

**Data Validation Report  
Tennessee Valley Authority  
Allen Fossil Plant  
Environmental Investigation Plan  
Background Soil Samples  
Chain-of-Custody Number: ALF\_BS\_20190807\_1A**

This quality assurance (QA) review is based upon an examination of the data generated from the analyses of the three background soil samples and one aqueous blank collected on August 7, 2019, at the Tennessee Valley Authority (TVA) Allen Fossil Plant facility. These samples were collectively analyzed by Eurofins 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; for pH by SW-846 Method 9045D; and for fractional organic carbon (FOC) by ASTM D2974.

This review was performed in accordance with the Environmental Investigation Plan for the Tennessee Valley Authority Allen Fossil Plant Environmental Investigation (ALF EIP; Revision 3, March 3, 2019). 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 and ASTM 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 and ASTM Methods utilized by the laboratory.

### **Summary**

The analytical results and associated laboratory quality control (QC) samples were reviewed to determine the integrity of the reported analytical results and to ensure that the data met the established data quality objectives. This QA review includes all samples in Eurofins TestAmerica Job Number 180-93848-1.

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
ALF-BS-BG03-6.0/8.0-20190807	180-93848-1	180-93848-1	Soil	8/7/19	M, Hg, A, pH, FOC
ALF-BS-BG03-16.5/18.5-20190807	180-93848-2	180-93848-1	Soil	8/7/19	M, Hg, A, pH, FOC
ALF-BS-FB02-20190807 (Field Blank)	180-93848-3	180-93848-1	Aq	8/7/19	M, Hg, A
ALF-BS-BG03-26.5/28.5-20190807	180-93848-4	180-93848-1	Soil	8/7/19	M, Hg, A, pH, FOC

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.
- FOC - Fractional Organic Carbon by ASTM D2974.
- 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 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). Qualification of data due to this issue was not warranted.

### **Qualifier Summary**

Analyte(s)	Job Number	Sample(s)	Validation Qualifier	Reason(s) for Qualification
calcium	180-93848-1	All samples, except ALF-BS-FB02-20190807	J	M+
zinc	180-93848-1	All samples, except ALF-BS-FB02-20190807	J	M+, P+
lead and thallium	180-93848-1	ALF-BS-BG03-6.0/8.0-20190807	J	I
beryllium	180-93848-1	All samples, except ALF-BS-FB02-20190807	J	SD

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: Danielle Coles, Quality Assurance Chemist  
Review reviewed by: Andrew L. Piasecki, Senior Quality Assurance Chemist  
Review approved by: Rock J. Vitale, CEAC, Technical Director of Chemistry/Principal  
Date review completed: 10/9/19



**SECTION 2**

**ANALYTICAL RESULTS**

## **INORGANIC DATA QUALIFIERS**

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

## REASON CODES AND EXPLANATIONS

Reason Code	Explanation
BE	Equipment blank contamination. The result should be considered "not-detected."
BF	Field blank contamination. The result should be considered "not-detected."
BL	Laboratory blank contamination. The result should be considered "not-detected."
BN	Negative laboratory blank contamination.
C	Initial and/or Continuing Calibration issue, indeterminate bias.
C+	Initial and/or Continuing Calibration issue. The result may be biased high.
C-	Initial and/or Continuing Calibration issue. The result may be biased low.
FD	Field duplicate imprecision.
FG	Total versus Dissolved Imprecision.
H	Holding time exceeded.
I	Internal standard recovery outside of acceptance limits.
L	LCS and LCSD recoveries outside of acceptance limits, indeterminate bias.
L+	LCS and/or LCSD recoveries outside of acceptance limits. The result may be biased high.
L-	LCS and/or LCSD recoveries outside of acceptance limits. The result may be biased low.
LD	Laboratory duplicate imprecision.
LP	LCS/LCSD imprecision.
M	MS and MSD recoveries outside of acceptance limits, indeterminate bias.
M+	MS and/or MSD recoveries outside of acceptance limits. The result may be biased high.
M-	MS and/or MSD recoveries outside of acceptance limits. The result may be biased low.
MP	MS/MSD imprecision.
P	Post-digestion spike recoveries outside of acceptance limits, indeterminate bias.
P+	Post-digestion spike recovery outside of acceptance limits. The result may be biased high.
P-	Post-digestion spike recovery outside of acceptance limits. The result may be biased low.
Q	Chemical Preservation issue.
R	RL standards outside of acceptance limits, indeterminate bias.
R+	RL standard(s) outside of acceptance limits. The result may be biased high.
R-	RL standard(s) outside of acceptance limits. The result may be biased low.
RL	Reported result between the MDL and the 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	180-93848-1
Sys Sample Code	ALF-BS-BG03-6.0/8.0-20190807
Sample Name	ALF-BS-BG03-6.0/8.0-20190807
Sample Date	8/7/2019 1:23:00 PM
Location	ALF-BG03
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:			%	27.6									
ASTM D2974-87	Fractional Organic	FOC	N	%	1.6			0.5	0.5	0.5	Y	Yes	1	NA
SW-846 6020A	Antimony	7440-36-0	T	MG/KG	0.461			0.0891	0.0891	0.288	Y	Yes	1	DRY
	Arsenic	7440-38-2	T	MG/KG	5.60			0.0374	0.0374	0.144	Y	Yes	1	DRY
	Barium	7440-39-3	T	MG/KG	171			0.184	0.184	1.44	Y	Yes	1	DRY
	Beryllium	7440-41-7	T	MG/KG	0.697	J	SD	0.0108	0.0108	0.144	Y	Yes	1	DRY
	Boron	7440-42-8	T	MG/KG	6.95	J	RL	1.94	1.94	11.5	Y	Yes	1	DRY
	Cadmium	7440-43-9	T	MG/KG	0.352			0.0244	0.0244	0.144	Y	Yes	1	DRY
	Calcium	7440-70-2	T	MG/KG	5040	J	M+	12.9	12.9	71.9	Y	Yes	1	DRY
	Chromium	7440-47-3	T	MG/KG	11.2			0.119	0.119	0.288	Y	Yes	1	DRY
	Cobalt	7440-48-4	T	MG/KG	6.76			0.0119	0.0119	0.0719	Y	Yes	1	DRY
	Copper	7440-50-8	T	MG/KG	14.6			0.162	0.162	0.288	Y	Yes	1	DRY
	Lead	7439-92-1	T	MG/KG	12.5	J	I	0.0503	0.0503	0.144	Y	Yes	1	DRY
	Lithium	7439-93-2	T	MG/KG	10.4			0.397	0.397	0.719	Y	Yes	1	DRY
	Molybdenum	7439-98-7	T	MG/KG	0.673	J	RL	0.234	0.234	0.719	Y	Yes	1	DRY
	Nickel	7440-02-0	T	MG/KG	17.1			0.0877	0.0877	0.144	Y	Yes	1	DRY
	Selenium	7782-49-2	T	MG/KG	1.09			0.175	0.175	0.719	Y	Yes	1	DRY
	Silver	7440-22-4	T	MG/KG	0.0613	J	RL	0.0388	0.0388	0.144	Y	Yes	1	DRY
	Thallium	7440-28-0	T	MG/KG	0.558	J	I	0.0359	0.0359	0.144	Y	Yes	1	DRY
	Vanadium	7440-62-2	T	MG/KG	20.6			0.0920	0.0920	0.144	Y	Yes	1	DRY
	Zinc	7440-66-6	T	MG/KG	47.7	J	M+,P+	0.480	0.480	0.719	Y	Yes	1	DRY
SW-846 7471B	Mercury	7439-97-6	T	MG/KG	0.0592			0.0172	0.0172	0.0396	Y	Yes	1	DRY
SW-846 9045D	pH at 25 Degrees C	PH	N	SU	7.9			0.1	0.1	0.1	Y	Yes	1	NA
SW-846 9056A	Chloride	16887-00-6	N	MG/KG		U		5.20	5.20	13.4	N	Yes	1	DRY
	Fluoride	16984-48-8	N	MG/KG	3.95			0.912	0.912	1.34	Y	Yes	1	DRY
	Sulfate	14808-79-8	N	MG/KG	34.5			9.10	9.10	13.4	Y	Yes	1	DRY

