ENVIRONMENTAL STANDARDS
Setting the Standards for Innovative Environmental Solutions

Data Validation Report
Tennessee Valley Authority
Watts Bar Fossil Plant
Environmental Investigation Plan
Surface Stream Samples
Chain-of-Custody Number: WBF_STR_20191106_1B

This quality assurance (QA) review is based upon an examination of the data generated from the analyses of the twenty-three aqueous samples and two aqueous blanks collected on November 6, 2019, at the Tennessee Valley Authority (TVA) Watts Bar Fossil Plant facility. These samples were collectively analyzed by Eurofins TestAmerica, of St. Louis, Missouri, for total radium-226 by US EPA Method 903.0 and for total 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 Bar 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 methods 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 methods 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 180-98513-1.

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

Sample Identification	Laboratory Sample Identification	Job Number	Matrix	Date Sample Collected	Parameters Examined
WBF-STR-FB01-20191106 (Field Blank)	180-98513-1	180-98513-1	Aq	11/6/19	Ra-226, Ra-228, Ra-226/228
WBF-STR-EB01-20191106 (Equipment Blank)	180-98513-2	180-98513-1	Aq	11/6/19	Ra-226, Ra-228, Ra-226/228
WBF-STR-TR06-LB-SUR-20191106	180-98513-4	180-98513-1	Aq	11/6/19	Ra-226, Ra-228, Ra-226/228
WBF-STR-TR06-LB-BOT-20191106	180-98513-5	180-98513-1	Aq	11/6/19	Ra-226, Ra-228, Ra-226/228
WBF-STR-TR06-CC-SUR-20191106	180-98513-6	180-98513-1	Aq	11/6/19	Ra-226, Ra-228, Ra-226/228
WBF-STR-TR06-CC-MID-20191106	180-98513-7	180-98513-1	Aq	11/6/19	Ra-226, Ra-228, Ra-226/228
WBF-STR-TR06-CC-BOT-20191106	180-98513-8	180-98513-1	Aq	11/6/19	Ra-226, Ra-228, Ra-226/228
WBF-STR-TR06-RB-SUR-20191106	180-98513-9	180-98513-1	Aq	11/6/19	Ra-226, Ra-228, Ra-226/228
WBF-STR-TR06-RB-MID-20191106	180-98513-10	180-98513-1	Aq	11/6/19	Ra-226, Ra-228, Ra-226/228
WBF-STR-TR06-RB-BOT-20191106	180-98513-11	180-98513-1	Aq	11/6/19	Ra-226, Ra-228, Ra-226/228
WBF-STR-TR05-RB-SUR-20191106	180-98513-12	180-98513-1	Aq	11/6/19	Ra-226, Ra-228, Ra-226/228
WBF-STR-TR05-RB-BOT-20191106	180-98513-13	180-98513-1	Aq	11/6/19	Ra-226, Ra-228, Ra-226/228
WBF-STR-TR05-CC-SUR-20191106	180-98513-14	180-98513-1	Aq	11/6/19	Ra-226, Ra-228, Ra-226/228
WBF-STR-TR05-CC-MID-20191106	180-98513-15	180-98513-1	Aq	11/6/19	Ra-226, Ra-228, Ra-226/228
WBF-STR-TR05-CC-BOT-20191106	180-98513-16	180-98513-1	Aq	11/6/19	Ra-226, Ra-228, Ra-226/228
WBF-STR-TR05-LB-SUR-20191106	180-98513-17	180-98513-1	Aq	11/6/19	Ra-226, Ra-228, Ra-226/228
WBF-STR-TR05-LB-BOT-20191106	180-98513-18	180-98513-1	Aq	11/6/19	Ra-226, Ra-228, Ra-226/228
WBF-STR-TR04-LB-SUR-20191106	180-98513-19	180-98513-1	Aq	11/6/19	Ra-226, Ra-228, Ra-226/228

Sample Identification	Laboratory Sample Identification	Job Number	Matrix	Date Sample Collected	Parameters Examined
WBF-STR-TR04-LB-BOT-20191106	180-98513-20	180-98513-1	Aq	11/6/19	Ra-226, Ra-228, Ra-226/228
WBF-STR-TR04-CC-SUR-20191106	180-98513-21	180-98513-1	Aq	11/6/19	Ra-226, Ra-228, Ra-226/228
WBF-STR-TR04-CC-MID-20191106	180-98513-22	180-98513-1	Aq	11/6/19	Ra-226, Ra-228, Ra-226/228
WBF-STR-TR04-CC-BOT-20191106	180-98513-23	180-98513-1	Aq	11/6/19	Ra-226, Ra-228, Ra-226/228
WBF-STR-TR04-RB-MID-20191106	180-98513-24	180-98513-1	Aq	11/6/19	Ra-226, Ra-228, Ra-226/228
WBF-STR-DUP01-20191106 (Field Duplicate of WBF-STR-TR04-LB-SUR-20191106)	180-98513-25	180-98513-1	Aq	11/6/19	Ra-226, Ra-228, Ra-226/228
WBF-STR-DUP02-20191106 (Field Duplicate of WBF-STR-TR04-RB-MID-20191106)	180-98513-26	180-98513-1	Aq	11/6/19	Ra-226, Ra-228, Ra-226/228

Parameters Examined

Ra-226 - Total Radium-226 by US EPA Method 903.0.
Ra-228 - Total Radium-228 by US EPA Method 904.
Ra-226/228 - Radium-226/228 Calculation by US EPA Method 903.0/US EPA Method 904.0.
Aq - Aqueous.

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

Comments and Exceptions

- 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.

- During data inquiries with Eurofins TestAmerica, it was discovered that the calibration coefficients associated with the radium-226 efficiency curves for detectors blue 19, 20, and 21 were incorrectly entered into the laboratory information management system (LIMS); consequently, the radium-226 activity, uncertainty, and MDC values were proportionally impacted by the incorrect calculation applied to samples analyzed using the impacted detectors. The error resulted in a maximum ± 4% difference between the originally reported values and the corrected values calculated by Eurofins TestAmerica St. Louis. Data usability was not impacted by this issue; therefore, qualification of data was not warranted. (see Project Correspondence [Section 5]).

Qualifier Summary

After thorough data review, qualification of the data was not warranted.

Review performed by: Danielle Coles, Quality Assurance Chemist
Review reviewed by: Ammie L. Martin, 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: 4/28/20

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 QL.
S	Radium-226+228 flagged due to reporting protocol for combined results.
SD	Serial Dilution imprecision.
T	Temperature preservation issue.
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: Watts Bar Fossil Plant
SDG: 180985131

Lab Sample ID	180-98513-1
Sys Sample Code	WBF-STR-FB01-20191106
Sample Name	WBF-STR-FB01-20191106
Sample Date	11/6/2019 10:15:00 AM
Location	
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
CALC	Radium 226 + radium 228	RA226/228	T	PCI/L	0.0928	U	S	0.339				N	Yes	1	NA
EPA 903.0	Radium-226	13982-63-3	T	PCI/L	-0.0564	U		0.0550	0.140	0.140	1.00	N	Yes	1	NA
EPA 904.0	Radium 228	15262-20-1	T	PCI/L	0.0928	U		0.335	0.581	0.581	1.00	N	Yes	1	NA

TVA CCR Program
Facility: Watts Bar Fossil Plant
SDG: 180985131

Lab Sample ID	180-98513-10
Sys Sample Code	WBF-STR-TR06-RB-MID-20191106
Sample Name	WBF-STR-TR06-RB-MID-20191106
Sample Date	11/6/2019 12:40:00 PM
Location	TR06
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	T	PCI/L	0.0129	U	S	0.288				N	Yes	1	NA
EPA 903.0	Radium-226	13982-63-3	T	PCI/L	0.0129	U		0.0884	0.167	0.167	1.00	N	Yes	1	NA
EPA 904.0	Radium 228	15262-20-1	T	PCI/L	-0.0870	U		0.274	0.514	0.514	1.00	N	Yes	1	NA

TVA CCR Program
Facility: Watts Bar Fossil Plant
SDG: 180985131

Lab Sample ID	180-98513-11
Sys Sample Code	WBF-STR-TR06-RB-BOT-20191106
Sample Name	WBF-STR-TR06-RB-BOT-20191106
Sample Date	11/6/2019 12:45:00 PM
Location	TR06
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	T	PCI/L	0.000	U	S	0.367				N	Yes	1	NA
EPA 903.0	Radium-226	13982-63-3	T	PCI/L	-0.0520	U		0.0755	0.171	0.171	1.00	N	Yes	1	NA
EPA 904.0	Radium 228	15262-20-1	T	PCI/L	-0.194	U		0.359	0.676	0.676	1.00	N	Yes	1	NA

Lab Sample ID	180-98513-12
Sys Sample Code	WBF-STR-TR05-RB-SUR-20191106
Sample Name	WBF-STR-TR05-RB-SUR-20191106
Sample Date	11/6/2019 1:30:00 PM
Location	TR05
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	T	PCI/L	0.370	U	S	0.495				N	Yes	1	NA
EPA 903.0	Radium-226	13982-63-3	T	PCI/L	-0.0421	U		0.0673	0.152	0.152	1.00	N	Yes	1	NA
EPA 904.0	Radium 228	15262-20-1	T	PCI/L	0.370	U		0.490	0.813	0.813	1.00	N	Yes	1	NA

TVA CCR Program
Facility: Watts Bar Fossil Plant
SDG: 180985131

Lab Sample ID	180-98513-13
Sys Sample Code	WBF-STR-TR05-RB-BOT-20191106
Sample Name	WBF-STR-TR05-RB-BOT-20191106
Sample Date	11/6/2019 1:40:00 PM
Location	TR05
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	T	PCI/L	0.160	U	S	0.426				N	Yes	1	NA
EPA 903.0	Radium-226	13982-63-3	T	PCI/L	-0.0598	U		0.0751	0.174	0.174	1.00	N	Yes	1	NA
EPA 904.0	Radium 228	15262-20-1	T	PCI/L	0.160	U		0.419	0.724	0.724	1.00	N	Yes	1	NA

Lab Sample ID	180-98513-14
Sys Sample Code	WBF-STR-TR05-CC-SUR-20191106
Sample Name	WBF-STR-TR05-CC-SUR-20191106
Sample Date	11/6/2019 2:10:00 PM
Location	TR05
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	T	PCI/L	0.189	U		0.352				N	Yes	1	NA
EPA 903.0	Radium-226	13982-63-3	T	PCI/L	0.115	U		0.102	0.151	0.151	1.00	N	Yes	1	NA
EPA 904.0	Radium 228	15262-20-1	T	PCI/L	0.0737	U		0.337	0.601	0.601	1.00	N	Yes	1	NA

Lab Sample ID	180-98513-15
Sys Sample Code	WBF-STR-TR05-CC-MID-20191106
Sample Name	WBF-STR-TR05-CC-MID-20191106
Sample Date	11/6/2019 2:20:00 PM
Location	TR05
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	T	PCI/L	0.132	U	S	0.273				N	Yes	1	NA
EPA 903.0	Radium-226	13982-63-3	T	PCI/L	-0.0150	U		0.0698	0.147	0.147	1.00	N	Yes	1	NA
EPA 904.0	Radium 228	15262-20-1	T	PCI/L	0.132	U		0.264	0.454	0.454	1.00	N	Yes	1	NA

TVA CCR Program
Facility: Watts Bar Fossil Plant
SDG: 180985131

Lab Sample ID	180-98513-16
Sys Sample Code	WBF-STR-TR05-CC-BOT-20191106
Sample Name	WBF-STR-TR05-CC-BOT-20191106
Sample Date	11/6/2019 2:30:00 PM
Location	TR05
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	T	PCI/L	0.255	U		0.484				N	Yes	1	NA
EPA 903.0	Radium-226	13982-63-3	T	PCI/L	0.0465	U		0.113	0.203	0.203	1.00	N	Yes	1	NA
EPA 904.0	Radium 228	15262-20-1	T	PCI/L	0.208	U		0.471	0.806	0.806	1.00	N	Yes	1	NA

Lab Sample ID	180-98513-17
Sys Sample Code	WBF-STR-TR05-LB-SUR-20191106
Sample Name	WBF-STR-TR05-LB-SUR-20191106
Sample Date	11/6/2019 3:10:00 PM
Location	TR05
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	T	PCI/L	0.000	U	S	0.279				N	Yes	1	NA
EPA 903.0	Radium-226	13982-63-3	T	PCI/L	-0.0637	U		0.0765	0.178	0.178	1.00	N	Yes	1	NA
EPA 904.0	Radium 228	15262-20-1	T	PCI/L	-0.132	U		0.268	0.511	0.511	1.00	N	Yes	1	NA

