

**Data Validation Report  
Tennessee Valley Authority  
Cumberland Fossil Plant  
Environmental Investigation Plan  
Biota Samples  
Chain-of-Custody: CUF\_MF\_20190117\_1A**

This quality assurance (QA) review is based upon an examination of the data generated from the analyses of the 15 biota samples collected on June 5, 6, 7, 19, 22, and 23, 2018, at the Tennessee Valley Authority (TVA) Cumberland Fossil Plant facility. These samples were collectively analyzed by Pace Analytical Services, Inc. (Pace), of Green Bay, Wisconsin, for total metals by SW-846 Method 6020; for mercury by SW-846 Method 7473; and for percent moisture by American Society for Testing and Materials (ASTM) Method D2974-87.

This review was performed in accordance with the Environmental Investigation Plan, Cumberland Fossil Plant (CUF EIP; Revision 3, 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 Data Validation Standard Operating Procedures for Contract Laboratory Program Routine Analytical Services (Revision 2.1, July 1999); and the US EPA Region IV Data Validation Standard Operating Procedure. 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, ASTM, and Pace Methods.

### **Summary**

The analytical results and associated laboratory QA/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 Pace Work Orders 40182294 and 40182295.

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-MFN-CURA-20180605	40182294001	40182294	Biota	6/5/18	M, Hg, PM
CUF-MFN-CURD-20180607	40182294002	40182294	Biota	6/7/18	M, Hg, PM
CUF-MFN-CURU-20180607	40182294003	40182294	Biota	6/7/18	M, Hg, PM
CUF-MFN-WCU-20180605	40182294004	40182294	Biota	6/5/18	M, Hg, PM
CUF-MFN-WCD-20180605	40182294005	40182294	Biota	6/5/18	M, Hg, PM
CUF-MFP-CURA-20180607	40182294006	40182294	Biota	6/7/18	M, Hg, PM
CUF-MFP-CURD-20180606	40182294007	40182294	Biota	6/6/18	M, Hg, PM
CUF-MFP-CURU-20180606	40182294008	40182294	Biota	6/6/18	M, Hg, PM
CUF-MFP-WCU-20180606	40182294009	40182294	Biota	6/6/18	M, Hg, PM
CUF-MFP-WCD-20180606	40182294010	40182294	Biota	6/6/18	M, Hg, PM
CUF-MFA-CURA-20180622	40182295001	40182295	Biota	6/22/18	M, Hg, PM
CUF-MFA-CURD-20180619	40182295002	40182295	Biota	6/19/18	M, Hg, PM
CUF-MFA-CURU-20180623	40182295003	40182295	Biota	6/23/18	M, Hg, PM
CUF-MFA-WCU-20180622	40182295004	40182295	Biota	6/22/18	M, Hg, PM
CUF-MFA-WCD-20180622	40182295005	40182295	Biota	6/22/18	M, Hg, PM

Parameters Examined

- M - Total Metals by SW-846 Method 6020.  
Hg - Mercury by SW-846 Method 7473.  
PM - Percent Moisture by ASTM Method D2974-87.

Items Reviewed	
Holding Times	Instrument Tuning and Calibrations
Sample Preservation	Reporting Limit (RL) Standard Recoveries
Chain-of-Custody (COC) Record and Case Narratives	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	Standard Reference Material Results

### Comments and Exceptions

- All analyses performed for the sampling event were in compliance with the requirements set forth in the EIP.

### Qualifier Summary

Analyte	Job Number(s)	Sample(s)	Validation Qualifier(s)	Reason for Qualification
total chromium	40182294	CUF-MFN-CURA-20180605, CUF-MFN-CURD-20180607, CUF-MFN-CURU-20180607, CUF-MFN-WCU-20180605, CUF-MFN-WCD-20180605, and CUF-MFP-CURU-20180606	U*	BL
total nickel	40182294	CUF-MFP-CURA-20180607, CUF-MFP-CURD-20180606, CUF-MFP-CURU-20180606, CUF-MFP-WCU-20180606, and CUF-MFP-WCD-20180606	U*	BL
total molybdenum	40182294 and 40182295	All samples except CUF-MFN-CURA-20180605, CUF-MFN-CURD-20180607, and CUF-MFN-WCU-20180605	U*	BL
total mercury	40182294 and 40182295	All samples except CUF-MFP-CURD-20180606, CUF-MFP-WCD-20180606, and CUF-MFA-WCU-20180622	U*	BL
total calcium and total zinc	40182294 and 40182295	All samples	J	M-

Analyte	Job Number(s)	Sample(s)	Validation Qualifier(s)	Reason for Qualification
total chromium	40182294 and 40182295	All samples	J/UJ (unless previously flagged "U**")	L-

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)

---

Review performed by: Danielle Coles, Senior Quality Assurance Chemist

Review 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: 4/4/19

**SECTION 2**

**ANALYTICAL RESULTS**

## **INORGANIC DATA QUALIFIERS**

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



## **REASON CODES AND EXPLANATIONS**

<b>Reason Code</b>	<b>Explanation</b>
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	40182294001									
Sys Sample Code	CUF-MFN-CURA-20180605									
Sample Name	CUF-MFN-CuRA-20180605									
Sample Date	6/5/2018 6:32:00 PM									
Location	CURA									
Sample Type	N									
Parent Sample										
Result Unit	Final Result	Final Qual	Reason code	Final MDL	Final RL	Final QL	Final Detect	Final Report	DF	Basis
%	81.0			0.10	0.10	0.10	Y	Yes	1	Freeze Dry
MG/KG	0.032	J	RL	0.016	0.016	0.10	Y	Yes	1	Freeze Dry
MG/KG	0.87			0.060	0.060	0.20	Y	Yes	2	Freeze Dry
MG/KG	11.4			0.031	0.031	0.10	Y	Yes	1	Freeze Dry
MG/KG	0.082	J	RL	0.066	0.066	0.22	Y	Yes	2	Freeze Dry
MG/KG		U		1.4	1.4	4.6	N	Yes	2	Freeze Dry
MG/KG	0.34			0.028	0.028	0.20	Y	Yes	2	Freeze Dry
MG/KG	912	J	M-	50.7	50.7	169	Y	Yes	2	Freeze Dry
MG/KG		U*	BL,L-	2.0	2.0	2.0	N	Yes	2	Freeze Dry
MG/KG	1.4			0.016	0.016	0.20	Y	Yes	2	Freeze Dry
MG/KG	4.0			0.57	0.57	1.9	Y	Yes	2	Freeze Dry
MG/KG	1.8			0.026	0.026	0.087	Y	Yes	1	Freeze Dry
MG/KG	1.2			0.042	0.042	0.20	Y	Yes	2	Freeze Dry
MG/KG	0.29			0.071	0.071	0.24	Y	Yes	2	Freeze Dry
MG/KG	2.0			0.082	0.082	0.27	Y	Yes	2	Freeze Dry
MG/KG	0.67			0.10	0.10	0.34	Y	Yes	2	Freeze Dry
MG/KG		U		0.022	0.022	0.10	N	Yes	2	Freeze Dry
MG/KG	3.1			0.32	0.32	1.1	Y	Yes	2	Freeze Dry
MG/KG	0.020	J	RL	0.013	0.013	0.10	Y	Yes	1	Freeze Dry
MG/KG	3.0			0.066	0.066	0.22	Y	Yes	2	Freeze Dry
MG/KG	56.6	J	M-	3.4	3.4	11.5	Y	Yes	2	Freeze Dry
MG/KG		U*	BL	0.0091	0.0091	0.019	N	Yes	1	Freeze Dry

