

**Data Validation Report  
Tennessee Valley Authority  
Cumberland Fossil Plant  
Environmental Investigation Plan  
Background Soil Samples**

This data validation report was revised to include the ICP/MS metals data reported from TestAmerica Laboratories, Inc. (TestAmerica) of Pittsburgh, Pennsylvania.

This quality assurance (QA) review is based upon an examination of the data generated from the analyses of the nine background soil samples and two aqueous blanks collected on August 23, 2018, at the Tennessee Valley Authority (TVA) Cumberland Fossil Plant facility. These samples were collectively analyzed by TestAmerica, of Pittsburgh, Pennsylvania, for total metals by SW-846 Method 6020A. In addition, these samples were collectively analyzed by TestAmerica, of Nashville, Tennessee, 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 Cumberland Fossil Plant Environmental Investigation (CUF EIP; Revision 3 Final, June 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 Numbers 490-157991-1 and 490-157991-2.

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

Sample Identification	Laboratory Sample Identification	Job Number	Matrix	Date Sample Collected	Parameter(s) Examined
CUF-BS-FB03-20180823 (Field Blank)	490-157991-1	490-157991-1 490-157991-2	Aq	8/23/18	A, Hg M
CUF-BS-BG04-0.0/0.5-20180823	490-157991-2	490-157991-1 490-157991-2	Soil	8/23/18	A, Hg, pH M
CUF-BS-BG04-1.5/3.5-20180823	490-157991-3	490-157991-1 490-157991-2	Soil	8/23/18	A, Hg, pH M
CUF-BS-BG04-6.5/8.5-20180823	490-157991-4	490-157991-1 490-157991-2	Soil	8/23/18	A, Hg, pH M
CUF-BS-BG04-10.0/11.4-20180823	490-157991-5	490-157991-1 490-157991-2	Soil	8/23/18	A, Hg, pH M
CUF-BS-EB01-20180823 (Equipment Blank)	490-157991-6	490-157991-1 490-157991-2	Aq	8/23/18	A, Hg M
CUF-BS-BG09-0.0/0.5-20180823	490-157991-7	490-157991-1 490-157991-2	Soil	8/23/18	A, Hg, pH M
CUF-BS-BG09-1.5/3.5-20180823	490-157991-8	490-157991-1 490-157991-2	Soil	8/23/18	A, Hg, pH M
CUF-BS-BG09-6.5/8.5-20180823	490-157991-9	490-157991-1 490-157991-2	Soil	8/23/18	A, Hg, pH M
CUF-BS-BG09-11.5/13.5-20180823	490-157991-10	490-157991-1 490-157991-2	Soil	8/23/18	A, Hg, pH M
CUF-BS-BG09-16.5/18.5-20180823	490-157991-11	490-157991-1 490-157991-2	Soil	8/23/18	A, Hg, pH M

Parameters Examined

- M - Total Metals by SW-846 Method 6020A.
- Hg - 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.
- 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/Laboratory Control Sample Duplicate (LCS/LCSD) Results	Sample Preparation
Laboratory 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 CUF EIP.
- Due to quality control noncompliance identified during data validation, all background soil samples included in this Job Number were reanalyzed for ICP/MS metals at TestAmerica of Pittsburgh, Pennsylvania. Upon further review of the data, TestAmerica rescinded all of the background soil ICP/MS data originally reported from TestAmerica of Nashville, Tennessee. The ICP/MS metals results for these samples were re-reported from the re-analyses performed at TestAmerica of Pittsburgh, Pennsylvania. (see Project Correspondence [Section 5]).

### **Qualifier Summary**

Analyte(s)	Job Number	Sample(s)	Validation Qualifier(s)	Reason(s) for Qualification
sulfate	490-157991-1	CUF-BS-BG04-0.0/0.5-20180823, CUF-BS-BG04-1.5/3.5-20180823, CUF-BS-BG04-6.5/8.5-20180823, CUF-BS-BG04-10.0/11.4-20180823, CUF-BS-BG09-0.0/0.5-20180823, CUF-BS-BG09-1.5/3.5-20180823, and CUF-BS-BG09-11.5/13.5-20180823	U*	BE, BF, BL
fluoride	490-157991-1	All samples except CUF-BS-FB03-20180823 and CUF-BS-EB01-20180823	J/UR	M-
antimony and selenium	490-157991-2	All samples except CUF-BS-FB03-20180823 and CUF-BS-EB01-20180823	J	M-

Analyte(s)	Job Number	Sample(s)	Validation Qualifier(s)	Reason(s) for Qualification
lithium	490-157991-2	All samples except CUF-BS-FB03-20180823 and CUF-BS-EB01-20180823	J	M+
calcium, chromium, cobalt, copper, nickel, vanadium, and zinc	490-157991-2	CUF-BS-BG09-1.5/3.5-20180823	J	I
arsenic, molybdenum, and selenium	490-157991-2	All samples except CUF-BS-BG04-0.0/0.5-20180823, CUF-BS-FB03-20180823, and CUF-BS-EB01-20180823	J	I
antimony, cadmium, lead, silver, and thallium	490-157991-2	All samples except CUF-BS-BG04-0.0/0.5-20180823, CUF-BS-BG04-1.5/3.5-20180823, CUF-BS-FB03-20180823, and CUF-BS-EB01-20180823	J	I

All positive results reported between the MDL and QL should be considered estimated and have been flagged "J" (unless previously flagged "U\*") on the data tables. (Reason Code: RL)

Review performed by: Danielle Coles, Quality Assurance Chemist  
 Report reviewed and approved by: Andrew L. Piasecki, Senior Quality Assurance Chemist  
 Review approved by: Rock J. Vitale, CEAC, Technical Director of Chemistry/Principal  
 Date review completed: 2/25/19

**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	490-157991-1
Sys Sample Code	CUF-BS-FB03-20180823
Sample Name	CUF-BS-FB03-20180823
Sample Date	8/23/2018 9:06:00 AM
Location	
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		0.00112	0.00112	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		0.000373	0.000373	0.0100	N	Yes	1	NA
	Beryllium	7440-41-7	T	MG/L		U		0.0000570	0.0000570	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	0.134	J	RL	0.116	0.116	0.500	Y	Yes	1	NA
	Chromium	7440-47-3	T	MG/L	0.00117	J	RL	0.000631	0.000631	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		0.00130	0.00130	0.00200	N	Yes	1	NA
	Lead	7439-92-1	T	MG/L		U		0.0000940	0.0000940	0.00100	N	Yes	1	NA
	Lithium	7439-93-2	T	MG/L		U		0.00256	0.00256	0.00500	N	Yes	1	NA
	Molybdenum	7439-98-7	T	MG/L		U		0.000474	0.000474	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		0.000813	0.000813	0.00500	N	Yes	1	NA
	Silver	7440-22-4	T	MG/L		U		0.000121	0.000121	0.00100	N	Yes	1	NA
	Thallium	7440-28-0	T	MG/L		U		0.0000630	0.0000630	0.00100	N	Yes	1	NA
	Vanadium	7440-62-2	T	MG/L		U		0.000899	0.000899	0.00100	N	Yes	1	NA
Zinc	7440-66-6	T	MG/L		U		0.00242	0.00242	0.00500	N	Yes	1	NA	
SW-846 7470A	Mercury	7439-97-6	T	MG/L		U		0.000100	0.000100	0.000200	N	Yes	1	NA
SW-846 9056A	Chloride	16887-00-6	N	MG/L	0.259	J	RL	0.200	0.200	1.00	Y	Yes	1	NA
	Fluoride	16984-48-8	N	MG/L		U		0.0100	0.0100	0.100	N	Yes	1	NA
	Sulfate	14808-79-8	N	MG/L	0.434	J	RL	0.0300	0.0300	1.00	Y	Yes	1	NA

Lab Sample ID	490-157991-10
Sys Sample Code	CUF-BS-BG09-11.5/13.5-20180823
Sample Name	CUF-BS-BG09-11.5/13.5-20180823
Sample Date	8/23/2018 3:33:00 PM
Location	BG-09
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:			%	25.4									
SW-846 6020A	Antimony	7440-36-0	T	MG/KG	0.819	J	M-,I	0.0815	0.0815	0.263	Y	Yes	1	DRY
	Arsenic	7440-38-2	T	MG/KG	17.8	J	I	0.0342	0.0342	0.132	Y	Yes	1	DRY
	Barium	7440-39-3	T	MG/KG	45.9			0.0750	0.0750	1.32	Y	Yes	1	DRY
	Beryllium	7440-41-7	T	MG/KG	0.888			0.00986	0.00986	0.132	Y	Yes	1	DRY
	Boron	7440-42-8	T	MG/KG	1.78	J	RL	1.00	1.00	10.5	Y	Yes	1	DRY
	Cadmium	7440-43-9	T	MG/KG	0.0416	J	I,RL	0.0224	0.0224	0.132	Y	Yes	1	DRY
	Calcium	7440-70-2	T	MG/KG	552			11.8	11.8	65.8	Y	Yes	1	DRY
	Chromium	7440-47-3	T	MG/KG	26.9			0.0868	0.0868	0.263	Y	Yes	1	DRY
	Cobalt	7440-48-4	T	MG/KG	3.75			0.0109	0.0109	0.0658	Y	Yes	1	DRY
	Copper	7440-50-8	T	MG/KG	15.4			0.149	0.149	0.263	Y	Yes	1	DRY
	Lead	7439-92-1	T	MG/KG	19.3	J	I	0.0460	0.0460	0.132	Y	Yes	1	DRY
	Lithium	7439-93-2	T	MG/KG	10.2	J	M+	0.363	0.363	0.658	Y	Yes	1	DRY
	Molybdenum	7439-98-7	T	MG/KG	3.62	J	I	0.0815	0.0815	0.658	Y	Yes	1	DRY
	Nickel	7440-02-0	T	MG/KG	18.7			0.0802	0.0802	0.132	Y	Yes	1	DRY
	Selenium	7782-49-2	T	MG/KG	0.358	J	M-,I,RL	0.0789	0.0789	0.658	Y	Yes	1	DRY
	Silver	7440-22-4	T	MG/KG	0.0348	J	I,RL	0.0184	0.0184	0.132	Y	Yes	1	DRY
	Thallium	7440-28-0	T	MG/KG	0.361	J	I	0.0171	0.0171	0.132	Y	Yes	1	DRY
Vanadium	7440-62-2	T	MG/KG	49.5			0.0802	0.0802	0.132	Y	Yes	1	DRY	
Zinc	7440-66-6	T	MG/KG	27.3			0.439	0.439	0.658	Y	Yes	1	DRY	
SW-846 7471B	Mercury	7439-97-6	T	MG/KG	0.114	J	RL	0.0400	0.0400	0.133	Y	Yes	1	DRY
SW-846 9045D	pH at 25 Degrees C	PH	N	SU	5.9			0.1	0.1	0.1	Y	Yes	1	WET
SW-846 9056A	Chloride	16887-00-6	N	MG/KG		U		9.51	9.51	13.6	N	Yes	1	DRY
	Fluoride	16984-48-8	N	MG/KG		UR	M-	1.09	1.09	1.36	N	Yes	1	DRY
	Sulfate	14808-79-8	N	MG/KG		U*	BE,BF,BL,RL	11.5	11.5	13.6	N	Yes	1	DRY