Lab Sample ID	180-98513-18
Sys Sample Code	WBF-STR-TR05-LB-BOT-20191106
Sample Name	WBF-STR-TR05-LB-BOT-20191106
Sample Date	11/6/2019 3:20:00 PM
Location	TR05
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	T	PCI/L	0.674	U	S	0.657				N	Yes	1	NA
EPA 903.0	Radium-226	13982-63-3	T	PCI/L	-0.0136	U		0.128	0.256	0.256	1.00	N	Yes	1	NA
EPA 904.0	Radium 228	15262-20-1	T	PCI/L	0.674	U		0.644	1.03	1.03	1.03	N	Yes	1	NA

Lab Sample ID	180-98513-19
Sys Sample Code	WBF-STR-TR04-LB-SUR-20191106
Sample Name	WBF-STR-TR04-LB-SUR-20191106
Sample Date	11/6/2019 3:50:00 PM
Location	TR04
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	T	PCI/L	0.000	U	S	0.549				N	Yes	1	NA
EPA 903.0	Radium-226	13982-63-3	T	PCI/L	-0.123	U		0.111	0.271	0.271	1.00	N	Yes	1	NA
EPA 904.0	Radium 228	15262-20-1	T	PCI/L	-0.302	U		0.538	1.02	1.02	1.02	N	Yes	1	NA

TVA CCR Program
Facility: Watts Bar Fossil Plant
SDG: 180985131

Lab Sample ID	180-98513-2
Sys Sample Code	WBF-STR-EB01-20191106
Sample Name	WBF-STR-EB01-20191106
Sample Date	11/6/2019 10:25:00 AM
Location	
Sample Type	EB
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	T	PCI/L	0.589	U	S	0.570				N	Yes	1	NA
EPA 903.0	Radium-226	13982-63-3	T	PCI/L	-0.0929	U		0.0504	0.145	0.145	1.00	N	Yes	1	NA
EPA 904.0	Radium 228	15262-20-1	T	PCI/L	0.589	U		0.568	0.917	0.917	1.00	N	Yes	1	NA

Lab Sample ID	180-98513-20
Sys Sample Code	WBF-STR-TR04-LB-BOT-20191106
Sample Name	WBF-STR-TR04-LB-BOT-20191106
Sample Date	11/6/2019 4:00:00 PM
Location	TR04
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	T	PCI/L	0.271	U		0.400				N	Yes	1	NA
EPA 903.0	Radium-226	13982-63-3	T	PCI/L	0.0221	U		0.0960	0.178	0.178	1.00	N	Yes	1	NA
EPA 904.0	Radium 228	15262-20-1	T	PCI/L	0.249	U		0.388	0.652	0.652	1.00	N	Yes	1	NA

Lab Sample ID	180-98513-21
Sys Sample Code	WBF-STR-TR04-CC-SUR-20191106
Sample Name	WBF-STR-TR04-CC-SUR-20191106
Sample Date	11/6/2019 4:15:00 PM
Location	TR04
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	T	PCI/L	0.242	U		0.341				N	Yes	1	NA
EPA 903.0	Radium-226	13982-63-3	T	PCI/L	0.0273	U		0.0878	0.163	0.163	1.00	N	Yes	1	NA
EPA 904.0	Radium 228	15262-20-1	T	PCI/L	0.214	U		0.329	0.552	0.552	1.00	N	Yes	1	NA

Lab Sample ID	180-98513-22
Sys Sample Code	WBF-STR-TR04-CC-MID-20191106
Sample Name	WBF-STR-TR04-CC-MID-20191106
Sample Date	11/6/2019 4:25:00 PM
Location	TR04
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	T	PCI/L	0.403	U	S	0.366				N	Yes	1	NA
EPA 903.0	Radium-226	13982-63-3	T	PCI/L	-0.0348	U		0.0651	0.144	0.144	1.00	N	Yes	1	NA
EPA 904.0	Radium 228	15262-20-1	T	PCI/L	0.403	U		0.360	0.576	0.576	1.00	N	Yes	1	NA

Lab Sample ID	180-98513-23
Sys Sample Code	WBF-STR-TR04-CC-BOT-20191106
Sample Name	WBF-STR-TR04-CC-BOT-20191106
Sample Date	11/6/2019 4:30:00 PM
Location	TR04
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	T	PCI/L	0.0209	U	S	0.282				N	Yes	1	NA
EPA 903.0	Radium-226	13982-63-3	T	PCI/L	-0.0651	U		0.0627	0.150	0.150	1.00	N	Yes	1	NA
EPA 904.0	Radium 228	15262-20-1	T	PCI/L	0.0209	U		0.275	0.488	0.488	1.00	N	Yes	1	NA

Lab Sample ID	180-98513-24
Sys Sample Code	WBF-STR-TR04-RB-MID-20191106
Sample Name	WBF-STR-TR04-RB-MID-20191106
Sample Date	11/6/2019 4:55:00 PM
Location	TR04
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	T	PCI/L	0.381	U	S	0.332				N	Yes	1	NA
EPA 903.0	Radium-226	13982-63-3	T	PCI/L	-0.0358	U		0.0716	0.154	0.154	1.00	N	Yes	1	NA
EPA 904.0	Radium 228	15262-20-1	T	PCI/L	0.381	U		0.324	0.514	0.514	1.00	N	Yes	1	NA

Lab Sample ID	180-98513-25
Sys Sample Code	WBF-STR-DUP01-20191106
Sample Name	WBF-STR-DUP01-20191106
Sample Date	11/6/2019 12:00:00 AM
Location	TR04
Sample Type	FD
Parent Sample	WBF-STR-TR04-LB-SUR-20191106

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	T	PCI/L	0.434	U	S	0.295				N	Yes	1	NA
EPA 903.0	Radium-226	13982-63-3	T	PCI/L	-0.0445	U		0.0647	0.146	0.146	1.00	N	Yes	1	NA
EPA 904.0	Radium 228	15262-20-1	T	PCI/L	0.434	U		0.288	0.438	0.438	1.00	N	Yes	1	NA

Lab Sample ID	180-98513-26
Sys Sample Code	WBF-STR-DUP03-20191106
Sample Name	WBF-STR-DUP03-20191106
Sample Date	11/6/2019 12:00:00 AM
Location	TR04
Sample Type	FD
Parent Sample	WBF-STR-TR04-RB-MID-20191106

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	T	PCI/L	0.172	U		0.311				N	Yes	1	NA
EPA 903.0	Radium-226	13982-63-3	T	PCI/L	0.00469	U		0.0769	0.148	0.148	1.00	N	Yes	1	NA
EPA 904.0	Radium 228	15262-20-1	T	PCI/L	0.167	U		0.301	0.508	0.508	1.00	N	Yes	1	NA

Lab Sample ID	180-98513-4
Sys Sample Code	WBF-STR-TR06-LB-SUR-20191106
Sample Name	WBF-STR-TR06-LB-SUR-20191106
Sample Date	11/6/2019 10:50:00 AM
Location	TR06
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	T	PCI/L	0.147	U		0.392				N	Yes	1	NA
EPA 903.0	Radium-226	13982-63-3	T	PCI/L	0.0182	U		0.0913	0.171	0.171	1.00	N	Yes	1	NA
EPA 904.0	Radium 228	15262-20-1	T	PCI/L	0.129	U		0.381	0.660	0.660	1.00	N	Yes	1	NA

Lab Sample ID	180-98513-5
Sys Sample Code	WBF-STR-TR06-LB-BOT-20191106
Sample Name	WBF-STR-TR06-LB-BOT-20191106
Sample Date	11/6/2019 11:00:00 AM
Location	TR06
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	T	PCI/L	0.0759	U	S	0.361				N	Yes	1	NA
EPA 903.0	Radium-226	13982-63-3	T	PCI/L	-0.0237	U		0.0838	0.173	0.173	1.00	N	Yes	1	NA
EPA 904.0	Radium 228	15262-20-1	T	PCI/L	0.0759	U		0.351	0.615	0.615	1.00	N	Yes	1	NA

Lab Sample ID	180-98513-6
Sys Sample Code	WBF-STR-TR06-CC-SUR-20191106
Sample Name	WBF-STR-TR06-CC-SUR-20191106
Sample Date	11/6/2019 11:40:00 AM
Location	TR06
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	T	PCI/L	0.407	U	S	0.384				N	Yes	1	NA
EPA 903.0	Radium-226	13982-63-3	T	PCI/L	-0.00673	U		0.110	0.218	0.218	1.00	N	Yes	1	NA
EPA 904.0	Radium 228	15262-20-1	T	PCI/L	0.407	U		0.368	0.587	0.587	1.00	N	Yes	1	NA

Lab Sample ID	180-98513-7
Sys Sample Code	WBF-STR-TR06-CC-MID-20191106
Sample Name	WBF-STR-TR06-CC-MID-20191106
Sample Date	11/6/2019 11:50:00 AM
Location	TR06
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	T	PCI/L	0.0370	U	S	0.320				N	Yes	1	NA
EPA 903.0	Radium-226	13982-63-3	T	PCI/L	-0.0106	U		0.0813	0.167	0.167	1.00	N	Yes	1	NA
EPA 904.0	Radium 228	15262-20-1	T	PCI/L	0.0370	U		0.309	0.548	0.548	1.00	N	Yes	1	NA

Lab Sample ID	180-98513-8
Sys Sample Code	WBF-STR-TR06-CC-BOT-20191106
Sample Name	WBF-STR-TR06-CC-BOT-20191106
Sample Date	11/6/2019 11:55:00 AM
Location	TR06
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	T	PCI/L	0.0669	U	S	0.439				N	Yes	1	NA
EPA 903.0	Radium-226	13982-63-3	T	PCI/L	-0.0731	U		0.0630	0.158	0.158	1.00	N	Yes	1	NA
EPA 904.0	Radium 228	15262-20-1	T	PCI/L	0.0669	U		0.434	0.763	0.763	1.00	N	Yes	1	NA

Lab Sample ID	180-98513-9
Sys Sample Code	WBF-STR-TR06-RB-SUR-20191106
Sample Name	WBF-STR-TR06-RB-SUR-20191106
Sample Date	11/6/2019 12:30:00 PM
Location	TR06
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	T	PCI/L	0.000	U	S	0.319				N	Yes	1	NA
EPA 903.0	Radium-226	13982-63-3	T	PCI/L	-0.0371	U		0.0759	0.163	0.163	1.00	N	Yes	1	NA
EPA 904.0	Radium 228	15262-20-1	T	PCI/L	-0.113	U		0.310	0.573	0.573	1.00	N	Yes	1	NA

SECTION 3

SUPPORTING DOCUMENTATION FOR QUALIFIERS

RADIOLOGICAL ANALYSIS SUPPORT DOCUMENTATION

ESI project name:	WBF EI Implementation QA	Reviewed by:	Danielle Coles
Sample Collection Dates:	11/6/19	Approved by:	ALM
Job Number:	**20198500.A000**	Completion Date:	04/2020
Project Manager:	AP		
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)	180985131	
	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				
	903.0	904.0				903.0	904.0				903.0	904.0			
Holding Times	X	X													
Blank Analysis Results	X	X													
Laboratory Control Standard (LCS)	X	X													
Tracer/Chemical Yield	X	X													
Duplicate Analysis: (X) Field (X) Lab	X	X													
Matrix Spike Results															
Quantitation of Results	X	X													
Detection Limit															
Efficiency/Energy Calibrations	X	X													
Initial Calibration Verifications	X	X													
Annual Calibration Verifications															
Continuing Calibration Checks	X	X													
Continuing Calibration Backgrounds	X	X													
Sample Preservation	X	X													
Condition on Receipt	X	X													
Others:															

Comments: All results are usable unless otherwise qualified.

