

**Data Validation Report  
Tennessee Valley Authority  
Watts Barr Fossil Plant  
Environmental Investigation Plan  
Seep Soil Samples  
Chain-of-Custody: WBF\_SES\_20190418\_1A**

This quality assurance (QA) review is based upon an examination of the data generated from the analyses of the two seep soil samples and two aqueous blanks collected on April 18, 2019, at the Tennessee Valley Authority (TVA) Watts Barr Fossil Plant facility. These samples were collectively analyzed by TestAmerica Laboratories, Inc. (TestAmerica), of Pittsburgh, Pennsylvania, for total metals by SW-846 Method 6020A; for total mercury by SW-846 Methods 7470A/7471B; for anions (specifically, chloride, fluoride, and sulfate) by SW-846 Method 9056A; and for pH by SW-846 Method 9045D.

This review was performed in accordance with the Environmental Investigation Plan for the Tennessee Valley Authority Watts Barr Fossil Plant (WBF EIP; Revision 3, November 2018). This review was performed with guidance from the National Functional Guidelines for Inorganic Data Review (US EPA, October 2004); the US EPA Region IV Environmental Investigations Standard Operating Procedures and Quality Assurance Manual (November 2001); and the US EPA Region IV Data Validation Standard Operating Procedures. These validation guidance documents specifically address analyses performed in accordance with the Contract Laboratory Program (CLP) analytical methods and are not completely applicable to the type of analyses and analytical protocols performed for the SW-846 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 SW-846 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 TestAmerica Job Number 180-89236-1.

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-SES-01-20190418	180-89236-1	180-89236-1	Sed	4/18/19	M, Hg, A, pH
WBF-SES-DUP01-20190418 (Field Duplicate of WBF-SES-01-20190418)	180-89236-2	180-89236-1	Sed	4/18/19	M, Hg, A, pH
WBF-SES-EB01-20190418 (Equipment Blank)	180-89236-3	180-89236-1	Aq	4/18/19	M, Hg, A
WBF-SES-FB01-20190418 (Field Blank)	180-89236-4	180-89236-1	Aq	4/18/19	M, Hg, A

Parameters Examined

- M - Total Metals by SW-846 Method 6020A.
- Hg - Total Mercury by SW-846 Methods 7470A/7471B.
- A - Anions (specifically, chloride, fluoride, and sulfate) by SW-846 Method 9056A.
- pH - pH by SW-846 Method 9045D.
- Sed - Sediment.
- Aq - Aqueous.



Items Reviewed	
Holding Times	Instrument Tuning and Calibrations
Sample Preservation	Reporting Limit (RL) Standard Recoveries
Chain-of-Custody (COC) Record and Case Narrative	Internal Standard Recoveries
Blank Results	Serial Dilution Analysis
Matrix Spike/Matrix Spike Duplicate (MS/MSD) Results	Post-Digestion Spike Results
Laboratory Control Sample (LCS) Results	Sample Preparation
Laboratory and Field Duplicate Results	Analytical Sequence
Quantitation of Positive Results	

### **Comments and Exceptions**

- All analyses performed for the sampling event were in compliance with the requirements set forth in the EIP.
- MS/MSD, post-digestion spike, laboratory duplicate, and/or serial dilution analyses were performed on a non-project sample(s) (see Supporting Documentation for Qualifiers [Section 3]). Qualification of data due to this issue was not warranted.

### **Qualifier Summary**

Analyte(s)	Job Number	Samples	Validation Qualifier(s)	Reason(s) for Qualification
chloride, fluoride, and sulfate	180-89236-1	WBF-SES-01-20190418	J	M-
antimony and chromium	180-89236-1	WBF-SES-01-20190418 and WBF-SES-DUP01-20190418	J	M-
lithium	180-89236-1	WBF-SES-01-20190418 and WBF-SES-DUP01-20190418	J	M+, P-
nickel	180-89236-1	WBF-SES-01-20190418 and WBF-SES-DUP01-20190418	J	SD
cobalt	180-89236-1	WBF-SES-01-20190418 and WBF-SES-DUP01-20190418	J	FD

Unless otherwise qualified, all positive results reported between the method detection limit (MDL) and quantitation limit (QL) should be considered estimated and have been flagged "J" on the data tables. (Reason Code: RL)

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Review performed by: Kristen L. Ferguson, Senior Quality Assurance Chemist  
Review reviewed by: Thomas H. Weinmann, Senior Quality Assurance Chemist  
Review approved by: Amanda J. Cover, Senior Quality Assurance Chemist  
Review approved by: Rock J. Vitale, CEAC, Technical Director of Chemistry/Principal  
Date review completed: 6/4/19



## **SECTION 2**

### **ANALYTICAL RESULTS**

## **INORGANIC DATA QUALIFIERS**

- U\* This result should be considered “not-detected” because it was detected in a rinsate blank or laboratory blank at a similar level.
- UR Unreliable reporting limit; analyte may or may not be present in sample.
- R Unreliable positive result; analyte may or may not be present in sample.
- J Quantitation is approximate due to limitations identified during data validation.
- UJ This analyte was not detected, but the reporting limit may or may not be higher due to a bias identified during data validation.



## REASON CODES AND EXPLANATIONS

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

Lab Sample ID	180-89236-1
Sys Sample Code	WBF-SES-01-20190418
Sample Name	WBF-SeS-01-20190418
Sample Date	4/18/2019 10:41:00 AM
Location	SES01
Sample Type	N
Parent Sample	

