waybill

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
196537

669872
THE LEADER IN ENVIRONMENTAL TESTING

10-08-19
Daw M

ORIG
DATE
TEST
581

UNITED STATES US
BICL RECIPIENT

TO **SAMPLE RECEIVING**
EUROFINS TESTAMERICA
301 ALPHA DR RIDC PARK

PITTSBURGH PA 15238

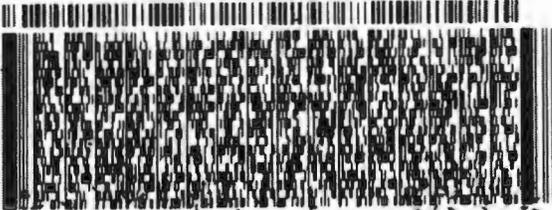
(412) 968-7068
REF: DEPT:

Custody Seal

DATE

SIGNATURE

10/8/2019
DB



REL# 3788348

1 of 4
TRK# 8120 5914 9207
MASTER #

WED - 09 OCT 3:00
STANDARD OVERNIGHT

NA AGCA

PA-1523

Uncorrected temp
Thermometer ID

31.4 °C
10
B

CF 0 Initials

PT-WI-SR-001 effective 11/8/18



669872

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Custody Seal

DATE 10/08/19
SIGNATURE [Signature]

10-08-19
Dan [Signature]

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
196538

KNOXVILLE, TN 37821
UNITED STATES US

BILL RECIPIENT

SAMPLE RECEIVING
EUROFINS TESTAMERICA
301 ALPHA DR RIDGE PARK

PITTSBURGH PA 15238

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
669874



FedEx
Express
E
RELN
3786948

Custody Seal

DATE 10/08/19
SIGNATURE [Signature]

3 of 4
MPS# 7766 1292 2437
0681
Metr# 8120 5014 9207
0215
WED - 09 OCT 3:00
STANDARD OVERNIGHT
AH
1523
PA-US PI

NA AGCA

Uncorrected temp
Thermometer ID

21.2
10 °C

CF 0 Initials [Signature]

PT-WI-SR-001 effective 11/8/18



TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
669875

669874
TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

669876

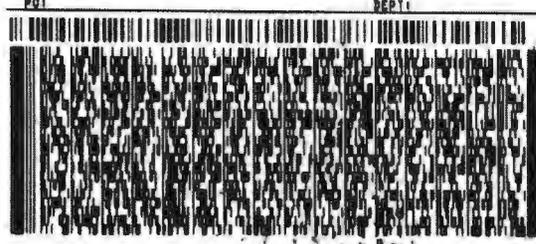
TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Signature *CF*
Date *10/8/19*
Custody Seal

TESTAMERICA KNOX LAB
6816 MIDDLEBROOK LAB
KNOXVILLE, TN 37921
UNITED STATES US
DIMBT 24X19X30
BILL RECEIPT

TO SAMPLE RECEIVING
EUROFINS TESTAMERICA
301 ALPHA DR RIDC PARK
PITTSBURGH PA 15238

(412) 969-7058 REF:



FedEx
Express
E
REL# 3786346

DATE *10/8/2019*
SIGNATURE *CF*

Custody Seal

4 of 4
MPS# 7766 1292 2448
Met# 8120 5914 9207

WED - 09 OCT 3:00P
STANDARD OVERNIGHT

NA AGCA

AHS
15238
PA-US PIT

Uncorrected temp *2.6* °C
Thermometer ID *10*

CF *CF* Initials *CF*

PT-WI-SR-001 effective 11/8/18



TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
669876
ENVIRONMENTAL TESTING
876

878699
THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica

Custody Seal



DATE 10/8/19
SIGNATURE CP

PITTSBURGH
PA
15238
US - UNITED STATES
4128837058

THE LEADER IN ENVIRONMENTAL TESTING

669879

FedEx
MPS# 0263 7766 1292 2426

10:30A
PRIORITY OVERNIGHT

NA AGCA

15238
PA-US
PIT

Uncorrected temp 3.7 °C
Thermometer ID W
CF 6 Initials JB
PT-WI-SR-001 effective 11/8/18



Custody Seal

DATE 10/8/19
SIGNATURE SB

97
1 15:00 A
2426
AS INDIC 10.10

Refrigerated
2 to 8°C
Frozen
-20 to -25°C

THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica
669879

Login Sample Receipt Checklist

Client: Environmental Standards Inc.

Job Number: 180-97022-1

Login Number: 97022

List Number: 1

Creator: Say, Thomas C

List Source: Eurofins TestAmerica, Pittsburgh

Question	Answer	Comment
Radioactivity wasn't checked or is \leq 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?	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 $<6\text{mm}$ (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: 180-97022-1

Login Number: 97022
List Number: 2
Creator: Say, Thomas C

List Source: Eurofins TestAmerica, Pittsburgh

Question	Answer	Comment
Radioactivity wasn't checked or is \neq 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?	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 <math><6\text{mm}</math> (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: 180-97022-1

Login Number: 97022
List Number: 3
Creator: Harris, Lorin C

List Source: Eurofins TestAmerica, St. Louis
List Creation: 10/12/19 02:29 PM

Question	Answer	Comment
Radioactivity wasn't checked or is \leq 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.	False	
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 <math><6\text{mm}</math> (1/4").	N/A	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



Login Sample Receipt Checklist

Client: Environmental Standards Inc.

Job Number: 180-97022-1

Login Number: 97022

List Number: 4

Creator: Harris, Lorin C

List Source: Eurofins TestAmerica, St. Louis

List Creation: 10/12/19 02:45 PM

Question	Answer	Comment
Radioactivity wasn't checked or is \leq 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.	False	
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 $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