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: WBF_STR_20191106_1B

Job ID: 180-98513-1

Client Sample ID: WBF-STR-FB01-20191106 ~ NA

Lab Sample ID: 180-98513-1

Date Collected: 11/06/19 10:15

Matrix: Water

Date Received: 11/08/19 09:00

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	-0.0564	U	0.0547	0.0550	1.00	0.140	pCi/L	11/14/19 13:42	11/26/19 11:02	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*87.0*		*40 - 110*	*11/14/19 13:42*	*11/26/19 11:02*	*1*

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.0928	U	0.335	0.335	1.00	0.581	pCi/L	11/14/19 14:19	11/19/19 18:40	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*87.0*		*40 - 110*	*11/14/19 14:19*	*11/19/19 18:40*	*1*
Y Carrier	*67.7*		*40 - 110*	*11/14/19 14:19*	*11/19/19 18:40*	*1*

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	0.0928	U U,S	0.339	0.339	5.00		pCi/L		11/29/19 08:45	1

All ND, no qual

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: WBF_STR_20191106_1B

Job ID: 180-98513-1

Client Sample ID: WBF-STR-EB01-20191106 ~ NA

Lab Sample ID: 180-98513-2

Date Collected: 11/06/19 10:25

Matrix: Water

Date Received: 11/08/19 09:00

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	-0.0929	U	0.0498	0.0504	1.00	0.145	pCi/L	11/14/19 13:42	11/26/19 11:02	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*90.1*		*40 - 110*	*11/14/19 13:42*	*11/26/19 11:02*	*1*

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.589	U	0.566	0.568	1.00	0.917	pCi/L	11/14/19 14:19	11/19/19 18:40	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*90.1*		*40 - 110*	*11/14/19 14:19*	*11/19/19 18:40*	*1*
Y Carrier	*41.9*		*40 - 110*	*11/14/19 14:19*	*11/19/19 18:40*	*1*

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	0.589	U U,S	0.568	0.570	5.00		pCi/L		11/29/19 08:45	1

All ND, no qual

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: WBF_STR_20191106_1B

Job ID: 180-98513-1

Client Sample ID: WBF-STR-TR06-LB-SUR-20191106 ~ STR-TR06

Lab Sample ID: 180-98513-4

Date Collected: 11/06/19 10:50
Date Received: 11/08/19 09:00

Matrix: Water

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0182	U	0.0912	0.0913	1.00	0.171	pCi/L	11/14/19 13:42	11/26/19 11:02	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*83.9*		*40 - 110*	*11/14/19 13:42*	*11/26/19 11:02*	*1*

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.129	U	0.381	0.381	1.00	0.660	pCi/L	11/14/19 14:19	11/19/19 18:40	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*83.9*		*40 - 110*	*11/14/19 14:19*	*11/19/19 18:40*	*1*
Y Carrier	*56.8*		*40 - 110*	*11/14/19 14:19*	*11/19/19 18:40*	*1*

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	0.147	U	0.392	0.392	5.00		pCi/L		11/29/19 08:45	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: WBF_STR_20191106_1B

Job ID: 180-98513-1

Client Sample ID: WBF-STR-TR06-LB-BOT-20191106 ~ STR-TR06

Lab Sample ID: 180-98513-5

Date Collected: 11/06/19 11:00
Date Received: 11/08/19 09:00

Matrix: Water

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	-0.0237	U	0.0838	0.0838	1.00	0.173	pCi/L	11/14/19 13:42	11/26/19 11:02	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*78.2*		*40 - 110*	*11/14/19 13:42*	*11/26/19 11:02*	*1*

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.0759	U	0.351	0.351	1.00	0.615	pCi/L	11/14/19 14:19	11/19/19 18:41	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*78.2*		*40 - 110*	*11/14/19 14:19*	*11/19/19 18:41*	*1*
Y Carrier	*68.4*		*40 - 110*	*11/14/19 14:19*	*11/19/19 18:41*	*1*

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	0.0759	U U,S	0.361	0.361	5.00		pCi/L		11/29/19 08:45	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: WBF_STR_20191106_1B

Job ID: 180-98513-1

Client Sample ID: WBF-STR-TR06-CC-SUR-20191106 ~ STR-TR06

Lab Sample ID: 180-98513-6

Date Collected: 11/06/19 11:40
Date Received: 11/08/19 09:00

Matrix: Water

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	-0.00673	U	0.110	0.110	1.00	0.218	pCi/L	11/14/19 13:42	11/26/19 11:03	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*64.1*		*40 - 110*	*11/14/19 13:42*	*11/26/19 11:03*	*1*

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.407	U	0.366	0.368	1.00	0.587	pCi/L	11/14/19 14:19	11/19/19 18:41	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*64.1*		*40 - 110*	*11/14/19 14:19*	*11/19/19 18:41*	*1*
Y Carrier	*80.4*		*40 - 110*	*11/14/19 14:19*	*11/19/19 18:41*	*1*

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	0.407	U U,S	0.382	0.384	5.00		pCi/L		11/29/19 08:45	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: WBF_STR_20191106_1B

Job ID: 180-98513-1

Client Sample ID: WBF-STR-TR06-CC-MID-20191106 ~ STR-TR06

Lab Sample ID: 180-98513-7

Date Collected: 11/06/19 11:50
Date Received: 11/08/19 09:00

Matrix: Water

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	-0.0106	U	0.0813	0.0813	1.00	0.167	pCi/L	11/14/19 13:42	11/26/19 11:03	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*80.5*		*40 - 110*	*11/14/19 13:42*	*11/26/19 11:03*	*1*

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.0370	U	0.309	0.309	1.00	0.548	pCi/L	11/14/19 14:19	11/19/19 18:41	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*80.5*		*40 - 110*	*11/14/19 14:19*	*11/19/19 18:41*	*1*
Y Carrier	*70.7*		*40 - 110*	*11/14/19 14:19*	*11/19/19 18:41*	*1*

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	0.0370	U U,S	0.320	0.320	5.00		pCi/L		11/29/19 08:45	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: WBF_STR_20191106_1B

Job ID: 180-98513-1

Client Sample ID: WBF-STR-TR06-CC-BOT-20191106 ~ STR-TR06

Lab Sample ID: 180-98513-8

Date Collected: 11/06/19 11:55
Date Received: 11/08/19 09:00

Matrix: Water

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	-0.0731	U	0.0626	0.0630	1.00	0.158	pCi/L	11/14/19 13:42	11/26/19 12:55	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*81.6*		*40 - 110*	*11/14/19 13:42*	*11/26/19 12:55*	*1*

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.0669	U	0.434	0.434	1.00	0.763	pCi/L	11/14/19 14:19	11/19/19 18:41	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*81.6*		*40 - 110*	*11/14/19 14:19*	*11/19/19 18:41*	*1*
Y Carrier	*55.3*		*40 - 110*	*11/14/19 14:19*	*11/19/19 18:41*	*1*

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	0.0669	U U,S	0.438	0.439	5.00		pCi/L		11/29/19 08:45	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: WBF_STR_20191106_1B

Job ID: 180-98513-1

Client Sample ID: WBF-STR-TR06-RB-SUR-20191106 ~ STR-TR06

Lab Sample ID: 180-98513-9

Date Collected: 11/06/19 12:30
Date Received: 11/08/19 09:00

Matrix: Water

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	-0.0371	U	0.0758	0.0759	1.00	0.163	pCi/L	11/14/19 13:42	11/26/19 12:56	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*86.7*		*40 - 110*	*11/14/19 13:42*	*11/26/19 12:56*	*1*

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	-0.113	U	0.310	0.310	1.00	0.573	pCi/L	11/14/19 14:19	11/19/19 18:41	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*86.7*		*40 - 110*	*11/14/19 14:19*	*11/19/19 18:41*	*1*
Y Carrier	*66.9*		*40 - 110*	*11/14/19 14:19*	*11/19/19 18:41*	*1*

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	0.000	U U,S	0.319	0.319	5.00		pCi/L		11/29/19 08:45	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: WBF_STR_20191106_1B

Job ID: 180-98513-1

Client Sample ID: WBF-STR-TR06-RB-MID-20191106 ~ STR-TR06

Lab Sample ID: 180-98513-10

Date Collected: 11/06/19 12:40
Date Received: 11/08/19 09:00

Matrix: Water

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0129	U	0.0884	0.0884	1.00	0.167	pCi/L	11/14/19 13:42	11/26/19 12:56	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*83.9*		*40 - 110*	*11/14/19 13:42*	*11/26/19 12:56*	*1*

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	-0.0870	U	0.274	0.274	1.00	0.514	pCi/L	11/14/19 14:19	11/19/19 18:41	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*83.9*		*40 - 110*	*11/14/19 14:19*	*11/19/19 18:41*	*1*
Y Carrier	*71.4*		*40 - 110*	*11/14/19 14:19*	*11/19/19 18:41*	*1*

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	0.0129	U U,S	0.288	0.288	5.00		pCi/L		11/29/19 08:45	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: WBF_STR_20191106_1B

Job ID: 180-98513-1

Client Sample ID: WBF-STR-TR06-RB-BOT-20191106 ~ STR-TR06

Lab Sample ID: 180-98513-11

Date Collected: 11/06/19 12:45
Date Received: 11/08/19 09:00

Matrix: Water

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	-0.0520	U	0.0754	0.0755	1.00	0.171	pCi/L	11/14/19 13:42	11/26/19 12:56	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*79.7*		*40 - 110*	*11/14/19 13:42*	*11/26/19 12:56*	*1*

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	-0.194	U	0.358	0.359	1.00	0.676	pCi/L	11/14/19 14:19	11/19/19 18:41	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*79.7*		*40 - 110*	*11/14/19 14:19*	*11/19/19 18:41*	*1*
Y Carrier	*60.9*		*40 - 110*	*11/14/19 14:19*	*11/19/19 18:41*	*1*

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	0.000	U U,S	0.366	0.367	5.00		pCi/L		11/29/19 08:45	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: WBF_STR_20191106_1B

Job ID: 180-98513-1

Client Sample ID: WBF-STR-TR05-RB-SUR-20191106 ~ STR-TR05

Lab Sample ID: 180-98513-12

Date Collected: 11/06/19 13:30
Date Received: 11/08/19 09:00

Matrix: Water

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	-0.0421	U	0.0672	0.0673	1.00	0.152	pCi/L	11/14/19 13:42	11/26/19 12:56	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*86.2*		*40 - 110*	*11/14/19 13:42*	*11/26/19 12:56*	*1*

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.370	U	0.489	0.490	1.00	0.813	pCi/L	11/14/19 14:19	11/19/19 18:42	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*86.2*		*40 - 110*	*11/14/19 14:19*	*11/19/19 18:42*	*1*
Y Carrier	*52.0*		*40 - 110*	*11/14/19 14:19*	*11/19/19 18:42*	*1*

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	0.370	U U,S	0.494	0.495	5.00		pCi/L		11/29/19 08:45	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: WBF_STR_20191106_1B

Job ID: 180-98513-1

Client Sample ID: WBF-STR-TR05-RB-BOT-20191106 ~ STR-TR05

Lab Sample ID: 180-98513-13

Date Collected: 11/06/19 13:40
Date Received: 11/08/19 09:00

Matrix: Water

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	-0.0598	U	0.0749	0.0751	1.00	0.174	pCi/L	11/14/19 13:42	11/26/19 12:56	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*77.1*		*40 - 110*	*11/14/19 13:42*	*11/26/19 12:56*	*1*

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.160	U	0.419	0.419	1.00	0.724	pCi/L	11/14/19 14:19	11/19/19 18:44	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*77.1*		*40 - 110*	*11/14/19 14:19*	*11/19/19 18:44*	*1*
Y Carrier	*55.3*		*40 - 110*	*11/14/19 14:19*	*11/19/19 18:44*	*1*

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	0.160	U U,S	0.426	0.426	5.00		pCi/L		11/29/19 08:45	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: WBF_STR_20191106_1B

Job ID: 180-98513-1

Client Sample ID: WBF-STR-TR05-CC-SUR-20191106 ~ STR-TR05

Lab Sample ID: 180-98513-14

Date Collected: 11/06/19 14:10
Date Received: 11/08/19 09:00

Matrix: Water

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.115	U	0.101	0.102	1.00	0.151	pCi/L	11/14/19 13:42	11/26/19 12:56	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*61.9*		*40 - 110*	*11/14/19 13:42*	*11/26/19 12:56*	*1*

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.0737	U	0.337	0.337	1.00	0.601	pCi/L	11/14/19 14:19	11/19/19 18:44	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*61.9*		*40 - 110*	*11/14/19 14:19*	*11/19/19 18:44*	*1*
Y Carrier	*71.0*		*40 - 110*	*11/14/19 14:19*	*11/19/19 18:44*	*1*

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	0.189	U	0.352	0.352	5.00		pCi/L		11/29/19 08:45	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: WBF_STR_20191106_1B

Job ID: 180-98513-1

Client Sample ID: WBF-STR-TR05-CC-MID-20191106 ~ STR-TR05

Lab Sample ID: 180-98513-15

Date Collected: 11/06/19 14:20
Date Received: 11/08/19 09:00

Matrix: Water

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	-0.0150	U	0.0698	0.0698	1.00	0.147	pCi/L	11/14/19 13:42	11/26/19 12:56	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*81.6*		*40 - 110*	*11/14/19 13:42*	*11/26/19 12:56*	*1*