Analytic Method	Chemical Name	CAS Rn	Fraction	Result Unit	Final Result	Final Qual	Reason code	Final MDL	Final RL	Final QL	Final Detect	Final Report	DF	Basis
	Percent Moisture:			%	17.4									
SW-846 6020A	Antimony	7440-36-0	T	MG/KG	0.490	J	M-	0.0729	0.0729	0.235	Y	Yes	1	DRY
	Arsenic	7440-38-2	T	MG/KG	12.5			0.0306	0.0306	0.118	Y	Yes	1	DRY
	Barium	7440-39-3	T	MG/KG	76.7			0.150	0.150	1.18	Y	Yes	1	DRY
	Beryllium	7440-41-7	T	MG/KG	0.681			0.00881	0.00881	0.118	Y	Yes	1	DRY
	Boron	7440-42-8	T	MG/KG	2.14	J	RL	1.59	1.59	9.40	Y	Yes	1	DRY
	Cadmium	7440-43-9	T	MG/KG	0.0828	J	RL	0.0200	0.0200	0.118	Y	Yes	1	DRY
	Calcium	7440-70-2	T	MG/KG	1470			10.5	10.5	58.8	Y	Yes	1	DRY
	Chromium	7440-47-3	T	MG/KG	55.8	J	M-	0.0975	0.0975	0.235	Y	Yes	1	DRY
	Cobalt	7440-48-4	T	MG/KG	32.6	J	FD	0.00975	0.00975	0.0588	Y	Yes	1	DRY
	Copper	7440-50-8	T	MG/KG	7.13			0.133	0.133	0.235	Y	Yes	1	DRY
	Lead	7439-92-1	T	MG/KG	50.2			0.0411	0.0411	0.118	Y	Yes	1	DRY
	Lithium	7439-93-2	T	MG/KG	6.12	J	M+,P-	0.324	0.324	0.588	Y	Yes	1	DRY
	Molybdenum	7439-98-7	T	MG/KG	1.62			0.192	0.192	0.588	Y	Yes	1	DRY
	Nickel	7440-02-0	T	MG/KG	11.8	J	SD	0.0717	0.0717	0.118	Y	Yes	1	DRY
	Selenium	7782-49-2	T	MG/KG	0.889			0.143	0.143	0.588	Y	Yes	1	DRY
	Silver	7440-22-4	T	MG/KG			U	0.0317	0.0317	0.118	N	Yes	1	DRY
	Sodium	7440-23-5	T	MG/KG			U	22.1	22.1	58.8	N	Yes	1	DRY
	Thallium	7440-28-0	T	MG/KG	0.317			0.0294	0.0294	0.118	Y	Yes	1	DRY
Vanadium	7440-62-2	T	MG/KG	47.2			0.0752	0.0752	0.118	Y	Yes	1	DRY	
Zinc	7440-66-6	T	MG/KG	29.2			0.392	0.392	0.588	Y	Yes	1	DRY	
SW-846 7471B	Mercury	7439-97-6	T	MG/KG	0.0936			0.0182	0.0182	0.0420	Y	Yes	1	DRY
SW-846 9045D	pH at 25 Degrees C	PH	N	SU	7.1			0.1	0.1	0.1	Y	Yes	1	NA
SW-846 9056A	Chloride	16887-00-6	N	MG/KG	12.2	J	M-	4.57	4.57	11.8	Y	Yes	1	DRY
	Fluoride	16984-48-8	N	MG/KG	1.82	J	M-	0.801	0.801	1.18	Y	Yes	1	DRY
	Sulfate	14808-79-8	N	MG/KG	474	J	M-	8.00	8.00	11.8	Y	Yes	1	DRY

Lab Sample ID	180-89236-2
Sys Sample Code	WBF-SES-DUP01-20190418
Sample Name	WBF-SeS-DUP01-20190418
Sample Date	4/18/2019 12:00:00 AM
Location	SES01
Sample Type	FD
Parent Sample	WBF-SES-01-20190418

Analytic Method	Chemical Name	CAS Rn	Fraction	Result Unit	Final Result	Final Qual	Reason code	Final MDL	Final RL	Final QL	Final Detect	Final Report	DF	Basis
	Percent Moisture:			%	17.3									
SW-846 6020A	Antimony	7440-36-0	T	MG/KG	0.392	J	M-	0.0750	0.0750	0.242	Y	Yes	1	DRY
	Arsenic	7440-38-2	T	MG/KG	10.0			0.0315	0.0315	0.121	Y	Yes	1	DRY
	Barium	7440-39-3	T	MG/KG	60.9			0.155	0.155	1.21	Y	Yes	1	DRY
	Beryllium	7440-41-7	T	MG/KG	0.638			0.00907	0.00907	0.121	Y	Yes	1	DRY
	Boron	7440-42-8	T	MG/KG	1.89	J	RL	1.63	1.63	9.68	Y	Yes	1	DRY
	Cadmium	7440-43-9	T	MG/KG	0.0590	J	RL	0.0206	0.0206	0.121	Y	Yes	1	DRY
	Calcium	7440-70-2	T	MG/KG	1240			10.8	10.8	60.5	Y	Yes	1	DRY
	Chromium	7440-47-3	T	MG/KG	64.5	J	M-	0.100	0.100	0.242	Y	Yes	1	DRY
	Cobalt	7440-48-4	T	MG/KG	20.8	J	FD	0.0100	0.0100	0.0605	Y	Yes	1	DRY
	Copper	7440-50-8	T	MG/KG	7.39			0.137	0.137	0.242	Y	Yes	1	DRY
	Lead	7439-92-1	T	MG/KG	35.2			0.0423	0.0423	0.121	Y	Yes	1	DRY
	Lithium	7439-93-2	T	MG/KG	6.35	J	M+,P-	0.334	0.334	0.605	Y	Yes	1	DRY
	Molybdenum	7439-98-7	T	MG/KG	1.10			0.197	0.197	0.605	Y	Yes	1	DRY
	Nickel	7440-02-0	T	MG/KG	12.3	J	SD	0.0738	0.0738	0.121	Y	Yes	1	DRY
	Selenium	7782-49-2	T	MG/KG	0.953			0.148	0.148	0.605	Y	Yes	1	DRY
	Silver	7440-22-4	T	MG/KG			U	0.0327	0.0327	0.121	N	Yes	1	DRY
	Sodium	7440-23-5	T	MG/KG			U	22.7	22.7	60.5	N	Yes	1	DRY
	Thallium	7440-28-0	T	MG/KG	0.240			0.0302	0.0302	0.121	Y	Yes	1	DRY
Vanadium	7440-62-2	T	MG/KG	40.3			0.0774	0.0774	0.121	Y	Yes	1	DRY	
Zinc	7440-66-6	T	MG/KG	30.8			0.404	0.404	0.605	Y	Yes	1	DRY	
SW-846 7471B	Mercury	7439-97-6	T	MG/KG	0.0648			0.0148	0.0148	0.0342	Y	Yes	1	DRY
SW-846 9045D	pH at 25 Degrees C	PH	N	SU	7.0			0.1	0.1	0.1	Y	Yes	1	NA
SW-846 9056A	Chloride	16887-00-6	N	MG/KG	5.43	J	RL	4.64	4.64	12.0	Y	Yes	1	DRY
	Fluoride	16984-48-8	N	MG/KG	2.05			0.813	0.813	1.20	Y	Yes	1	DRY
	Sulfate	14808-79-8	N	MG/KG	397			8.12	8.12	12.0	Y	Yes	1	DRY