Lab Sample ID	40182294002									
Sys Sample Code	CUF-MFN-CURD-20180607									
Sample Name	CUF-MFN-CuRD-20180607									
Sample Date	6/7/2018 2:24:00 PM									
Location	CURD									
Sample Type	N									
Parent Sample										
Result Unit	Final Result	Final Qual	Reason code	Final MDL	Final RL	Final QL	Final Detect	Final Report	DF	Basis
%	79.7			0.10	0.10	0.10	Y	Yes	1	Freeze Dry
MG/KG	0.027	J	RL	0.016	0.016	0.095	Y	Yes	1	Freeze Dry
MG/KG	0.76			0.058	0.058	0.19	Y	Yes	2	Freeze Dry
MG/KG	9.8			0.029	0.029	0.097	Y	Yes	1	Freeze Dry
MG/KG		U		0.063	0.063	0.21	N	Yes	2	Freeze Dry
MG/KG		U		1.3	1.3	4.4	N	Yes	2	Freeze Dry
MG/KG	0.22			0.027	0.027	0.19	Y	Yes	2	Freeze Dry
MG/KG	757	J	M-	48.4	48.4	161	Y	Yes	2	Freeze Dry
MG/KG		U*	BL,L-	1.5	1.5	1.5	N	Yes	2	Freeze Dry
MG/KG	1.0			0.016	0.016	0.19	Y	Yes	2	Freeze Dry
MG/KG	3.1			0.54	0.54	1.8	Y	Yes	2	Freeze Dry
MG/KG	1.3			0.025	0.025	0.083	Y	Yes	1	Freeze Dry
MG/KG	0.90			0.040	0.040	0.19	Y	Yes	2	Freeze Dry
MG/KG	0.23			0.068	0.068	0.23	Y	Yes	2	Freeze Dry
MG/KG	1.5			0.078	0.078	0.26	Y	Yes	2	Freeze Dry
MG/KG	0.74			0.097	0.097	0.32	Y	Yes	2	Freeze Dry
MG/KG		U		0.021	0.021	0.095	N	Yes	2	Freeze Dry
MG/KG	2.6			0.31	0.31	1.0	Y	Yes	2	Freeze Dry
MG/KG	0.019	J	RL	0.012	0.012	0.095	Y	Yes	1	Freeze Dry
MG/KG	2.2			0.063	0.063	0.21	Y	Yes	2	Freeze Dry
MG/KG	41.9	J	M-	3.3	3.3	10.9	Y	Yes	2	Freeze Dry
MG/KG		U*	BL	0.014	0.014	0.019	N	Yes	1	Freeze Dry

Lab Sample ID	40182294003									
Sys Sample Code	CUF-MFN-CURU-20180607									
Sample Name	CUF-MFN-CuRU-20180607									
Sample Date	6/7/2018 11:16:00 AM									
Location	CURU									
Sample Type	N									
Parent Sample										
Result Unit	Final Result	Final Qual	Reason code	Final MDL	Final RL	Final QL	Final Detect	Final Report	DF	Basis
%	78.7			0.10	0.10	0.10	Y	Yes	1	Freeze Dry
MG/KG		U		0.032	0.032	0.20	N	Yes	2	Freeze Dry
MG/KG	0.63			0.060	0.060	0.20	Y	Yes	2	Freeze Dry
MG/KG	8.7			0.061	0.061	0.20	Y	Yes	2	Freeze Dry
MG/KG		U		0.066	0.066	0.22	N	Yes	2	Freeze Dry
MG/KG		U		1.4	1.4	4.6	N	Yes	2	Freeze Dry
MG/KG	0.34			0.028	0.028	0.20	Y	Yes	2	Freeze Dry
MG/KG	627	J	M-	50.6	50.6	169	Y	Yes	2	Freeze Dry
MG/KG		U*	BL,L-	1.6	1.6	1.6	N	Yes	2	Freeze Dry
MG/KG	1.3			0.016	0.016	0.20	Y	Yes	2	Freeze Dry
MG/KG	2.7			0.57	0.57	1.9	Y	Yes	2	Freeze Dry
MG/KG	1.4			0.026	0.026	0.087	Y	Yes	1	Freeze Dry
MG/KG	0.78			0.042	0.042	0.20	Y	Yes	2	Freeze Dry
MG/KG		U*	BL	0.17	0.17	0.24	N	Yes	2	Freeze Dry
MG/KG	1.5			0.082	0.082	0.27	Y	Yes	2	Freeze Dry
MG/KG	0.58			0.10	0.10	0.34	Y	Yes	2	Freeze Dry
MG/KG		U		0.022	0.022	0.10	N	Yes	2	Freeze Dry
MG/KG	2.2			0.32	0.32	1.1	Y	Yes	2	Freeze Dry
MG/KG	0.015	J	RL	0.013	0.013	0.10	Y	Yes	1	Freeze Dry
MG/KG	2.3			0.066	0.066	0.22	Y	Yes	2	Freeze Dry
MG/KG	42.9	J	M-	3.4	3.4	11.4	Y	Yes	2	Freeze Dry
MG/KG		U*	BL	0.011	0.011	0.019	N	Yes	1	Freeze Dry

				<b>Lab Sample ID</b>	40182294004									
				<b>Sys Sample Code</b>	CUF-MFN-WCU-20180605									
				<b>Sample Name</b>	CUF-MFN-WCU-20180605									
				<b>Sample Date</b>	6/5/2018 3:00:00 PM									
				<b>Location</b>	WCU									
				<b>Sample Type</b>	N									
				<b>Parent Sample</b>										
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
ASTM D2974-87	Percent Moisture	MOISTURE	N	%	78.0			0.10	0.10	0.10	Y	Yes	1	Freeze Dry
SW-846 6020A	Antimony	7440-36-0	T	MG/KG		U		0.032	0.032	0.19	N	Yes	2	Freeze Dry
	Arsenic	7440-38-2	T	MG/KG	0.57			0.059	0.059	0.20	Y	Yes	2	Freeze Dry
	Barium	7440-39-3	T	MG/KG	8.4			0.059	0.059	0.20	Y	Yes	2	Freeze Dry
	Beryllium	7440-41-7	T	MG/KG		U		0.064	0.064	0.21	N	Yes	2	Freeze Dry
	Boron	7440-42-8	T	MG/KG		U		1.4	1.4	4.5	N	Yes	2	Freeze Dry
	Cadmium	7440-43-9	T	MG/KG	0.18	J	RL	0.027	0.027	0.19	Y	Yes	2	Freeze Dry
	Calcium	7440-70-2	T	MG/KG	872	J	M-	49.3	49.3	164	Y	Yes	2	Freeze Dry
	Chromium	7440-47-3	T	MG/KG		U*	BL,L-	1.6	1.6	1.6	N	Yes	2	Freeze Dry
	Cobalt	7440-48-4	T	MG/KG	1.2			0.016	0.016	0.19	Y	Yes	2	Freeze Dry
	Copper	7440-50-8	T	MG/KG	2.8			0.55	0.55	1.8	Y	Yes	2	Freeze Dry
	Lead	7439-92-1	T	MG/KG	1.2			0.025	0.025	0.085	Y	Yes	1	Freeze Dry
	Lithium	7439-93-2	T	MG/KG	0.55			0.041	0.041	0.19	Y	Yes	2	Freeze Dry
	Molybdenum	7439-98-7	T	MG/KG	0.21	J	RL	0.070	0.070	0.23	Y	Yes	2	Freeze Dry
	Nickel	7440-02-0	T	MG/KG	1.5			0.080	0.080	0.27	Y	Yes	2	Freeze Dry
	Selenium	7782-49-2	T	MG/KG	0.78			0.098	0.098	0.33	Y	Yes	2	Freeze Dry
	Silver	7440-22-4	T	MG/KG		U		0.022	0.022	0.097	N	Yes	2	Freeze Dry
	Strontium	7440-24-6	T	MG/KG	2.0			0.31	0.31	1.0	Y	Yes	2	Freeze Dry
	Thallium	7440-28-0	T	MG/KG		U		0.013	0.013	0.097	N	Yes	1	Freeze Dry
	Vanadium	7440-62-2	T	MG/KG	2.3			0.065	0.065	0.22	Y	Yes	2	Freeze Dry
	Zinc	7440-66-6	T	MG/KG	36.7	J	M-	3.3	3.3	11.2	Y	Yes	2	Freeze Dry
SW-846 7473	Mercury	7439-97-6	T	MG/KG		U*	BL	0.025	0.025	0.025	N	Yes	1	Freeze Dry