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.132	U	0.264	0.264	1.00	0.454	pCi/L	11/14/19 14:19	11/19/19 18:44	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*81.6*		*40 - 110*	*11/14/19 14:19*	*11/19/19 18:44*	*1*
Y Carrier	*71.4*		*40 - 110*	*11/14/19 14:19*	*11/19/19 18:44*	*1*

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	0.132	U U,S	0.273	0.273	5.00		pCi/L		11/29/19 08:45	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: WBF_STR_20191106_1B

Job ID: 180-98513-1

Client Sample ID: WBF-STR-TR05-CC-BOT-20191106 ~ STR-TR05

Lab Sample ID: 180-98513-16

Date Collected: 11/06/19 14:30
Date Received: 11/08/19 09:00

Matrix: Water

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0465	U	0.113	0.113	1.00	0.203	pCi/L	11/14/19 13:42	11/26/19 12:56	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*60.2*		*40 - 110*	*11/14/19 13:42*	*11/26/19 12:56*	*1*

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.208	U	0.471	0.471	1.00	0.806	pCi/L	11/14/19 14:19	11/19/19 18:44	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*60.2*		*40 - 110*	*11/14/19 14:19*	*11/19/19 18:44*	*1*
Y Carrier	*71.4*		*40 - 110*	*11/14/19 14:19*	*11/19/19 18:44*	*1*

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	0.255	U	0.484	0.484	5.00		pCi/L		11/29/19 08:45	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: WBF_STR_20191106_1B

Job ID: 180-98513-1

Client Sample ID: WBF-STR-TR05-LB-SUR-20191106 ~ STR-TR05

Lab Sample ID: 180-98513-17

Date Collected: 11/06/19 15:10
Date Received: 11/08/19 09:00

Matrix: Water

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	-0.0637	U	0.0763	0.0765	1.00	0.178	pCi/L	11/14/19 13:42	11/26/19 12:57	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*81.1*		*40 - 110*	*11/14/19 13:42*	*11/26/19 12:57*	*1*

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	-0.132	U	0.268	0.268	1.00	0.511	pCi/L	11/14/19 14:19	11/19/19 18:44	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*81.1*		*40 - 110*	*11/14/19 14:19*	*11/19/19 18:44*	*1*
Y Carrier	*71.8*		*40 - 110*	*11/14/19 14:19*	*11/19/19 18:44*	*1*

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	0.000	U U,S	0.279	0.279	5.00		pCi/L		11/29/19 08:45	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: WBF_STR_20191106_1B

Job ID: 180-98513-1

Client Sample ID: WBF-STR-TR05-LB-BOT-20191106 ~ STR-TR05

Lab Sample ID: 180-98513-18

Date Collected: 11/06/19 15:20
Date Received: 11/08/19 09:00

Matrix: Water

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	-0.0136	U	0.128	0.128	1.00	0.256	pCi/L	11/14/19 13:42	11/26/19 12:57	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*52.3*		*40 - 110*	*11/14/19 13:42*	*11/26/19 12:57*	*1*

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.674	U G	0.641	0.644	1.00	1.03	pCi/L	11/14/19 14:19	11/19/19 18:44	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*52.3*		*40 - 110*	*11/14/19 14:19*	*11/19/19 18:44*	*1*
Y Carrier	*55.0*		*40 - 110*	*11/14/19 14:19*	*11/19/19 18:44*	*1*

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	0.674	U U,S	0.654	0.657	5.00		pCi/L		11/29/19 08:45	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: WBF_STR_20191106_1B

Job ID: 180-98513-1

Client Sample ID: WBF-STR-TR04-LB-SUR-20191106 ~ STR-TR04

Lab Sample ID: 180-98513-19

Date Collected: 11/06/19 15:50
Date Received: 11/08/19 09:00

Matrix: Water

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	-0.123	U	0.111	0.111	1.00	0.271	pCi/L	11/14/19 13:42	11/26/19 12:57	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*46.6*		*40 - 110*	*11/14/19 13:42*	*11/26/19 12:57*	*1*

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	-0.302	U G	0.537	0.538	1.00	1.02	pCi/L	11/14/19 14:19	11/19/19 18:45	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*46.6*		*40 - 110*	*11/14/19 14:19*	*11/19/19 18:45*	*1*
Y Carrier	*66.9*		*40 - 110*	*11/14/19 14:19*	*11/19/19 18:45*	*1*

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	0.000	U U,S	0.548	0.549	5.00		pCi/L		11/29/19 08:45	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: WBF_STR_20191106_1B

Job ID: 180-98513-1

Client Sample ID: WBF-STR-TR04-LB-BOT-20191106 ~ STR-TR04

Lab Sample ID: 180-98513-20

Date Collected: 11/06/19 16:00
Date Received: 11/08/19 09:00

Matrix: Water

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0221	U	0.0960	0.0960	1.00	0.178	pCi/L	11/14/19 13:42	11/26/19 12:57	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*79.9*		*40 - 110*	*11/14/19 13:42*	*11/26/19 12:57*	*1*

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.249	U	0.387	0.388	1.00	0.652	pCi/L	11/14/19 14:19	11/19/19 18:45	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*79.9*		*40 - 110*	*11/14/19 14:19*	*11/19/19 18:45*	*1*
Y Carrier	*58.7*		*40 - 110*	*11/14/19 14:19*	*11/19/19 18:45*	*1*

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	0.271	U	0.399	0.400	5.00		pCi/L		11/29/19 08:45	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: WBF_STR_20191106_1B

Job ID: 180-98513-1

Client Sample ID: WBF-STR-TR04-CC-SUR-20191106 ~ STR-TR04

Lab Sample ID: 180-98513-21

Date Collected: 11/06/19 16:15
Date Received: 11/08/19 09:00

Matrix: Water

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0273	U	0.0878	0.0878	1.00	0.163	pCi/L	11/14/19 13:42	11/26/19 12:57	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*82.5*		*40 - 110*	*11/14/19 13:42*	*11/26/19 12:57*	*1*

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.214	U	0.329	0.329	1.00	0.552	pCi/L	11/14/19 14:19	11/19/19 18:45	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*82.5*		*40 - 110*	*11/14/19 14:19*	*11/19/19 18:45*	*1*
Y Carrier	*71.8*		*40 - 110*	*11/14/19 14:19*	*11/19/19 18:45*	*1*

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	0.242	U	0.341	0.341	5.00		pCi/L		11/29/19 08:45	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: WBF_STR_20191106_1B

Job ID: 180-98513-1

Client Sample ID: WBF-STR-TR04-CC-MID-20191106 ~ STR-TR04

Lab Sample ID: 180-98513-22

Date Collected: 11/06/19 16:25
Date Received: 11/08/19 09:00

Matrix: Water

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	-0.0348	U	0.0650	0.0651	1.00	0.144	pCi/L	11/14/19 07:44	11/27/19 18:37	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*84.2*		*40 - 110*	*11/14/19 07:44*	*11/27/19 18:37*	*1*

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.403	U	0.358	0.360	1.00	0.576	pCi/L	11/14/19 07:58	11/19/19 12:35	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*84.2*		*40 - 110*	*11/14/19 07:58*	*11/19/19 12:35*	*1*
Y Carrier	*72.1*		*40 - 110*	*11/14/19 07:58*	*11/19/19 12:35*	*1*

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	0.403	U U,S	0.364	0.366	5.00		pCi/L		12/02/19 10:41	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: WBF_STR_20191106_1B

Job ID: 180-98513-1

Client Sample ID: WBF-STR-TR04-CC-BOT-20191106 ~ STR-TR04

Lab Sample ID: 180-98513-23

Date Collected: 11/06/19 16:30
Date Received: 11/08/19 09:00

Matrix: Water

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	-0.0651	U	0.0624	0.0627	1.00	0.150	pCi/L	11/14/19 07:44	11/27/19 09:45	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*89.6*		*40 - 110*	*11/14/19 07:44*	*11/27/19 09:45*	*1*

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.0209	U	0.275	0.275	1.00	0.488	pCi/L	11/14/19 07:58	11/19/19 12:36	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*89.6*		*40 - 110*	*11/14/19 07:58*	*11/19/19 12:36*	*1*
Y Carrier	*76.3*		*40 - 110*	*11/14/19 07:58*	*11/19/19 12:36*	*1*

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	0.0209	U U,S	0.282	0.282	5.00		pCi/L		12/02/19 10:41	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: WBF_STR_20191106_1B

Job ID: 180-98513-1

Client Sample ID: WBF-STR-TR04-RB-MID-20191106 ~ STR-TR04

Lab Sample ID: 180-98513-24

Date Collected: 11/06/19 16:55
Date Received: 11/08/19 09:00

Matrix: Water

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	-0.0358	U	0.0715	0.0716	1.00	0.154	pCi/L	11/14/19 07:44	11/27/19 09:45	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*86.3*		*40 - 110*	*11/14/19 07:44*	*11/27/19 09:45*	*1*

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.381	U	0.322	0.324	1.00	0.514	pCi/L	11/14/19 07:58	11/19/19 12:36	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*86.3*		*40 - 110*	*11/14/19 07:58*	*11/19/19 12:36*	*1*
Y Carrier	*75.9*		*40 - 110*	*11/14/19 07:58*	*11/19/19 12:36*	*1*

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	0.381	U U,S	0.330	0.332	5.00		pCi/L		12/02/19 10:41	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: WBF_STR_20191106_1B

Job ID: 180-98513-1

Client Sample ID: WBF-STR-DUP01-20191106 ~ NA

Lab Sample ID: 180-98513-25

Date Collected: 11/06/19 00:00
Matrix: Water
Date Received: 11/08/19 09:00

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	-0.0445	U	0.0645	0.0647	1.00	0.146	pCi/L	11/14/19 07:44	11/27/19 09:45	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*89.6*		*40 - 110*	*11/14/19 07:44*	*11/27/19 09:45*	*1*

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.434	U	0.285	0.288	1.00	0.438	pCi/L	11/14/19 07:58	11/19/19 12:36	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*89.6*		*40 - 110*	*11/14/19 07:58*	*11/19/19 12:36*	*1*
Y Carrier	*78.5*		*40 - 110*	*11/14/19 07:58*	*11/19/19 12:36*	*1*

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	0.434	U U,S	0.292	0.295	5.00		pCi/L		12/02/19 10:41	1

parent WBF-STR-TR04-LB-SUR-20191106, all results ND

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: WBF_STR_20191106_1B

Job ID: 180-98513-1

Client Sample ID: WBF-STR-DUP03-20191106 ~ NA

Lab Sample ID: 180-98513-26

Date Collected: 11/06/19 00:00
Matrix: Water
Date Received: 11/08/19 09:00

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.00469	U	0.0769	0.0769	1.00	0.148	pCi/L	11/14/19 07:44	11/27/19 09:45	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*88.1*		*40 - 110*	*11/14/19 07:44*	*11/27/19 09:45*	*1*

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.167	U	0.300	0.301	1.00	0.508	pCi/L	11/14/19 07:58	11/19/19 12:36	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*88.1*		*40 - 110*	*11/14/19 07:58*	*11/19/19 12:36*	*1*
Y Carrier	*79.6*		*40 - 110*	*11/14/19 07:58*	*11/19/19 12:36*	*1*

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	0.172	U	0.310	0.311	5.00		pCi/L		12/02/19 10:41	1

parent WBF-STR-TR04-RB-MID-20191106, all ND

SECTION 4

CASE NARRATIVE AND CHAIN-OF-CUSTODY RECORD

Job ID: 180-98513-1

Laboratory: Eurofins TestAmerica, Pittsburgh

Narrative

Job Narrative
180-98513-1

Receipt
The samples were received on 11/8/2019 9:00 AM; the samples arrived in good condition, properly preserved and, , on ice. The temperatures of the 5 coolers at receipt time were 9.6º C, 11.8º C, 11.9º C, 12.4º C and 12.6º C.