Lab Sample ID	180-93848-2
Sys Sample Code	ALF-BS-BG03-16.5/18.5-20190807
Sample Name	ALF-BS-BG03-16.5/18.5-20190807
Sample Date	8/7/2019 2:18:00 PM
Location	ALF-BG03
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:			%	24.8									
ASTM D2974-87	Fractional Organic	FOC	N	%	0.8			0.5	0.5	0.5	Y	Yes	1	NA
SW-846 6020A	Antimony	7440-36-0	T	MG/KG	0.199	J	RL	0.0793	0.0793	0.256	Y	Yes	1	DRY
	Arsenic	7440-38-2	T	MG/KG	3.49			0.0332	0.0332	0.128	Y	Yes	1	DRY
	Barium	7440-39-3	T	MG/KG	105			0.164	0.164	1.28	Y	Yes	1	DRY
	Beryllium	7440-41-7	T	MG/KG	0.383	J	SD	0.00959	0.00959	0.128	Y	Yes	1	DRY
	Boron	7440-42-8	T	MG/KG	3.81	J	RL	1.73	1.73	10.2	Y	Yes	1	DRY
	Cadmium	7440-43-9	T	MG/KG	0.172			0.0217	0.0217	0.128	Y	Yes	1	DRY
	Calcium	7440-70-2	T	MG/KG	9650	J	M+	11.4	11.4	63.9	Y	Yes	1	DRY
	Chromium	7440-47-3	T	MG/KG	7.29			0.106	0.106	0.256	Y	Yes	1	DRY
	Cobalt	7440-48-4	T	MG/KG	4.43			0.0106	0.0106	0.0639	Y	Yes	1	DRY
	Copper	7440-50-8	T	MG/KG	6.47			0.144	0.144	0.256	Y	Yes	1	DRY
	Lead	7439-92-1	T	MG/KG	7.15			0.0447	0.0447	0.128	Y	Yes	1	DRY
	Lithium	7439-93-2	T	MG/KG	6.11			0.353	0.353	0.639	Y	Yes	1	DRY
	Molybdenum	7439-98-7	T	MG/KG	0.426	J	RL	0.208	0.208	0.639	Y	Yes	1	DRY
	Nickel	7440-02-0	T	MG/KG	11.7			0.0780	0.0780	0.128	Y	Yes	1	DRY
	Selenium	7782-49-2	T	MG/KG	0.609	J	RL	0.156	0.156	0.639	Y	Yes	1	DRY
	Silver	7440-22-4	T	MG/KG		U		0.0345	0.0345	0.128	N	Yes	1	DRY
	Thallium	7440-28-0	T	MG/KG	0.229			0.0320	0.0320	0.128	Y	Yes	1	DRY
	Vanadium	7440-62-2	T	MG/KG	12.1			0.0818	0.0818	0.128	Y	Yes	1	DRY
	Zinc	7440-66-6	T	MG/KG	27.6	J	M+,P+	0.427	0.427	0.639	Y	Yes	1	DRY
SW-846 7471B	Mercury	7439-97-6	T	MG/KG		U		0.0187	0.0187	0.0432	N	Yes	1	DRY
SW-846 9045D	pH at 25 Degrees C	PH	N	SU	8.1			0.1	0.1	0.1	Y	Yes	1	NA
SW-846 9056A	Chloride	16887-00-6	N	MG/KG		U		5.03	5.03	13.0	N	Yes	1	DRY
	Fluoride	16984-48-8	N	MG/KG	1.74			0.882	0.882	1.30	Y	Yes	1	DRY
	Sulfate	14808-79-8	N	MG/KG	8.81	J	RL	8.81	8.81	13.0	Y	Yes	1	DRY