				<b>Lab Sample ID</b>	40182294005									
				<b>Sys Sample Code</b>	CUF-MFN-WCD-20180605									
				<b>Sample Name</b>	CUF-MFN-WCD-20180605									
				<b>Sample Date</b>	6/5/2018 1:12:00 PM									
				<b>Location</b>	WCD									
				<b>Sample Type</b>	N									
				<b>Parent Sample</b>										
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
ASTM D2974-87	Percent Moisture	MOISTURE	N	%	81.2			0.10	0.10	0.10	Y	Yes	1	Freeze Dry
SW-846 6020A	Antimony	7440-36-0	T	MG/KG		U		0.033	0.033	0.20	N	Yes	2	Freeze Dry
	Arsenic	7440-38-2	T	MG/KG	0.80			0.060	0.060	0.20	Y	Yes	2	Freeze Dry
	Barium	7440-39-3	T	MG/KG	10.0			0.061	0.061	0.20	Y	Yes	2	Freeze Dry
	Beryllium	7440-41-7	T	MG/KG	0.088	J	RL	0.066	0.066	0.22	Y	Yes	2	Freeze Dry
	Boron	7440-42-8	T	MG/KG		U		1.4	1.4	4.7	N	Yes	2	Freeze Dry
	Cadmium	7440-43-9	T	MG/KG	0.15	J	RL	0.028	0.028	0.20	Y	Yes	2	Freeze Dry
	Calcium	7440-70-2	T	MG/KG	1250	J	M-	50.8	50.8	169	Y	Yes	2	Freeze Dry
	Chromium	7440-47-3	T	MG/KG		U*	BL,L-	1.9	1.9	1.9	N	Yes	2	Freeze Dry
	Cobalt	7440-48-4	T	MG/KG	1.1			0.016	0.016	0.20	Y	Yes	2	Freeze Dry
	Copper	7440-50-8	T	MG/KG	2.6			0.57	0.57	1.9	Y	Yes	2	Freeze Dry
	Lead	7439-92-1	T	MG/KG	1.2			0.026	0.026	0.087	Y	Yes	1	Freeze Dry
	Lithium	7439-93-2	T	MG/KG	0.77			0.042	0.042	0.20	Y	Yes	2	Freeze Dry
	Molybdenum	7439-98-7	T	MG/KG		U*	BL	0.16	0.16	0.24	N	Yes	2	Freeze Dry
	Nickel	7440-02-0	T	MG/KG	1.7			0.082	0.082	0.27	Y	Yes	2	Freeze Dry
	Selenium	7782-49-2	T	MG/KG	0.58			0.10	0.10	0.34	Y	Yes	2	Freeze Dry
	Silver	7440-22-4	T	MG/KG		U		0.022	0.022	0.10	N	Yes	2	Freeze Dry
	Strontium	7440-24-6	T	MG/KG	2.4			0.32	0.32	1.1	Y	Yes	2	Freeze Dry
	Thallium	7440-28-0	T	MG/KG	0.015	J	RL	0.013	0.013	0.10	Y	Yes	1	Freeze Dry
	Vanadium	7440-62-2	T	MG/KG	2.7			0.067	0.067	0.22	Y	Yes	2	Freeze Dry
	Zinc	7440-66-6	T	MG/KG	30.6	J	M-	3.4	3.4	11.5	Y	Yes	2	Freeze Dry
SW-846 7473	Mercury	7439-97-6	T	MG/KG		U*	BL	0.0034	0.0034	0.019	N	Yes	1	Freeze Dry

Lab Sample ID	40182294006									
Sys Sample Code	CUF-MFP-CURA-20180607									
Sample Name	CUF-MFP-CuRA-20180607									
Sample Date	6/7/2018 6:00:00 PM									
Location	CURA									
Sample Type	N									
Parent Sample										
Result Unit	Final Result	Final Qual	Reason code	Final MDL	Final RL	Final QL	Final Detect	Final Report	DF	Basis
%	83.3			0.10	0.10	0.10	Y	Yes	1	Freeze Dry
MG/KG		U		0.030	0.030	0.19	N	Yes	2	Freeze Dry
MG/KG	0.090	J	RL	0.056	0.056	0.19	Y	Yes	2	Freeze Dry
MG/KG	0.89			0.057	0.057	0.19	Y	Yes	2	Freeze Dry
MG/KG		U		0.061	0.061	0.20	N	Yes	2	Freeze Dry
MG/KG		U		1.3	1.3	4.3	N	Yes	2	Freeze Dry
MG/KG	0.95			0.026	0.026	0.19	Y	Yes	2	Freeze Dry
MG/KG	457	J	M-	47.2	47.2	157	Y	Yes	2	Freeze Dry
MG/KG		UJ	L-	0.16	0.16	0.55	N	Yes	2	Freeze Dry
MG/KG	0.63			0.015	0.015	0.19	Y	Yes	2	Freeze Dry
MG/KG	2.2			0.53	0.53	1.8	Y	Yes	2	Freeze Dry
MG/KG	0.032	J	RL	0.024	0.024	0.081	Y	Yes	1	Freeze Dry
MG/KG		U		0.039	0.039	0.19	N	Yes	2	Freeze Dry
MG/KG		U*	BL	0.14	0.14	0.22	N	Yes	2	Freeze Dry
MG/KG		U*	BL	0.12	0.12	0.25	N	Yes	2	Freeze Dry
MG/KG	0.42			0.094	0.094	0.31	Y	Yes	2	Freeze Dry
MG/KG		U		0.021	0.021	0.093	N	Yes	2	Freeze Dry
MG/KG	1.2			0.30	0.30	1.0	Y	Yes	2	Freeze Dry
MG/KG		U		0.012	0.012	0.093	N	Yes	1	Freeze Dry
MG/KG		U		0.062	0.062	0.21	N	Yes	2	Freeze Dry
MG/KG	74.5	J	M-	3.2	3.2	10.7	Y	Yes	2	Freeze Dry
MG/KG		U*	BL	0.0038	0.0038	0.019	N	Yes	1	Freeze Dry