RAD
Method 903.0: Radium-226 Prep Batch 160-450462
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.
WBF-STR-FB01-20191106 ~ NA (180-98513-1), WBF-STR-EB01-20191106 ~ NA (180-98513-2), WBF-STR-TR06-LB-SUR-20191106 ~ STR-TR06 (180-98513-4), WBF-STR-TR06-LB-BOT-20191106 ~ STR-TR06 (180-98513-5), WBF-STR-TR06-CC-SUR-20191106 ~ STR-TR06 (180-98513-6), WBF-STR-TR06-CC-MID-20191106 ~ STR-TR06 (180-98513-7), WBF-STR-TR06-CC-BOT-20191106 ~ STR-TR06 (180-98513-8), WBF-STR-TR06-RB-SUR-20191106 ~ STR-TR06 (180-98513-9), WBF-STR-TR06-RB-MID-20191106 ~ STR-TR06 (180-98513-10), WBF-STR-TR06-RB-BOT-20191106 ~ STR-TR06 (180-98513-11), WBF-STR-TR05-RB-SUR-20191106 ~ STR-TR05 (180-98513-12), WBF-STR-TR05-RB-BOT-20191106 ~ STR-TR05 (180-98513-13), WBF-STR-TR05-CC-SUR-20191106 ~ STR-TR05 (180-98513-14), WBF-STR-TR05-CC-MID-20191106 ~ STR-TR05 (180-98513-15), WBF-STR-TR05-CC-BOT-20191106 ~ STR-TR05 (180-98513-16), WBF-STR-TR05-LB-SUR-20191106 ~ STR-TR05 (180-98513-17), WBF-STR-TR05-LB-BOT-20191106 ~ STR-TR05 (180-98513-18), WBF-STR-TR04-LB-SUR-20191106 ~ STR-TR04 (180-98513-19), WBF-STR-TR04-LB-BOT-20191106 ~ STR-TR04 (180-98513-20), WBF-STR-TR04-CC-SUR-20191106 ~ STR-TR04 (180-98513-21), (LCS 160-450462/1-A), (MB 160-450462/23-A) and (180-98513-C-2-A DU)

Method 903.0: Radium-226 Prep Batch 160-450462
Based upon client request, 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.
WBF-STR-FB01-20191106 ~ NA (180-98513-1), WBF-STR-EB01-20191106 ~ NA (180-98513-2), WBF-STR-TR06-LB-SUR-20191106 ~ STR-TR06 (180-98513-4), WBF-STR-TR06-LB-BOT-20191106 ~ STR-TR06 (180-98513-5), WBF-STR-TR06-CC-SUR-20191106 ~ STR-TR06 (180-98513-6), WBF-STR-TR06-CC-MID-20191106 ~ STR-TR06 (180-98513-7), WBF-STR-TR06-CC-BOT-20191106 ~ STR-TR06 (180-98513-8), WBF-STR-TR06-RB-SUR-20191106 ~ STR-TR06 (180-98513-9), WBF-STR-TR06-RB-MID-20191106 ~ STR-TR06 (180-98513-10), WBF-STR-TR06-RB-BOT-20191106 ~ STR-TR06 (180-98513-11), WBF-STR-TR05-RB-SUR-20191106 ~ STR-TR05 (180-98513-12), WBF-STR-TR05-RB-BOT-20191106 ~ STR-TR05 (180-98513-13), WBF-STR-TR05-CC-SUR-20191106 ~ STR-TR05 (180-98513-14), WBF-STR-TR05-CC-MID-20191106 ~ STR-TR05 (180-98513-15), WBF-STR-TR05-CC-BOT-20191106 ~ STR-TR05 (180-98513-16), WBF-STR-TR05-LB-SUR-20191106 ~ STR-TR05 (180-98513-17), WBF-STR-TR05-LB-BOT-20191106 ~ STR-TR05 (180-98513-18), WBF-STR-TR04-LB-SUR-20191106 ~ STR-TR04 (180-98513-19), WBF-STR-TR04-LB-BOT-20191106 ~ STR-TR04 (180-98513-20), WBF-STR-TR04-CC-SUR-20191106 ~ STR-TR04 (180-98513-21), (LCS 160-450462/1-A), (MB 160-450462/23-A) and (180-98513-C-2-A DU)

Method 903.0: Radium-226 Prep Batch 160-450403
Based upon client request, 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.

WBF-STR-TR04-CC-MID-20191106 ~ STR-TR04 (180-98513-22), WBF-STR-TR04-CC-BOT-20191106 ~ STR-TR04 (180-98513-23), WBF-STR-TR04-RB-MID-20191106 ~ STR-TR04 (180-98513-24), WBF-STR-DUP01-20191106 ~ NA (180-98513-25), WBF-STR-DUP03-20191106 ~ NA (180-98513-26), (LCS 160-450403/1-A), (MB 160-450403/8-A) and (180-98513-A-22-A DU)

Method 903.0: Radium-226 prep batch 160-450403
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.

Job ID: 180-98513-1 (Continued)

Laboratory: Eurofins TestAmerica, Pittsburgh (Continued)

WBF-STR-TR04-CC-MID-20191106 ~ STR-TR04 (180-98513-22), WBF-STR-TR04-CC-BOT-20191106 ~ STR-TR04 (180-98513-23), WBF-STR-TR04-RB-MID-20191106 ~ STR-TR04 (180-98513-24), WBF-STR-DUP01-20191106 ~ NA (180-98513-25), WBF-STR-DUP03-20191106 ~ NA (180-98513-26), (LCS 160-450403/1-A), (MB 160-450403/8-A) and (180-98513-A-22-A DU)

Method 903.0: Radium-226 Prep Batch 160-450403
The Method Blank (MB) exhibited a negative result greater in magnitude than the 3 sigma TPU. This occurrence was evaluated and determined to be random in nature. Sporadic occurrences such as this are statistically expected. No further action is required.
WBF-STR-TR04-CC-MID-20191106 ~ STR-TR04 (180-98513-22), WBF-STR-TR04-CC-BOT-20191106 ~ STR-TR04 (180-98513-23), WBF-STR-TR04-RB-MID-20191106 ~ STR-TR04 (180-98513-24), WBF-STR-DUP01-20191106 ~ NA (180-98513-25), WBF-STR-DUP03-20191106 ~ NA (180-98513-26), (LCS 160-450403/1-A), (MB 160-450403/8-A) and (180-98513-A-22-A DU)

okay, no qual

Method 904.0: Radium-228 Prep Batch: 160-450406
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.
WBF-STR-TR04-CC-MID-20191106 ~ STR-TR04 (180-98513-22), WBF-STR-TR04-CC-BOT-20191106 ~ STR-TR04 (180-98513-23), WBF-STR-TR04-RB-MID-20191106 ~ STR-TR04 (180-98513-24), WBF-STR-DUP01-20191106 ~ NA (180-98513-25), WBF-STR-DUP03-20191106 ~ NA (180-98513-26), (LCS 160-450406/1-A), (MB 160-450406/8-A) and (180-98513-A-22-B DU)

Method 904.0: Radium-228 prep batch 160-450465-
The Relative Percent Difference (RPD) is outside of the acceptance limits. The sample and sample duplicate activity are less than the MDC (non-detect). The results are reported with this narrative.
WBF-STR-FB01-20191106 ~ NA (180-98513-1), WBF-STR-EB01-20191106 ~ NA (180-98513-2), WBF-STR-TR06-LB-SUR-20191106 ~ STR-TR06 (180-98513-4), WBF-STR-TR06-LB-BOT-20191106 ~ STR-TR06 (180-98513-5), WBF-STR-TR06-CC-SUR-20191106 ~ STR-TR06 (180-98513-6), WBF-STR-TR06-CC-MID-20191106 ~ STR-TR06 (180-98513-7), WBF-STR-TR06-CC-BOT-20191106 ~ STR-TR06 (180-98513-8), WBF-STR-TR06-RB-SUR-20191106 ~ STR-TR06 (180-98513-9), WBF-STR-TR06-RB-MID-20191106 ~ STR-TR06 (180-98513-10), WBF-STR-TR06-RB-BOT-20191106 ~ STR-TR06 (180-98513-11), WBF-STR-TR05-RB-SUR-20191106 ~ STR-TR05 (180-98513-12), WBF-STR-TR05-RB-BOT-20191106 ~ STR-TR05 (180-98513-13), WBF-STR-TR05-CC-SUR-20191106 ~ STR-TR05 (180-98513-14), WBF-STR-TR05-CC-MID-20191106 ~ STR-TR05 (180-98513-15), WBF-STR-TR05-CC-BOT-20191106 ~ STR-TR05 (180-98513-16), WBF-STR-TR05-LB-SUR-20191106 ~ STR-TR05 (180-98513-17), WBF-STR-TR05-LB-BOT-20191106 ~ STR-TR05 (180-98513-18), WBF-STR-TR04-LB-SUR-20191106 ~ STR-TR04 (180-98513-19), WBF-STR-TR04-LB-BOT-20191106 ~ STR-TR04 (180-98513-20), WBF-STR-TR04-CC-SUR-20191106 ~ STR-TR04 (180-98513-21) and (180-98513-C-2-B DU)

Method 904.0: Radium-228 prep batch 160-450465-
The following samples did not meet the requested limit (RL). The samples have lower carrier recoveries that fall within limits, and the samples are non-detect. The data have been reported with this narrative per client request.
WBF-STR-TR05-LB-BOT-20191106 ~ STR-TR05 (180-98513-18) and WBF-STR-TR04-LB-SUR-20191106 ~ STR-TR04 (180-98513-19)

Method 904.0: Radium-228 prep batch 160-450465-
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.
WBF-STR-FB01-20191106 ~ NA (180-98513-1), WBF-STR-EB01-20191106 ~ NA (180-98513-2), WBF-STR-TR06-LB-SUR-20191106 ~ STR-TR06 (180-98513-4), WBF-STR-TR06-LB-BOT-20191106 ~ STR-TR06 (180-98513-5), WBF-STR-TR06-CC-SUR-20191106 ~ STR-TR06 (180-98513-6), WBF-STR-TR06-CC-MID-20191106 ~ STR-TR06 (180-98513-7), WBF-STR-TR06-CC-BOT-20191106 ~ STR-TR06 (180-98513-8), WBF-STR-TR06-RB-SUR-20191106 ~ STR-TR06 (180-98513-9), WBF-STR-TR06-RB-MID-20191106 ~ STR-TR06 (180-98513-10), WBF-STR-TR06-RB-BOT-20191106 ~ STR-TR06 (180-98513-11), WBF-STR-TR05-RB-SUR-20191106 ~ STR-TR05 (180-98513-12), WBF-STR-TR05-RB-BOT-20191106 ~ STR-TR05 (180-98513-13), WBF-STR-TR05-CC-SUR-20191106 ~ STR-TR05 (180-98513-14), WBF-STR-TR05-CC-MID-20191106 ~ STR-TR05 (180-98513-15), WBF-STR-TR05-CC-BOT-20191106 ~ STR-TR05 (180-98513-16), WBF-STR-TR05-LB-SUR-20191106 ~ STR-TR05 (180-98513-17), WBF-STR-TR05-LB-BOT-20191106 ~ STR-TR05 (180-98513-18), WBF-STR-TR04-LB-SUR-20191106 ~ STR-TR04 (180-98513-19), WBF-STR-TR04-LB-BOT-20191106 ~ STR-TR04 (180-98513-20), WBF-STR-TR04-CC-SUR-20191106 ~ STR-TR04 (180-98513-21), (LCS 160-450465/1-A), (MB 160-450465/23-A) and (180-98513-C-2-B DU)

Job ID: 180-98513-1 (Continued)

Laboratory: Eurofins TestAmerica, Pittsburgh (Continued)