Lab Sample ID	180-89236-3
Sys Sample Code	WBF-SES-EB01-20190418
Sample Name	WBF-SeS-EB01-20190418
Sample Date	4/18/2019 10:55:00 AM
Location	SES01
Sample Type	EB
Parent Sample	

Analytic Method	Chemical Name	CAS Rn	Fraction	Result Unit	Final Result	Final Qual	Reason code	Final MDL	Final RL	Final QL	Final Detect	Final Report	DF	Basis
SW-846 6020A	Antimony	7440-36-0	T	MG/L		U		0.000378	0.000378	0.00200	N	Yes	1	NA
	Arsenic	7440-38-2	T	MG/L		U		0.000323	0.000323	0.00100	N	Yes	1	NA
	Barium	7440-39-3	T	MG/L		U		0.00149	0.00149	0.0100	N	Yes	1	NA
	Beryllium	7440-41-7	T	MG/L		U		0.000155	0.000155	0.00100	N	Yes	1	NA
	Boron	7440-42-8	T	MG/L	0.0351	J	RL	0.0303	0.0303	0.0800	Y	Yes	1	NA
	Cadmium	7440-43-9	T	MG/L		U		0.000125	0.000125	0.00100	N	Yes	1	NA
	Calcium	7440-70-2	T	MG/L		U		0.116	0.116	0.500	N	Yes	1	NA
	Chromium	7440-47-3	T	MG/L	0.00197	J	RL	0.00153	0.00153	0.00200	Y	Yes	1	NA
	Cobalt	7440-48-4	T	MG/L		U		0.0000750	0.0000750	0.000500	N	Yes	1	NA
	Copper	7440-50-8	T	MG/L		U		0.000627	0.000627	0.00200	N	Yes	1	NA
	Lead	7439-92-1	T	MG/L		U		0.000128	0.000128	0.00100	N	Yes	1	NA
	Lithium	7439-93-2	T	MG/L		U		0.00314	0.00314	0.00500	N	Yes	1	NA
	Molybdenum	7439-98-7	T	MG/L		U		0.000610	0.000610	0.00500	N	Yes	1	NA
	Nickel	7440-02-0	T	MG/L		U		0.000312	0.000312	0.00100	N	Yes	1	NA
	Selenium	7782-49-2	T	MG/L		U		0.00262	0.00262	0.00500	N	Yes	1	NA
	Silver	7440-22-4	T	MG/L		U		0.000121	0.000121	0.00100	N	Yes	1	NA
	Sodium	7440-23-5	T	MG/L		U		0.251	0.251	0.500	N	Yes	1	NA
	Thallium	7440-28-0	T	MG/L		U		0.000128	0.000128	0.00100	N	Yes	1	NA
Vanadium	7440-62-2	T	MG/L	0.00197			0.000899	0.000899	0.00100	Y	Yes	1	NA	
Zinc	7440-66-6	T	MG/L		U		0.00322	0.00322	0.00500	N	Yes	1	NA	
SW-846 7470A	Mercury	7439-97-6	T	MG/L		U		0.000101	0.000101	0.000200	N	Yes	1	NA
SW-846 9056A	Chloride	16887-00-6	N	MG/L		U		0.715	0.715	1.00	N	Yes	1	NA
	Fluoride	16984-48-8	N	MG/L		U		0.0263	0.0263	0.100	N	Yes	1	NA
	Sulfate	14808-79-8	N	MG/L		U		0.380	0.380	1.00	N	Yes	1	NA

Lab Sample ID	180-89236-4
Sys Sample Code	WBF-SES-FB01-20190418
Sample Name	WBF-SeS-FB01-20190418
Sample Date	4/18/2019 11:00:00 AM
Location	SES01
Sample Type	FB
Parent Sample	

Analytic Method	Chemical Name	CAS Rn	Fraction	Result Unit	Final Result	Final Qual	Reason code	Final MDL	Final RL	Final QL	Final Detect	Final Report	DF	Basis
SW-846 6020A	Antimony	7440-36-0	T	MG/L		U		0.000378	0.000378	0.00200	N	Yes	1	NA
	Arsenic	7440-38-2	T	MG/L		U		0.000323	0.000323	0.00100	N	Yes	1	NA
	Barium	7440-39-3	T	MG/L		U		0.00149	0.00149	0.0100	N	Yes	1	NA
	Beryllium	7440-41-7	T	MG/L		U		0.000155	0.000155	0.00100	N	Yes	1	NA
	Boron	7440-42-8	T	MG/L		U		0.0303	0.0303	0.0800	N	Yes	1	NA
	Cadmium	7440-43-9	T	MG/L		U		0.000125	0.000125	0.00100	N	Yes	1	NA
	Calcium	7440-70-2	T	MG/L		U		0.116	0.116	0.500	N	Yes	1	NA
	Chromium	7440-47-3	T	MG/L	0.00190	J	RL	0.00153	0.00153	0.00200	Y	Yes	1	NA
	Cobalt	7440-48-4	T	MG/L		U		0.0000750	0.0000750	0.000500	N	Yes	1	NA
	Copper	7440-50-8	T	MG/L		U		0.000627	0.000627	0.00200	N	Yes	1	NA
	Lead	7439-92-1	T	MG/L		U		0.000128	0.000128	0.00100	N	Yes	1	NA
	Lithium	7439-93-2	T	MG/L		U		0.00314	0.00314	0.00500	N	Yes	1	NA
	Molybdenum	7439-98-7	T	MG/L		U		0.000610	0.000610	0.00500	N	Yes	1	NA
	Nickel	7440-02-0	T	MG/L		U		0.000312	0.000312	0.00100	N	Yes	1	NA
	Selenium	7782-49-2	T	MG/L		U		0.00262	0.00262	0.00500	N	Yes	1	NA
	Silver	7440-22-4	T	MG/L		U		0.000121	0.000121	0.00100	N	Yes	1	NA
	Sodium	7440-23-5	T	MG/L		U		0.251	0.251	0.500	N	Yes	1	NA
	Thallium	7440-28-0	T	MG/L		U		0.000128	0.000128	0.00100	N	Yes	1	NA
Vanadium	7440-62-2	T	MG/L	0.00183			0.000899	0.000899	0.00100	Y	Yes	1	NA	
Zinc	7440-66-6	T	MG/L		U		0.00322	0.00322	0.00500	N	Yes	1	NA	
SW-846 7470A	Mercury	7439-97-6	T	MG/L		U		0.000101	0.000101	0.000200	N	Yes	1	NA
SW-846 9056A	Chloride	16887-00-6	N	MG/L		U		0.715	0.715	1.00	N	Yes	1	NA
	Fluoride	16984-48-8	N	MG/L		U		0.0263	0.0263	0.100	N	Yes	1	NA
	Sulfate	14808-79-8	N	MG/L		U		0.380	0.380	1.00	N	Yes	1	NA