Lab Sample ID	40182294007									
Sys Sample Code	CUF-MFP-CURD-20180606									
Sample Name	CUF-MFP-CuRD-20180606									
Sample Date	6/6/2018 3:16:00 PM									
Location	CURD									
Sample Type	N									
Parent Sample										
Result Unit	Final Result	Final Qual	Reason code	Final MDL	Final RL	Final QL	Final Detect	Final Report	DF	Basis
%	84.2			0.10	0.10	0.10	Y	Yes	1	Freeze Dry
MG/KG		U		0.016	0.016	0.098	N	Yes	1	Freeze Dry
MG/KG	0.092	J	RL	0.059	0.059	0.20	Y	Yes	2	Freeze Dry
MG/KG	0.95			0.030	0.030	0.10	Y	Yes	1	Freeze Dry
MG/KG		U		0.065	0.065	0.22	N	Yes	2	Freeze Dry
MG/KG		U		1.4	1.4	4.6	N	Yes	2	Freeze Dry
MG/KG	0.31			0.028	0.028	0.20	Y	Yes	2	Freeze Dry
MG/KG	377	J	M-	49.8	49.8	166	Y	Yes	2	Freeze Dry
MG/KG		UJ	L-	0.17	0.17	0.58	N	Yes	2	Freeze Dry
MG/KG	0.28			0.016	0.016	0.20	Y	Yes	2	Freeze Dry
MG/KG	2.2			0.56	0.56	1.9	Y	Yes	2	Freeze Dry
MG/KG	0.076	J	RL	0.026	0.026	0.086	Y	Yes	1	Freeze Dry
MG/KG		U		0.041	0.041	0.20	N	Yes	2	Freeze Dry
MG/KG		U*	BL	0.14	0.14	0.23	N	Yes	2	Freeze Dry
MG/KG		U*	BL	0.15	0.15	0.27	N	Yes	2	Freeze Dry
MG/KG	0.58			0.099	0.099	0.33	Y	Yes	2	Freeze Dry
MG/KG		U		0.022	0.022	0.098	N	Yes	2	Freeze Dry
MG/KG	0.98	J	RL	0.32	0.32	1.1	Y	Yes	2	Freeze Dry
MG/KG		U		0.013	0.013	0.098	N	Yes	1	Freeze Dry
MG/KG	0.088	J	RL	0.065	0.065	0.22	Y	Yes	2	Freeze Dry
MG/KG	39.0	J	M-	3.4	3.4	11.3	Y	Yes	2	Freeze Dry
MG/KG		U		0.0031	0.0031	0.020	N	Yes	1	Freeze Dry

Lab Sample ID	40182294008									
Sys Sample Code	CUF-MFP-CURU-20180606									
Sample Name	CUF-MFP-CuRU-20180606									
Sample Date	6/6/2018 12:48:00 PM									
Location	CURU									
Sample Type	N									
Parent Sample										
Result Unit	Final Result	Final Qual	Reason code	Final MDL	Final RL	Final QL	Final Detect	Final Report	DF	Basis
%	80.5			0.10	0.10	0.10	Y	Yes	1	Freeze Dry
MG/KG		U		0.016	0.016	0.097	N	Yes	1	Freeze Dry
MG/KG	0.13	J	RL	0.059	0.059	0.20	Y	Yes	2	Freeze Dry
MG/KG	1.8			0.030	0.030	0.099	Y	Yes	1	Freeze Dry
MG/KG		U		0.064	0.064	0.21	N	Yes	2	Freeze Dry
MG/KG		U		1.4	1.4	4.5	N	Yes	2	Freeze Dry
MG/KG	0.39			0.027	0.027	0.19	Y	Yes	2	Freeze Dry
MG/KG	356	J	M-	49.3	49.3	164	Y	Yes	2	Freeze Dry
MG/KG		U*	BL,L-	0.30	0.30	0.57	N	Yes	2	Freeze Dry
MG/KG	0.57			0.016	0.016	0.19	Y	Yes	2	Freeze Dry
MG/KG	2.3			0.55	0.55	1.8	Y	Yes	2	Freeze Dry
MG/KG	0.21			0.025	0.025	0.085	Y	Yes	1	Freeze Dry
MG/KG	0.11	J	RL	0.041	0.041	0.19	Y	Yes	2	Freeze Dry
MG/KG		U*	BL	0.15	0.15	0.23	N	Yes	2	Freeze Dry
MG/KG		U*	BL	0.28	0.28	0.28	N	Yes	2	Freeze Dry
MG/KG	0.47			0.098	0.098	0.33	Y	Yes	2	Freeze Dry
MG/KG		U		0.022	0.022	0.097	N	Yes	2	Freeze Dry
MG/KG	0.98	J	RL	0.31	0.31	1.0	Y	Yes	2	Freeze Dry
MG/KG		U		0.013	0.013	0.097	N	Yes	1	Freeze Dry
MG/KG	0.34			0.065	0.065	0.22	Y	Yes	2	Freeze Dry
MG/KG	43.2	J	M-	3.3	3.3	11.2	Y	Yes	2	Freeze Dry
MG/KG		U*	BL	0.0057	0.0057	0.019	N	Yes	1	Freeze Dry

Lab Sample ID	40182294009									
Sys Sample Code	CUF-MFP-WCU-20180606									
Sample Name	CUF-MFP-WCU-20180606									
Sample Date	6/6/2018 4:43:00 PM									
Location	WCU									
Sample Type	N									
Parent Sample										
Result Unit	Final Result	Final Qual	Reason code	Final MDL	Final RL	Final QL	Final Detect	Final Report	DF	Basis
%	81.5			0.10	0.10	0.10	Y	Yes	1	Freeze Dry
MG/KG		U		0.016	0.016	0.096	N	Yes	1	Freeze Dry
MG/KG	0.10	J	RL	0.058	0.058	0.19	Y	Yes	2	Freeze Dry
MG/KG	1.1			0.030	0.030	0.098	Y	Yes	1	Freeze Dry
MG/KG		U		0.064	0.064	0.21	N	Yes	2	Freeze Dry
MG/KG		U		1.3	1.3	4.5	N	Yes	2	Freeze Dry
MG/KG	0.12	J	RL	0.027	0.027	0.19	Y	Yes	2	Freeze Dry
MG/KG	450	J	M-	49.0	49.0	163	Y	Yes	2	Freeze Dry
MG/KG		UJ	L-	0.17	0.17	0.57	N	Yes	2	Freeze Dry
MG/KG	0.45			0.016	0.016	0.19	Y	Yes	2	Freeze Dry
MG/KG	1.9			0.55	0.55	1.8	Y	Yes	2	Freeze Dry
MG/KG	0.073	J	RL	0.025	0.025	0.084	Y	Yes	1	Freeze Dry
MG/KG		U		0.041	0.041	0.19	N	Yes	2	Freeze Dry
MG/KG		U*	BL	0.16	0.16	0.23	N	Yes	2	Freeze Dry
MG/KG		U*	BL	0.19	0.19	0.26	N	Yes	2	Freeze Dry
MG/KG	0.60			0.098	0.098	0.33	Y	Yes	2	Freeze Dry
MG/KG		U		0.022	0.022	0.096	N	Yes	2	Freeze Dry
MG/KG	0.93	J	RL	0.31	0.31	1.0	Y	Yes	2	Freeze Dry
MG/KG		U		0.013	0.013	0.096	N	Yes	1	Freeze Dry
MG/KG	0.12	J	RL	0.064	0.064	0.21	Y	Yes	2	Freeze Dry
MG/KG	34.7	J	M-	3.3	3.3	11.1	Y	Yes	2	Freeze Dry
MG/KG		U*	BL	0.011	0.011	0.020	N	Yes	1	Freeze Dry