Lab Sample ID	490-157991-11
Sys Sample Code	CUF-BS-BG09-16.5/18.5-20180823
Sample Name	CUF-BS-BG09-16.5/18.5-20180823
Sample Date	8/23/2018 3:46:00 PM
Location	BG-09
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:			%	30.8									
SW-846 6020A	Antimony	7440-36-0	T	MG/KG	0.707	J	M-,I	0.0924	0.0924	0.298	Y	Yes	1	DRY
	Arsenic	7440-38-2	T	MG/KG	19.9	J	I	0.0388	0.0388	0.149	Y	Yes	1	DRY
	Barium	7440-39-3	T	MG/KG	58.5			0.0850	0.0850	1.49	Y	Yes	1	DRY
	Beryllium	7440-41-7	T	MG/KG	5.59			0.0112	0.0112	0.149	Y	Yes	1	DRY
	Boron	7440-42-8	T	MG/KG	1.59	J	RL	1.14	1.14	11.9	Y	Yes	1	DRY
	Cadmium	7440-43-9	T	MG/KG	0.0786	J	I,RL	0.0253	0.0253	0.149	Y	Yes	1	DRY
	Calcium	7440-70-2	T	MG/KG	1370			13.3	13.3	74.5	Y	Yes	1	DRY
	Chromium	7440-47-3	T	MG/KG	35.4			0.0984	0.0984	0.298	Y	Yes	1	DRY
	Cobalt	7440-48-4	T	MG/KG	6.99			0.0124	0.0124	0.0745	Y	Yes	1	DRY
	Copper	7440-50-8	T	MG/KG	19.3			0.168	0.168	0.298	Y	Yes	1	DRY
	Lead	7439-92-1	T	MG/KG	27.1	J	I	0.0522	0.0522	0.149	Y	Yes	1	DRY
	Lithium	7439-93-2	T	MG/KG	14.4	J	M+	0.411	0.411	0.745	Y	Yes	1	DRY
	Molybdenum	7439-98-7	T	MG/KG	2.97	J	I	0.0924	0.0924	0.745	Y	Yes	1	DRY
	Nickel	7440-02-0	T	MG/KG	19.5			0.0909	0.0909	0.149	Y	Yes	1	DRY
	Selenium	7782-49-2	T	MG/KG	2.41	J	M-,I	0.0894	0.0894	0.745	Y	Yes	1	DRY
	Silver	7440-22-4	T	MG/KG	0.0671	J	I,RL	0.0209	0.0209	0.149	Y	Yes	1	DRY
	Thallium	7440-28-0	T	MG/KG	0.466	J	I	0.0194	0.0194	0.149	Y	Yes	1	DRY
	Vanadium	7440-62-2	T	MG/KG	61.0			0.0909	0.0909	0.149	Y	Yes	1	DRY
Zinc	7440-66-6	T	MG/KG	49.6			0.498	0.498	0.745	Y	Yes	1	DRY	
SW-846 7471B	Mercury	7439-97-6	T	MG/KG	0.131	J	RL	0.0421	0.0421	0.140	Y	Yes	1	DRY
SW-846 9045D	pH at 25 Degrees C	PH	N	SU	6.8			0.1	0.1	0.1	Y	Yes	1	WET
SW-846 9056A	Chloride	16887-00-6	N	MG/KG		U		10.1	10.1	14.5	N	Yes	1	DRY
	Fluoride	16984-48-8	N	MG/KG		UR	M-	1.16	1.16	1.45	N	Yes	1	DRY
	Sulfate	14808-79-8	N	MG/KG		U		8.68	8.68	14.5	N	Yes	1	DRY

Lab Sample ID	490-157991-2
Sys Sample Code	CUF-BS-BG04-0.0/0.5-20180823
Sample Name	CUF-BS-BG04-0.0/0.5-20180823
Sample Date	8/23/2018 9:56:00 AM
Location	BG-04
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:			%	16.1									
SW-846 6020A	Antimony	7440-36-0	T	MG/KG	0.261	J	M-	0.0762	0.0762	0.246	Y	Yes	1	DRY
	Arsenic	7440-38-2	T	MG/KG	4.81			0.0319	0.0319	0.123	Y	Yes	1	DRY
	Barium	7440-39-3	T	MG/KG	108			0.0700	0.0700	1.23	Y	Yes	1	DRY
	Beryllium	7440-41-7	T	MG/KG	0.841			0.00921	0.00921	0.123	Y	Yes	1	DRY
	Boron	7440-42-8	T	MG/KG	1.42	J	RL	0.937	0.937	9.83	Y	Yes	1	DRY
	Cadmium	7440-43-9	T	MG/KG	0.125			0.0209	0.0209	0.123	Y	Yes	1	DRY
	Calcium	7440-70-2	T	MG/KG	1250			11.0	11.0	61.4	Y	Yes	1	DRY
	Chromium	7440-47-3	T	MG/KG	22.1			0.0811	0.0811	0.246	Y	Yes	1	DRY
	Cobalt	7440-48-4	T	MG/KG	11.3			0.0102	0.0102	0.0614	Y	Yes	1	DRY
	Copper	7440-50-8	T	MG/KG	7.38			0.139	0.139	0.246	Y	Yes	1	DRY
	Lead	7439-92-1	T	MG/KG	17.4			0.0430	0.0430	0.123	Y	Yes	1	DRY
	Lithium	7439-93-2	T	MG/KG	3.95	J	M+	0.339	0.339	0.614	Y	Yes	1	DRY
	Molybdenum	7439-98-7	T	MG/KG	0.694			0.0762	0.0762	0.614	Y	Yes	1	DRY
	Nickel	7440-02-0	T	MG/KG	8.53			0.0749	0.0749	0.123	Y	Yes	1	DRY
	Selenium	7782-49-2	T	MG/KG	0.672	J	M-	0.0737	0.0737	0.614	Y	Yes	1	DRY
	Silver	7440-22-4	T	MG/KG	0.0397	J	RL	0.0172	0.0172	0.123	Y	Yes	1	DRY
	Thallium	7440-28-0	T	MG/KG	0.152			0.0160	0.0160	0.123	Y	Yes	1	DRY
Vanadium	7440-62-2	T	MG/KG	20.6			0.0749	0.0749	0.123	Y	Yes	1	DRY	
Zinc	7440-66-6	T	MG/KG	22.2			0.410	0.410	0.614	Y	Yes	1	DRY	
SW-846 7471B	Mercury	7439-97-6	T	MG/KG		U		0.0347	0.0347	0.116	N	Yes	1	DRY
SW-846 9045D	pH at 25 Degrees C	PH	N	SU	7.3			0.1	0.1	0.1	Y	Yes	1	WET
SW-846 9056A	Chloride	16887-00-6	N	MG/KG	22.5			8.32	8.32	11.9	Y	Yes	1	DRY
	Fluoride	16984-48-8	N	MG/KG	7.84	J	M-	0.951	0.951	1.19	Y	Yes	1	DRY
	Sulfate	14808-79-8	N	MG/KG		U*	BE,BF,BL,RL	9.87	9.87	11.9	N	Yes	1	DRY

Lab Sample ID	490-157991-3
Sys Sample Code	CUF-BS-BG04-1.5/3.5-20180823
Sample Name	CUF-BS-BG04-1.5/3.5-20180823
Sample Date	8/23/2018 10:18:00 AM
Location	BG-04
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:			%	19.7									
SW-846 6020A	Antimony	7440-36-0	T	MG/KG	0.337	J	M-	0.0788	0.0788	0.254	Y	Yes	1	DRY
	Arsenic	7440-38-2	T	MG/KG	13.7	J	I	0.0330	0.0330	0.127	Y	Yes	1	DRY
	Barium	7440-39-3	T	MG/KG	342			0.0724	0.0724	1.27	Y	Yes	1	DRY
	Beryllium	7440-41-7	T	MG/KG	1.83			0.00953	0.00953	0.127	Y	Yes	1	DRY
	Boron	7440-42-8	T	MG/KG	2.01	J	RL	0.969	0.969	10.2	Y	Yes	1	DRY
	Cadmium	7440-43-9	T	MG/KG	0.350			0.0216	0.0216	0.127	Y	Yes	1	DRY
	Calcium	7440-70-2	T	MG/KG	1940			11.4	11.4	63.5	Y	Yes	1	DRY
	Chromium	7440-47-3	T	MG/KG	20.1			0.0838	0.0838	0.254	Y	Yes	1	DRY
	Cobalt	7440-48-4	T	MG/KG	15.9			0.0105	0.0105	0.0635	Y	Yes	1	DRY
	Copper	7440-50-8	T	MG/KG	10.8			0.144	0.144	0.254	Y	Yes	1	DRY
	Lead	7439-92-1	T	MG/KG	20.8			0.0445	0.0445	0.127	Y	Yes	1	DRY
	Lithium	7439-93-2	T	MG/KG	8.28	J	M+	0.351	0.351	0.635	Y	Yes	1	DRY
	Molybdenum	7439-98-7	T	MG/KG	0.951	J	I	0.0788	0.0788	0.635	Y	Yes	1	DRY
	Nickel	7440-02-0	T	MG/KG	17.6			0.0775	0.0775	0.127	Y	Yes	1	DRY
	Selenium	7782-49-2	T	MG/KG	1.25	J	M-,I	0.0762	0.0762	0.635	Y	Yes	1	DRY
	Silver	7440-22-4	T	MG/KG	0.0743	J	RL	0.0178	0.0178	0.127	Y	Yes	1	DRY
	Thallium	7440-28-0	T	MG/KG	0.232			0.0165	0.0165	0.127	Y	Yes	1	DRY
Vanadium	7440-62-2	T	MG/KG	41.4			0.0775	0.0775	0.127	Y	Yes	1	DRY	
Zinc	7440-66-6	T	MG/KG	43.5			0.424	0.424	0.635	Y	Yes	1	DRY	
SW-846 7471B	Mercury	7439-97-6	T	MG/KG	0.0537	J	RL	0.0372	0.0372	0.124	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	WET
SW-846 9056A	Chloride	16887-00-6	N	MG/KG		U		8.64	8.64	12.3	N	Yes	1	DRY
	Fluoride	16984-48-8	N	MG/KG	0.988	J	M-,RL	0.988	0.988	1.23	Y	Yes	1	DRY
	Sulfate	14808-79-8	N	MG/KG		U*	BE,BF,BL,RL	10.7	10.7	12.3	N	Yes	1	DRY

Lab Sample ID	490-157991-4
Sys Sample Code	CUF-BS-BG04-6.5/8.5-20180823
Sample Name	CUF-BS-BG04-6.5/8.5-20180823
Sample Date	8/23/2018 10:41:00 AM
Location	BG-04
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:			%	20.1									
SW-846 6020A	Antimony	7440-36-0	T	MG/KG	0.653	J	M-,I	0.0776	0.0776	0.250	Y	Yes	1	DRY
	Arsenic	7440-38-2	T	MG/KG	22.8	J	I	0.0326	0.0326	0.125	Y	Yes	1	DRY
	Barium	7440-39-3	T	MG/KG	214			0.0714	0.0714	1.25	Y	Yes	1	DRY
	Beryllium	7440-41-7	T	MG/KG	1.93			0.00939	0.00939	0.125	Y	Yes	1	DRY
	Boron	7440-42-8	T	MG/KG	1.16	J	RL	0.955	0.955	10.0	Y	Yes	1	DRY
	Cadmium	7440-43-9	T	MG/KG	0.914	J	I	0.0213	0.0213	0.125	Y	Yes	1	DRY
	Calcium	7440-70-2	T	MG/KG	1700			11.2	11.2	62.6	Y	Yes	1	DRY
	Chromium	7440-47-3	T	MG/KG	39.7			0.0826	0.0826	0.250	Y	Yes	1	DRY
	Cobalt	7440-48-4	T	MG/KG	25.0			0.0104	0.0104	0.0626	Y	Yes	1	DRY
	Copper	7440-50-8	T	MG/KG	18.5			0.141	0.141	0.250	Y	Yes	1	DRY
	Lead	7439-92-1	T	MG/KG	44.8	J	I	0.0438	0.0438	0.125	Y	Yes	1	DRY
	Lithium	7439-93-2	T	MG/KG	12.1	J	M+	0.346	0.346	0.626	Y	Yes	1	DRY
	Molybdenum	7439-98-7	T	MG/KG	3.20	J	I	0.0776	0.0776	0.626	Y	Yes	1	DRY
	Nickel	7440-02-0	T	MG/KG	28.3			0.0764	0.0764	0.125	Y	Yes	1	DRY
	Selenium	7782-49-2	T	MG/KG	0.626	J	M-,I	0.0751	0.0751	0.626	Y	Yes	1	DRY
	Silver	7440-22-4	T	MG/KG	0.0337	J	I,RL	0.0175	0.0175	0.125	Y	Yes	1	DRY
	Thallium	7440-28-0	T	MG/KG	0.314	J	I	0.0163	0.0163	0.125	Y	Yes	1	DRY
Vanadium	7440-62-2	T	MG/KG	62.2			0.0764	0.0764	0.125	Y	Yes	1	DRY	
Zinc	7440-66-6	T	MG/KG	66.4			0.418	0.418	0.626	Y	Yes	1	DRY	
SW-846 7471B	Mercury	7439-97-6	T	MG/KG	0.0663	J	RL	0.0369	0.0369	0.123	Y	Yes	1	DRY
SW-846 9045D	pH at 25 Degrees C	PH	N	SU	6.9			0.1	0.1	0.1	Y	Yes	1	WET
SW-846 9056A	Chloride	16887-00-6	N	MG/KG		U		8.67	8.67	12.4	N	Yes	1	DRY
	Fluoride	16984-48-8	N	MG/KG	1.31	J	M-	0.990	0.990	1.24	Y	Yes	1	DRY
	Sulfate	14808-79-8	N	MG/KG		U*	BE,BF,BL	13.7	13.7	13.7	N	Yes	1	DRY