Method 904.0: Radium-228 Prep Batch 160-450465
The MDC (1.01) for Ra-228 in the method blank (MB) is above the client requested limit (RL) (1.00). This is likely due to the negative result (-0.18) for this analyte from the instrument software - the laboratory has seen a tendency for negative results to produce a somewhat higher MDC than a positive result of a similar magnitude. The laboratory does not believe this excursion adversely affects the data.
WBF-STR-FB01-20191106 ~ NA (180-98513-1), WBF-STR-EB01-20191106 ~ NA (180-98513-2), WBF-STR-TR06-LB-SUR-20191106 ~ STR-TR06 (180-98513-4), WBF-STR-TR06-LB-BOT-20191106 ~ STR-TR06 (180-98513-5), WBF-STR-TR06-CC-SUR-20191106 ~ STR-TR06 (180-98513-6), WBF-STR-TR06-CC-MID-20191106 ~ STR-TR06 (180-98513-7), WBF-STR-TR06-CC-BOT-20191106 ~ STR-TR06 (180-98513-8), WBF-STR-TR06-RB-SUR-20191106 ~ STR-TR06 (180-98513-9), WBF-STR-TR06-RB-MID-20191106 ~ STR-TR06 (180-98513-10), WBF-STR-TR06-RB-BOT-20191106 ~ STR-TR06 (180-98513-11), WBF-STR-TR05-RB-SUR-20191106 ~ STR-TR05 (180-98513-12), WBF-STR-TR05-RB-BOT-20191106 ~ STR-TR05 (180-98513-13), WBF-STR-TR05-CC-SUR-20191106 ~ STR-TR05 (180-98513-14), WBF-STR-TR05-CC-MID-20191106 ~ STR-TR05 (180-98513-15), WBF-STR-TR05-CC-BOT-20191106 ~ STR-TR05 (180-98513-16), WBF-STR-TR05-LB-SUR-20191106 ~ STR-TR05 (180-98513-17), WBF-STR-TR05-LB-BOT-20191106 ~ STR-TR05 (180-98513-18), WBF-STR-TR04-LB-SUR-20191106 ~ STR-TR04 (180-98513-19), WBF-STR-TR04-LB-BOT-20191106 ~ STR-TR04 (180-98513-20), WBF-STR-TR04-CC-SUR-20191106 ~ STR-TR04 (180-98513-21), (MB 160-450465/23-A) and (180-98513-C-2-B DU)

okay, no qual

Method PrecSep_0: Radium 228 Prep Batch 160-450465:
The following samples had light white particles:WBF-STR-TR06-LB-BOT-20191106 ~ STR-TR06 (180-98513-5), WBF-STR-TR06-CC-SUR-20191106 ~ STR-TR06 (180-98513-6), WBF-STR-TR06-CC-MID-20191106 ~ STR-TR06 (180-98513-7), WBF-STR-TR06-CC-BOT-20191106 ~ STR-TR06 (180-98513-8), WBF-STR-TR06-RB-SUR-20191106 ~ STR-TR06 (180-98513-9), WBF-STR-TR06-RB-MID-20191106 ~ STR-TR06 (180-98513-10), WBF-STR-TR06-RB-BOT-20191106 ~ STR-TR06 (180-98513-11), WBF-STR-TR05-RB-SUR-20191106 ~ STR-TR05 (180-98513-12), WBF-STR-TR05-RB-BOT-20191106 ~ STR-TR05 (180-98513-13), WBF-STR-TR05-CC-SUR-20191106 ~ STR-TR05 (180-98513-14), WBF-STR-TR05-CC-MID-20191106 ~ STR-TR05 (180-98513-15), WBF-STR-TR05-CC-BOT-20191106 ~ STR-TR05 (180-98513-16), WBF-STR-TR05-LB-SUR-20191106 ~ STR-TR05 (180-98513-17), WBF-STR-TR05-LB-BOT-20191106 ~ STR-TR05 (180-98513-18), WBF-STR-TR04-LB-SUR-20191106 ~ STR-TR04 (180-98513-19), WBF-STR-TR04-LB-BOT-20191106 ~ STR-TR04 (180-98513-20) and WBF-STR-TR04-CC-SUR-20191106 ~ STR-TR04 (180-98513-21).

Method PrecSep STD: Radium 226 Prep Batch 160-450462:
The following samples had light white particles:WBF-STR-TR06-LB-BOT-20191106 ~ STR-TR06 (180-98513-5), WBF-STR-TR06-CC-SUR-20191106 ~ STR-TR06 (180-98513-6), WBF-STR-TR06-CC-MID-20191106 ~ STR-TR06 (180-98513-7), WBF-STR-TR06-CC-BOT-20191106 ~ STR-TR06 (180-98513-8), WBF-STR-TR06-RB-SUR-20191106 ~ STR-TR06 (180-98513-9), WBF-STR-TR06-RB-MID-20191106 ~ STR-TR06 (180-98513-10), WBF-STR-TR06-RB-BOT-20191106 ~ STR-TR06 (180-98513-11), WBF-STR-TR05-RB-SUR-20191106 ~ STR-TR05 (180-98513-12), WBF-STR-TR05-RB-BOT-20191106 ~ STR-TR05 (180-98513-13), WBF-STR-TR05-CC-SUR-20191106 ~ STR-TR05 (180-98513-14), WBF-STR-TR05-CC-MID-20191106 ~ STR-TR05 (180-98513-15), WBF-STR-TR05-CC-BOT-20191106 ~ STR-TR05 (180-98513-16), WBF-STR-TR05-LB-SUR-20191106 ~ STR-TR05 (180-98513-17), WBF-STR-TR05-LB-BOT-20191106 ~ STR-TR05 (180-98513-18), WBF-STR-TR04-LB-SUR-20191106 ~ STR-TR04 (180-98513-19), WBF-STR-TR04-LB-BOT-20191106 ~ STR-TR04 (180-98513-20) and WBF-STR-TR04-CC-SUR-20191106 ~ STR-TR04 (180-98513-21).

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

Sample Summary

Client: Environmental Standards Inc.
Project/Site: WBF_STR_20191106_1B

Job ID: 180-98513-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
180-98513-1	WBF-STR-FB01-20191106 ~ NA	Water	11/06/19 10:15	11/08/19 09:00	
180-98513-2	WBF-STR-EB01-20191106 ~ NA	Water	11/06/19 10:25	11/08/19 09:00	
180-98513-4	WBF-STR-TR06-LB-SUR-20191106 ~ STR-TR06	Water	11/06/19 10:50	11/08/19 09:00	
180-98513-5	WBF-STR-TR06-LB-BOT-20191106 ~ STR-TR06	Water	11/06/19 11:00	11/08/19 09:00	
180-98513-6	WBF-STR-TR06-CC-SUR-20191106 ~ STR-TR0	Water	11/06/19 11:40	11/08/19 09:00	
180-98513-7	WBF-STR-TR06-CC-MID-20191106 ~ STR-TR06	Water	11/06/19 11:50	11/08/19 09:00	
180-98513-8	WBF-STR-TR06-CC-BOT-20191106 ~ STR-TR0	Water	11/06/19 11:55	11/08/19 09:00	
180-98513-9	WBF-STR-TR06-RB-SUR-20191106 ~ STR-TR0	Water	11/06/19 12:30	11/08/19 09:00	
180-98513-10	WBF-STR-TR06-RB-MID-20191106 ~ STR-TR06	Water	11/06/19 12:40	11/08/19 09:00	
180-98513-11	WBF-STR-TR06-RB-BOT-20191106 ~ STR-TR0	Water	11/06/19 12:45	11/08/19 09:00	
180-98513-12	WBF-STR-TR05-RB-SUR-20191106 ~ STR-TR0	Water	11/06/19 13:30	11/08/19 09:00	
180-98513-13	WBF-STR-TR05-RB-BOT-20191106 ~ STR-TR0	Water	11/06/19 13:40	11/08/19 09:00	
180-98513-14	WBF-STR-TR05-CC-SUR-20191106 ~ STR-TR0	Water	11/06/19 14:10	11/08/19 09:00	
180-98513-15	WBF-STR-TR05-CC-MID-20191106 ~ STR-TR05	Water	11/06/19 14:20	11/08/19 09:00	
180-98513-16	WBF-STR-TR05-CC-BOT-20191106 ~ STR-TR0	Water	11/06/19 14:30	11/08/19 09:00	
180-98513-17	WBF-STR-TR05-LB-SUR-20191106 ~ STR-TR05	Water	11/06/19 15:10	11/08/19 09:00	
180-98513-18	WBF-STR-TR05-LB-BOT-20191106 ~ STR-TR05	Water	11/06/19 15:20	11/08/19 09:00	
180-98513-19	WBF-STR-TR04-LB-SUR-20191106 ~ STR-TR04	Water	11/06/19 15:50	11/08/19 09:00	
180-98513-20	WBF-STR-TR04-LB-BOT-20191106 ~ STR-TR04	Water	11/06/19 16:00	11/08/19 09:00	
180-98513-21	WBF-STR-TR04-CC-SUR-20191106 ~ STR-TR0	Water	11/06/19 16:15	11/08/19 09:00	
180-98513-22	WBF-STR-TR04-CC-MID-20191106 ~ STR-TR04	Water	11/06/19 16:25	11/08/19 09:00	
180-98513-23	WBF-STR-TR04-CC-BOT-20191106 ~ STR-TR0	Water	11/06/19 16:30	11/08/19 09:00	
180-98513-24	WBF-STR-TR04-RB-MID-20191106 ~ STR-TR04	Water	11/06/19 16:55	11/08/19 09:00	
180-98513-25	WBF-STR-DUP01-20191106 ~ NA	Water	11/06/19 00:00	11/08/19 09:00	
180-98513-26	WBF-STR-DUP03-20191106 ~ NA	Water	11/06/19 00:00	11/08/19 09:00	

Shipping and Receiving Documents

TVA Environmental Investigations

Tennessee Valley Authority

COOLER No.:	1	of	5
COC No:	WBF_STR_20191106_1B		
1 of 3 Pages			
Task Desc:	WBF_STR		

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 #:	WATTS BAR FOSSIL PLANT	Sampler: Tyler Baker	
Lab Address:	301 Alpha Drive	Project #:	426799	Sampling Company: TVA	
	RIDC Park	Site Address	933 Old Ferry Road	Address: TVA Chickamauga Power Service Center, 4601 N. Access Road, 37415	
	Pittsburgh, PA 15238	City	Spring City State, Zip: TN, 37381	City/State: Chattanooga, TN	Phone: 423-876-6733
Lab Manager Contact Information		Site PM Name:	Roy Quinn		
Lab PM:	Gail Lage	Phone/Fax:	423-751-3753	Sampling Team Number:	1
Phone/Fax:	615-301-5741/615-726-3404	Site PM Email:	jrquinn@tva.gov	Send EDD/Hard Copy to:	tva_deliverables@envstd.com
Lab Email:	Gail.Lage@testamericainc.com				

Analysis Turnaround Time

☐ CALENDAR DAYS ☑ WORKING DAYS

TAT if different from Below _____

☐ 24 Hours
☑ 3 Business Days
☐ 5 Business Days
☑ 10 Business Days (Standard)

ITEMS #	SAMPLE ID Samples IDs MUST BE UNIQUE	SAMPLE LOCATION	Sample Depth Depth Unit Start Depth	Sample Depth Meters End Depth	MATRIX CODE	G= GRAB C=COMP	SAMPLE TYPE	SAMPLE DATE	SAMPLE TIME	# OF CONTAINERS	Comments/ Lab Sample I.D.	MS/MSD	Analysis SW_RAD	Filtered N	Preserve HNO3
1	WBF-STR-FB01-20191106	NA	NA	NA	AQ	G	FB	11/6/2019	1015	3		☐	X		
2	WBF-STR-EB01-20191106	NA	NA	NA	AQ	G	EB	11/6/2019	1025	3		☐	X		
3	WBF-STR-TR06-LB-SUR-20191106	STR-TR06	0.5	NA	SW	G	N	11/6/2019	1050	3		☐	X		
4	WBF-STR-TR06-LB-BOT-20191106	STR-TR06	2.5	NA	SW	G	N	11/6/2019	1100	3		☐	X		
5	WBF-STR-TR06-CC-SUR-20191106	STR-TR06	0.5	NA	SW	G	N	11/6/2019	1140	3		☐	X		
6	WBF-STR-TR06-CC-MID-20191106	STR-TR06	2.0	NA	SW	G	N	11/6/2019	1150	3		☐	X		
7	WBF-STR-TR06-CC-BOT-20191106	STR-TR06	4.2	NA	SW	G	N	11/6/2019	1155	3		☐	X		
8	WBF-STR-TR06-RB-SUR-20191106	STR-TR06	0.5	NA	SW	G	N	11/6/2019	1230	3		☐	X		
9	WBF-STR-TR06-RB-MID-20191106	STR-TR06	2.5	NA	SW	G	N	11/6/2019	1240	3		☐	X		
10	WBF-STR-TR06-RB-BOT-20191106	STR-TR06	5.0	NA	SW	G	N	11/6/2019	1245	3		☐	X		
11												☐			
12												☐			
13												☐			

Tyler Baker 11-7-19

180-98513 Chain of Custody

Additional Comments/Special Instructions:

Tyler Baker 11-7-19

Custody Seals 510464 - 510468

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Tyler Baker / TVA	11-7-19	1400	[illegible]	11/8/19	700

SHIPPING METHOD:	SAMPLER NAME AND SIGNATURE
Fedex	Tyler Baker Tyler Baker

Sample Receipt Conditions

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

Form TVA 30067A

TVA Environmental Investigations

Tennessee Valley Authority

COOLER No.:	1	of	5
COC No:	WBF_STR_20191106_1B		
2 of 3 Pages			
Task Desc:	WBF_STR		