**SECTION 3**

**SUPPORTING DOCUMENTATION FOR QUALIFIERS**

**INORGANIC ANALYSIS SUPPORT DOCUMENTATION**

 ESI project name: TVA-WBF  
 Sample Collection Dates: 4/18/19  
 Job Number: 201 98500.A000  
 Project Manager: A. Cover  
 Laboratory: TA Pittsburgh

 Reviewed by: K. Ferguson  
 Approved by: THW  
 Completion Date: 5/2019

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

 Deliverable: CLP (Full) ( )  
 Level IV (Full)   
 Limited ( )  
 Other: \_\_\_\_\_

 Sample No. 180-89236-1  
 Lab Control No. \_\_\_\_\_

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

	Criteria Examined in Detail				Problems Identified				Support Documentation Attachments			
	Check (✓) if Yes or Footnote Letter for Comments Below				Check (✓) if Yes or Footnote Letter for Comments Below				Check (✓) if Yes or Footnote Letter for Comments Below			
	60209	7H7/H7E	90506	90506	60209	7H7/H7E	90506	90506	60209	7H7/H7E	90506	90506
Holding Times	X	X	X	X					X	X	X	X
Blank Analysis Results	X	X	X	X					X	X	X	X
Matrix Spike (Predigestion) Results	X	X	X	X			X		X	X	X	X
Duplicate Analysis: (X) Field (X) Lab	X	X	X	X	X				X	X	X	X
Quantitation of Results	X	X	X	X					X	X	X	X
Detection Limit/Sensitivity	X	X	X	X					X	X	X	X
Initial Calibrations	X	X	X	X					X	X	X	X
Continuing Calibrations	X	X	X	X					X	X	X	X
Laboratory Control Standard (LCS)	X	X	X	X					X	X	X	X
ICP Linear Range Analysis	X											
ICP Interference Checks												
ICP Serial Dilutions	X				X				X			
ICP Post-Digestion Spike	X				X				X			
GFAA Post Digestion Spikes												
GFAA Duplicate Injections												
ICP Multiple Exposures												
GFAA Standard Additions												
CRDL Standards	X	X		X					X	X		X
Condition on Receipt	X	X	X	X					X	X	X	X
Percent Solids	X	X	X	X					X	X	X	X
Others: <u>internal standards</u>	X								X			

 Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
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 \_\_\_\_\_  
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# QC Sample Results

Client: Environmental Standards Inc.  
Project/Site: WBF-SES\_20190418\_1A

Job ID: 180-89236-1

**Method: EPA 9056A - Anions, Ion Chromatography (Continued)**

90R: 75-125 RPD LZO

Lab Sample ID: 180-88916-B-1-E MS - *Batch QC*  
Matrix: Solid  
Analysis Batch: 276504

Client Sample ID: Matrix Spike  
Prep Type: Soluble

*non-TVA sample - not used for eval*

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	31.7		346	398.8		mg/Kg	☼	106	80 - 120
Fluoride	5.25	F1	17.3	11.18	F1	mg/Kg	☼	↓ 34	80 - 120
Sulfate	252		346	579.9		mg/Kg	☼	95	80 - 120

Lab Sample ID: 180-88916-B-1-F MSD *Batch QC*  
Matrix: Solid  
Analysis Batch: 276504

Client Sample ID: Matrix Spike Duplicate  
Prep Type: Soluble

*non-TVA sample - not used for eval*

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	31.7		348	402.4		mg/Kg	☼	106	80 - 120	1	15
Fluoride	5.25	F1	17.4	11.52	F1	mg/Kg	☼	↓ 36	80 - 120	3	15
Sulfate	252		348	580.1		mg/Kg	☼	94	80 - 120	0	15

Lab Sample ID: MB 180-277793/1-A  
Matrix: Solid  
Analysis Batch: 277773

Client Sample ID: Method Blank  
Prep Type: Soluble

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		10.0	3.88	mg/Kg			05/06/19 11:06	1
Fluoride	ND		1.00	0.680	mg/Kg			05/06/19 11:06	1
Sulfate	ND	✓	10.0	6.79	mg/Kg			05/06/19 11:06	1

*MB LMDL*

Lab Sample ID: LCS 180-277793/2-A  
Matrix: Solid  
Analysis Batch: 277773

Client Sample ID: Lab Control Sample  
Prep Type: Soluble

90R: 80-120

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	250	239.4		mg/Kg		96	80 - 120
Fluoride	12.5	12.26	✓	mg/Kg		98	80 - 120
Sulfate	250	239.5		mg/Kg		96	80 - 120

Lab Sample ID: 180-89236-1 MS  
Matrix: Solid  
Analysis Batch: 277773

Client Sample ID: WBF-SES-01-20190418  
Prep Type: Soluble

*sample: 180-89236-1*

90R: 75-125

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	12.2	F1	589	285.7	F1	mg/Kg	☼	↓ 46	80 - 120
Fluoride	1.82	F1	29.4	4.937	F1	mg/Kg	☼	↓ 11	80 - 120
Sulfate	474	F1	589	740.7	F1	mg/Kg	☼	↓ 45	80 - 120

*46  
11  
45*

Lab Sample ID: 180-89236-1 MSD  
Matrix: Solid  
Analysis Batch: 277773

Client Sample ID: WBF-SES-01-20190418  
Prep Type: Soluble

90R: 75-125 RPD LZO

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	12.2	F1	301	305.9		mg/Kg	☼	97	80 - 120	7	15
Fluoride	1.82	F1	15.1	5.025	F1	mg/Kg	☼	↓ 21	80 - 120	2	15
Sulfate	474	F1	301	781.0		mg/Kg	☼	102	80 - 120	5	15

*21*

90R: + "J"/ND "MJ"  
- all yflag "J"

# QC Sample Results

Client: Environmental Standards Inc.  
Project/Site: WBF-SES\_20190418\_1A

Job ID: 180-89236-1

## Method: EPA 6020A - Metals (ICP/MS) (Continued)

Lab Sample ID: 180-89236-2 MS  
Matrix: Solid  
Analysis Batch: 276818

*Samples: 180-89236-01  
180-89236-02*

Client Sample ID: WBF-SES-DUP01-20190418  
*90R: 75-125*  
Prep Type: Total/NA  
Prep Batch: 276569  
%Rec.