				<b>Lab Sample ID</b>	40182294010									
				<b>Sys Sample Code</b>	CUF-MFP-WCD-20180606									
				<b>Sample Name</b>	CUF-MFP-WCD-20180606									
				<b>Sample Date</b>	6/6/2018 5:45:00 PM									
				<b>Location</b>	WCD									
				<b>Sample Type</b>	N									
				<b>Parent Sample</b>										
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
ASTM D2974-87	Percent Moisture	MOISTURE	N	%	84.8			0.10	0.10	0.10	Y	Yes	1	Freeze Dry
SW-846 6020A	Antimony	7440-36-0	T	MG/KG		U		0.016	0.016	0.099	N	Yes	1	Freeze Dry
	Arsenic	7440-38-2	T	MG/KG	0.10	J	RL	0.060	0.060	0.20	Y	Yes	2	Freeze Dry
	Barium	7440-39-3	T	MG/KG	0.99			0.030	0.030	0.10	Y	Yes	1	Freeze Dry
	Beryllium	7440-41-7	T	MG/KG		U		0.066	0.066	0.22	N	Yes	2	Freeze Dry
	Boron	7440-42-8	T	MG/KG		U		1.4	1.4	4.6	N	Yes	2	Freeze Dry
	Cadmium	7440-43-9	T	MG/KG	0.11	J	RL	0.028	0.028	0.20	Y	Yes	2	Freeze Dry
	Calcium	7440-70-2	T	MG/KG	414	J	M-	50.4	50.4	168	Y	Yes	2	Freeze Dry
	Chromium	7440-47-3	T	MG/KG		UJ	L-	0.18	0.18	0.58	N	Yes	2	Freeze Dry
	Cobalt	7440-48-4	T	MG/KG	0.29			0.016	0.016	0.20	Y	Yes	2	Freeze Dry
	Copper	7440-50-8	T	MG/KG	1.9			0.56	0.56	1.9	Y	Yes	2	Freeze Dry
	Lead	7439-92-1	T	MG/KG	0.064	J	RL	0.026	0.026	0.087	Y	Yes	1	Freeze Dry
	Lithium	7439-93-2	T	MG/KG		U		0.042	0.042	0.20	N	Yes	2	Freeze Dry
	Molybdenum	7439-98-7	T	MG/KG		U*	BL	0.13	0.13	0.24	N	Yes	2	Freeze Dry
	Nickel	7440-02-0	T	MG/KG		U*	BL	0.17	0.17	0.27	N	Yes	2	Freeze Dry
	Selenium	7782-49-2	T	MG/KG	0.48			0.10	0.10	0.33	Y	Yes	2	Freeze Dry
	Silver	7440-22-4	T	MG/KG		U		0.022	0.022	0.099	N	Yes	2	Freeze Dry
	Strontium	7440-24-6	T	MG/KG	0.79	J	RL	0.32	0.32	1.1	Y	Yes	2	Freeze Dry
	Thallium	7440-28-0	T	MG/KG		U		0.013	0.013	0.099	N	Yes	1	Freeze Dry
	Vanadium	7440-62-2	T	MG/KG	0.12	J	RL	0.066	0.066	0.22	Y	Yes	2	Freeze Dry
	Zinc	7440-66-6	T	MG/KG	32.5	J	M-	3.4	3.4	11.4	Y	Yes	2	Freeze Dry
SW-846 7473	Mercury	7439-97-6	T	MG/KG		U		0.0029	0.0029	0.018	N	Yes	1	Freeze Dry

Lab Sample ID	40182295001									
Sys Sample Code	CUF-MFA-CURA-20180622									
Sample Name	CUF-MFA-CuRA-20180622									
Sample Date	6/22/2018 10:45:00 AM									
Location	CURA									
Sample Type	N									
Parent Sample										
Result Unit	Final Result	Final Qual	Reason code	Final MDL	Final RL	Final QL	Final Detect	Final Report	DF	Basis
%	72.3			0.10	0.10	0.10	Y	Yes	1	Freeze Dry
MG/KG		U		0.016	0.016	0.095	N	Yes	1	Freeze Dry
MG/KG		U		0.057	0.057	0.19	N	Yes	2	Freeze Dry
MG/KG	0.20			0.029	0.029	0.097	Y	Yes	1	Freeze Dry
MG/KG		U		0.063	0.063	0.21	N	Yes	2	Freeze Dry
MG/KG		U		1.3	1.3	4.4	N	Yes	2	Freeze Dry
MG/KG	0.25			0.027	0.027	0.19	Y	Yes	2	Freeze Dry
MG/KG	296	J	M-	48.4	48.4	161	Y	Yes	2	Freeze Dry
MG/KG		UJ	L-	0.17	0.17	0.56	N	Yes	2	Freeze Dry
MG/KG	0.34			0.016	0.016	0.19	Y	Yes	2	Freeze Dry
MG/KG	8.0			0.54	0.54	1.8	Y	Yes	2	Freeze Dry
MG/KG		U		0.025	0.025	0.083	N	Yes	1	Freeze Dry
MG/KG		U		0.040	0.040	0.19	N	Yes	2	Freeze Dry
MG/KG		U*	BL	0.12	0.12	0.23	N	Yes	2	Freeze Dry
MG/KG		U		0.078	0.078	0.26	N	Yes	2	Freeze Dry
MG/KG	0.75			0.097	0.097	0.32	Y	Yes	2	Freeze Dry
MG/KG		U		0.021	0.021	0.095	N	Yes	2	Freeze Dry
MG/KG	0.39	J	RL	0.31	0.31	1.0	Y	Yes	2	Freeze Dry
MG/KG		U		0.012	0.012	0.095	N	Yes	1	Freeze Dry
MG/KG		U		0.063	0.063	0.21	N	Yes	2	Freeze Dry
MG/KG	27.6	J	M-	3.3	3.3	10.9	Y	Yes	2	Freeze Dry
MG/KG		U*	BL	0.026	0.026	0.026	N	Yes	1	Freeze Dry

Lab Sample ID	40182295002									
Sys Sample Code	CUF-MFA-CURD-20180619									
Sample Name	CUF-MFA-CuRD-20180619									
Sample Date	6/19/2018 1:25:00 PM									
Location	CURD									
Sample Type	N									
Parent Sample										
Result Unit	Final Result	Final Qual	Reason code	Final MDL	Final RL	Final QL	Final Detect	Final Report	DF	Basis
%	74.4			0.10	0.10	0.10	Y	Yes	1	Freeze Dry
MG/KG		U		0.016	0.016	0.099	N	Yes	1	Freeze Dry
MG/KG		U		0.060	0.060	0.20	N	Yes	2	Freeze Dry
MG/KG	0.14			0.030	0.030	0.10	Y	Yes	1	Freeze Dry
MG/KG		U		0.065	0.065	0.22	N	Yes	2	Freeze Dry
MG/KG		U		1.4	1.4	4.6	N	Yes	2	Freeze Dry
MG/KG	0.28			0.028	0.028	0.20	Y	Yes	2	Freeze Dry
MG/KG	260	J	M-	50.2	50.2	167	Y	Yes	2	Freeze Dry
MG/KG		UJ	L-	0.17	0.17	0.58	N	Yes	2	Freeze Dry
MG/KG	0.25			0.016	0.016	0.20	Y	Yes	2	Freeze Dry
MG/KG	6.8			0.56	0.56	1.9	Y	Yes	2	Freeze Dry
MG/KG		U		0.026	0.026	0.086	N	Yes	1	Freeze Dry
MG/KG		U		0.042	0.042	0.20	N	Yes	2	Freeze Dry
MG/KG		U*	BL	0.11	0.11	0.24	N	Yes	2	Freeze Dry
MG/KG		U		0.081	0.081	0.27	N	Yes	2	Freeze Dry
MG/KG	0.72			0.10	0.10	0.33	Y	Yes	2	Freeze Dry
MG/KG		U		0.022	0.022	0.099	N	Yes	2	Freeze Dry
MG/KG	0.36	J	RL	0.32	0.32	1.1	Y	Yes	2	Freeze Dry
MG/KG		U		0.013	0.013	0.099	N	Yes	1	Freeze Dry
MG/KG		U		0.066	0.066	0.22	N	Yes	2	Freeze Dry
MG/KG	26.0	J	M-	3.4	3.4	11.4	Y	Yes	2	Freeze Dry
MG/KG		U*	BL	0.019	0.019	0.020	N	Yes	1	Freeze Dry