Lab Sample ID	490-157991-5
Sys Sample Code	CUF-BS-BG04-10.0/11.4-20180823
Sample Name	CUF-BS-BG04-10.0/11.4-20180823
Sample Date	8/23/2018 10:54:00 AM
Location	BG-04
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:			%	22.8									
SW-846 6020A	Antimony	7440-36-0	T	MG/KG	0.227	J	M-,I,RL	0.0811	0.0811	0.262	Y	Yes	1	DRY
	Arsenic	7440-38-2	T	MG/KG	7.97	J	I	0.0340	0.0340	0.131	Y	Yes	1	DRY
	Barium	7440-39-3	T	MG/KG	56.6			0.0746	0.0746	1.31	Y	Yes	1	DRY
	Beryllium	7440-41-7	T	MG/KG	1.52			0.00981	0.00981	0.131	Y	Yes	1	DRY
	Boron	7440-42-8	T	MG/KG		U		0.998	0.998	10.5	N	Yes	1	DRY
	Cadmium	7440-43-9	T	MG/KG	0.211	J	I	0.0222	0.0222	0.131	Y	Yes	1	DRY
	Calcium	7440-70-2	T	MG/KG	1970			11.7	11.7	65.4	Y	Yes	1	DRY
	Chromium	7440-47-3	T	MG/KG	20.9			0.0863	0.0863	0.262	Y	Yes	1	DRY
	Cobalt	7440-48-4	T	MG/KG	5.48			0.0109	0.0109	0.0654	Y	Yes	1	DRY
	Copper	7440-50-8	T	MG/KG	13.9			0.148	0.148	0.262	Y	Yes	1	DRY
	Lead	7439-92-1	T	MG/KG	15.3	J	I	0.0458	0.0458	0.131	Y	Yes	1	DRY
	Lithium	7439-93-2	T	MG/KG	13.2	J	M+	0.361	0.361	0.654	Y	Yes	1	DRY
	Molybdenum	7439-98-7	T	MG/KG	0.504	J	I,RL	0.0811	0.0811	0.654	Y	Yes	1	DRY
	Nickel	7440-02-0	T	MG/KG	16.9			0.0798	0.0798	0.131	Y	Yes	1	DRY
	Selenium	7782-49-2	T	MG/KG	0.895	J	I,M-	0.0785	0.0785	0.654	Y	Yes	1	DRY
	Silver	7440-22-4	T	MG/KG	0.0957	J	I,RL	0.0183	0.0183	0.131	Y	Yes	1	DRY
	Thallium	7440-28-0	T	MG/KG	0.245	J	I	0.0170	0.0170	0.131	Y	Yes	1	DRY
Vanadium	7440-62-2	T	MG/KG	26.9			0.0798	0.0798	0.131	Y	Yes	1	DRY	
Zinc	7440-66-6	T	MG/KG	58.7			0.437	0.437	0.654	Y	Yes	1	DRY	
SW-846 7471B	Mercury	7439-97-6	T	MG/KG	0.0537	J	RL	0.0386	0.0386	0.129	Y	Yes	1	DRY
SW-846 9045D	pH at 25 Degrees C	PH	N	SU	7.3			0.1	0.1	0.1	Y	Yes	1	WET
SW-846 9056A	Chloride	16887-00-6	N	MG/KG		U		9.20	9.20	13.1	N	Yes	1	DRY
	Fluoride	16984-48-8	N	MG/KG	2.38	J	M-	1.05	1.05	1.31	Y	Yes	1	DRY
	Sulfate	14808-79-8	N	MG/KG		U*	BE,BF,BL,RL	10.2	10.2	13.1	N	Yes	1	DRY

Lab Sample ID	490-157991-6
Sys Sample Code	CUF-BS-EB01-20180823
Sample Name	CUF-BS-EB01-20180823
Sample Date	8/23/2018 11:13:00 AM
Location	
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		0.00112	0.00112	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		0.000373	0.000373	0.0100	N	Yes	1	NA
	Beryllium	7440-41-7	T	MG/L		U		0.0000570	0.0000570	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	0.147	J	RL	0.116	0.116	0.500	Y	Yes	1	NA
	Chromium	7440-47-3	T	MG/L	0.00122	J	RL	0.000631	0.000631	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		0.00130	0.00130	0.00200	N	Yes	1	NA
	Lead	7439-92-1	T	MG/L		U		0.0000940	0.0000940	0.00100	N	Yes	1	NA
	Lithium	7439-93-2	T	MG/L		U		0.00256	0.00256	0.00500	N	Yes	1	NA
	Molybdenum	7439-98-7	T	MG/L		U		0.000474	0.000474	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		0.000813	0.000813	0.00500	N	Yes	1	NA
	Silver	7440-22-4	T	MG/L		U		0.000121	0.000121	0.00100	N	Yes	1	NA
	Thallium	7440-28-0	T	MG/L		U		0.0000630	0.0000630	0.00100	N	Yes	1	NA
	Vanadium	7440-62-2	T	MG/L		U		0.000899	0.000899	0.00100	N	Yes	1	NA
Zinc	7440-66-6	T	MG/L		U		0.00242	0.00242	0.00500	N	Yes	1	NA	
SW-846 7470A	Mercury	7439-97-6	T	MG/L		U		0.000100	0.000100	0.000200	N	Yes	1	NA
SW-846 9056A	Chloride	16887-00-6	N	MG/L	0.270	J	RL	0.200	0.200	1.00	Y	Yes	1	NA
	Fluoride	16984-48-8	N	MG/L		U		0.0100	0.0100	0.100	N	Yes	1	NA
	Sulfate	14808-79-8	N	MG/L	0.434	J	RL	0.0300	0.0300	1.00	Y	Yes	1	NA

Lab Sample ID	490-157991-7
Sys Sample Code	CUF-BS-BG09-0.0/0.5-20180823
Sample Name	CUF-BS-BG09-0.0/0.5-20180823
Sample Date	8/23/2018 1:34:00 PM
Location	BG-09
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:			%	15.8									
SW-846 6020A	Antimony	7440-36-0	T	MG/KG	0.228	J	M-,I,RL	0.0743	0.0743	0.240	Y	Yes	1	DRY
	Arsenic	7440-38-2	T	MG/KG	4.78	J	I	0.0312	0.0312	0.120	Y	Yes	1	DRY
	Barium	7440-39-3	T	MG/KG	73.8			0.0684	0.0684	1.20	Y	Yes	1	DRY
	Beryllium	7440-41-7	T	MG/KG	0.670			0.00899	0.00899	0.120	Y	Yes	1	DRY
	Boron	7440-42-8	T	MG/KG	1.19	J	RL	0.915	0.915	9.59	Y	Yes	1	DRY
	Cadmium	7440-43-9	T	MG/KG	0.0658	J	I,RL	0.0204	0.0204	0.120	Y	Yes	1	DRY
	Calcium	7440-70-2	T	MG/KG	999			10.7	10.7	60.0	Y	Yes	1	DRY
	Chromium	7440-47-3	T	MG/KG	11.8			0.0791	0.0791	0.240	Y	Yes	1	DRY
	Cobalt	7440-48-4	T	MG/KG	9.09			0.00995	0.00995	0.0600	Y	Yes	1	DRY
	Copper	7440-50-8	T	MG/KG	5.90			0.136	0.136	0.240	Y	Yes	1	DRY
	Lead	7439-92-1	T	MG/KG	13.4	J	I	0.0420	0.0420	0.120	Y	Yes	1	DRY
	Lithium	7439-93-2	T	MG/KG	4.44	J	M+	0.331	0.331	0.600	Y	Yes	1	DRY
	Molybdenum	7439-98-7	T	MG/KG	0.612	J	I	0.0743	0.0743	0.600	Y	Yes	1	DRY
	Nickel	7440-02-0	T	MG/KG	8.37			0.0731	0.0731	0.120	Y	Yes	1	DRY
	Selenium	7782-49-2	T	MG/KG	0.717	J	M-,I	0.0719	0.0719	0.600	Y	Yes	1	DRY
	Silver	7440-22-4	T	MG/KG	0.0252	J	I,RL	0.0168	0.0168	0.120	Y	Yes	1	DRY
	Thallium	7440-28-0	T	MG/KG	0.136	J	I	0.0156	0.0156	0.120	Y	Yes	1	DRY
Vanadium	7440-62-2	T	MG/KG	19.7			0.0731	0.0731	0.120	Y	Yes	1	DRY	
Zinc	7440-66-6	T	MG/KG	20.5			0.401	0.401	0.600	Y	Yes	1	DRY	
SW-846 7471B	Mercury	7439-97-6	T	MG/KG		U		0.0357	0.0357	0.119	N	Yes	1	DRY
SW-846 9045D	pH at 25 Degrees C	PH	N	SU	6.7			0.1	0.1	0.1	Y	Yes	1	WET
SW-846 9056A	Chloride	16887-00-6	N	MG/KG		U		8.27	8.27	11.8	N	Yes	1	DRY
	Fluoride	16984-48-8	N	MG/KG	2.74	J	M-	0.945	0.945	1.18	Y	Yes	1	DRY
	Sulfate	14808-79-8	N	MG/KG		U*	BE,BF,BL,RL	8.68	8.68	11.8	N	Yes	1	DRY

Lab Sample ID	490-157991-8
Sys Sample Code	CUF-BS-BG09-1.5/3.5-20180823
Sample Name	CUF-BS-BG09-1.5/3.5-20180823
Sample Date	8/23/2018 3:00:00 PM
Location	BG-09
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:			%	13.2									
SW-846 6020A	Antimony	7440-36-0	T	MG/KG	0.332	J	M-,I	0.0721	0.0721	0.233	Y	Yes	1	DRY
	Arsenic	7440-38-2	T	MG/KG	7.59	J	I	0.0302	0.0302	0.116	Y	Yes	1	DRY
	Barium	7440-39-3	T	MG/KG	52.7			0.0663	0.0663	1.16	Y	Yes	1	DRY
	Beryllium	7440-41-7	T	MG/KG	0.418			0.00873	0.00873	0.116	Y	Yes	1	DRY
	Boron	7440-42-8	T	MG/KG	1.42	J	RL	0.888	0.888	9.31	Y	Yes	1	DRY
	Cadmium	7440-43-9	T	MG/KG	0.0371	J	I,RL	0.0198	0.0198	0.116	Y	Yes	1	DRY
	Calcium	7440-70-2	T	MG/KG	836	J	I	10.4	10.4	58.2	Y	Yes	1	DRY
	Chromium	7440-47-3	T	MG/KG	19.8	J	I	0.0768	0.0768	0.233	Y	Yes	1	DRY
	Cobalt	7440-48-4	T	MG/KG	10.3	J	I	0.00966	0.00966	0.0582	Y	Yes	1	DRY
	Copper	7440-50-8	T	MG/KG	9.18	J	I	0.131	0.131	0.233	Y	Yes	1	DRY
	Lead	7439-92-1	T	MG/KG	12.9	J	I	0.0407	0.0407	0.116	Y	Yes	1	DRY
	Lithium	7439-93-2	T	MG/KG	7.02	J	M+	0.321	0.321	0.582	Y	Yes	1	DRY
	Molybdenum	7439-98-7	T	MG/KG	1.29	J	I	0.0721	0.0721	0.582	Y	Yes	1	DRY
	Nickel	7440-02-0	T	MG/KG	9.53	J	I	0.0710	0.0710	0.116	Y	Yes	1	DRY
	Selenium	7782-49-2	T	MG/KG	0.318	J	M-,I,RL	0.0698	0.0698	0.582	Y	Yes	1	DRY
	Silver	7440-22-4	T	MG/KG	0.0289	J	I,RL	0.0163	0.0163	0.116	Y	Yes	1	DRY
	Thallium	7440-28-0	T	MG/KG	0.171	J	I	0.0151	0.0151	0.116	Y	Yes	1	DRY
Vanadium	7440-62-2	T	MG/KG	29.5	J	I	0.0710	0.0710	0.116	Y	Yes	1	DRY	
Zinc	7440-66-6	T	MG/KG	22.8	J	I	0.389	0.389	0.582	Y	Yes	1	DRY	
SW-846 7471B	Mercury	7439-97-6	T	MG/KG	0.0638	J	RL	0.0346	0.0346	0.115	Y	Yes	1	DRY
SW-846 9045D	pH at 25 Degrees C	PH	N	SU	6.0			0.1	0.1	0.1	Y	Yes	1	WET
SW-846 9056A	Chloride	16887-00-6	N	MG/KG		U		7.97	7.97	11.4	N	Yes	1	DRY
	Fluoride	16984-48-8	N	MG/KG		UR	M-	0.911	0.911	1.14	N	Yes	1	DRY
	Sulfate	14808-79-8	N	MG/KG		U*	BE,BF,BL	16.6	16.6	16.6	N	Yes	1	DRY