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Antimony	0.392	F1	61.1	42.34	F1	mg/Kg	*	69	75 - 125
Arsenic	10.0		4.89	15.05		mg/Kg	*	103	75 - 125
Barium	60.9	✓	244	284.0	✓	mg/Kg	*	91	75 - 125
Beryllium	0.638	B	6.11	6.021		mg/Kg	*	88	75 - 125
Boron	1.89	J	122	103.0		mg/Kg	*	83	75 - 125
Cadmium	0.0590	J	6.11	5.452		mg/Kg	*	88	75 - 125
Calcium	1240		6110	6102		mg/Kg	*	80	75 - 125
Chromium	64.5	F1	24.4	71.27	F1	mg/Kg	*	28	75 - 125
Cobalt	20.8		61.1	74.90		mg/Kg	*	89	75 - 125
Copper	7.39		30.5	36.18		mg/Kg	*	94	75 - 125
* Lead	35.2		2.44	39.71	4	mg/Kg	*	186	75 - 125
Lithium	6.35	F1 B	6.11	14.87	F1	mg/Kg	*	139	75 - 125
Molybdenum	1.10		122	108.1		mg/Kg	*	88	75 - 125
Nickel	12.3		61.1	67.45		mg/Kg	*	90	75 - 125
Selenium	0.953		1.22	1.896		mg/Kg	*	77	75 - 125
Silver	ND		6.11	5.562		mg/Kg	*	91	75 - 125
Thallium	0.240		6.11	5.344		mg/Kg	*	84	75 - 125
Vanadium	40.3		61.1	91.75		mg/Kg	*	84	75 - 125
Sodium	ND	✓	6110	5660	✓	mg/Kg	*	93	75 - 125
Zinc	30.8		61.1	93.77		mg/Kg	*	103	75 - 125

Lab Sample ID: 180-89236-2 MSD  
Matrix: Solid  
Analysis Batch: 276818

Client Sample ID: WBF-SES-DUP01-20190418  
*90R: 75-125  
RPD < 20*  
Prep Type: Total/NA  
Prep Batch: 276569  
%Rec. RPD

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Antimony	0.392	F1	59.9	40.18	F1	mg/Kg	*	66	75 - 125	5	20
Arsenic	10.0		4.79	14.07		mg/Kg	*	84	75 - 125	7	20
Barium	60.9	✓	240	263.5	✓	mg/Kg	*	85	75 - 125	7	20
Beryllium	0.638	B	5.99	5.904		mg/Kg	*	88	75 - 125	2	20
Boron	1.89	J	120	99.81		mg/Kg	*	82	75 - 125	3	20
Cadmium	0.0590	J	5.99	5.225		mg/Kg	*	86	75 - 125	4	20
Calcium	1240		5990	5984		mg/Kg	*	79	75 - 125	2	20
Chromium	64.5	F1	24.0	68.41	F1	mg/Kg	*	16	75 - 125	4	20
Cobalt	20.8		59.9	69.43		mg/Kg	*	81	75 - 125	8	20
Copper	7.39		29.9	34.55		mg/Kg	*	91	75 - 125	5	20
* Lead	35.2		2.40	37.00	4	mg/Kg	*	76	75 - 125	7	20
Lithium	6.35	F1 B	5.99	14.89	F1	mg/Kg	*	143	75 - 125	0	20
Molybdenum	1.10		120	105.3		mg/Kg	*	87	75 - 125	3	20
Nickel	12.3		59.9	64.91		mg/Kg	*	88	75 - 125	4	20
Selenium	0.953		1.20	1.908		mg/Kg	*	80	75 - 125	1	20
Silver	ND		5.99	5.412		mg/Kg	*	90	75 - 125	3	20
Thallium	0.240		5.99	5.169		mg/Kg	*	82	75 - 125	3	20
Vanadium	40.3		59.9	88.33		mg/Kg	*	80	75 - 125	4	20
Sodium	ND	✓	5990	5455	✓	mg/Kg	*	91	75 - 125	4	20
Zinc	30.8		59.9	88.93		mg/Kg	*	97	75 - 125	5	20

*\*Initial sample result > 4x spike amt ∴ no qual*

*90R ↓: Antimony + Chromium + "J"/ND "UJ" - both flag "J"*

*90RT: Lithium + "J"/ND - no flag - both flag "J"*

## QC Association Summary

Client: Environmental Standards Inc.  
Project/Site: WBF-SES\_20190418\_1A

Job ID: 180-89236-1

### HPLC/IC

#### Leach Batch: 276483

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89236-2	WBF-SES-DUP01-20190418	Soluble	Solid	DI Leach	
MB 180-276483/1-A	Method Blank	Soluble	Solid	DI Leach	
LCS 180-276483/2-A	Lab Control Sample	Soluble	Solid	DI Leach	
180-88916-B-1-E MS	Matrix Spike	Soluble	Solid	DI Leach	
180-88916-B-1-F MSD	Matrix Spike Duplicate	Soluble	Solid	DI Leach	

#### Analysis Batch: 276504

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 180-276483/1-A	Method Blank	Soluble	Solid	EPA 9056A	276483
LCS 180-276483/2-A	Lab Control Sample	Soluble	Solid	EPA 9056A	276483
180-88916-B-1-E MS	Matrix Spike	Soluble	Solid	EPA 9056A	276483
180-88916-B-1-F MSD	Matrix Spike Duplicate	Soluble	Solid	EPA 9056A	276483

#### Analysis Batch: 276604

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89236-2	WBF-SES-DUP01-20190418	Soluble	Solid	EPA 9056A	276483