Lab Sample ID	40182295003									
Sys Sample Code	CUF-MFA-CURU-20180623									
Sample Name	CUF-MFA-CuRU-20180623									
Sample Date	6/23/2018 2:45:00 PM									
Location	CURU									
Sample Type	N									
Parent Sample										
Result Unit	Final Result	Final Qual	Reason code	Final MDL	Final RL	Final QL	Final Detect	Final Report	DF	Basis
%	70.2			0.10	0.10	0.10	Y	Yes	1	Freeze Dry
MG/KG		U		0.015	0.015	0.092	N	Yes	1	Freeze Dry
MG/KG		U		0.056	0.056	0.19	N	Yes	2	Freeze Dry
MG/KG	0.13			0.028	0.028	0.094	Y	Yes	1	Freeze Dry
MG/KG		U		0.061	0.061	0.20	N	Yes	2	Freeze Dry
MG/KG		U		1.3	1.3	4.3	N	Yes	2	Freeze Dry
MG/KG	0.21			0.026	0.026	0.18	Y	Yes	2	Freeze Dry
MG/KG	224	J	M-	46.8	46.8	156	Y	Yes	2	Freeze Dry
MG/KG		UJ	L-	0.16	0.16	0.54	N	Yes	2	Freeze Dry
MG/KG	0.29			0.015	0.015	0.18	Y	Yes	2	Freeze Dry
MG/KG	7.9			0.52	0.52	1.7	Y	Yes	2	Freeze Dry
MG/KG		U		0.024	0.024	0.080	N	Yes	1	Freeze Dry
MG/KG		U		0.039	0.039	0.18	N	Yes	2	Freeze Dry
MG/KG		U*	BL	0.10	0.10	0.22	N	Yes	2	Freeze Dry
MG/KG		U		0.076	0.076	0.25	N	Yes	2	Freeze Dry
MG/KG	0.90			0.093	0.093	0.31	Y	Yes	2	Freeze Dry
MG/KG		U		0.021	0.021	0.092	N	Yes	2	Freeze Dry
MG/KG	0.30	J	RL	0.30	0.30	0.99	Y	Yes	2	Freeze Dry
MG/KG		U		0.012	0.012	0.092	N	Yes	1	Freeze Dry
MG/KG		U		0.061	0.061	0.20	N	Yes	2	Freeze Dry
MG/KG	25.4	J	M-	3.2	3.2	10.6	Y	Yes	2	Freeze Dry
MG/KG		U*	BL	0.026	0.026	0.026	N	Yes	1	Freeze Dry

Lab Sample ID	40182295004									
Sys Sample Code	CUF-MFA-WCU-20180622									
Sample Name	CUF-MFA-WCU-20180622									
Sample Date	6/22/2018 12:30:00 PM									
Location	WCU									
Sample Type	N									
Parent Sample										
Result Unit	Final Result	Final Qual	Reason code	Final MDL	Final RL	Final QL	Final Detect	Final Report	DF	Basis
%	68.6			0.10	0.10	0.10	Y	Yes	1	Freeze Dry
MG/KG		U		0.016	0.016	0.098	N	Yes	1	Freeze Dry
MG/KG		U		0.059	0.059	0.20	N	Yes	2	Freeze Dry
MG/KG	0.19			0.030	0.030	0.10	Y	Yes	1	Freeze Dry
MG/KG		U		0.065	0.065	0.22	N	Yes	2	Freeze Dry
MG/KG		U		1.4	1.4	4.6	N	Yes	2	Freeze Dry
MG/KG	0.17	J	RL	0.028	0.028	0.20	Y	Yes	2	Freeze Dry
MG/KG	388	J	M-	50.0	50.0	167	Y	Yes	2	Freeze Dry
MG/KG		UJ	L-	0.17	0.17	0.58	N	Yes	2	Freeze Dry
MG/KG	0.45			0.016	0.016	0.20	Y	Yes	2	Freeze Dry
MG/KG	8.0			0.56	0.56	1.9	Y	Yes	2	Freeze Dry
MG/KG		U		0.026	0.026	0.086	N	Yes	1	Freeze Dry
MG/KG		U		0.041	0.041	0.20	N	Yes	2	Freeze Dry
MG/KG		U*	BL	0.14	0.14	0.23	N	Yes	2	Freeze Dry
MG/KG		U		0.081	0.081	0.27	N	Yes	2	Freeze Dry
MG/KG	0.98			0.10	0.10	0.33	Y	Yes	2	Freeze Dry
MG/KG		U		0.022	0.022	0.098	N	Yes	2	Freeze Dry
MG/KG		U		0.32	0.32	1.1	N	Yes	2	Freeze Dry
MG/KG		U		0.013	0.013	0.098	N	Yes	1	Freeze Dry
MG/KG		U		0.066	0.066	0.22	N	Yes	2	Freeze Dry
MG/KG	32.9	J	M-	3.4	3.4	11.3	Y	Yes	2	Freeze Dry
MG/KG	0.045			0.0031	0.0031	0.020	Y	Yes	1	Freeze Dry

				<b>Lab Sample ID</b>	40182295005									
				<b>Sys Sample Code</b>	CUF-MFA-WCD-20180622									
				<b>Sample Name</b>	CUF-MFA-WCD-20180622									
				<b>Sample Date</b>	6/22/2018 11:30:00 AM									
				<b>Location</b>	WCD									
				<b>Sample Type</b>	N									
				<b>Parent Sample</b>										
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
ASTM D2974-87	Percent Moisture	MOISTURE	N	%	72.5			0.10	0.10	0.10	Y	Yes	1	Freeze Dry
SW-846 6020A	Antimony	7440-36-0	T	MG/KG		U		0.016	0.016	0.096	N	Yes	1	Freeze Dry
	Arsenic	7440-38-2	T	MG/KG		U		0.058	0.058	0.19	N	Yes	2	Freeze Dry
	Barium	7440-39-3	T	MG/KG	0.14			0.029	0.029	0.098	Y	Yes	1	Freeze Dry
	Beryllium	7440-41-7	T	MG/KG		U		0.064	0.064	0.21	N	Yes	2	Freeze Dry
	Boron	7440-42-8	T	MG/KG		U		1.3	1.3	4.5	N	Yes	2	Freeze Dry
	Cadmium	7440-43-9	T	MG/KG	0.071	J	RL	0.027	0.027	0.19	Y	Yes	2	Freeze Dry
	Calcium	7440-70-2	T	MG/KG	246	J	M-	48.7	48.7	162	Y	Yes	2	Freeze Dry
	Chromium	7440-47-3	T	MG/KG		UJ	L-	0.17	0.17	0.57	N	Yes	2	Freeze Dry
	Cobalt	7440-48-4	T	MG/KG	0.23			0.016	0.016	0.19	Y	Yes	2	Freeze Dry
	Copper	7440-50-8	T	MG/KG	7.7			0.55	0.55	1.8	Y	Yes	2	Freeze Dry
	Lead	7439-92-1	T	MG/KG		U		0.025	0.025	0.084	N	Yes	1	Freeze Dry
	Lithium	7439-93-2	T	MG/KG		U		0.040	0.040	0.19	N	Yes	2	Freeze Dry
	Molybdenum	7439-98-7	T	MG/KG		U*	BL	0.098	0.098	0.23	N	Yes	2	Freeze Dry
	Nickel	7440-02-0	T	MG/KG		U		0.079	0.079	0.26	N	Yes	2	Freeze Dry
	Selenium	7782-49-2	T	MG/KG	0.96			0.097	0.097	0.32	Y	Yes	2	Freeze Dry
	Silver	7440-22-4	T	MG/KG		U		0.021	0.021	0.096	N	Yes	2	Freeze Dry
	Strontium	7440-24-6	T	MG/KG		U		0.31	0.31	1.0	N	Yes	2	Freeze Dry
	Thallium	7440-28-0	T	MG/KG		U		0.012	0.012	0.096	N	Yes	1	Freeze Dry
	Vanadium	7440-62-2	T	MG/KG		U		0.064	0.064	0.21	N	Yes	2	Freeze Dry
	Zinc	7440-66-6	T	MG/KG	29.7	J	M-	3.3	3.3	11.0	Y	Yes	2	Freeze Dry
SW-846 7473	Mercury	7439-97-6	T	MG/KG		U*	BL	0.017	0.017	0.020	N	Yes	1	Freeze Dry