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 #:	WATTS BAR FOSSIL PLANT	Sampler: Tyler Baker	
Lab Address:	301 Alpha Drive	Project #:	426799	Sampling Company: TVA	
	RIDC Park	Site Address	933 Old Ferry Road	Address: TVA Chickamauga Power Service Center, 4601 N. Access Road, 37415	
	Pittsburgh, PA 15238	City	Spring City State, Zip: TN, 37381	City/State: Chattanooga, TN	Phone: 423-876-6733
Lab Manager Contact Information		Site PM Name:	Roy Quinn		
Lab PM:	Gail Lage	Phone/Fax:	423-751-3753	Sampling Team Number:	1
Phone/Fax:	615-301-5741/615-726-3404	Site PM Email:	jrquinn@tva.gov	Send EDD/Hard Copy to:	tva_deliverables@envstd.com
Lab Email:	Gail.Lage@testamericainc.com				

Analysis Turnaround Time

☐ CALENDAR DAYS ☑ WORKING DAYS

TAT if different from Below _____

☐ 24 Hours
☐ 3 Business Days
☐ 5 Business Days
☑ 10 Business Days (Standard)

ITEMS #	SAMPLE ID Samples IDs MUST BE UNIQUE	SAMPLE LOCATION	Sample Depth Depth Unit Start Depth	Sample Depth Depth Unit End Depth (Meters)	MATRIX CODE	G= GRAB C=COMP	SAMPLE TYPE	SAMPLE DATE	SAMPLE TIME	# OF CONTAINERS	Comments/ Lab Sample I.D.	MS/MSD	Analysis SW_RAD	Filtered N	Preserve HNO3
1	WBF-STR-TR05-RB-SUR-20191106	STR-TR05	0.5	NA	SW	G	N	11/6/2019	1330	3		☐	X		
2	WBF-STR-TR05-RB-BOT-20191106	STR-TR05	2.8	NA	SW	G	N	11/6/2019	1340	3		☐	X		
3	WBF-STR-TR05-CC-SUR-20191106	STR-TR05	0.5	NA	SW	G	N	11/6/2019	1410	3		☐	X		
4	WBF-STR-TR05-CC-MID-20191106	STR-TR05	2.5	NA	SW	G	N	11/6/2019	1420	3		☐	X		
5	WBF-STR-TR05-CC-BOT-20191106	STR-TR05	4.9	NA	SW	G	N	11/6/2019	1430	3		☐	X		
6	WBF-STR-TR05-LB-SUR-20191106	STR-TR05	0.5	NA	SW	G	N	11/6/2019	1510	3		☐	X		
7	WBF-STR-TR05-LB-BOT-20191106	STR-TR05	2.9	NA	SW	G	N	11/6/2019	1520	3		☐	X		
8	WBF-STR-TR04-LB-SUR-20191106	STR-TR04	0.5	NA	SW	G	N	11/6/2019	1550	3		☐	X		
9	WBF-STR-TR04-LB-BOT-20191106	STR-TR04	2.9	NA	SW	G	N	11/6/2019	1600	3		☐	X		
10	WBF-STR-TR04-CC-SUR-20191106	STR-TR04	0.5	NA	SW	G	N	11/6/2019	1615	3		☐	X		
11	WBF-STR-TR04-CC-MID-20191106	STR-TR04	2.5	NA	SW	G	N	11/6/2019	1625	3		☐	X		
12	WBF-STR-TR04-CC-BOT-20191106	STR-TR04	4.5	NA	SW	G	N	11/6/2019	1630	3		☐	X		
13	WBF-STR-TR04-RB-MID-20191106	STR-TR04	1.0	NA	SW	G	N	11/6/2019	1655	3		☐	X		

Tyler Baker 11-7-19

Additional Comments/Special Instructions:

Tyler Baker 11-7-19

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Tyler Baker / TVA	11-7-19	1400	[illegible]	11/8/19	900

SHIPPING METHOD:	SAMPLER NAME AND SIGNATURE
Fedex	Tyler Baker Tyler Baker

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

Form TVA 30067A

TVA Environmental Investigations

Tennessee Valley Authority

COOLER No.:	1	of	5
COC No:	WBF_STR_20191106_1B		
3 of 3 Pages			
Task Desc:	WBF_STR		

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 #:	WATTS BAR FOSSIL PLANT	Sampler: Tyler Baker	
Lab Address:	301 Alpha Drive	Project #:	426799	Sampling Company: TVA	
	RIDC Park	Site Address	933 Old Ferry Road	Address: TVA Chickamauga Power Service Center, 4601 N. Access Road, 37415	
	Pittsburgh, PA 15238	City	Spring City State, Zip: TN, 37381	City/State: Chattanooga, TN	Phone: 423-876-6733
Lab Manager Contact Information		Site PM Name:	Roy Quinn		
Lab PM:	Gail Lage	Phone/Fax:	423-751-3753	Sampling Team Number:	1
Phone/Fax:	615-301-5741/615-726-3404	Site PM Email:	jrquinn@tva.gov	Send EDD/Hard Copy to:	tva_deliverables@envstd.com
Lab Email:	Gail.Lage@testamericainc.com				

Analysis Turnaround Time

☐ CALENDAR DAYS ☑ WORKING DAYS

TAT if different from Below _____

☐ 24 Hours
☐ 3 Business Days
☐ 5 Business Days
☑ 10 Business Days (Standard)

ITEMS #	SAMPLE ID Samples IDs MUST BE UNIQUE	SAMPLE LOCATION	Sample Depth: Depth Unit	Sample Depth: Meters	MATRIX CODE	G= GRAB C=COMP	SAMPLE TYPE	SAMPLE DATE	SAMPLE TIME	# OF CONTAINERS	Comments/ Lab Sample I.D.	MS/MSD	Filtered: N	Preserve: HNO3	Analysis: SW_RAD
1	WBF-STR-DUP01-20191106	NA	NA	NA	SW	G	FD	11/6/2019	NA	3		☐			X
2	WBF-STR-DUP03-20191106	NA	NA	NA	SW	G	FD	11/6/2019	NA	3		☐			X
3												☐			
4												☐			
5												☐			
6												☐			
7												☐			
8												☐			
9												☐			
10												☐			
11												☐			
12												☐			
13												☐			

Tyler Baker 11-7-19

Additional Comments/Special Instructions:

Tyler Baker 11-7-19

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Tyler Baker / TVA	11-7-19	1400		11/8/19	900

SHIPPING METHOD:	SAMPLER NAME AND SIGNATURE
Fedex	Tyler Baker Tyler Baker

Sample Receipt Conditions			
☐Yes ☐No	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No N/A
☐Yes ☐No	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No
☐Yes ☐No	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No
☐Yes ☐No	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No
Temperature in °C	Sample on Ice?	Sample Intact?	Trip Blank?

Form TVA 30067A

180-98513 Waybill

Do Not Lift Using This Tag

ORIGIN ID:CHAA (423) 876-6733
TVA

P91B91 01684A
1101 MARKET ST
CHATTANOOGA, TN 37402
UNITED STATES US

SHIP DATE: 07NOV19
ACTWGT: 46.00 LB
CAD: 6993895/SSFE2021
DIMS: 24x13x14 IN

BILL THIRD PARTY

Part # 156297-455 RNO EXP 08/20
567J1/F330/0502

TO **TEST AMERICA – PITTSBURGH**
TEST AMERICA – PITTSBURGH
301 ALPHA DR

PITTSBURGH PA, 15238
(412) 963-2428 REF:
INV:
PO: DEPT:

FedEx Express

J19211909190 1 AV

5 of 5

MPS# 0263 **7808 1319 1120**

Mstr# 7808 1319 1083 0201

XH AGCA

FRI – 08 NOV 10:30A
PRIORITY OVERNIGHT
AHS
15238
PIT

PA-US-C

Uncorrected temp 11.5
Thermometer ID 10
Initials NI Jic B
CF 0

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

1
10:30 A
11.0

Do Not Lift Using This Tag

ORIGIN ID:CHAA (423) 876-6733
TVA

P91B91 01684A
1101 MARKET ST
CHATTANOOGA, TN 37402
UNITED STATES US

SHIP DATE: 07NOV19
ACTWGT: 45.20 LB
CAD: 6993895/SSFE2021
DIMS: 24x13x14 IN

BILL THIRD PARTY

TO TEST AMERICA – PITTSBURGH
TEST AMERICA – PITTSBURGH
301 ALPHA DR

PITTSBURGH PA 15238
(412) 963-2428
INV:
PO: REF:
DEPT:

FedEx Express

1 of 5

TRK# 0201 7808 1319 1083
MASTER

FRI – 08 NOV 10:30A
PRIORITY OVERNIGHT
AHS
15238
PA-US PIT

XH ACCA

Uncorrected temp
Thermometer ID 11.9 °C
CF 0 Initials JB

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

Do Not Lift Using This Tag

ORIGIN ID:CHAA (423) 876-6733
TVA

P91B91 01684A
1101 MARKET ST
CHATTANOOGA, TN 37402
UNITED STATES US

SHIP DATE: 07NOV19
ACTWGT: 46.00 LB
CAD: 6993895/SSFE2021
DIMS: 24x13x14 IN

BILL THIRD PARTY

Part # 156297-439 REV DATE 08/20

TO **TEST AMERICA – PITTSBURGH**
TEST AMERICA – PITTSBURGH
301 ALPHA DR

PITTSBURGH PA 15238

(412) 963-2428 REF:
INV:
PO: DEPT:

FedEx Express

J1927150919198

4 of 5

MPS# 0263 7808 1319 1110

Mstr# 7808 1319 1083 0201

XH AGCA

FRI – 08 NOV 10:30A
PRIORITY OVERNIGHT
AHS
15238
PA-US PIT

Uncorrected temp 12.6 C
Thermometer ID 10
No Ice
CF 0 Initials B

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

RT 97 1 10:30 A 1110 11.08

FZ

Do Not Lift Using This Tag

ORIGIN ID:CHAA (423) 876-6733
TVA

P91B91 01684A
1101 MARKET ST
CHATTANOOGA, TN 37402
UNITED STATES US

SHIP DATE: 07NOV19
ACTWGT: 46.70 LB
CAD: 6993895/SSFE2021
DIMS: 24x13x14 IN

BILL THIRD PARTY

Part # 156297-133 NRD EXP 08/20
5671J/F330/0502

TO TEST AMERICA – PITTSBURGH
TEST AMERICA – PITTSBURGH
301 ALPHA DR

PITTSBURGH PA 15238
(412) 963-2428 REF:
INV:
PO: DEPT:

FedEx Express

J192119091901 AP

3 of 5
MPS# 0263 7808 1319 1109
Mstr# 7808 1319 1083 0201

FRI – 08 NOV 10:30A
PRIORITY OVERNIGHT
AHS
15238
PA-US PIT

XH AGCA

Uncorrected temp 9.6 °C
Thermometer ID 10
CF 0 Initials B
PT-WI-SR-001 effective 11/8/18
Uncorrected temp °C

FZ

I A
10:30
1109
11.08

Do Not Lift Using This Tag

Part # 150469-434 RIT2 EXP 08/19

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ORIGIN ID:MIFA (281) 552-8437
TYLER BAKER
CHICKAMAUGA POWER SERVICE CENTER
4601 NORTH ACCESS ROAD, BUILDING G

CHATTANOOGA, TN 37415
UNITED STATES US

SHIP DATE: 1[illegible]FEB19
ACTWGT: 10.00 LB MAN
CAD: 592545/CAFE3211

TO

TESTAMERICA PITTSBURGH
301 ALPHA DRIVE
RIDC PARK
PITTSBURGH PA 15238-2907

(412) 963-7058 REF: S180-49805
DEPT: BOTTLES

RMA:

FedEx Express

FedEx
TRK# 0221 4759 5527 5368

F P RT 97 FZ

1? 10:30 A

5368
11.08

XH AGCA

PA-US PIT

EXP 08/20

Uncorrected temp 12.4 °C
Thermometer ID 10
CF 0 Initials B

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

#5305246 11/07 567J1/F330/05A2

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
510466

Custody Seal
DATE 11-7-19
SIGNATURE

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
510466

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
510467

Custody Seal
DATE 11-7-19
SIGNATURE

SEAL
IMPER
DATE 11-7-19
INITIALS
CAL NO ELAT

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
510464

Custody Seal
DATE 11-7-19
SIGNATURE

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
510465

Custody Seal
DATE 11-7-19
SIGNATURE

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
510465

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
510341

Custody Seal
DATE 11-7-19
SIGNATURE

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
510341

SEAL
DATE 11-7-19
INITIALS

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
510468

Custody Seal
DATE 11-7-19
SIGNATURE

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
510468

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: 180-378483.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: jennifer.rumble@testamericainc.com	State of Origin: Tennessee	Page: Page 1 of 3
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note):		Job #: 180-98513-1
Address: 13715 Rider Trail North, ,	Due Date Requested: 12/11/2019			
City: Earth City	TAT Requested (days):			
State, Zip: MO, 63045				
Phone: 314-298-8566(Tel) 314-298-8757(Fax)	PO #:			
Email:	WO #:			
Project Name: WBF_STR_20191106_1B	Project #: 18020303			
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)	903.0/PrecSep_STD Ra-226	904.0/PrecSep_0 Ra-228	Ra226_228GFPC_P	Total Number of containers	Special Instructions/Note:
			Preservation Code:								
WBF-STR-FB01-20191106 ~ NA (180-98513-1)	11/6/19	10:15 Eastern		Water			X	X	X	3	TVA - Batch alone
WBF-STR-EB01-20191106 ~ NA (180-98513-2)	11/6/19	10:25 Eastern		Water			X	X	X	3	TVA - Batch alone
WBF-STR-TR06-LB-SUR-20191106 ~ STR-TR06 (180-98513-4)	11/6/19	10:50 Eastern		Water			X	X	X	3	TVA - Batch alone
WBF-STR-TR06-LB-BOT-20191106 ~ STR-TR06 (180-98513-5)	11/6/19	11:00 Eastern		Water			X	X	X	3	TVA - Batch alone
WBF-STR-TR06-CC-SUR-20191106 ~ STR-TR06 (180-98513-6)	11/6/19	11:40 Eastern		Water			X	X	X	3	TVA - Batch alone
WBF-STR-TR06-CC-MID-20191106 ~ STR-TR06 (180-98513-7)	11/6/19	11:50 Eastern		Water			X	X	X	3	TVA - Batch alone
WBF-STR-TR06-CC-BOT-20191106 ~ STR-TR06 (180-98513-8)	11/6/19	11:55 Eastern		Water			X	X	X	3	TVA - Batch alone
WBF-STR-TR06-RB-SUR-20191106 ~ STR-TR06 (180-98513-9)	11/6/19	12:30 Eastern		Water			X	X	X	3	TVA - Batch alone
WBF-STR-TR06-RB-MID-20191106 ~ STR-TR06 (180-98513-10)	11/6/19	12:40 Eastern		Water			X	X	X	3	TVA - Batch alone

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon sub-contract 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:

	Date/Time	Company		Date/Time	Company
Relinquished by:	11/11/19 1700	DTS	Received by: Michael Hearn	11-13-19 09:45	TASTL
Relinquished by:			Received by:		
Relinquished by:			Received by:		

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

Ver: 01/16/2019

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)
Client Contact: Shipping/Receiving
Company: TestAmerica Laboratories, Inc.
Address: 13715 Rider Trail North,
City: Earth City
State, Zip: MO, 63045
Phone: 314-298-8566(Tel) 314-298-8757(Fax)
Email:
Project Name: WBF_STR_20191106_1B
Site:

Sampler:
Phone:
Due Date Requested: 12/11/2019
TAT Requested (days):
PO #:
WO #:
Project #: 18020303
SSOW#:

Lab PM: Rumble, Jennifer L
E-Mail: jennifer.rumble@testamericainc.com
Carrier Tracking No(s):
State of Origin: Tennessee
Accreditations Required (See note):

COC No: 180-378483.2
Page: Page 2 of 3
Job #: 180-98513-1

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:

Analysis Requested

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)	903.0/PrecSep_STD Ra-226	904.0/PrecSep_0 Ra-228	Ra226_228GFPC_P	Total Number of containers	Special Instructions/Note:
				Preservation Code:							
WBF-STR-TR06-RB-BOT-20191106 ~ STR-TR06 (180-98513-11	11/6/19	12:45 Eastern		Water			X	X	X	3	TVA - Batch alone
WB-STR-TR05-RB-SUR-20191106 ~ STR-TR05 (180-98513-12)	11/6/19	13:30 Eastern		Water			X	X	X	3	TVA - Batch alone
WB-STR-TR05-RB-BOT-20191106 ~ STR-TR05 (180-98513-13)	11/6/19	13:40 Eastern		Water			X	X	X	3	TVA - Batch alone
WB-STR-TR05-CC-SUR-20191106 ~ STR-TR05 (180-98513-14)	11/6/19	14:10 Eastern		Water			X	X	X	3	TVA - Batch alone
WB-STR-TR05-CC-MID-20191106 ~ STR-TR05 (180-98513-15)	11/6/19	14:20 Eastern		Water			X	X	X	3	TVA - Batch alone
WB-STR-TR05-CC-BOT-20191106 ~ STR-TR05 (180-98513-16)	11/6/19	14:30 Eastern		Water			X	X	X	3	TVA - Batch alone
WB-STR-TR05-LB-SUR-20191106 ~ STR-TR05 (180-98513-17)	11/6/19	15:10 Eastern		Water			X	X	X	3	TVA - Batch alone
WB-STR-TR05-LB-BOT-20191106 ~ STR-TR05 (180-98513-18)	11/6/19	15:20 Eastern		Water			X	X	X	3	TVA - Batch alone
WB-STR-TR04-LB-SUR-20191106 ~ STR-TR04 (180-98513-19)	11/6/19	15:50 Eastern		Water			X	X	X	3	TVA - Batch alone

180-98513-01 Chain of Custody

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. I

Possible Hazard Identification
Unconfirmed
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*
Special Instructions/QC Requirements:

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

Relinquished by:	Date/Time: 11/16/19	Company TAS	Received by:	Date/Time: 11-13-19 09:45	Company TA STL
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

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)
Client Contact: Shipping/Receiving
Company: TestAmerica Laboratories, Inc.
Address: 13715 Rider Trail North,
City: Earth City
State, Zip: MO, 63045
Phone: 314-298-8566(Tel) 314-298-8757(Fax)
Email:
Project Name: WBF_STR_20191106_1B
Site:

Sampler:
Phone:
Due Date Requested: 12/11/2019
TAT Requested (days):
PO #:
WO #:
Project #: 18020303
SSOW#:

Lab PM: Rumble, Jennifer L
E-Mail: jennifer.rumble@testamericainc.com
Carrier Tracking No(s):
State of Origin: Tennessee
Accreditations Required (See note):

COC No: 180-378483.3
Page: Page 3 of 3
Job #: 180-98513-1

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:

Analysis Requested

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)	903.0/PrecSep_STD Ra-226	904.0/PrecSep_0 Ra-228	Ra226_228GFPC_P	Total Number of containers	Special Instructions/Note:
			Preservation Code:								
WB-STR-TR04-LB-BOT-20191106 ~ STR-TR04 (180-98513-20)	11/6/19	16:00 Eastern		Water			X	X	X	3	TVA - Batch alone
WB-STR-TR04-CC-SUR-20191106 ~ STR-TR04 (180-98513-21)	11/6/19	16:15 Eastern		Water			X	X	X	3	TVA - Batch alone
WB-STR-TR04-CC-MID-20191106 ~ STR-TR04 (180-98513-22)	11/6/19	16:25 Eastern		Water			X	X	X	3	TVA - Batch alone
WB-STR-TR04-CC-BOT-20191106 ~ STR-TR04 (180-98513-23)	11/6/19	16:30 Eastern		Water			X	X	X	3	TVA - Batch alone
WB-STR-TR04-RB-MID-20191106 ~ STR-TR04 (180-98513-24)	11/6/19	16:55 Eastern		Water			X	X	X	3	TVA - Batch alone
WBF-STR-DUP01-20191106 ~ NA (180-98513-25)	11/6/19	Eastern		Water			X	X	X	3	TVA - Batch alone
WBF-STR-DUP03-20191106 ~ NA (180-98513-26)	11/6/19	Eastern		Water			X	X	X	3	TVA - Batch alone

180-98513-02 Chain of Custody

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. I

Possible Hazard Identification
Unconfirmed

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *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
	11/11/19			11-13-19 09:45	TASR
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

Login Sample Receipt Checklist

Client: Environmental Standards Inc.

Job Number: 180-98513-1

Login Number: 98513
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.	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?	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: 180-98513-1

Login Number: 98513
List Number: 2
Creator: Hellm, Michael

List Source: Eurofins TestAmerica, St. Louis
List Creation: 11/13/19 10:53 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.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	18.0
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?	N/A	
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	

Login Sample Receipt Checklist

Client: Environmental Standards Inc.

Job Number: 180-98513-1

Login Number: 98513
List Number: 3
Creator: Hellm, Michael

List Source: Eurofins TestAmerica, St. Louis
List Creation: 11/13/19 10:57 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.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	18.0
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?	N/A	
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	

SECTION 5

PROJECT CORRESPONDENCE

From:	Lage, Gail
To:	Andrew Piasecki; CSO – TVA Projects
Cc:	TVA_Deliverables; Amanda Harvey; Amanda Cover; Danielle Coles
Subject:	RE: JOF CCR Materials - Request for 180-99668-1
Date:	Monday, February 3, 2020 9:55:28 AM
Attachments:	image001.png Incorrect Calibration Coefficient - TVA.DOCX

Andrew – attached is a list of the sample effected by the wrong coefficient being used the Blue detector calibrations (I think I said that correctly). Any here is some explanation on how the are affected.

In regard to the rest of the jobs you gave me, there are a total of 82 samples affected. 72 of the samples have "U" flags (would not change with different efficiency, as the efficiency affects the uncertainties and detection limit(s) proportionally. 10 samples have results > MDC, but all are less than 0.5 pCi/L (<RL). Recalculating with the correct efficiency will not cause any results to be >RL (not even greater than 0.5 pCi/L).

the bias ranges from about 4%low to 3% high (well within the reported uncertainty). The 82 samples are sorted such that the samples between the MDC and RL ("<1" in the "Flag" column) are listed first and the samples below the MDC ("U") are after that. Samples are sorted in those groups by increasing "Inc/Corr" ratio.

Do you require revise reports for these jobs?

Thanks

Gail Lage
Senior Project Manager

Eurofins TestAmerica
500 Wilson Pike Circle
Suite 100
Brentwood, TN 37027
USA

Phone: 615-301-5741

From: Andrew Piasecki [mailto:apiasecki@envstd.com]
Sent: Tuesday, January 28, 2020 1:02 PM
To: CSO – TVA Projects
Cc: TVA_Deliverables; Amanda Harvey; Amanda Cover; Danielle Coles
Subject: JOF CCR Materials - Request for 180-99668-1

-External Email-

Hi Gail,

Please address the items in the email below for Job 180-99668-1, and provide revisions. Please also investigate whether any other SDGs are impacted by the radium-226 efficiency issues for detectors Blue 19, 20, and 21.

Thanks,

Andrew L. Piasecki
Quality Assurance Chemist
Environmental Standards, Inc.
1140 Valley Forge Road • PO Box 810 • Valley Forge, PA 19482
610.935.5577 ext. 433 • www.envstd.com • apiasecki@envstd.com

Emergency Response Quality Assurance Hotline: 855.374.7272

From: Danielle Coles
Sent: Tuesday, January 28, 2020 8:17 AM
To: Andrew Piasecki <apiasecki@envstd.com>
Cc: Amanda Harvey <aharvey@envstd.com>; Amanda Cover <ACover@envstd.com>; TVA_Deliverables <tva_deliverables@envstd.com>
Subject: WBF CCR Materials - Request for 180-99668-1

Hi Andrew,

Can you have the laboratory look into the two items below for SDG 180-99668-1. We also have outstanding requests for the detectors referenced in #2 for SDGs 180-98513-1, 180-99722-1, and 180-98007-1.

1. For method 901.1 sample 180-99668-10 was analyzed on 1/6/2020 on detector GV8. The monthly background provided for detector GV8 was on 11/12/19. Please provide the monthly background for this detector from January.

2. I am unable to recalculate the radium-226 efficiency for all samples where detectors Blue 19, 20, and 21 were used in this SDG. Can you have the laboratory confirm the efficiencies for the following.

   Blue 19: Prep Batch 454457; 180-99668-4
   Blue 20: Prep Batch 454457; 180-99668-5
   Blue 21: Prep Batch 454457; 180-99668-6

Thanks!

Danielle Coles
Quality Assurance Chemist
Environmental Standards, Inc.
1140 Valley Forge Road • PO Box 810 • Valley Forge, PA 19482
610.935.5577 x419 • www.envstd.com • dcoles@envstd.com

Emergency Response Quality Assurance Hotline: 855.374.7272