#### Analysis Batch: 276756

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89236-3	WBF-SES-EB01-20190418	Total/NA	Water	EPA 9056A	
180-89236-4	WBF-SES-FB01-20190418	Total/NA	Water	EPA 9056A	
MB 180-276756/6	Method Blank	Total/NA	Water	EPA 9056A	
LCS 180-276756/5	Lab Control Sample	Total/NA	Water	EPA 9056A	
180-89180-B-4 MS	Matrix Spike	Total/NA	Water	EPA 9056A	
180-89180-B-4 MSD	Matrix Spike Duplicate	Total/NA	Water	EPA 9056A	

#### Analysis Batch: 277773

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89236-1	WBF-SES-01-20190418	Soluble	Solid	EPA 9056A	277793
MB 180-277793/1-A	Method Blank	Soluble	Solid	EPA 9056A	277793
LCS 180-277793/2-A	Lab Control Sample	Soluble	Solid	EPA 9056A	277793
180-89236-1 MS	WBF-SES-01-20190418	Soluble	Solid	EPA 9056A	277793
180-89236-1 MSD	WBF-SES-01-20190418	Soluble	Solid	EPA 9056A	277793

#### Leach Batch: 277793

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89236-1	WBF-SES-01-20190418	Soluble	Solid	DI Leach	
MB 180-277793/1-A	Method Blank	Soluble	Solid	DI Leach	
LCS 180-277793/2-A	Lab Control Sample	Soluble	Solid	DI Leach	
180-89236-1 MS	WBF-SES-01-20190418	Soluble	Solid	DI Leach	
180-89236-1 MSD	WBF-SES-01-20190418	Soluble	Solid	DI Leach	

### Metals

#### Prep Batch: 276569

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89236-1	WBF-SES-01-20190418	Total/NA	Solid	3050B	
180-89236-2	WBF-SES-DUP01-20190418	Total/NA	Solid	3050B	
MB 180-276569/1-A	Method Blank	Total/NA	Solid	3050B	
LCS 180-276569/2-A	Lab Control Sample	Total/NA	Solid	3050B	
180-89236-2 MS	WBF-SES-DUP01-20190418	Total/NA	Solid	3050B	

## QC Association Summary

Client: Environmental Standards Inc.  
Project/Site: WBF-SES\_20190418\_1A

Job ID: 180-89236-1

### Metals (Continued)

#### Prep Batch: 276569 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89236-2 MSD	WBF-SES-DUP01-20190418	Total/NA	Solid	3050B	

#### Prep Batch: 276661

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89236-3	WBF-SES-EB01-20190418	Total Recoverable	Water	3005A	
180-89236-4	WBF-SES-FB01-20190418	Total Recoverable	Water	3005A	
MB 180-276661/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 180-276661/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
180-89242-B-2-A MS	Matrix Spike	Total Recoverable	Water	3005A	
180-89242-B-2-B MSD	Matrix Spike Duplicate	Total Recoverable	Water	3005A	

#### Analysis Batch: 276818

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89236-1	WBF-SES-01-20190418	Total/NA	Solid	EPA 6020A	276569
180-89236-2	WBF-SES-DUP01-20190418	Total/NA	Solid	EPA 6020A	276569
MB 180-276569/1-A	Method Blank	Total/NA	Solid	EPA 6020A	276569
LCS 180-276569/2-A	Lab Control Sample	Total/NA	Solid	EPA 6020A	276569
180-89236-2 MS	WBF-SES-DUP01-20190418	Total/NA	Solid	EPA 6020A	276569
180-89236-2 MSD	WBF-SES-DUP01-20190418	Total/NA	Solid	EPA 6020A	276569

#### Analysis Batch: 276856

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89236-3	WBF-SES-EB01-20190418	Total Recoverable	Water	EPA 6020A	276661
180-89236-4	WBF-SES-FB01-20190418	Total Recoverable	Water	EPA 6020A	276661
MB 180-276661/1-A	Method Blank	Total Recoverable	Water	EPA 6020A	276661
LCS 180-276661/2-A	Lab Control Sample	Total Recoverable	Water	EPA 6020A	276661
180-89242-B-2-A MS	Matrix Spike	Total Recoverable	Water	EPA 6020A	276661
180-89242-B-2-B MSD	Matrix Spike Duplicate	Total Recoverable	Water	EPA 6020A	276661

#### Prep Batch: 277058

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89236-2	WBF-SES-DUP01-20190418	Total/NA	Solid	7471B	
MB 180-277058/1-A	Method Blank	Total/NA	Solid	7471B	
LCS 180-277058/2-A	Lab Control Sample	Total/NA	Solid	7471B	
180-89202-E-9-B MS	Matrix Spike	Total/NA	Solid	7471B	
180-89202-E-9-C MSD	Matrix Spike Duplicate	Total/NA	Solid	7471B	

#### Analysis Batch: 277214

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89236-2	WBF-SES-DUP01-20190418	Total/NA	Solid	EPA 7471B	277058
MB 180-277058/1-A	Method Blank	Total/NA	Solid	EPA 7471B	277058
LCS 180-277058/2-A	Lab Control Sample	Total/NA	Solid	EPA 7471B	277058
180-89202-E-9-B MS	Matrix Spike	Total/NA	Solid	EPA 7471B	277058
180-89202-E-9-C MSD	Matrix Spike Duplicate	Total/NA	Solid	EPA 7471B	277058

#### Prep Batch: 277420

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89236-3	WBF-SES-EB01-20190418	Total/NA	Water	7470A	
180-89236-4	WBF-SES-FB01-20190418	Total/NA	Water	7470A	
MB 180-277420/1-A	Method Blank	Total/NA	Water	7470A	
LCS 180-277420/2-A	Lab Control Sample	Total/NA	Water	7470A	

5B-IN  
 POST DIGESTION SPIKE SAMPLE RECOVERY  
 METALS

902:80-120

Client ID: WBF-SES-DUP01-20190418 PDS

Lab ID: 180-89236-2 PDS

Lab Name: Eurofins TestAmerica, Pittsburgh

Job No.: 180-89236-1

SDG No.:

Matrix: Solid

Concentration Units: mg/Kg

Analyte	SSR	Sample Result (SR)	Spike Added (SA)	%R	Control Limit %R	Q	Method
	C	C					
Antimony	51.64	0.392	60.5	85	80-120		EPA 6020A
Arsenic	14.08	10.0	4.84	83	80-120		EPA 6020A
Barium	261.4	60.9	242	83	80-120		EPA 6020A
Beryllium	6.439 ✓	0.638 ✓	6.05	96 ✓	80-120		EPA 6020A
Boron	118.9	1.89 J	121	97	80-120		EPA 6020A
Cadmium	5.639	0.0590 J	6.05	92	80-120		EPA 6020A
Calcium	6657	1240	6050	90	80-120		EPA 6020A
Chromium	84.87	64.5	24.2	84	80-120		EPA 6020A
Cobalt	77.69 ✓	20.8 ✓	60.5	94 ✓	80-120		EPA 6020A
Copper	37.09	7.39	30.2	98	80-120		EPA 6020A
Lead	34.74	35.2	2.42	NC	80-120		EPA 6020A
Lithium	11.13	6.35	6.05	79	80-120	W	EPA 6020A
Molybdenum	113.8	1.10	121	93	80-120		EPA 6020A
Nickel	69.30	12.3	60.5	94	80-120		EPA 6020A
Selenium	2.226	0.953	1.21	105	80-120		EPA 6020A
Silver	5.824	ND	6.05	96	80-120		EPA 6020A
Thallium	5.400	0.240	6.05	85	80-120		EPA 6020A
Vanadium	93.71	40.3	60.5	88	80-120		EPA 6020A
Sodium	6312	ND	6050	104	80-120		EPA 6020A
Zinc	84.25	30.8	60.5	88	80-120		EPA 6020A

SSR = Spiked Sample Result

Samples: 180-89236-1 + 2

902 ↓ : Lithium

both samples flag "J"

Calculations are performed before rounding to avoid round-off errors in calculated results.  
 Note - Results and Reporting Limits have been adjusted for dry weight.

FORM VB - IN

8-IN  
ICP-AES AND ICP-MS SERIAL DILUTIONS  
METALS

%D < 10

Lab ID: 180-89236-2

SDG No:

Lab Name: Eurofins TestAmerica, Pittsburgh

Job No: 180-89236-1

Matrix: Solid

Concentration Units: mg/Kg

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Method
Antimony	0.392		0.4421	J	NC		EPA 6020A
Arsenic	10.0		10.48		4.4		EPA 6020A
Barium	60.9		63.45		4.2	✓	EPA 6020A
Beryllium	0.638		0.6205		2.7		EPA 6020A
Boron	1.89	J	ND		NC		EPA 6020A
Cadmium	0.0590	J	ND		NC		EPA 6020A
Calcium	1240		1233		0.78		EPA 6020A
Chromium	64.5		63.81		1.0		EPA 6020A
Cobalt	20.8		20.55		1.0		EPA 6020A
Copper	7.39		7.427		0.51	✓	EPA 6020A
Lead	35.2		34.81		1.0		EPA 6020A
Lithium	6.35		11.89		NC		EPA 6020A
Molybdenum	1.10		ND		NC		EPA 6020A
Nickel	12.3		20.02		62	V	EPA 6020A
Selenium	0.953		ND		NC		EPA 6020A
Silver	ND		ND		NC		EPA 6020A
Thallium	0.240		0.2516	J	NC		EPA 6020A
Vanadium	40.3		39.94		0.90		EPA 6020A
Sodium	ND		ND		NC		EPA 6020A
Zinc	30.8		31.47		2.2		EPA 6020A

samples: 180-89236-1 + 2 ✓

%D > 10 : Nickel

both samples flag "J"

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIII-IN

**SECTION 4**

**CASE NARRATIVE AND CHAIN-OF-CUSTODY RECORD**

**Job Narrative**  
**180-89236-1**

**Receipt**

The samples were received on 4/19/2019 9:00 AM; the samples arrived in good condition, properly preserved and on ice. The temperature of the cooler at receipt was 2.9° C. ✓

**GC Semi VOA**

Method 9056A: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for preparation batch 180-277793 and analytical batch 180-277773 were outside control limits. Sample matrix interference is suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits. ✓

**Metals**

Method 6020A: The serial dilution performed for WBF-SES-DUP01-20190418 (180-89236-2) associated with batch 276569 was outside control limits for nickel. ✓

Method 6020A: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for 276569 were outside control limits for several analytes. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits. ✓

**General Chemistry**

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

TVA Environmental Investigations



Tennessee Valley Authority

COOLER No.:	1	of	2
COC No.:	WBF_SES 20190418 1A		
1 of 1 Pages			
Task Desc:	WBF_SES		

**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 Barr Fossil Plant			Sampler:	Anne Wilson, Joseph Sander, Bradney Barton						
Lab Address:	301 Alpha Drive Pittsburgh, PA 15238		Project #:	175006050			Sampling Company:	Stantec						
Lab Manager Contact Information			Site Address:	6868 Watts Bar Highway			Address:	601 Grassmere Park Road, Suite 22						
Lab PM:	Gail Lage		City:	Spring City	State:	TN	City/State:	Nashville, TN	Phone:	615-865-1144				
Phone/Fax:	615-301-5741/615-726-3404		Site PM Name:	Roy Quinn			Sampling Team Number:	1						
Lab Email:	Gail.Lage@testamericac.com		Phone/Fax:	423-751-3753			Send EDD/Hard Copy to:	vrl_delivery@stentec.com						
			Site PM Email:	roy.quinn@tva.com			Analysis Turnaround Time							
							<input type="checkbox"/> CALENDAR DAYS <input type="checkbox"/> WORKING DAYS TAT if different from Below _____ <input type="checkbox"/> 24 Hours <input type="checkbox"/> 3 Business Days <input type="checkbox"/> 5 Business Days <input checked="" type="checkbox"/> 10 Business Days							
ITEMS #	SAMPLE ID Samples IDs MUST BE UNIQUE	SAMPLE LOCATION	Sample Depth		MATRIX CODE	G= GRAB C=COMP	SAMPLE TYPE	SAMPLE DATE	SAMPLE TIME	# OF CONTAINERS	Comments/ Lab Sample I.D.	MS/MSD	PRESERVED	ANALYZED
			Depth Unit	Feet										
1	WBF-SeS-01-20190418	SeS01	0.0	0.3'	SES	C	N	4/18/2019	1041	2		X	X	
2	WBF-SeS-DUP01-20190418	NA	NA	NA	SES	C	FD	4/18/2019	NA	2		X	X	
3	WBF-SeS-EB01-20190418	SeS01	NA	NA	AQ	G	EB	4/18/2019	1055	2		X	X	
4	WBF-SeS-FB01-20190418	SeS01	NA	NA	AQ	G	FB	4/18/2019	1100	2		X	X	
Additional Comments/Special Instructions:  Additional volume collected should be used for MS/MSDs.  SEEP_SOIL_BLANKS: Metals preserved w/ HNO3 to pH <2; Anions unpreserved			RELINQUISHED BY / AFFILIATION			DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	Sample Receipt Conditions			
			Richard Binder, Stantec			4/18/2019	14:50	Richard Binder	4/18/2019	14:50	Yes Yes Yes Yes No No No No Yes Yes Yes Yes No No No No Yes Yes Yes Yes No No No No			
			Joseph Sander, TANKS			4-18-19	16:00	Joseph Sander	4/18/2019	16:00	Yes Yes Yes Yes No No No No Yes Yes Yes Yes No No No No			
											Yes Yes Yes Yes No No No No			
SHIPPING METHOD:			SAMPLER NAME AND SIGNATURE											
TestAmerica Drop Off			Anne Wilson											
			Joseph Sander											
			Bradney Barton											
			Temperature in °C											
			Sample on Ice?											
			Sample Intact?											
			Trip Blank?											