## **SECTION 3**

### **SUPPORTING DOCUMENTATION FOR QUALIFIERS**



## INORGANIC ANALYSIS SUPPORT DOCUMENTATION

ESI project name:	TVA CUF EI
Sample Collection Dates:	6/5-6/7/18, 6/19/18, 6/22-6/23/18
Job Number:	20188111.A000
Project Manager:	AJC
Laboratory:	TestAmerica- Pittsburgh

Reviewed by: Danielle Coles  
Approved by: AP  
Completion Date: 3/2019

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) <input type="checkbox"/>		
	Level IV (Full) <input checked="" type="checkbox"/>	40182294, 40182295	
	Limited <input type="checkbox"/>		
	Other:		

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

Comments: All results are acceptable unless otherwise qualified.



## BLANK ANALYSIS RESULTS FOR INORGANIC PARAMETERS

Aq = Aqueous; S = Solid

#### Notes:

FORM II INORGANIC-1  
CRDL CHECK STANDARD

Lab Name: Pace Analytical - Green Bay SDG No. : 40182294 Contract: 0777010 CUMBERLAND FOSSIL PLAN

CRDL Check Standard Source: 217187 Analysis Date/Time: 02/05/2019 15:35 ✓

Concentration Units: ug/L

Analyte	CRDL Check Standard			
	True	Found	%R	Control Limit %R
Calcium	250.000	520	208.0 / 104.0	70-130
Copper	5.000	5.1 ✓	507.0 / 101.4	70-130
Strontium	1.000	5.0	407.0 / 99.4	70-130
Zinc	5.000	5.9 ✓	117.1 ✓ / 104.0	70-130

Issue indicated in the  
case narrative

FORM II INORGANIC-1  
CRDL CHECK STANDARD

Lab Name: Pace Analytical - Green Bay SDG No. : 40182294 Contract: 0777010 CUMBERLAND FOSSIL PLAN

CRDL Check Standard Source: 217187 Analysis Date/Time: 02/05/2019 20:17 ✓

Concentration Units: ug/L

Analyte	CRDL Check Standard			
	True	Found	%R	Control Limit %R
Calcium	350 500	555	222.0 111.0	70-130
Copper	10 5.0	4.8 ✓	482.7 96.5	70-130
Strontium	10 5.0	5.0	499.7 99.9	70-130
Zinc	5.0 0.05019	5.3 ✓	105.8 0.31019	70-130

Issue indicated  
in the case number

FORM II INORGANIC-1  
CRDL CHECK STANDARD

Lab Name: Pace Analytical - Green Bay SDG No. : 40182294 Contract: 0777010 CUMBERLAND FOSSIL PLAN

CRDL Check Standard Source: 217187 Analysis Date/Time: 02/05/2019 21:56 ✓

Concentration Units: ug/L

Analyte	CRDL Check Standard			
	True	Found	%R	Control Limit %R
Boron	5.0	5.2 ✓	105.0 /	70-130
Calcium	250 500	503	201.1 100.1	70-130
Copper	1.0 5.0	5.1	509.1 101.8	70-130
Strontium	1.0 5.0	5.0 ✓	496.3 99.3	70-130
Zinc	5.0 0.3125%	5.1	102.3 ✓	70-130

Issue indicated in  
the case narrative

FORM II INORGANIC-1  
CRDL CHECK STANDARD

Lab Name: Pace Analytical - Green Bay SDG No. : 40182294 Contract: 0777010 CUMBERLAND FOSSIL PLAN

CRDL Check Standard Source: 217187 Analysis Date/Time: 02/06/2019 00:55 ✓

Concentration Units: ug/L

Analyte	CRDL Check Standard			
	True	Found	%R	Control Limit %R
Boron	5.0	4.5	90.1	70-130
Calcium	280.500	522 ✓	209.0 104.5	70-130
Copper	1.0 5.0	5.0	497.2 99.44	70-130
Strontium	1.0 5.0	5.0 ✓	500.6 100.1	70-130
Zinc	5.0 0032019	4.4	87.4 DL 30 ppm	70-130

Issue indicated in  
cause narrative

## FORM III INORGANIC-1

## BLANKS

Lab Name: Pace Analytical - Green Bay SDG No. : 40182294 Contract : 0777010 CUMBERLAND FOSSIL PLAN

Method Blank Matrix: Tissue Instrument ID: 40ICM2

Method Blank Concentration Units: mg/kg

Analyte	Initial Calibration Blank (ug/L)		Continuing Calibration Blank (ug/L)						Method Blank (mg/kg)	
	02/05/2019 15:21 ✓	C	02/05/2019 16:02	C	02/05/2019 17:18	C	02/05/2019 18:41 ✓	C	1820202	C
Arsenic	0.14	U	0.14	U	0.14	U	0.14	U	<0.030	U
Beryllium	0.22	U	0.22	U	0.22	U	0.22	U	<0.033	U
Cadmium	0.10	U	0.10	U	0.10	U	0.10	U	<0.014	U
Calcium	500	U	500	U	500	U	500	U	<25.4	U
Chromium	1.4	U	1.4	U	1.4	U	1.4	U	0.22	J
Cobalt	0.10	U	0.10	U	0.10	U	0.10	U	<0.0082	U
Copper	0.64	U	0.64	U	0.64	U	0.64	U	<0.28	U
Lithium	1.0	U	1.0	U	1.0	U	1.0	U	<0.021	U
Molybdenum	0.13	U	0.13	U	0.13	U	0.13	U	<0.036	U
Nickel	0.65	U	0.65	U	0.65	U	0.65	U	0.075	J
Selenium	0.81	U	0.81	U	0.81	U	0.81	U	<0.051	U
Silver	0.014	U	0.014	U	0.014	U	0.014	U	<0.011	U
Strontium	0.24	U	0.24	U	0.24	U	0.24	U	<0.16	U
Vanadium	0.40	U	0.40	U	0.40	U	0.40	U	<0.033	U
Zinc	18.9	U	18.9	U	18.9	U	18.9	U	<1.7	U

Clear

do not bracket, no eval

Clear

Cr

$$2.162 \text{ ug/L} \times 5 = 10.81$$

U: 99006-99010

94001-94005, 94008

Ni

$$0.753 \text{ ug/L} \times 5 = 3.765$$

U: 99006-99010

## FORM III INORGANIC-1

## BLANKS

Lab Name: Pace Analytical - Green Bay SDG No. : 40182294 Contract : 0777010 CUMBERLAND FOSSIL PLAN