Lab Sample ID	490-157991-9
Sys Sample Code	CUF-BS-BG09-6.5/8.5-20180823
Sample Name	CUF-BS-BG09-6.5/8.5-20180823
Sample Date	8/23/2018 3:12:00 PM
Location	BG-09
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:			%	26.8									
SW-846 6020A	Antimony	7440-36-0	T	MG/KG	0.782	J	M-,I	0.0855	0.0855	0.276	Y	Yes	1	DRY
	Arsenic	7440-38-2	T	MG/KG	22.8	J	I	0.0359	0.0359	0.138	Y	Yes	1	DRY
	Barium	7440-39-3	T	MG/KG	33.9			0.0786	0.0786	1.38	Y	Yes	1	DRY
	Beryllium	7440-41-7	T	MG/KG	1.04			0.0103	0.0103	0.138	Y	Yes	1	DRY
	Boron	7440-42-8	T	MG/KG	2.07	J	RL	1.05	1.05	11.0	Y	Yes	1	DRY
	Cadmium	7440-43-9	T	MG/KG	0.0354	J	I,RL	0.0234	0.0234	0.138	Y	Yes	1	DRY
	Calcium	7440-70-2	T	MG/KG	446			12.3	12.3	69.0	Y	Yes	1	DRY
	Chromium	7440-47-3	T	MG/KG	17.5			0.0910	0.0910	0.276	Y	Yes	1	DRY
	Cobalt	7440-48-4	T	MG/KG	4.78			0.0114	0.0114	0.0690	Y	Yes	1	DRY
	Copper	7440-50-8	T	MG/KG	15.0			0.156	0.156	0.276	Y	Yes	1	DRY
	Lead	7439-92-1	T	MG/KG	18.2	J	I	0.0483	0.0483	0.138	Y	Yes	1	DRY
	Lithium	7439-93-2	T	MG/KG	8.89	J	M+	0.381	0.381	0.690	Y	Yes	1	DRY
	Molybdenum	7439-98-7	T	MG/KG	3.65	J	I	0.0855	0.0855	0.690	Y	Yes	1	DRY
	Nickel	7440-02-0	T	MG/KG	17.9			0.0841	0.0841	0.138	Y	Yes	1	DRY
	Selenium	7782-49-2	T	MG/KG	0.261	J	M-,I,RL	0.0828	0.0828	0.690	Y	Yes	1	DRY
	Silver	7440-22-4	T	MG/KG	0.0388	J	I,RL	0.0193	0.0193	0.138	Y	Yes	1	DRY
	Thallium	7440-28-0	T	MG/KG	0.364	J	I	0.0179	0.0179	0.138	Y	Yes	1	DRY
	Vanadium	7440-62-2	T	MG/KG	34.6			0.0841	0.0841	0.138	Y	Yes	1	DRY
Zinc	7440-66-6	T	MG/KG	27.5			0.461	0.461	0.690	Y	Yes	1	DRY	
SW-846 7471B	Mercury	7439-97-6	T	MG/KG	0.0925	J	RL	0.0402	0.0402	0.134	Y	Yes	1	DRY
SW-846 9045D	pH at 25 Degrees C	PH	N	SU	5.6			0.1	0.1	0.1	Y	Yes	1	WET
SW-846 9056A	Chloride	16887-00-6	N	MG/KG		U		9.58	9.58	13.7	N	Yes	1	DRY
	Fluoride	16984-48-8	N	MG/KG		UR	M-	1.10	1.10	1.37	N	Yes	1	DRY
	Sulfate	14808-79-8	N	MG/KG		U		8.21	8.21	13.7	N	Yes	1	DRY

**SECTION 3**

**SUPPORTING DOCUMENTATION FOR QUALIFIERS**



## INORGANIC ANALYSIS SUPPORT DOCUMENTATION

ESI project name: TVA CUF EI  
 Sample Collection Dates: 8/23/18  
 Job Number: 20188111.A000  
 Project Manager: AJC  
 Laboratory: TestAmerica- Pittsburgh

Reviewed by: Danielle Coles  
 Approved by: AP  
 Completion Date: 2/2019

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

				<u>Sample No.</u>	<u>Lab Control No.</u>
Deliverable:	CLP (Full)	( )			
	Level IV (Full)	( X )		490-157991-1	
	Limited	( )			
	Other:				

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

	Criteria Examined in Detail				Problems Identified				Support Documentation Attachments			
	Check (√) if Yes or Footnote Letter for Comments Below				Check (√) if Yes or Footnote Letter for Comments Below				Check (√) if Yes or Footnote Letter for Comments Below			
	6020A	7470/7471	9056		6020A	7470/7471	9056		6020A	7470/7471	9056	
Holding Times	X	X	X									
Blank Analysis Results	X	X	X			X				X		
Matrix Spike (Predigestion) Results	X	X	X		X	X			X	X		
Duplicate Analysis: ( ) Field ( X ) Lab	X	X	X									
Quantitation of Results	X	X	X									
Detection Limit/Sensitivity												
Initial Calibrations	X	X	X									
Continuing Calibrations	X	X	X									
Laboratory Control Standard (LCS)	X	X	X									
ICP Linear Range Analysis	X											
ICP Interference Checks												
ICP Serial Dilutions	X											
ICP Post-Digestion Spike	X											
GFAA Post Digestion Spikes												
GFAA Duplicate Injections												
ICP Multiple Exposures												
GFAA Standard Additions												
CRDL Standards	X	X	X									
Condition on Receipt	X	X	X									
Percent Solids												
Others: ICPMS internal standards, multiple injections	X				X				X			

Comments: All results are acceptable unless otherwise qualified.

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# Client Sample Results

Client: Environmental Standards Inc.  
Project/Site: CUF\_BS\_20180823\_1A

TestAmerica Job ID: 490-157991-1

**Client Sample ID: CUF-BS-FB03-20180823**

**Lab Sample ID: 490-157991-1**

Date Collected: 08/23/18 09:06

Matrix: Water

Date Received: 08/23/18 19:54

**Method: 9056A - Anions, Ion Chromatography**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	0.259	J B	1.00	0.200	mg/L			08/24/18 16:51	1
Fluoride	ND		0.100	0.0100	mg/L			08/24/18 16:51	1
Sulfate	0.434	J B	1.00	0.0300	mg/L			08/24/18 16:51	1

*Handwritten notes: results > 5x MDL, no qual. V# : 2-5, 7, 8, 10*

**Method: 7470A - Mercury (CVAA)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000100	mg/L		08/27/18 12:10	08/31/18 19:35	1

**Method: EPA 6020A - Metals (ICP/MS) - Total Recoverable**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.00200	0.00112	mg/L		12/07/18 13:06	12/08/18 10:55	1
Arsenic	ND		0.00100	0.000323	mg/L		12/07/18 13:06	12/08/18 10:55	1
Barium	ND		0.0100	0.000373	mg/L		12/07/18 13:06	12/08/18 10:55	1
Beryllium	ND		0.00100	0.0000570	mg/L		12/07/18 13:06	12/08/18 10:55	1
Boron	ND		0.0800	0.0303	mg/L		12/07/18 13:06	12/08/18 10:55	1
Cadmium	ND		0.00100	0.000125	mg/L		12/07/18 13:06	12/08/18 10:55	1
Calcium	0.134	J RL	0.500	0.116	mg/L		12/07/18 13:06	12/08/18 10:55	1
Chromium	0.00117	J RL	0.00200	0.000631	mg/L		12/07/18 13:06	12/08/18 10:55	1
Cobalt	ND		0.000500	0.0000750	mg/L		12/07/18 13:06	12/08/18 10:55	1
Copper	ND		0.00200	0.00130	mg/L		12/07/18 13:06	12/08/18 10:55	1
Lead	ND		0.00100	0.0000940	mg/L		12/07/18 13:06	12/08/18 10:55	1
Lithium	ND		0.00500	0.00256	mg/L		12/07/18 13:06	12/08/18 10:55	1
Molybdenum	ND		0.00500	0.000474	mg/L		12/07/18 13:06	12/08/18 10:55	1
Nickel	ND		0.00100	0.000312	mg/L		12/07/18 13:06	12/08/18 10:55	1
Selenium	ND		0.00500	0.000813	mg/L		12/07/18 13:06	12/08/18 10:55	1
Silver	ND		0.00100	0.000121	mg/L		12/07/18 13:06	12/08/18 10:55	1
Thallium	ND		0.00100	0.0000630	mg/L		12/07/18 13:06	12/08/18 10:55	1
Vanadium	ND		0.00100	0.000899	mg/L		12/07/18 13:06	12/08/18 10:55	1
Zinc	ND		0.00500	0.00242	mg/L		12/07/18 13:06	12/08/18 10:55	1

*Handwritten notes: results > 5x MDL, no qual.*

# Client Sample Results

Client: Environmental Standards Inc.  
 Project/Site: CUF\_BS\_20180823\_1A

TestAmerica Job ID: 490-157991-1

**Client Sample ID: CUF-BS-EB01-20180823**

**Lab Sample ID: 490-157991-6**

Date Collected: 08/23/18 11:13

Matrix: Water

Date Received: 08/23/18 19:54

**Method: 9056A - Anions, Ion Chromatography**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	results > 5x or MD, no qual	RL 0.270 JB	1.00	0.200	mg/L			08/24/18 17:02	1
Fluoride		ND	0.100	0.0100	mg/L			08/24/18 17:02	1
Sulfate	v: 2-S, 7, 8, 10	RL 0.434 JB	1.00	0.0300	mg/L			08/24/18 17:02	1

**Method: 7470A - Mercury (CVAA)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury		ND	0.000200	0.000100	mg/L		08/29/18 14:16	08/31/18 21:40	1

**Method: EPA 6020A - Metals (ICP/MS) - Total Recoverable**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony		ND	0.00200	0.00112	mg/L		12/07/18 13:06	12/08/18 10:59	1
Arsenic		ND	0.00100	0.000323	mg/L		12/07/18 13:06	12/08/18 10:59	1
Barium		ND	0.0100	0.000373	mg/L		12/07/18 13:06	12/08/18 10:59	1
Beryllium		ND	0.00100	0.0000570	mg/L		12/07/18 13:06	12/08/18 10:59	1
Boron		ND	0.0800	0.0303	mg/L		12/07/18 13:06	12/08/18 10:59	1
Cadmium		ND	0.00100	0.000125	mg/L		12/07/18 13:06	12/08/18 10:59	1
Calcium	result > 5x, no qual	{ 0.147 J RL	0.500	0.116	mg/L		12/07/18 13:06	12/08/18 10:59	1
Chromium		{ 0.00122 J RL	0.00200	0.000631	mg/L		12/07/18 13:06	12/08/18 10:59	1
Cobalt		ND	0.000500	0.0000750	mg/L		12/07/18 13:06	12/08/18 10:59	1
Copper		ND	0.00200	0.00130	mg/L		12/07/18 13:06	12/08/18 10:59	1
Lead		ND	0.00100	0.0000940	mg/L		12/07/18 13:06	12/08/18 10:59	1
Lithium		ND	0.00500	0.00256	mg/L		12/07/18 13:06	12/08/18 10:59	1
Molybdenum		ND	0.00500	0.000474	mg/L		12/07/18 13:06	12/08/18 10:59	1
Nickel		ND	0.00100	0.000312	mg/L		12/07/18 13:06	12/08/18 10:59	1
Selenium		ND	0.00500	0.000813	mg/L		12/07/18 13:06	12/08/18 10:59	1
Silver		ND	0.00100	0.000121	mg/L		12/07/18 13:06	12/08/18 10:59	1
Thallium		ND	0.00100	0.0000630	mg/L		12/07/18 13:06	12/08/18 10:59	1
Vanadium		ND	0.00100	0.000899	mg/L		12/07/18 13:06	12/08/18 10:59	1
Zinc		ND	0.00500	0.00242	mg/L		12/07/18 13:06	12/08/18 10:59	1