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TVA Environmental Investigations



Tennessee Valley Authority

Chain-of-Custody / Analytical Request Document

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

COOLER No.:	2	of	2
COC No.:	WBF_SES 20190418 1A		
1 of 1 Pages			
Task Desc:	WBF_SES		

Required Ship to Lab:			Required Project Information:				Required Sampler Information:				Preserved	Analysis																									
Lab Name:	Site ID #:	Watts Bar Fossil Plant	Project #:	17558050	Sampler:	Anna Wilson, Joseph Sander, Bradney Barton																															
Lab Address:	301 Alpha Drive Pittsburgh, PA 15238	Site Address:	6866 Watts Bar Highway Spring City, TN, 37381		Sampling Company:	Startec			Address:	601 Grassmere Park Road, Suite 22 Nashville, TN Phone: 615-865-1144		Name	Date																								
Lab Manager Contact Information:	Site PM Name:	Roy Quinn		City/State:	Nashville, TN			City/State:	Nashville, TN																												
Lab PM:	Gail Lage	Phone/Fax:	423-751-3753		Sampling Team Number:	1			Send EDD/Hard Copy to:	va_de_vetera@starstec.com		SEEP_SOIL_BLANKS	SEEP_SOIL_BLANKS																								
Phone/Fax:	615-301-5741/615-726-3404	Site PM Email:	rquinn@wattsbar.gov																																		
Lab Email:	Gail.Lage@testamericatnc.com																																				
Analysis Turnaround Time												X	X																								
- CALENDAR DAYS - WORKING DAYS TAT if different from Below _____ <input type="checkbox"/> 24 Hours <input type="checkbox"/> 3 Business Days <input type="checkbox"/> 5 Business Days <input checked="" type="checkbox"/> 10 Business Days																																					
ITEMS #	SAMPLE ID Samples IDs MUST BE UNIQUE	SAMPLE LOCATION	Sample Depth		MATRIX CODE	Gr GRAB C-COMP	SAMPLE TYPE	SAMPLE DATE	SAMPLE TIME	# OF CONTAINERS	Comments/ Lab Sample I.D.	RECEIVED	ANALYSIS	DATE	TIME	Sample Receipt Conditions																					
			Depth Unit	Feet												Start Depth	End Depth	Yes	No	Yes	No	Yes	No	Yes	No												
1	WBF-SeS-01-20190418	SeS01	0.0	0.3'	SES	C	N	4/18/2019	1041	2		X	X																								
2	WBF-SeS-DUP01-20190418	NA	NA	NA	SES	C	FD	4/18/2019	NA	2		X	X																								
3	WBF-SeS-EB01-20190418	SeS01	NA	NA	AQ	G	EB	4/18/2019	1055	2		X	X																								
4	WBF-SeS-FB01-20190418	SeS01	NA	NA	AQ	G	FB	4/18/2019	1100	2		X	X																								
Additional Comments/Special Instructions:												RELINQUISHED BY / AFFILIATION		DATE	TIME	ACCEPTED BY / AFFILIATION		DATE	TIME	Sample Receipt Conditions																	
Additional volume collected should be used for MS/MSDs.												Richard Binder, Startec		4/18/2019	14:00	[Signature]		4/18/2019	14:50	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No								
SEEP_SOIL_BLANKS: Metals preserved w/ HNO3 to pH <2; Anions unpreserved												[Signature]		4-18-19	16:00	[Signature]		4/18/2019	14:50	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	Yes	No										
												SHIPPING METHOD:		SAMPLER NAME AND SIGNATURE																							
												TestAmerica Drop Off		Anna Wilson [Signature]																							
														Joseph Sander [Signature]																							
														Bradney Barton [Signature]																							
														Temperature in °C																							
														Sample on Ice?																							
														Sample Intact?																							
														Trip Blank?																							

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## Login Sample Receipt Checklist

Client: Environmental Standards Inc.

Job Number: 180-89236-1

**Login Number: 89236**

**List Source: Eurofins TestAmerica, Pittsburgh**

**List Number: 1**

**Creator: Say, Thomas C**

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

**SECTION 5**

**PROJECT CORRESPONDENCE**

## Kristen Ferguson

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**From:** Lage, Gail <Gail.Lage@testamericainc.com>  
**Sent:** Tuesday, May 21, 2019 11:40 AM  
**To:** Andrew Piasecki; CSO – TVA Projects  
**Cc:** TVA\_Deliverables; Amanda Cover; Kristen Ferguson  
**Subject:** RE: WBF SES - Request for 180-89236-1

Revised L4 uploaded to Total Access

**Gail Lage**  
Senior Project Manager

Eurofins TestAmerica  
2960 Foster Creighton Drive  
Nashville, TN 37204  
USA

Phone: 615-301-5741

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**From:** Andrew Piasecki [mailto:apiasecki@envstd.com]  
**Sent:** Monday, May 20, 2019 1:08 PM  
**To:** CSO – TVA Projects  
**Cc:** TVA\_Deliverables; Amanda Cover; Kristen Ferguson  
**Subject:** WBF SES - Request for 180-89236-1

### **-External Email-**

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Hi Gail,

In Job 180-89236-1, the ICP/MS raw data was missing for the sequence starting on 4/25/19 at 12:19 and ending on 4/26/19 at 00:15 on instrument A. Please provide a revised L4 to include the information.

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**