Lab Sample ID	180-93848-3
Sys Sample Code	ALF-BS-FB02-20190807
Sample Name	ALF-BS-FB02-20190807
Sample Date	8/7/2019 2:59:00 PM
Location	ALF-BG03
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		0.00160	0.00160	0.0100	N	Yes	1	NA
	Beryllium	7440-41-7	T	MG/L		U		0.000182	0.000182	0.00100	N	Yes	1	NA
	Boron	7440-42-8	T	MG/L		U		0.0386	0.0386	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		0.127	0.127	0.500	N	Yes	1	NA
	Chromium	7440-47-3	T	MG/L		U		0.00153	0.00153	0.00200	N	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		0.00339	0.00339	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		0.000336	0.000336	0.00100	N	Yes	1	NA
	Selenium	7782-49-2	T	MG/L		U		0.00151	0.00151	0.00500	N	Yes	1	NA
	Silver	7440-22-4	T	MG/L		U		0.000177	0.000177	0.00100	N	Yes	1	NA
	Thallium	7440-28-0	T	MG/L		U		0.000148	0.000148	0.00100	N	Yes	1	NA
	Vanadium	7440-62-2	T	MG/L		U		0.000991	0.000991	0.00100	N	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	180-93848-4
Sys Sample Code	ALF-BS-BG03-26.5/28.5-20190807
Sample Name	ALF-BS-BG03-26.5/28.5-20190807
Sample Date	8/7/2019 3:54:00 PM
Location	ALF-BG03
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:			%	23.1									
ASTM D2974-87	Fractional Organic	FOC	N	%	1.0			0.5	0.5	0.5	Y	Yes	1	NA
SW-846 6020A	Antimony	7440-36-0	T	MG/KG	0.144	J	RL	0.0768	0.0768	0.248	Y	Yes	1	DRY
	Arsenic	7440-38-2	T	MG/KG	2.61			0.0322	0.0322	0.124	Y	Yes	1	DRY
	Barium	7440-39-3	T	MG/KG	80.4			0.159	0.159	1.24	Y	Yes	1	DRY
	Beryllium	7440-41-7	T	MG/KG	0.310	J	SD	0.00929	0.00929	0.124	Y	Yes	1	DRY
	Boron	7440-42-8	T	MG/KG	3.17	J	RL	1.67	1.67	9.91	Y	Yes	1	DRY
	Cadmium	7440-43-9	T	MG/KG	0.107	J	RL	0.0211	0.0211	0.124	Y	Yes	1	DRY
	Calcium	7440-70-2	T	MG/KG	7190	J	M+	11.1	11.1	62.0	Y	Yes	1	DRY
	Chromium	7440-47-3	T	MG/KG	5.73			0.103	0.103	0.248	Y	Yes	1	DRY
	Cobalt	7440-48-4	T	MG/KG	3.46			0.0103	0.0103	0.0620	Y	Yes	1	DRY
	Copper	7440-50-8	T	MG/KG	5.05			0.140	0.140	0.248	Y	Yes	1	DRY
	Lead	7439-92-1	T	MG/KG	5.40			0.0434	0.0434	0.124	Y	Yes	1	DRY
	Lithium	7439-93-2	T	MG/KG	4.50			0.342	0.342	0.620	Y	Yes	1	DRY
	Molybdenum	7439-98-7	T	MG/KG	0.301	J	RL	0.202	0.202	0.620	Y	Yes	1	DRY
	Nickel	7440-02-0	T	MG/KG	8.98			0.0756	0.0756	0.124	Y	Yes	1	DRY
	Selenium	7782-49-2	T	MG/KG	0.549	J	RL	0.151	0.151	0.620	Y	Yes	1	DRY
	Silver	7440-22-4	T	MG/KG		U		0.0335	0.0335	0.124	N	Yes	1	DRY
	Thallium	7440-28-0	T	MG/KG	0.173			0.0310	0.0310	0.124	Y	Yes	1	DRY
	Vanadium	7440-62-2	T	MG/KG	9.81			0.0793	0.0793	0.124	Y	Yes	1	DRY
	Zinc	7440-66-6	T	MG/KG	21.9	J	M+,P+	0.414	0.414	0.620	Y	Yes	1	DRY
SW-846 7471B	Mercury	7439-97-6	T	MG/KG		U		0.0157	0.0157	0.0363	N	Yes	1	DRY
SW-846 9045D	pH at 25 Degrees C	PH	N	SU	8.3			0.1	0.1	0.1	Y	Yes	1	NA
SW-846 9056A	Chloride	16887-00-6	N	MG/KG		U		4.98	4.98	12.8	N	Yes	1	DRY
	Fluoride	16984-48-8	N	MG/KG	1.94			0.872	0.872	1.28	Y	Yes	1	DRY
	Sulfate	14808-79-8	N	MG/KG	14.8			8.71	8.71	12.8	Y	Yes	1	DRY

**SECTION 3**

**SUPPORTING DOCUMENTATION FOR QUALIFIERS**



## INORGANIC ANALYSIS SUPPORT DOCUMENTATION

ESI project name: TVA ALF EI Implementation  
 Sample Collection Dates: 8/7/19  
 Job Number: 20188318.A000  
 Project Manager: AJC  
 Laboratory: TestAmerica- Pittsburgh