FORM I  
HPLC/IC ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Nashville Job No.: 490-157991-1  
 SDG No.: \_\_\_\_\_  
 Client Sample ID: \_\_\_\_\_ Lab Sample ID: CCB 490-540592/3  
 Matrix: Solid Lab File ID: 090418IC9\_008dat-Conductivity.  
 Analysis Method: 9056A Date Collected: \_\_\_\_\_  
 Extraction Method: \_\_\_\_\_ Date Extracted: \_\_\_\_\_  
 Sample wt/vol: 10(mL) Date Analyzed: 09/04/2018 10:00  
 Con. Extract Vol.: \_\_\_\_\_ Dilution Factor: 1  
 Injection Volume: 1(uL) GC Column: Metrohm ASupp4 ID: 4 (mm)  
 % Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
 Analysis Batch No.: 540592 Units: mg/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
16887-00-6	Chloride	0.2334 J		1.00	0.200
16984-48-8	Fluoride	ND		0.100	0.0100
14808-79-8	Sulfate	0.4603 J		1.00	0.0300

*higher conc. in  
CCB/20 used to  
evaluate  
blank container*

*X5 = 2.3015  
U<sup>2</sup>: 2-5, 7, 8, 10*

FORM III  
HPLC/IC MATRIX SPIKE RECOVERY

Lab Name: TestAmerica Nashville Job No.: 490-157991-1  
 SDG No.: \_\_\_\_\_  
 Matrix: Solid (Soluble) Level: Low Lab File ID: 090418IC9\_013dat-Conductivity  
 Lab ID: 490-157991-2 MS Client ID: CUF-BS-BG04-0.0/0.5-20180823 MS

75-125

COMPOUND	SPIKE	SAMPLE	MS	MS	QC	#
	ADDED (mg/Kg)	CONCENTRATION (mg/Kg)	CONCENTRATION (mg/Kg)	% REC	LIMITS REC	
Chloride	119	22.5	113.1 ✓	76 ✓	80-120	F1
Fluoride	11.9	7.84	9.634 ✓	15 ✓	80-120	F1
Sulfate	119	9.87 J	115.9 ✓	89 ✓	80-120	

J/WR(M-): all samples but 1,6

FORM III  
HPLC/IC MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: TestAmerica Nashville Job No.: 490-157991-1  
SDG No.: \_\_\_\_\_  
Matrix: Solid (Soluble) Level: Low Lab File ID: 090418IC9\_014dat-Conductivity  
Lab ID: 490-157991-2 MSD Client ID: CUF-BS-BG04-0.0/0.5-20180823 MS

75125

COMPOUND	SPIKE ADDED (mg/Kg)	MSD CONCENTRATION (mg/Kg)	MSD		QC LIMITS		#
			% REC	% RPD	RPD	REC	
Chloride	119	115.1	78 ✓	2 ✓	20	80-120	F1
Fluoride	11.9	9.623	15 ↓	0 ✓	20	80-120	F1
Sulfate	119	115.4	89 ✓	0 ✓	20	80-120	

*Handwritten:* flag all samples except 1,6  
UR

# Column to be used to flag recovery and RPD values  
FORM III 9056A

5A-IN  
MATRIX SPIKE SAMPLE RECOVERY  
METALS

Client ID: \_\_\_\_\_ Lab ID: 490-157829-D-5-B MS  
 Lab Name: TestAmerica Pittsburgh Job No.: 490-157991-2  
 SDG No.: \_\_\_\_\_  
 Matrix: Solid Concentration Units: mg/Kg  
 % Solids: 77.9

Analyte	SSR	Sample Result (SR)	Spike Added (SA)	%R	Control Limit %R	Q	Method
Antimony	46.03	0.218	65.5	70	75-125	F1	EPA 6020A
Arsenic	9.346	4.93	5.24	84	75-125		EPA 6020A
Barium	310.9	56.4	262	97	75-125		EPA 6020A
Beryllium	6.784	0.554	6.55	95	75-125		EPA 6020A
Boron	116.8	1.72	131	88	75-125		EPA 6020A
Cadmium	5.908	0.0825	6.55	89	75-125		EPA 6020A
Calcium	6484	846	6550	86	75-125		EPA 6020A
Chromium	39.05	14.8	26.2	92	75-125		EPA 6020A
Cobalt	61.67	7.05	65.5	83	75-125		EPA 6020A
Copper	37.36	12.2	32.7	77	75-125		EPA 6020A
Lead	17.78	12.7	2.62	196	75-125	4	EPA 6020A
Lithium	17.03	5.22	6.55	180	75-125	F1	EPA 6020A
Molybdenum	128.9	0.740	131	98	75-125		EPA 6020A
Nickel	62.01	8.28	65.5	82	75-125		EPA 6020A
Selenium	1.524	0.549	1.31	74	75-125	F1	EPA 6020A
Silver	6.183	0.0239	6.55	94	75-125		EPA 6020A
Thallium	5.731	0.138	6.55	85	75-125		EPA 6020A
Vanadium	78.11	23.1	65.5	84	75-125		EPA 6020A
Zinc	88.19	30.5	65.5	88	75-125		EPA 6020A

SSR = Spiked Sample Result

Sbt Se  
J, M.: 2-5, 7-11

Li  
J, M.: 2-5, 7-11

result > 4x spike, no eval

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

5A-IN  
 MATRIX SPIKE DUPLICATE SAMPLE RECOVERY  
 METALS

Client ID: \_\_\_\_\_

Lab ID: 490-157829-D-5-C MSD

Lab Name: TestAmerica Pittsburgh

Job No.: 490-157991-2

SDG No.: \_\_\_\_\_

Matrix: Solid

Concentration Units: mg/Kg

% Solids: 77.9

35%

Analyte	(SDR) C	Spike Added (SA)	%R	Control Limit %R	RPD	RPD Limit	Q	Method
Antimony	42.44	62.3	68	75-125	8	20	F1	EPA 6020A
Arsenic	10.59	4.98	113	75-125	12	20		EPA 6020A
Barium	297.6 ✓	249	97	75-125	4	20		EPA 6020A
Beryllium	6.367	6.23	93	75-125	6 ✓	20		EPA 6020A
Boron	107.0 ✓	125	85 ✓	75-125	9	20		EPA 6020A
Cadmium	5.599 ✓	6.23	89	75-125	5 ✓	20		EPA 6020A
Calcium	6285	6230	87	75-125	3	20		EPA 6020A
Chromium	43.49	24.9	115	75-125	11	20		EPA 6020A
Cobalt	62.71	62.3	89	75-125	2	20		EPA 6020A
Copper	36.60	31.2	78	75-125	2	20		EPA 6020A
Lead	19.75	2.49	285	75-125	10 ✓	20	4	EPA 6020A
Lithium	16.60	6.23	183	75-125	3	20	F1	EPA 6020A
Molybdenum	121.1	125	97	75-125	6	20		EPA 6020A
Nickel	61.21	62.3	85	75-125	1	20		EPA 6020A
Selenium	1.549	1.25	80	75-125	2 ✓	20		EPA 6020A
Silver	5.782 ✓	6.23	92 ✓	75-125	7 ✓	20		EPA 6020A
Thallium	5.529 ✓	6.23	87	75-125	4	20		EPA 6020A
Vanadium	83.01	62.3	96	75-125	6	20		EPA 6020A
Zinc	91.15	62.3	97 ✓	75-125	3 ✓	20		EPA 6020A

SDR = Sample Duplicate Result

Sb  
J.M.: 2-5, 7-11

Li  
J.M.: 2-5, 7-11

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

60-125%

15-IN  
ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY  
METALS

Lab Name: TestAmerica Pittsburgh

Job No.: 490-157991-2

SDG No.:

ICP-MS Instrument ID: X

Start Date: 12/10/2018 End Date: 12/11/2018

Lab Sample ID	Time	Internal Standards %RI For:									
		Element Li-6	Q	Element Sc	Q	Element Y-89	Q	Element Rh-103	Q	Element In	Q
STD1 180-265229/2 IC	16:02	100		100		100		100		100	
STD2 180-265229/3 IC	16:08	94		92		100		91		96	
STD3 180-265229/4 IC	16:13	98		99		99		97		99	
ICV 180-265229/5	16:18	97		100		101		95		99	
ICB 180-265229/6	16:30	94		90		94		91		93	
ICVL 180-265229/7	16:34	86		83		88		87		91	
ICSA 180-265229/8	16:39	76		80		88		80		87	
ICSAB 180-265229/9	16:44	77		79		84		79		86	
CCV 180-265229/10	16:49	82		79		90		83		88	
CCB1 180-265229/11	16:54	89		88		92		91		94	
MB 180-264944/1-A	17:20	83		74		80		80		82	
LCS 180-264944/2-A	17:25	82		70		78		76		79	
CCV 180-265229/22	17:55	83		81		94		86		87	
CCB2 180-265229/23	18:00	101		98		103		99		100	
490-157829-D-5-A SD ^5	18:10	96		85		104		90		90	
490-157829-D-5-B MS	18:15	83		83				70		72	
490-157829-D-5-C MSD	18:20	81		76				68		71	
490-157829-D-5-A PDS	18:25	78		74				66		70	
CCV 180-265229/34	18:59	73		62		70		63		65	
CCB3 180-265229/35	19:05	89		75		76		74		75	
490-157991-2	19:15	85		68				61		62	
490-157991-3	19:20	84		70				59		61	
490-157991-4	19:25	83		68				55		57	
490-157991-5	19:30	81		64				53		55	
490-157991-7	19:35	82		60				53		53	
490-157991-8	19:40	79		59				51		52	
490-157991-9	19:45	80		63				54		55	
490-157991-10	19:50	81		64				53		55	
490-157991-11	19:55	79		66				51		52	
CCV 180-265229/46	20:04	66		49 <sup>DL</sup>		54		49 <sup>DL</sup>		51 <sup>DL</sup>	
CCB4 180-265229/47	20:10	80		62		62		60		61	
CCVL 180-265229/106	01:19	58		52		58		57		59	

✓ J.I: Ca, Cr, Co, Cu, Ni, V, Zn  
Samps B

J.I: As, Mo, Se  
Samps 3-5, 7-11

J.I: Ag, Cd, Pb  
Samps 4, 6, 8, 10, 11  
4.5, 7-11

60-1257

15-IN  
ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY  
METALS

Lab Name: TestAmerica Pittsburgh Job No.: 490-157991-2  
SDG No.: \_\_\_\_\_  
ICP-MS Instrument ID: X Start Date: 12/10/2018 End Date: 12/11/2018

Lab Sample ID	Time	Internal Standards %RI For:									
		Element Tb	Q	Element Bi	Q	Element	Q	Element	Q	Element	Q
STD1 180-265229/2 IC	16:02	100		100							
STD2 180-265229/3 IC	16:08	97		89							
STD3 180-265229/4 IC	16:13	99		101							
ICV 180-265229/5	16:18	100		95							
ICB 180-265229/6	16:30	94		95							
ICVL 180-265229/7	16:34	93		95							
ICSA 180-265229/8	16:39	95		90							
ICSAB 180-265229/9	16:44	95		91							
CCV 180-265229/10	16:49	93		90							
CCB1 180-265229/11	16:54	97		100							
MB 180-264944/1-A	17:20	88		91							
LCS 180-264944/2-A	17:25	90		87							
CCV 180-265229/22	17:55	85		84							
CCB2 180-265229/23	18:00	97		100							
490-157829-D-5-A SD ^5	18:10	94		93							
490-157829-D-5-B MS	18:15	88		81							
490-157829-D-5-C MSD	18:20	86		77							
490-157829-D-5-A PDS	18:25	85		77							
CCV 180-265229/34	18:59	67		65							
CCB3 180-265229/35	19:05	77		77							
490-157991-2	19:15	79		67							
490-157991-3	19:20	82		63							
490-157991-4	19:25	72		58							
490-157991-5	19:30	73		57							
490-157991-7	19:35	66		57							
490-157991-8	19:40	62		56							
490-157991-9	19:45	63		56							
490-157991-10	19:50	62		55							
490-157991-11	19:55	88		54							
CCV 180-265229/46	20:04	54 <i>AL</i>		53 <i>AL</i>							
CCB4 180-265229/47	20:10	64		64							
CCVL 180-265229/106	01:19	65 ✓		66							

JJ = Pb, Tl  
Samples 4, 5, 7-11

**SECTION 4**

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

# Case Narrative

Client: Environmental Standards Inc.  
Project/Site: CUF\_BS\_20180823\_1A

TestAmerica Job ID: 490-157991-1

**Job ID: 490-157991-1**

**Laboratory: TestAmerica Nashville**

**Narrative**

**Job Narrative**  
**490-157991-1**

## Revised Report

This report was revised to include the ICPMS data from TestAmerica Pittsburgh. This replaces the previous final report.