Reviewed by: DC  
 Approved by: AP  
 Completion Date: 10/2019

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

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

Sample No.	Lab Control No.
180-93848-1	

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	7470A/7471B	9056A	Gen Chem	6020A	7470A	9056A	Gen Chem	6020A	7470A	9056A	Gen Chem
Holding Times	X	X	X	X								
Blank Analysis Results	X	X	X	X								
Matrix Spike (Predigestion) Results	X	X	X		X				X			
Duplicate Analysis: ( ) Field ( X ) Lab				X								
Quantitation of Results	X	X	X	X								
Detection Limit/Sensitivity	X	X	X	X								
Initial Calibrations	X	X	X									
Continuing Calibrations	X	X	X	X								
Laboratory Control Standard (LCS)	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	X											
GFAA Standard Additions												
CRDL Standards	X	X	X				X				X	
Condition on Receipt	X	X	X	X								
Percent Solids												
Others: ICP/MS Internal Standards	X				X				X			

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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5A-IN  
 MATRIX SPIKE SAMPLE RECOVERY  
 METALS

*ALF SDG*

Client ID: \_\_\_\_\_ Lab ID: 180-93808-A-11-B MS  
 Lab Name: Eurofins TestAmerica, Pittsburgh Job No.: 180-93848-1  
 SDG No.: \_\_\_\_\_  
 Matrix: Solid Concentration Units: mg/Kg  
 % Solids: 86.7

Analyte	SSR	Sample Result (SR) C	Spike Added (SA) C	%R	Control Limit %R	Q	Method
Antimony	21.27	0.110	J 27.7	76	75-125		EPA 6020A
Arsenic	88.92	2.43	111	78 ✓	75-125		EPA 6020A
Barium	155.6 ✓	47.0	111	98	75-125		EPA 6020A
Beryllium	51.92	0.545	55.5	93	75-125		EPA 6020A
Boron	137.0	6.49	J 139	94	75-125		EPA 6020A
Cadmium	53.42	0.0744	J 55.5	96	75-125		EPA 6020A
Calcium	7809	2670	2770	185	75-125	F1	EPA 6020A
Chromium	73.18	8.43	55.5	117	75-125		EPA 6020A
Cobalt	63.48	2.23	55.5	110	75-125		EPA 6020A
Copper	70.35	4.26	55.5	119	75-125		EPA 6020A
Lead	60.85 ✓	4.06	55.5	102	75-125		EPA 6020A
Lithium	56.81 ✓	4.25	55.5	95 ✓	75-125		EPA 6020A
Molybdenum	51.73	0.653	55.5	92	75-125		EPA 6020A
Nickel	72.60	7.40	55.5	118	75-125		EPA 6020A
Selenium	109.7	0.282	J 111	99	75-125		EPA 6020A
Silver	26.40	ND	27.7	95	75-125		EPA 6020A
Thallium	111.1	0.0668	J 111	100	75-125		EPA 6020A
Vanadium	74.74 ✓	9.52	55.5	118	75-125		EPA 6020A
Zinc	54.82 ✓	16.2	27.7	139	75-125	F1	EPA 6020A

SSR = Spiked Sample Result

*J, Q+ 1, 2, 4*

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: 180-93808-A-11-C MSD

Lab Name: Eurofins TestAmerica, Pittsburgh Job No.: 180-93848-1

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

Matrix: Solid Concentration Units: mg/Kg

% Solids: 86.7

Analyte	(SDR) C	Spike Added (SA)	%R	Control Limit %R	RPD	RPD Limit	Q	Method
Antimony	21.93	28.6	76	75-125	3	20		EPA 6020A
Arsenic	87.56 ✓	114	75 ✓	75-125	2	20		EPA 6020A
Barium	157.3	114	97	75-125	1	20		EPA 6020A
Beryllium	52.17	57.1	90	75-125	0	20		EPA 6020A
Boron	137.7	143	92	75-125	1	20		EPA 6020A
Cadmium	53.86	57.1	94	75-125	1	20		EPA 6020A
Calcium	7597	2860	173	75-125	3	20	F1	EPA 6020A
Chromium	67.99 ✓	57.1	104	75-125	7	20		EPA 6020A
Cobalt	57.95 ✓	57.1	98	75-125	9	20		EPA 6020A
Copper	63.68	57.1	104	75-125	10	20		EPA 6020A
Lead	59.54	57.1	97 ✓	75-125	2	20		EPA 6020A
Lithium	56.22	57.1	91	75-125	1	20		EPA 6020A
Molybdenum	52.15	57.1	90	75-125	1	20		EPA 6020A
Nickel	65.65 ✓	57.1	102	75-125	10	20		EPA 6020A
Selenium	96.09	114	84	75-125	13	20		EPA 6020A
Silver	26.48	28.6	93 ✓	75-125	0	20		EPA 6020A
Thallium	112.5	114	98	75-125	1	20		EPA 6020A
Vanadium	68.26	57.1	103	75-125	9	20		EPA 6020A
Zinc	49.91	28.6	118	75-125	9 ✓	20		EPA 6020A

SDR = Sample Duplicate Result

J.Mt: 1.24

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 VD - IN

5B-IN  
POST DIGESTION SPIKE SAMPLE RECOVERY  
METALS

Client ID: \_\_\_\_\_ Lab ID: 180-93808-A-11-A PDS  
 Lab Name: Eurofins TestAmerica, Pittsburgh Job No.: 180-93848-1  
 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	28.44	0.110	J	30.4	93	80-120	EPA 6020A
Arsenic	104.5	2.43		121	84	80-120	EPA 6020A
Barium	159.1 ✓	47.0		121	92	80-120	EPA 6020A
Beryllium	60.95	0.545		60.7	100	80-120	EPA 6020A
Boron	153.4	6.49	J	152	97 ✓	80-120	EPA 6020A
Cadmium	63.15	0.0744	J	60.7	104	80-120	EPA 6020A
Calcium	5527 ✓	2670		3040	94	80-120	EPA 6020A
Chromium	77.84 ✓	8.43		60.7	114	80-120	EPA 6020A
Cobalt	70.85	2.23		60.7	113	80-120	EPA 6020A
Copper	77.10	4.26		60.7	120	80-120	EPA 6020A
Lead	69.82	4.06		60.7	108	80-120	EPA 6020A
Lithium	61.03	4.25		60.7	94	80-120	EPA 6020A
Molybdenum	61.80	0.653		60.7	101	80-120	EPA 6020A
Nickel	79.11	7.40		60.7	118 ✓	80-120	EPA 6020A
Selenium	121.7	0.282	J	121	100 ✓	80-120	EPA 6020A
Silver	29.98	ND		30.4	99	80-120	EPA 6020A
Thallium	133.7	0.0668	J	121	110	80-120	EPA 6020A
Vanadium	76.47	9.52		60.7	110	80-120	EPA 6020A
Zinc	54.04 ✓	16.2		30.4	125	80-120	W EPA 6020A

SSR = Spiked Sample Result

J,Pt: 1,2,4

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

ALF sample

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

Lab ID: 180-93808-A-11-A SD ^5

SDG No:

Lab Name: Eurofins TestAmerica, Pittsburgh

Job No: 180-93848-1

Matrix: Solid

Concentration Units: mg/Kg

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Method
Antimony	0.110	J	ND		NC		EPA 6020A
Arsenic	2.43		2.529		4.0		EPA 6020A
Barium	47.0		47.23		0.57		EPA 6020A
Beryllium	0.545		0.4438	J	19	V	EPA 6020A
Boron	6.49	J	ND		NC		EPA 6020A
Cadmium	0.0744	J	ND		NC		EPA 6020A
Calcium	2670		2707		1.4		EPA 6020A
Chromium	8.43		8.099		4.0		EPA 6020A
Cobalt	2.23		2.173		2.6		EPA 6020A
Copper	4.26		4.505		NC		EPA 6020A
Lead	4.06		3.970		2.2		EPA 6020A
Lithium	4.25		4.531		NC		EPA 6020A
Molybdenum	0.653		ND		NC		EPA 6020A
Nickel	7.40		7.243		2.1		EPA 6020A
Selenium	0.282	J	ND		NC		EPA 6020A
Silver	ND		ND		NC		EPA 6020A
Thallium	0.0668	J	ND		NC		EPA 6020A
Vanadium	9.52		9.161		3.8		EPA 6020A
Zinc	16.2		16.67		NC		EPA 6020A

J<sup>4</sup> qual  
-1  
-2  
-4

±10%  
when  
initial  
>50xMCL

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

FORM VIII-IN

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

60-12571

Lab Name: Eurofins TestAmerica, Pittsburgh Job No.: 180-93848-1

SDG No.:

ICP-MS Instrument ID: M

Start Date: 08/26/2019 End Date: 08/27/2019

Internal Standards %RI For:											
Lab Sample ID	Time	Element Li-6		Element Sc		Element Y-89		Element Rh-103		Element In	
		Q		Q		Q		Q		Q	
STD1 180-289472/2 IC	19:51	100		100		100		100		100	
STD2 180-289472/3 IC	19:56	96		93		96		89		90	
STD3 180-289472/4 IC	20:01	91		95		98		99		99	
ICV 180-289472/5	20:05	99		96		97		93		94	
ICB 180-289472/6	20:10	90		96		97		95		94	
ICVL 180-289472/7	20:15	89		96		98		100		99	
ICSA 180-289472/8	20:20	76		88		83		81		81	
ICSAB 180-289472/9	20:24	77		79		77		82		80	
CCV 180-289472/10	20:29	84		92		92		96		96	
CCB1 180-289472/11	20:34	98		102		100		102		99	
CCV 180-289472/58	00:28	109		111		89		98		91	
CCB5 180-289472/59	00:33	109		116		97		106		96	
MB 180-288247/1-A	01:20	117		120		98		107		95	
LCS 180-288247/2-A	01:24	108		97		78		88		76	
CCV 180-289472/70	01:29	109		110		90		91		83	
CCB6 180-289472/71	01:34	103		106		94		99		91	
CCV 180-289472/82	02:30	114		111		94		100		91	
CCB7 180-289472/83	02:35	114		119		97		100		89	
180-93808-A-11-A SD ^5	02:44	118		113		94		97		84	
180-93808-A-11-B MS	02:49	103		97				75		65	
180-93808-A-11-C MSD	02:54	102		96				81		72	
180-93808-A-11-A PDS	02:58	106		97				79		68	
180-93848-1	03:03	108		99				78		67	
180-93848-2	03:08	111		100				85		74	
180-93848-4	03:13	112		100				81		67	
CCV 180-289472/94	03:31	109		113		94		94		86	
CCB8 180-289472/95	03:35	108		116		97		104		95	
CCVL 180-289472/114	05:22	96	✓	87	✓	80	✓	80	✓	75	✓

60-1251

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

Lab Name: Eurofins TestAmerica, Pittsburgh Job No.: 180-93848-1

SDG No.:

ICP-MS Instrument ID: M Start Date: 08/26/2019 End Date: 08/27/2019

Lab Sample ID	Time	Internal Standards %RI For:							
		Element Tb	Q	Element Bi	Q	Element Q	Element Q	Element Q	Q
STD1 180-289472/2 IC	19:51	100		100					
STD2 180-289472/3 IC	19:56	92		82					
STD3 180-289472/4 IC	20:01	97		105					
ICV 180-289472/5	20:05	96		95					
ICB 180-289472/6	20:10	95		90					
ICVL 180-289472/7	20:15	98		106					
ICSA 180-289472/8	20:20	90		88					
ICSAB 180-289472/9	20:24	91		85					
CCV 180-289472/10	20:29	98		103					
CCB1 180-289472/11	20:34	99		98					
CCV 180-289472/58	00:28	93		86					
CCB5 180-289472/59	00:33	97		95					
MB 180-288247/1-A	01:20	95		87					
LCS 180-288247/2-A	01:24	88		85					
CCV 180-289472/70	01:29	87		68					
CCB6 180-289472/71	01:34	92		90					
CCV 180-289472/82	02:30	93		89					
CCB7 180-289472/83	02:35	90		69					
180-93808-A-11-A SD ^5	02:44	92		82					
180-93808-A-11-B MS	02:49	80		54					aligned
180-93808-A-11-C MSD	02:54	87		80					
180-93808-A-11-A PDS	02:58	83		67					
180-93848-1	03:03	85		55					
180-93848-2	03:08	92		82					
180-93848-4	03:13	86		69					
CCV 180-289472/94	03:31	88		72					
CCB8 180-289472/95	03:35	93		91					
CCVL 180-289472/114	05:22	79		64					