## Receipt

The samples were received on 8/23/2018 7:54 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 3 coolers at receipt time were 2.5° C, 3.5° C and 5.8° C.

## HPLC/IC

Method(s) 9056A: The method blank for analytical batch 490-538638 contained Chloride and Sulfate above the method detection limit. This target analyte concentration was less than half the reporting limit (1/2RL); therefore, re-extraction or re-analysis of samples was not performed.

Method(s) 9056, 9056A: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for analytical batch 490-538638 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

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

## Metals

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

## Organic Prep

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



# Sample Summary

Client: Environmental Standards Inc.  
Project/Site: CUF\_BS\_20180823\_1A

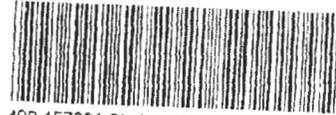
TestAmerica Job ID: 490-157991-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
490-157991-1	CUF-BS-FB03-20180823	Water	08/23/18 09:06	08/23/18 19:54
490-157991-2	CUF-BS-BG04-0.0/0.5-20180823	Solid	08/23/18 09:56	08/23/18 19:54
490-157991-3	CUF-BS-BG04-1.5/3.5-20180823	Solid	08/23/18 10:18	08/23/18 19:54
490-157991-4	CUF-BS-BG04-6.5/8.5-20180823	Solid	08/23/18 10:41	08/23/18 19:54
490-157991-5	CUF-BS-BG04-10.0/11.4-20180823	Solid	08/23/18 10:54	08/23/18 19:54
490-157991-6	CUF-BS-EB01-20180823	Water	08/23/18 11:13	08/23/18 19:54
490-157991-7	CUF-BS-BG09-0.0/0.5-20180823	Solid	08/23/18 13:34	08/23/18 19:54
490-157991-8	CUF-BS-BG09-1.5/3.5-20180823	Solid	08/23/18 15:00	08/23/18 19:54
490-157991-9	CUF-BS-BG09-6.5/8.5-20180823	Solid	08/23/18 15:12	08/23/18 19:54
490-157991-10	CUF-BS-BG09-11.5/13.5-20180823	Solid	08/23/18 15:33	08/23/18 19:54
490-157991-11	CUF-BS-BG09-16.5/18.5-20180823	Solid	08/23/18 15:46	08/23/18 19:54



3

## COOLER RECEIPT FORM



490-157991 Chain of Custody

Cooler Received/Opened On 08-23-2018 @ 1954

Time Samples Removed From Cooler \_\_\_\_\_ Time Samples Placed In Storage \_\_\_\_\_ (2 Hour Window)

1. Tracking # N/A (last 4 digits, FedEx) Courier: Lab  
IR Gun ID 31470368 pH Strip Lot \_\_\_\_\_ Chlorine Strip Lot \_\_\_\_\_

2. Temperature of rep. sample or temp blank when opened: 3.5 Degrees Celsius

3. If Item #2 temperature is 0°C or less, was the representative sample or temp blank frozen? YES NO... NA

4. Were custody seals on outside of cooler? YES...NO...NA

If yes, how many and where: 1 front

5. Were the seals intact, signed, and dated correctly? YES...NO...NA

6. Were custody papers inside cooler? YES...NO...NA

I certify that I opened the cooler and answered questions 1-6 (initial) EA

7. Were custody seals on containers:  YES NO and Intact YES...NO...NA

Were these signed and dated correctly? YES...NO...NA

8. Packing mat'l used? Bubblewrap Plastic bag Peanuts Vermiculite Foam Insert Paper Other None

9. Cooling process: Ice Ice-pack Ice (direct contact) Dry Ice Other None

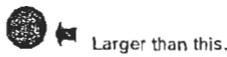
10. Did all containers arrive in good condition (unbroken)? YES...NO...NA

11. Were all container labels complete (#, date, signed, pres., etc)? YES...NO...NA

12. Did all container labels and tags agree with custody papers? YES...NO...NA

13a. Were VOA vials received? YES...NO...NA

b. Was there any observable headspace present in any VOA vial? YES...NO...NA



14. Was there a Trip Blank in this cooler? YES... NO...NA If multiple coolers, sequence # NA

I certify that I unloaded the cooler and answered questions 7-14 (initial) EA

15a. On pres'd bottles, did pH test strips suggest preservation reached the correct pH level? YES...NO... NA

b. Did the bottle labels indicate that the correct preservatives were used YES...NO...NA

16. Was residual chlorine present? YES...NO... NA

I certify that I checked for chlorine and pH as per SOP and answered questions 15-16 (initial) EA

17. Were custody papers properly filled out (ink, signed, etc)? YES...NO...NA

18. Did you sign the custody papers in the appropriate place? YES...NO...NA

19. Were correct containers used for the analysis requested? YES...NO...NA

20. Was sufficient amount of sample sent in each container? YES...NO...NA

I certify that I entered this project into LIMS and answered questions 17-20 (initial) EA

I certify that I attached a label with the unique LIMS number to each container (initial) EA

21. Were there Non-Conformance issues at login? YES... NO Was a NCM generated? YES... NO...# \_\_\_\_\_

## COOLER RECEIPT FORM

Cooler Received/Opened On 08-23-2018 @ 1954

Time Samples Removed From Cooler \_\_\_\_\_ Time Samples Placed In Storage \_\_\_\_\_ (2 Hour Window)

1. Tracking # N/A (last 4 digits, FedEx) Courier: Ldb  
IR Gun ID 31470368 pH Strip Lot \_\_\_\_\_ Chlorine Strip Lot \_\_\_\_\_

2. Temperature of rep. sample or temp blank when opened: 2.5 Degrees Celsius

3. If Item #2 temperature is 0°C or less, was the representative sample or temp blank frozen? YES NO... NA

4. Were custody seals on outside of cooler? YES...NO... NA

If yes, how many and where: 1 front

5. Were the seals intact, signed, and dated correctly?  YES...NO...NA

6. Were custody papers inside cooler?  YES...NO...NA

I certify that I opened the cooler and answered questions 1-6 (initial) EA

7. Were custody seals on containers:  YES NO and Intact  YES...NO...NA

Were these signed and dated correctly?  YES...NO...NA

8. Packing mat'l used?  Bubblewrap  Plastic bag Peanuts Vermiculite Foam Insert Paper Other None

9. Cooling process:  Ice Ice-pack Ice (direct contact) Dry ice Other None

10. Did all containers arrive in good condition (unbroken)?  YES...NO...NA

11. Were all container labels complete (#, date, signed, pres., etc)?  YES...NO...NA

12. Did all container labels and tags agree with custody papers?  YES...NO...NA

13a. Were VOA vials received? YES... NO...NA

b. Was there any observable headspace present in any VOA vial? YES...NO... NA



14. Was there a Trip Blank in this cooler? YES... NO...NA If multiple coolers, sequence # N/A

I certify that I unloaded the cooler and answered questions 7-14 (initial) EA

15a. On pres'd bottles, did pH test strips suggest preservation reached the correct pH level? YES...NO... NA

b. Did the bottle labels indicate that the correct preservatives were used  YES...NO...NA

16. Was residual chlorine present? YES...NO... NA

I certify that I checked for chlorine and pH as per SOP and answered questions 15-16 (initial) EA

17. Were custody papers properly filled out (ink, signed, etc)?  YES...NO...NA

18. Did you sign the custody papers in the appropriate place?  YES...NO...NA

19. Were correct containers used for the analysis requested?  YES...NO...NA

20. Was sufficient amount of sample sent in each container?  YES...NO...NA

I certify that I entered this project into LIMS and answered questions 17-20 (initial) EA

I certify that I attached a label with the unique LIMS number to each container (initial) EA

21. Were there Non-Conformance issues at login? YES... NO...# \_\_\_\_\_





**TestAmerica Nashville**

2960 Foster Creighton Drive  
Nashville, TN 37204  
Phone (615) 726-0177 Fax (615) 726-3404

M400

**Chain of Custody Record**



490-157991 Chain of Custody

**TestAmerica**

LEADER IN ENVIRONMENTAL TESTING

<b>Client Information (Sub Contract Lab)</b>	Sampler: Lage, Gail	Lab PM: Lage, Gail
Client Contact: Shipping/Receiving	Phone:	E-Mail: gail.lage@testamericainc.
Company: TestAmerica Laboratories, Inc.	Accreditations Required (See note):	

Address: 301 Alpha Drive, RIDC Park,	Due Date Requested: 12/12/2018	JOB #: 490-157991-2
City: Pittsburgh	TAT Requested (days):	Preservation Codes:
State, Zip: PA, 15238	PO #:	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
Phone: 412-963-7058(Tel) 412-963-2468(Fax)	WO #:	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)
Email:	Project #: 49014071	Other:
Project Name: CUF_BS_20180823_1A	SSOW#:	
Site:		

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=other, BT=Thru, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	6020A/3005A (MCD) Custom Metals	Total Number of Containers	Analysis Requested												Special Instructions/Note:					
									1	2	3	4	5	6	7	8	9	10	11	12						
CUF-BS-FB03-20180823 (490-157991-1)	8/23/18	09:06 Central		Water		X																		1	TVA	
CUF-BS-EB01-20180823 (490-157991-6)	8/23/18	11:13 Central		Water		X																			1	TVA

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

<b>Possible Hazard Identification</b>	<b>Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)</b>
Unconfirmed	<input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify)	Special Instructions/QC Requirements:

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

Relinquished by: <i>[Signature]</i>	Date/Time: 12-6-18 @ 1305	Company: TANAS	Received by: <i>[Signature]</i>	Date/Time: 12/17/18 1000	Company: TANAS
Relinquished by:	Date/Time:	Company:	Received by:	Date/Time:	Company:
Relinquished by:	Date/Time:	Company:	Received by:	Date/Time:	Company:

Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:
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**TestAmerica Nashville**

2960 Foster Creighton Drive  
Nashville, TN 37204  
Phone (615) 726-0177 Fax (615) 726-3404

**Chain of Custody Record**



490-157991 Chain of Custody

**TestAmerica**

THE LEADER IN ENVIRONMENTAL TESTING

<b>Client Information (Sub Contract Lab)</b>	Sampler: Lage, Gail	Lab PM: Lage, Gail	GC No: 190-83340.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: gail.lage@testamericainc.com	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.	Accreditations Required (See note):		Job #: 490-157991-2

Address: 301 Alpha Drive, RIDC Park,	Due Date Requested: 12/12/2018	<b>Analysis Requested</b>		Preservation Codes:
---	-----------------------------------	---------------------------	--	---------------------

City: Pittsburgh	TAT Requested (days):			A - HCL	M - Hexane
---------------------	-----------------------	--	--	---------	------------

State, Zip: PA, 15238	PO #:			B - NaOH	N - None
--------------------------	-------	--	--	----------	----------

Phone: 412-963-7058(Tel) 412-963-2468(Fax)	WO #:			C - Zn Acetate	O - AsNaO2
---	-------	--	--	----------------	------------

Email:	Project #: 49014071			D - Nitric Acid	P - Na2O4S
--------	------------------------	--	--	-----------------	------------

Project Name: CUF_BS_20180823_1A	SSOW#:			E - NaHSO4	Q - Na2SO3
-------------------------------------	--------	--	--	------------	------------

Site:	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	6020A3059B (NOI) Custom Matrix	F - MeOH	R - Na2S2O3
-------	-----------------------------------	----------------------------	--------------------------------	----------	-------------

				G - Amchlor	S - H2SO4
--	--	--	--	-------------	-----------

				H - Ascorbic Acid	T - TSP Dodecahydrate
--	--	--	--	-------------------	-----------------------

				I - Ice	U - Acetone
--	--	--	--	---------	-------------

				J - DI Water	V - MCAA
--	--	--	--	--------------	----------

				K - EDTA	W - pH 4-5
--	--	--	--	----------	------------

				L - EDA	Z - other (specify)
--	--	--	--	---------	---------------------

<b>Sample Identification - Client ID (Lab ID)</b>	<b>Sample Date</b>	<b>Sample Time</b>	<b>Sample Type (C=comp, G=grab)</b>	<b>Matrix (W=water, S=solid, O=volatile)</b>	<b>Field Filtered Sample (Yes or No)</b>	<b>Perform MS/MSD (Yes or No)</b>	<b>6020A3059B (NOI) Custom Matrix</b>	<b>Total Number of Containers</b>	<b>Special Instructions/Note:</b>
---	--------------------	--------------------	-------------------------------------	--	--	-----------------------------------	---------------------------------------	-----------------------------------	-----------------------------------