J.I : Pb, Tl

180-93848-B-1-A 8/27/2019 3:03:29 AM

User Pre-dilution: 1.000

Run	Time	6Li	7Li	9Be	10B	11B	13C	23Na	25Mg
		ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb
1	03:03:37	107.274%	71.160	4.695	51.530	48.870	0.000	609.300	33150.000
2	03:03:45	107.509%	71.280	4.572	49.860	48.950	0.000	618.800	33510.000
3	03:03:53	107.979%	74.910	5.283	54.500	47.200	0.000	620.700	33500.000
X		107.587%	72.450	4.850	51.960	48.340	0.000	616.200	33390.000
σ		0.359%	2.127	0.380	2.350	0.989	0.000	6.090	208.200
%RSD		0.334	2.936	7.831	4.524	2.045	0.000	0.988	0.624
Run	Time	26Mg	27Al	28Si	37Cl	39K	43Ca	44Ca	45Sc
		ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb
1	03:03:37	32550.000	68530.000	10400.000	0.000	12960.000	35760.000	34840.000	99.126%
2	03:03:45	32740.000	68960.000	10370.000	0.000	12940.000	35570.000	35120.000	98.922%
3	03:03:53	32930.000	69220.000	10340.000	0.000	12990.000	35730.000	35240.000	98.908%
X		32740.000	68900.000	10370.000	0.000	12970.000	35690.000	35070.000	98.985%
σ		190.000	346.400	29.120	0.000	21.980	99.640	207.900	0.122%
%RSD		0.580	0.503	0.281	0.000	0.170	0.279	0.593	0.124
Run	Time	47Ti	51V	52Cr	55Mn	56Fe	57Fe	59Co	60Ni
		ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb
1	03:03:37	1776.000	137.700	76.140	4046.000	91080.000	90030.000	45.520	116.300
2	03:03:45	1793.000	143.600	78.010	4064.000	92550.000	91620.000	46.960	117.500
3	03:03:53	1788.000	147.800	80.410	4067.000	94830.000	94640.000	48.500	121.900
X		1786.000	143.100	78.190	4059.000	92820.000	92090.000	46.990	118.600
σ		8.797	5.062	2.144	11.240	1889.000	2341.000	1.491	2.933
%RSD		0.493	3.538	2.742	0.277	2.035	2.542	3.173	2.474
Run	Time	63Cu	65Cu	66Zn	68Zn	75As	78Se	82Se	83Kr
		ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb
1	03:03:37	99.720	100.200	320.500	324.700	38.280	7.140	4.331	0.000
2	03:03:45	100.300	101.000	332.000	334.100	38.550	8.026	11.690	0.000
3	03:03:53	105.000	103.100	343.100	336.400	39.920	7.566	18.120	0.000
X		101.700	101.400	331.900	331.700	38.920	7.577	11.380	0.000
σ		2.901	1.495	11.330	6.201	0.881	0.443	6.899	0.000
%RSD		2.853	1.474	3.413	1.869	2.265	5.847	60.630	0.000
Run	Time	88Sr	89Y	95Mo	98Mo	103Rh	107Ag	109Ag	111Cd
		ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb
1	03:03:37	169.200	0.000	4.685	5.025	75.232%	0.376	0.519	2.517
2	03:03:45	174.200	0.000	4.895	4.903	78.390%	0.426	0.493	2.373
3	03:03:53	176.500	0.000	4.757	4.122	80.096%	0.477	0.525	2.443
X		173.300	0.000	4.779	4.683	77.906%	0.426	0.512	2.445
σ		3.748	0.000	0.107	0.490	2.468%	0.051	0.017	0.072
%RSD		2.162	0.000	2.233	10.460	3.168	11.840	3.365	2.939
Run	Time	114Cd	115In	118Sn	121Sb	123Sb	135Ba	137Ba	159Tb
		ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb
1	03:03:37	3.518	64.068%	46.940	3.333	3.442	1209.000	1191.000	81.615%
2	03:03:45	3.725	67.652%	49.110	3.152	2.902	1225.000	1191.000	85.075%
3	03:03:53	3.627	70.473%	46.630	3.134	3.257	1190.000	1186.000	88.719%
X		3.624	67.398%	47.560	3.206	3.200	1208.000	1189.000	85.136%
σ		0.104	3.210%	1.353	0.110	0.274	17.250	2.666	3.553%
%RSD		2.857	4.763	2.844	3.438	8.568	1.428	0.224	4.173
Run	Time	203Tl	205Tl	206Pb	207Pb	208Pb	209Bi		
		ppb	ppb	ppb	ppb	ppb	ppb		
1	03:03:37	4.367	4.120	89.220	83.600	87.500	51.390%		
2	03:03:45	4.056	3.920	88.810	83.170	86.790	54.539%		
3	03:03:53	3.754	3.603	87.640	83.020	87.060	58.616%		
X		4.059	3.881	88.580	83.280	87.120	54.848%		
σ		0.307	0.261	0.841	0.325	0.361	3.622%		
%RSD		7.556	6.713	0.950	0.391	0.414	6.605		

180-93848-B-2-A 8/27/2019 3:08:14 AM

User Pre-dilution: 1.000

Run	Time	6Li	7Li	9Be	10B	11B	13C	23Na	25Mg
		ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb
1	03:08:22	112.712%	46.260	3.106	28.770	29.740	0.000	587.600	41740.000
2	03:08:30	111.705%	47.910	2.820	29.570	28.720	0.000	595.200	41500.000
3	03:08:37	108.784%	49.160	3.072	32.590	30.960	0.000	600.900	42230.000
X		111.067%	47.780	2.999	30.310	29.810	0.000	594.600	41830.000
$\sigma$		2.040%	1.455	0.156	2.011	1.122	0.000	6.654	373.000
%RSD		1.837	3.046	5.198	6.636	3.765	0.000	1.119	0.892
Run	Time	26Mg	27Al	28Si	37Cl	39K	43Ca	44Ca	45Sc
		ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb
1	03:08:22	40820.000	41250.000	14780.000	0.000	8130.000	73060.000	75090.000	98.969%
2	03:08:30	40640.000	41160.000	14790.000	0.000	8096.000	72640.000	75400.000	99.868%
3	03:08:37	41170.000	41570.000	14900.000	0.000	8122.000	73930.000	75940.000	99.863%
X		40880.000	41330.000	14820.000	0.000	8116.000	73210.000	75470.000	99.567%
$\sigma$		268.600	217.400	68.360	0.000	17.570	657.200	430.600	0.518%
%RSD		0.657	0.526	0.461	0.000	0.217	0.898	0.571	0.520
Run	Time	47Ti	51V	52Cr	55Mn	56Fe	57Fe	59Co	60Ni
		ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb
1	03:08:22	1672.000	93.480	56.440	2032.000	63280.000	62990.000	34.080	90.210
2	03:08:30	1701.000	95.240	56.860	2033.000	64730.000	63430.000	34.310	91.660
3	03:08:37	1709.000	94.150	57.760	2048.000	65780.000	65000.000	35.540	92.690
X		1694.000	94.290	57.020	2038.000	64600.000	63800.000	34.640	91.520
$\sigma$		19.390	0.892	0.674	8.857	1257.000	1056.000	0.785	1.245
%RSD		1.145	0.946	1.181	0.435	1.947	1.655	2.265	1.361
Run	Time	63Cu	65Cu	66Zn	68Zn	75As	78Se	82Se	83Kr
		ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb
1	03:08:22	50.200	51.200	210.400	220.000	26.470	4.698	5.097	0.000
2	03:08:30	50.710	49.970	216.900	216.800	28.370	5.932	12.020	0.000
3	03:08:37	51.910	50.570	219.900	219.800	27.130	3.661	12.110	0.000
X		50.940	50.580	215.700	218.900	27.330	4.764	9.744	0.000
$\sigma$		0.874	0.615	4.866	1.791	0.966	1.137	4.024	0.000
%RSD		1.716	1.215	2.256	0.818	3.535	23.870	1.300	0.000
Run	Time	88Sr	89Y	95Mo	98Mo	103Rh	107Ag	109Ag	111Cd
		ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb
1	03:08:22	130.500	0.000	3.037	3.336	81.712%	0.141	0.197	1.206
2	03:08:30	136.500	0.000	3.370	3.215	84.581%	0.170	0.233	1.329
3	03:08:37	133.500	0.000	2.734	3.449	87.312%	0.191	0.207	1.495
X		133.500	0.000	3.047	3.333	84.535%	0.167	0.212	1.343
$\sigma$		2.997	0.000	0.318	0.117	2.801%	0.025	0.018	0.145
%RSD		2.245	0.000	10.430	3.504	3.313	14.840	8.674	10.810
Run	Time	114Cd	115In	118Sn	121Sb	123Sb	135Ba	137Ba	159Tb
		ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb
1	03:08:22	2.395	71.791%	48.890	1.448	1.313	812.200	813.700	87.447%
2	03:08:30	2.275	74.155%	49.870	1.628	1.334	829.700	825.700	92.206%
3	03:08:37	2.025	76.647%	49.780	1.594	1.414	843.700	824.100	95.128%
X		2.232	74.198%	49.510	1.557	1.354	828.500	821.200	91.593%
$\sigma$		0.189	2.429%	0.545	0.096	0.053	15.800	6.524	3.877%
%RSD		8.461	3.273	1.100	6.136	3.919	1.906	0.794	4.233
Run	Time	203Tl	205Tl	206Pb	207Pb	208Pb	209Bi		
		ppb	ppb	ppb	ppb	ppb	ppb		
1	03:08:22	1.927	1.781	58.180	53.280	56.060	78.286%		
2	03:08:30	1.783	1.827	57.050	52.470	55.390	82.465%		
3	03:08:37	1.758	1.773	58.800	52.970	56.280	85.067%		
X		1.823	1.794	58.010	52.910	55.910	81.939%		
$\sigma$		0.091	0.029	0.890	0.408	0.464	3.421%		
%RSD		4.999	1.634	1.534	0.771	0.830	4.175		