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=volatile)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	6020A3059B (NOI) Custom Matrix	Total Number of Containers	Special Instructions/Note:
CUF-BS-BG04-0.0/0.5-20180823 (490-157991-2)	8/23/18	09:56 Central		Solid		X		1	TVA - container labeled 490-157992-2
CUF-BS-BG04-1.5/3.5-20180823 (490-157991-3)	8/23/18	10:18 Central		Solid		X		1	TVA - container labeled 490-157992-3
CUF-BS-BG04-6.5/8.5-20180823 (490-157991-4)	8/23/18	10:41 Central		Solid		X		1	TVA - container labeled 490-157992-4
CUF-BS-BG04-10.0/11.4-20180823 (490-157991-5)	8/23/18	10:54 Central		Solid		X		1	TVA - container labeled 490-157992-5
CUF-BS-BG09-0.0/0.5-20180823 (490-157991-7)	8/23/18	13:34 Central		Solid		X		1	TVA - container labeled 490-157992-7
CUF-BS-BG09-1.5/3.5-20180823 (490-157991-8)	8/23/18	15:00 Central		Solid		X		1	TVA - container labeled 490-157992-8
CUF-BS-BG09-6.5/8.5-20180823 (490-157991-9)	8/23/18	15:12 Central		Solid		X		1	TVA - container labeled 490-157992-9
CUF-BS-BG09-11.5/13.5-20180823 (490-157991-10)	8/23/18	15:33 Central		Solid		X		1	TVA - container labeled 490-157992-10
CUF-BS-BG09-16.5/18.5-20180823 (490-157991-11)	8/23/18	15:46 Central		Solid		X		1	TVA - container labeled 490-157992-11

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/test/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 compliance to TestAmerica Laboratories, Inc.

<b>Possible Hazard Identification</b>	<b>Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)</b>
Unconfirmed	<input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> 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: <i>Michelle Pross</i>	Date/Time: 12-6-18/1630	Company: <i>TADP</i>	Received by: <i>[Signature]</i>
Relinquished by:	Date/Time:	Company:	Received by:
Relinquished by:	Date/Time:	Company:	Received by:

Custody Seals Intact: A Yes A No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:
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## Login Sample Receipt Checklist

Client: Environmental Standards Inc.

Job Number: 490-157991-2

**Login Number: 157991**

**List Number: 2**

**Creator: Neri, Tom**

**List Source: TestAmerica Pittsburgh**

**List Creation: 12/07/18 12:38 PM**

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	2.0/2.2
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?	N/A	Received project as a subcontract.
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

## Login Sample Receipt Checklist

Client: Environmental Standards Inc.

Job Number: 490-157991-2

**Login Number: 157991**  
**List Number: 3**  
**Creator: Say, Thomas C**

**List Source: TestAmerica Pittsburgh**  
**List Creation: 12/07/18 01:23 PM**

Question	Answer	Comment
Radioactivity wasn't checked or is <=/ background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	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	

**SECTION 5**

**PROJECT CORRESPONDENCE**

## Andrew Piasecki

---

**From:** Lage, Gail <Gail.Lage@testamericainc.com>  
**Sent:** Wednesday, February 13, 2019 2:22 PM  
**To:** Andrew Piasecki; CSO – TVA Projects  
**Cc:** TVA\_Deliverables; Amanda Cover; Danielle Coles  
**Subject:** RE: CUF BGS - Request for 490-157991-1

Andrew – Here you go. I think they are the same as before.

Li, B, Be use Li6  
Ca, Cr, V, Mn, Fe, Co, Ni, Cu, Zn use Sc  
As, Se, Mo use Rh  
Ag, Cd, Sb use In  
Ba uses Tb  
Tl and Pb use Bi.

### Gail Lage

Phone: 615-301-5741

E-mail: [Gail.Lage@testamericainc.com](mailto:Gail.Lage@testamericainc.com)

---

**From:** Andrew Piasecki [mailto:[apiasecki@envstd.com](mailto:apiasecki@envstd.com)]  
**Sent:** Tuesday, February 12, 2019 2:08 PM  
**To:** Lage, Gail; CSO – TVA Projects  
**Cc:** TVA\_Deliverables; Amanda Cover; Danielle Coles  
**Subject:** RE: CUF BGS - Request for 490-157991-1

~~External Email~~

---

Haha well I think Ellie can have whatever the winning prize is for our contest 😊

I think the ISTD table in your attachment is associated with instrument A. Just for clarification, do the same ISTD associations apply to the instrument X analyses performed on 12/10/18 at 12:12 to 12/11/18 at 1:30. (I think this is the older instrument which doesn't have the ISTD associations in the raw data)

Here's a snip from the runlog:

13-IN  
ANALYSIS RUN LOG  
METALS

Lab Name: TestAmerica Pittsburgh Job No.: 490-157991-2  
 SDC No.: \_\_\_\_\_  
 Instrument ID: X Analysis Method: EPA 6020A  
 Start Date: 12/10/2018 12:12 End Date: 12/11/2018 01:30

Lab Sample Id	D/F	T P e	Time	Analytes														
				A g	A s	B a	B a	C a	C d	C r	C u	L i	M n	N i	P b	S e	T l	V z
ITUNE 180-265229/1			12:12															
STD1 180-265229/2 IC	1		16:02	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
STD2 180-265229/3 IC	1		16:08	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
STD3 180-265229/4 IC	1		16:13	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
ICV 180-265229/5	1		16:18	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
ICB 180-265229/6	1		16:30	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
ICVL 180-265229/7	1		16:34	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
ICSA 180-265229/8	1		16:39	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
ICSAB 180-265229/9	1		16:44	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
CCV 180-265229/10	1		16:49	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
CCB1 180-265229/11	1		16:54	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
EEEEZ			17:00															
EEEEZ			17:05															
EEEEZ			17:10															
EEEEZ			17:15															
ME 180-264944/1-A	1 T		17:20	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
LCS 180-264944/2-A	1 T		17:25	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
EEEEZ			17:30															
EEEEZ			17:35															
EEEEZ			17:40															
EEEEZ			17:46															
CCV 180-265229/22	1		17:55	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
CCB2 180-265229/23	1		18:00	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
EEEEZ			18:05															
490-157829-D-5-A SD *5	5 T		18:10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
490-157829-D-5-B MS	1 T		18:15	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
490-157829-D-5-C MSD	1 T		18:20	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
490-157829-D-5-A PDS	1 T		18:25	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
EEEEZ			18:30															
EEEEZ			18:35															
EEEEZ			18:40															
EEEEZ			18:45															
EEEEZ			18:50															
CCV 180-265229/34	1		18:59	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
CCB3 180-265229/35	1		19:05	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
EEEEZ			19:10															
490-157991-2	1 T		19:19	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
490-157991-3	1 T		19:20	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
490-157991-4	1 T		19:25	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
490-157991-5	1 T		19:30	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
490-157991-7	1 T		19:35	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
490-157991-8	1 T		19:40	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

FORM XIII-IN

Thanks,  
Andrew

From: Lage, Gail [mailto:Gail.Lage@testamericainc.com]  
 Sent: Tuesday, February 12, 2019 2:50 PM  
 To: Andrew Piasecki <apiasecki@envstd.com>; CSO – TVA Projects <TVAProjects@testamericainc.com>  
 Cc: TVA\_Deliverables <tva\_deliverables@envstd.com>; Amanda Cover <ACover@envstd.com>; Danielle Coles <dcoles@envstd.com>  
 Subject: RE: CUF BGS - Request for 490-157991-1

Andrew – this form has the ISTD mass number, which coincides with the ISTD table on page 2.

FYI – I think you and Danielle are having a contest to see who can send me more emails.



**Gail Lage**

Phone: 615-301-5741

E-mail: [Gail.Lage@testamericainc.com](mailto:Gail.Lage@testamericainc.com)

---

**From:** Andrew Piasecki [<mailto:apiasecki@envstd.com>]

**Sent:** Monday, February 11, 2019 6:21 PM

**To:** CSO – TVA Projects

**Cc:** TVA\_Deliverables; Amanda Cover; Danielle Coles

**Subject:** CUF BGS - Request for 490-157991-1

**External Email**

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Hi Gail,

In Job 490-157991-1, can you please provide the ICP/MS internal standard associations for instrument X? You had provided the list below for Job 180-85058-1. Is it the same for 490-157991-1?

Li, B, Be use Li6

Ca, Cr, V, Mn, Fe, Co, Ni, Cu, Zn use Sc

As, Se, Mo use Rh

Ag, Cd, Sb use In

Ba uses Tb

Tl and Pb use Bi.

Thanks!

Andrew L. Piasecki

Quality Assurance Chemist

**Environmental Standards, Inc.**

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**Emergency Response Quality Assurance Hotline: 855.374.7272**



## Andrew Piasecki

---

**From:** Rock J. Vitale  
**Sent:** Wednesday, February 6, 2019 2:11 PM  
**To:** DeAnna Aungst; Jacob Gruzalski  
**Cc:** Jennifer Gable; Andrew Piasecki; Stephanie Lein  
**Subject:** FW: TVA- CUF- Data rescind  
**Attachments:** Datarescind- CUF-Nash-AFV-020119.pdf

Jacob – please create a “Background Rescind Letter” subfolder in W/TVA/EIP CUF and stash this letter in there.

DeAnna – please document the letter in DM documentation and document the *removal* of the Nashville data for CUF background soils from the database.

thanks

Rock J. Vitale, CEAC  
Consulting Chemistry

---

**From:** Vicinie, Rusty [mailto:[Rusty.Vicinie@testamericainc.com](mailto:Rusty.Vicinie@testamericainc.com)]  
**Sent:** Wednesday, February 6, 2019 12:31 PM  
**To:** Amanda Cover  
**Cc:** Rock J. Vitale ; Lage, Gail ; Bagawandoss, Doss ; Salomon, Sherry ; Lowe, Debbie ; Vicinie, Rusty  
**Subject:** TVA- CUF- Data rescind

Good afternoon Amanda

Please find our official rescind note on the data that has been being discussed. If any questions please contact me or Gail directly.

**ALBERT “RUSTY” VICINIE**  
Vice President- Operations

Eurofins TestAmerica  
301 Alpha Drive  
Pittsburgh, PA 15238  
USA

Phone: 412-963-2421  
Mobile: 724-312-3359

E-mail: [Rusty.vicinie@testamericainc.com](mailto:Rusty.vicinie@testamericainc.com)  
[www.EurofinsUS.com](http://www.EurofinsUS.com) | [www.TestAmericainc.com](http://www.TestAmericainc.com)



# TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Albert F. Vicinie III  
Vice President Operations  
TestAmerica Laboratories, Inc.

February 1, 2019

Ms. Amanda Cover  
Sr. Quality Assurance Scientist  
Environmental Standards, Inc.  
1140 Valley Forge Road  
Phoenixville, PA 19460

RE: TVA data –CUF BGS

Amanda

We have been discussing a data set associated with the Cumberland background soils and sediments that were initially analyzed at our Nashville laboratory. The data validation and subsequent review revealed a number of data imperfection in the data set for samples associated with the specific job numbers below.

CUF BGS	490-157829-1
CUF BGS	490-157892-1
CUF BGS	490-157991-1
CUF BGS	490-158029-1
CUF BGS	490-158137-1
CUF BGS	490-158232-1
CUF Sed	490-161141-1

While there are usable data within this data set, there are numerous imperfections across multiple analyses of these samples that make it challenging to determine which result from the various runs is most accurate and defensible. We have analyzed all of these samples in our Pittsburgh laboratory and this data set does not have the imperfections seen in the Nashville data set. Also, it is easier to validate and defend. As a matter of convenience and to provide clear guidance to the project team, TestAmerica is rescinding the data set from Nashville for the samples associated with the above jobs. We are providing the Pittsburgh laboratory data as the data of record for these samples.

I apologize for the inconvenience and the effort your team has invested in this data set. If any questions, please contact me directly at either [rusty.vicinie@testamericainc.com](mailto:rusty.vicinie@testamericainc.com) or 724-312-3359.

Respectfully submitted



Albert F. Vicinie III  
Vice President Operations

## Andrew Piasecki

---

**From:** CSO – TVA Projects <TVAProjects@testamericainc.com>  
**Sent:** Friday, February 8, 2019 1:32 PM  
**To:** Andrew Piasecki; CSO – TVA Projects  
**Cc:** TVA\_Deliverables; Amanda Cover; Jennifer Gable; Rock J. Vitale  
**Subject:** RE: CUF - BGS/Sed data

The BG are done. I'm working on Sed – it's giving me a fits. I hope to have it sent later today.