180-93848-B-4-A 8/27/2019 3:13:00 AM

User Pre-dilution: 1.000

Run	Time	6Li	7Li	9Be	10B	11B	13C	23Na	25Mg	
		ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	
1	03:13:08	111.940%	36.130	2.704	27.980	25.940	0.000	455.900	29660.000	
2	03:13:16	112.947%	36.170	2.246	28.820	25.530	0.000	470.700	30180.000	
3	03:13:24	111.739%	36.640	2.554	26.620	25.390	0.000	469.500	30230.000	
X		112.209%	36.310	2.502	27.810	25.620	0.000	465.400	30020.000	
		σ	0.648%	0.283	0.234	1.108	0.285	0.000	8.227	314.800
		%RSD	0.577	0.778	9.334	3.985	1.110	0.000	1.768	1.049
Run	Time	26Mg	27Al	28Si	37Cl	39K	43Ca	44Ca	45Sc	
		ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	
1	03:13:08	29180.000	33790.000	15590.000	0.000	7205.000	57300.000	56480.000	100.089%	
2	03:13:16	29390.000	34120.000	15430.000	0.000	7207.000	58150.000	57140.000	99.427%	
3	03:13:24	29610.000	34280.000	15640.000	0.000	7250.000	58830.000	60340.000	100.113%	
X		29390.000	34060.000	15550.000	0.000	7220.000	58100.000	57990.000	99.877%	
		σ	213.500	250.700	110.800	0.000	25.430	765.100	2065.000	0.389%
		%RSD	0.726	0.736	0.713	0.000	0.352	1.317	3.561	0.390
Run	Time	47Ti	51V	52Cr	55Mn	56Fe	57Fe	59Co	60Ni	
		ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	
1	03:13:08	1400.000	76.980	44.860	1358.000	51690.000	51360.000	27.100	72.660	
2	03:13:16	1425.000	78.370	46.420	1376.000	53580.000	53340.000	27.730	71.530	
3	03:13:24	1422.000	82.080	47.570	1383.000	54440.000	54170.000	28.940	73.110	
X		1416.000	79.140	46.280	1372.000	53240.000	52960.000	27.920	72.430	
		σ	13.150	2.639	1.364	12.840	1404.000	1442.000	0.932	0.816
		%RSD	0.929	3.334	2.947	0.936	2.637	2.724	3.339	1.127
Run	Time	63Cu	65Cu	66Zn	68Zn	75As	78Se	82Se	83Kr	
		ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	
1	03:13:08	40.860	40.730	168.800	163.100	20.960	5.145	13.810	0.000	
2	03:13:16	42.420	39.460	176.400	173.000	21.210	3.864	13.870	0.000	
3	03:13:24	42.420	42.030	184.600	177.500	21.010	4.290	12.710	0.000	
X		41.900	40.740	176.600	171.200	21.060	4.433	13.460	0.000	
		σ	0.900	1.286	7.918	7.374	0.129	0.652	0.653	0.000
		%RSD	2.149	3.156	4.484	4.308	0.611	14.710	4.850	0.000
Run	Time	88Sr	89Y	95Mo	98Mo	103Rh	107Ag	109Ag	111Cd	
		ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	
1	03:13:08	111.800	0.000	2.417	2.438	78.694%	0.206	0.180	0.908	
2	03:13:16	116.400	0.000	2.799	2.613	80.414%	0.181	0.168	0.884	
3	03:13:24	116.800	0.000	2.338	2.237	82.959%	0.148	0.189	0.807	
X		115.000	0.000	2.518	2.429	80.689%	0.178	0.179	0.866	
		σ	2.799	0.000	0.246	0.188	2.146%	0.029	0.010	0.053
		%RSD	2.434	0.000	9.777	7.728	2.659	16.320	5.848	6.081
Run	Time	114Cd	115In	118Sn	121Sb	123Sb	135Ba	137Ba	159Tb	
		ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	
1	03:13:08	1.549	66.609%	46.690	1.187	1.167	661.000	645.300	82.639%	
2	03:13:16	1.724	68.617%	47.780	1.163	1.256	655.100	647.000	87.508%	
3	03:13:24	1.408	72.261%	46.220	1.129	1.320	661.400	655.100	88.675%	
X		1.561	69.162%	46.900	1.160	1.248	659.200	649.100	86.274%	
		σ	0.158	2.865%	0.799	0.029	0.077	3.512	5.230	3.202%
		%RSD	10.140	4.142	1.704	2.517	6.158	0.533	0.806	3.711
Run	Time	203Tl	205Tl	206Pb	207Pb	208Pb	209Bi			
		ppb	ppb	ppb	ppb	ppb	ppb			
1	03:13:08	1.343	1.449	44.480	41.280	43.800	62.521%			
2	03:13:16	1.417	1.422	44.610	41.100	43.330	64.229%			
3	03:13:24	1.368	1.317	45.050	40.710	43.640	65.168%			
X		1.376	1.396	44.710	41.030	43.590	63.973%			
		σ	0.037	0.070	0.300	0.294	0.240	1.342%		
		%RSD	2.714	5.007	0.672	0.716	0.551	2.098		

**SECTION 4**

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

# Case Narrative

Client: Stantec Consulting Services Inc  
Project/Site: ALF\_BS\_20190807\_1A

Job ID: 180-93848-1

**Job ID: 180-93848-1**

**Laboratory: Eurofins TestAmerica, Pittsburgh**

## Narrative

**Job Narrative**  
**180-93848-1**

### Comments

No additional comments.

### Receipt

The samples were received on 8/8/2019 9:00 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.0° C. ✓

### GC Semi VOA

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

### Metals

Method(s) 200.8, 6020A: The low level continuing calibration verification (CCVL) associated with batch 180-289282 recovered above the upper control limit for boron. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported. ✓

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

### General Chemistry

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



# Sample Summary

Client: Stantec Consulting Services Inc  
Project/Site: ALF\_BS\_20190807\_1A

Job ID: 180-93848-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
180-93848-1	ALF-BS-BG03-6.0/8.0-20190807 ~ ALF-BG03	Solid	08/07/19 13:23 ✓	08/08/19 09:00	
180-93848-2	ALF-BS-BG03-16.5/18.5-20190807 ~ ALF-BG03	Solid	08/07/19 14:18 ✓	08/08/19 09:00	
180-93848-3	ALF-BS-FB02-20190807 ~ ALF-BG03	Water	08/07/19 14:59 ✓	08/08/19 09:00	
180-93848-4	ALF-BS-BG03-26.5/28.5-20190807 ~ ALF-BG03 ✓	Solid	08/07/19 15:54 ✓	08/08/19 09:00	





# Login Sample Receipt Checklist

Client: Stantec Consulting Services Inc

Job Number: 180-93848-1

**Login Number: 93848**  
**List Number: 1**  
**Creator: Say, Thomas C**

**List Source: Eurofins TestAmerica, Pittsburgh**

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	