Thanks

## Gail Lage

Phone: 615-301-5741

E-mail: [Gail.Lage@testamericainc.com](mailto:Gail.Lage@testamericainc.com)

---

**From:** Andrew Piasecki [mailto:[apiasecki@envstd.com](mailto:apiasecki@envstd.com)]  
**Sent:** Thursday, January 31, 2019 9:21 AM  
**To:** CSO – TVA Projects  
**Cc:** TVA\_Deliverables; Amanda Cover; Jennifer Gable; Rock J. Vitale  
**Subject:** RE: CUF - BGS/Sed data

**External Email**

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Hi Gail,

Thanks for the update. Also, just as a reminder, please report strontium in CUF Sediment SDG 490-161141-1.

Andrew L. Piasecki  
Quality Assurance Chemist  
**Environmental Standards, Inc.**  
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---

**From:** CSO – TVA Projects [mailto:[TVAProjects@testamericainc.com](mailto:TVAProjects@testamericainc.com)]  
**Sent:** Wednesday, January 30, 2019 11:33 AM  
**To:** Andrew Piasecki <[apiasecki@envstd.com](mailto:apiasecki@envstd.com)>  
**Cc:** CSO – TVA Projects <[TVAProjects@testamericainc.com](mailto:TVAProjects@testamericainc.com)>; TVA\_Deliverables <[tva\\_deliverables@envstd.com](mailto:tva_deliverables@envstd.com)>;

Amanda Cover <ACover@envstd.com>; Jennifer Gable <jgable@envstd.com>; Rock J. Vitale <rvitale@envstd.com>

**Subject:** RE: CUF - BGS/Sed data

Andrew – I should be able to have the revised reports/EDDs and the letter to you by the beginning of next week.

**GAIL A LAGE**

Project Manager

TestAmerica

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---

**From:** Andrew Piasecki [<mailto:apiasecki@envstd.com>]

**Sent:** Tuesday, January 29, 2019 1:24 PM

**To:** Lage, Gail

**Cc:** CSO – TVA Projects; TVA\_Deliverables; Amanda Cover; Jennifer Gable; Rock J. Vitale

**Subject:** CUF - BGS/Sed data

**External Email**

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Hi Gail,

As discussed on our call, please proceed with reporting the CUF Background soil and sediment data from Pittsburgh for the SDGs listed below. We would also like to request a formal letter rescinding the Nashville data for these SDGs. Can you please review the list and provide a schedule for when we should expect to receive the deliverables?

CUF BGS	490-157829-1
CUF BGS	490-157892-1
CUF BGS	490-157991-1
CUF BGS	490-158029-1
CUF BGS	490-158137-1
CUF BGS	490-158232-1
CUF Sed	490-161141-1

Thank you,

Andrew L. Piasecki

Quality Assurance Chemist

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## Andrew Piasecki

---

**From:** Lage, Gail <Gail.Lage@testamericainc.com>  
**Sent:** Wednesday, December 5, 2018 6:46 PM  
**To:** Jennifer Gable; Amanda Cover  
**Cc:** CSO – TVA Projects; Andrew Piasecki  
**Subject:** nashville metals

Here is what I have for the CUF and KIF that were run or were being run in Nashville. Currently, we have 490-164294 as the highest priority in Pittsburgh, but let me know as soon as possible, if there is another job that needs to be a higher.

The first 5 jobs, it sounds like St. Louis does still have volume for those, so I will have those shipped to Pittsburgh tomorrow. Do you need the KIF Watersource re-run?

JobID	Job Status	Job Description	Job Received	Nashville status
490-157829-1		CUF_BS_20180821_1A	8/21/2018 20:00	Reported - data questions
490-157892-1		CUF_BS_20180822_1A	8/22/2018 17:45	Reported
490-157991-1		CUF_BS_20180823_1A	8/23/2018 19:54	Reported
490-158029-1		CUF_BS_20180824_1A	8/24/2018 14:05	Reported
490-158137-1		CUF_BS_20180827_1A	8/27/2018 19:00	Reported - data questions
490-158232-1	ship to Pittsburgh on 12/5	CUF_BS_20180828_1A	8/28/2018 20:12	Reported - data questions
490-161141-1	ship to Pittsburgh on 12/5	CUF_SED_20181008_1A	10/12/2018 16:00	Reported - elevated ND?
490-161580-1	ship to Pittsburgh on 12/5	CUF_SED_20181016_1A	10/19/2018 12:00	Run but not reported
490-164092-1	ship to Pittsburgh on 12/5	CUF_BS_20181129_2A	11/30/2018 15:10	Analysis started
490-164109-1	ship to Pittsburgh on 12/5	CUF_BS_20181129_1A	11/30/2018 15:10	Analysis started
490-164294-1	ship to Pittsburgh on 12/5	CUF_BS_20181203_1A	12/4/2018 17:40	
490-161585-1		KIF-EI_WATERSOURCE_20181019_A	10/19/2018 14:28	Reported
490-163316-1	ship to Pittsburgh on 12/5	KIF_CCR_20181112_1A	11/15/2018 9:00	Totals run but not reported

Thanks

**GAIL A LAGE**

Project Manager

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## Andrew Piasecki

---

**From:** Lage, Gail <Gail.Lage@testamericainc.com>  
**Sent:** Friday, November 30, 2018 9:30 AM  
**To:** Amanda Cover; Andrew Piasecki  
**Cc:** CSO – TVA Projects; TVA\_Deliverables; Jennifer Gable  
**Subject:** RE: CUF BGS metals calibration issues  
**Attachments:** image001.png.html

I do not have an update, but there were meetings about these job yesterday. I will try and get an update this morning.

### GAIL A LAGE

Project Manager

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---

**From:** Amanda Cover [mailto:ACover@envstd.com]  
**Sent:** Friday, November 30, 2018 8:28 AM  
**To:** Andrew Piasecki; Lage, Gail  
**Cc:** CSO – TVA Projects; TVA\_Deliverables; Jennifer Gable  
**Subject:** RE: CUF BGS metals calibration issues

~~External Email~~

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Hi Gail,

Do you have any updates on the SDG below and also the 2 remaining SDGs: 490-158232 and 490-158137? I know that you are waiting for the lab to provide details on how the reported results were determined for 490-158232 and 490-158137. We're going to need to get resolution on these very soon.

Thanks  
Amanda

Amanda J. Cover  
Senior Quality Assurance Chemist  
**Environmental Standards, Inc.**  
610.935.5577 x408

---

**From:** Andrew Piasecki  
**Sent:** Wednesday, November 28, 2018 1:37 PM  
**To:** Lage, Gail <Gail.Lage@testamericainc.com>  
**Cc:** CSO – TVA Projects <TVAProjects@testamericainc.com>; TVA\_Deliverables <tva\_deliverables@envstd.com>;

Amanda Cover <ACover@envstd.com>; Jennifer Gable <jgable@envstd.com>

**Subject:** FW: CUF BGS metals calibration issues

Hi Gail,

It appears that the reprocessed results from the "reported" columns in the attached spreadsheet were not reported in the data packages and EDD that we currently have for 490-157829-1. Can you please look into this? The results that are reported in the data packages and EDD that we currently have correspond with the "ALL" columns in the attached spreadsheet and appear to be quantitated using the failing calibration.

Please confirm and provide any necessary revisions for all samples and QC.

Thanks,

Andrew L. Piasecki

Quality Assurance Chemist

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**Emergency Response Quality Assurance Hotline: 855.374.7272**



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**From:** Lage, Gail [<mailto:Gail.Lage@testamericainc.com>]

**Sent:** Tuesday, November 20, 2018 11:11 AM

**To:** Andrew Piasecki <[apiasecki@envstd.com](mailto:apiasecki@envstd.com)>; CSO – TVA Projects <[TVAProjects@testamericainc.com](mailto:TVAProjects@testamericainc.com)>; Amanda Cover <[ACover@envstd.com](mailto:ACover@envstd.com)>

**Cc:** Jennifer Gable <[jgable@envstd.com](mailto:jgable@envstd.com)>; TVA\_Deliverables <[tva\\_deliverables@envstd.com](mailto:tva_deliverables@envstd.com)>

**Subject:** RE: CUF BGS metals calibration issues

Andrew – Here is the correct table for 490-157829 – These are the instrument results. The "All" has all the calibration points and the "reported" are the results that were reported with the 2<sup>nd</sup> point removed from the calibration.

**GAIL A LAGE**

Project Manager

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---

**From:** Andrew Piasecki [<mailto:apiasecki@envstd.com>]

**Sent:** Tuesday, November 13, 2018 11:39 AM

**To:** CSO – TVA Projects; Amanda Cover

**Cc:** Jennifer Gable; TVA\_Deliverables

**Subject:** RE: CUF BGS metals calibration issues

~~External Email~~

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Hi Gail,

The spreadsheet doesn't appear to contain the data for the 490-157829 project samples. Can you please clarify and confirm what was provided.

Thanks,  
Andrew

Andrew L. Piasecki  
Quality Assurance Chemist  
**Environmental Standards, Inc.**  
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---

**From:** CSO – TVA Projects [<mailto:TVAProjects@testamericainc.com>]  
**Sent:** Monday, November 12, 2018 3:24 PM  
**To:** CSO – TVA Projects <[TVAProjects@testamericainc.com](mailto:TVAProjects@testamericainc.com)>; Amanda Cover <[ACover@envstd.com](mailto:ACover@envstd.com)>  
**Cc:** Jennifer Gable <[jgable@envstd.com](mailto:jgable@envstd.com)>; TVA\_Deliverables <[tva\\_deliverables@envstd.com](mailto:tva_deliverables@envstd.com)>  
**Subject:** RE: CUF BGS metals calibration issues

The attached table is the comparison for 490-157829 – the reported results were calculated again the curve without the 2<sup>nd</sup> point (the passing calibration).

The “Allpts” column is the original ICAL with the outlier. The “a” column is the ICAL without the outlier. The Supervisor indicated that she saw the initial failure and made the ICAL adjustment and reprocessed the data. The reported results should be acceptable. They did not attach the ICAL used for the samples. A quick check indicates an average difference between the ICALs to be approximately 2.3 %.

We are still working at pulling the tables with all results for 490-158137 and 490-158232.

Thanks

**GAIL A LAGE**  
Project Manager  
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---

**From:** CSO – TVA Projects  
**Sent:** Wednesday, November 07, 2018 10:10 AM  
**To:** 'Amanda Cover'  
**Cc:** CSO – TVA Projects; Jennifer Gable; TVA\_Deliverables  
**Subject:** RE: CUF BGS metals calibration issues

Can we set up a call for Thursday at 10 am ET (9 am CT)

Thanks

**GAIL A LAGE**  
Project Manager  
TestAmerica  
THE LEADER IN ENVIRONMENTAL TESTING

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[www.testamericainc.com](http://www.testamericainc.com)

---

**From:** Amanda Cover [<mailto:ACover@envstd.com>]  
**Sent:** Tuesday, November 06, 2018 10:27 AM  
**To:** Lage, Gail  
**Cc:** CSO – TVA Projects; Jennifer Gable; TVA\_Deliverables  
**Subject:** CUF BGS metals calibration issues

**External Email**

---

Hi Gail,

We have identified two more situations in addition to SDG 490-158232-1 where results appear to be reported from ICALs with failing correlation coefficients (< 0.998).

The following SDGs are impacted:

- 490-157829-1: the ICAL performed on instrument ICPMS3 on 8/24/18 failed for all of the metals. All soil samples are impacted along with the QC.
- 490-158137-1: the ICAL performed on instrument ICPMS4 on 8/30/18 failed for Ag, Be, Cd, Co, Cr, Mo, Ni, and Pb. All soil samples are impacted along with the QC.

Please ask the laboratory to review this information.

In addition, we would like to schedule a call to discuss this issue with QA, the metals department manager, and anyone else that TestAmerica thinks should participate.

Below is our availability for the remainder of the week:

- Wednesday: 3:30-4:30 ET
- Thursday: 10-11am ET; 2:30-4:00 ET
- Friday: 1:30-4:30 ET

Please let me know times that work for everyone and I will send out an invite.

Thanks  
Amanda

Amanda J. Cover  
Senior Quality Assurance Chemist  
**Environmental Standards, Inc.**  
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