Method Blank Matrix: \_\_\_\_\_ Instrument ID: 40ICM2

Method Blank Concentration Units: \_\_\_\_\_

Analyte	Initial Calibration Blank (ug/L)		Continuing Calibration Blank (ug/L)					
	02/05/2019 21:42 ✓	C	02/05/2019 22:24 ✓	C	02/05/2019 23:46 ✓	C	02/06/2019 00:41 ✓	C
Antimony	0.16	U	0.16	U	0.16	U	0.16	U
Arsenic	0.14	U	0.14	U	0.14	U	0.14	U
Barium	0.38	U	0.38	U	0.38	U	0.38	U
Beryllium	0.22	U	0.22	U	0.22	U	0.22	U
Boron	1.7	U	1.7	U	1.7	U	1.7	U
Cadmium	0.10	U	0.10	U	0.10	U	0.10	U
Calcium	500	U	500	U	500	U	500	U
Chromium	1.4	U	1.4	U	1.4	U	1.4	U
Cobalt	0.10	U	0.10	U	0.10	U	0.10	U
Copper	0.64	U	0.64	U	0.64	U	0.64	U
Lithium	1.0	U	1.0	U	1.0	U	1.0	U
Molybdenum	0.13	U	0.20		0.14		0.14	
Nickel	0.65	U	0.65	U	0.65	U	0.65	U
Selenium	0.81	U	0.81	U	0.81	U	0.81	U
Silver	0.014	U	0.023		0.019		0.019	
Strontium	0.24	U	0.24	U	0.24	U	0.24	U
Vanadium	0.40	U	0.40	U	0.40	U	0.40	U
Zinc	18.9	U	18.9	U	18.9	U	18.9	U

(clear)

Mo

0.21 ug/L (0.6801:23)

$$0.21 \times 5 = 1.05$$

V: 94003, 99005-99010

95001- 95005

Ag

0.035 ug/L (0.6801:23)

$$0.035 \times 5 = 0.175$$

all results ND, no qual

## FORM III INORGANIC-2

## BLANKS

Lab Name: Pace Analytical - Green Bay SDG No. : 40182294 Contract : 0777010 CUMBERLAND FOSSIL PLAN

Method Blank Matrix: \_\_\_\_\_ Instrument ID: 40ICM2

Method Blank Concentration Units: \_\_\_\_\_

Analyte	Initial Calibration Blank		Continuing Calibration Blank (ug/L)				
		C	02/06/2019 01:23	C	C	C	C
Antimony			0.16	U			
Arsenic			0.14	U			
Barium			0.38	U			
Beryllium			0.22	U			
Boron			1.7	U			
Cadmium			0.10	U			
Calcium			500	U			
Chromium			1.4	U			
Cobalt			0.10	U			
Copper			0.64	U			
Lithium			1.0	U			
Molybdenum			0.21				
Nickel			0.65	U			
Selenium			0.81	U			
Silver			0.035				
Strontium			0.24	U			
Vanadium			0.40	U			
Zinc			18.9	U			

does not bracket,  
no eval

Continuing CCB issue,  
use highest conc. despite non-bracketing  
See previous page for eval

SAMPLE NO.

FORM V INORGANIC-1  
MATRIX SPIKE SAMPLE RECOVERY

1820206MS

Lab Name: Pace Analytical - Green Bay

SDG No. : 40182294

Contract: 0777010 CUMBERLAND

Matrix: Tissue

Basis: Wet

Parent Sample ID: CUF-MFN-CURA-20180605 ✓

Percent Moisture:

Analyte	Units	Control Limit %R	Spiked Sample Result (SSR)	Sample Result (SR)	Spike Added (SA)	%R
Antimony	mg/kg	75-125	19.1 ✓	0.032J	19.9	96
Arsenic	mg/kg	75-125	20.7 ✓	0.87	19.9	100
Barium	mg/kg	75-125	27.2	11.4	19.9	79 ✓
Beryllium	mg/kg	75-125	19.5	0.082J	19.9	98
Boron	mg/kg	75-125	20.2	<1.4	19.9	98
Cadmium	mg/kg	75-125	20.9	0.34	19.9	103
Calcium	mg/kg	75-125	1590 ✓	912	994	68*
Chromium	mg/kg	75-125	20.9	2.0	19.9	95
Cobalt	mg/kg	75-125	20.9	1.4	19.9	98
Copper	mg/kg	75-125	22.3	4.0	19.9	92
Lead	mg/kg	75-125	19.7	1.8	19.9	90
Lithium	mg/kg	75-125	19.8	1.2	19.9	93 ✓
Molybdenum	mg/kg	75-125	20.1	0.29	19.9	100
Nickel	mg/kg	75-125	20.7	2.0	19.9	94
Selenium	mg/kg	75-125	21.5	0.67	19.9	105
Silver	mg/kg	75-125	10.2	<0.022	9.9	102
Strontium	mg/kg	75-125	20.7	3.1	19.9	89
Thallium	mg/kg	75-125	19.3	0.020J	19.9	97
Vanadium	mg/kg	75-125	21.4 ✓	3.0	19.9	93
Zinc	mg/kg	75-125	67.2 ✓	56.6	19.9	54*

J.M-: all samples

(40182294 + 40182295)

\* Spike Recovery outside QC Limits

02/15/2019 15:03

SAMPLE NO.

FORM V INORGANIC-2  
MATRIX SPIKE SAMPLE RECOVERY

1820207MSD

Lab Name: Pace Analytical - Green Bay SDG No. : 40182294 Contract: 0777010 CUMBERLAND  
 Matrix: Tissue Basis: Wet Parent Sample ID: CUF-MFN-CURA-20180605 ✓  
 Percent Moisture: \_\_\_\_\_

Analyte	Units	Control Limit %R	Spiked Sample Result (SSR)	Sample Result (SR)	Spike Added (SA)	%R
Antimony	mg/kg	75-125	18.8	0.032J	20.0	94
Arsenic	mg/kg	75-125	20.6 ✓	0.87	20.0	99
Barium	mg/kg	75-125	27.9	11.4	20.0	83 ✓
Beryllium	mg/kg	75-125	19.5	0.082J	20.0	97
Boron	mg/kg	75-125	20.1	<1.4	20.0	97
Cadmium	mg/kg	75-125	20.6	0.34	20.0	101
Calcium	mg/kg	75-125	1640	912	999	73* ↓
Chromium	mg/kg	75-125	21.1	2.0	20.0	95
Cobalt	mg/kg	75-125	21.0	1.4	20.0	98
Copper	mg/kg	75-125	22.2 ✓	4.0	20.0	91
Lead	mg/kg	75-125	20.0	1.8	20.0	91
Lithium	mg/kg	75-125	20.0	1.2	20.0	94
Molybdenum	mg/kg	75-125	19.7	0.29	20.0	97 ✓
Nickel	mg/kg	75-125	20.7	2.0	20.0	94
Selenium	mg/kg	75-125	21.2	0.67	20.0	103
Silver	mg/kg	75-125	10.0	<0.022	10.0	100
Strontium	mg/kg	75-125	20.7 ✓	3.1	20.0	88
Thallium	mg/kg	75-125	19.4	0.020J	20.0	97
Vanadium	mg/kg	75-125	21.8	3.0	20.0	94
Zinc	mg/kg	75-125	68.4	56.6	20.0	59* ↓

J, M-: all samples  
(40182294+40182295)

\* Spike Recovery outside QC Limits

02/15/2019 15:03

SAMPLE NO.

FORM VII INORGANIC-1  
LABORATORY CONTROL SAMPLE

1820204SRM ✓

Lab Name: Pace Analytical - Green Bay SDG No. : 40182294 Contract: 0777010 CUMBERLAND

Matrix: Tissue

*Dmt: 80-120%*

Analyte	Units	True	Found	%R	Limits	
Arsenic	mg/kg	59.5	69.2	116	80	126
Cadmium	mg/kg	42.3	40.6	96	80	120
Chromium	mg/kg	2.0	1.3 ✓	65 ✓	13	93
Cobalt	mg/kg	1.1	1.1	100	80	120
Copper	mg/kg	497	405	81	77	120
Lead	mg/kg	0.22	0.21	92 ✓	79	120
Molybdenum	mg/kg	3.4	3.1	90	80	120
Nickel	mg/kg	5.3	4.5	86	76	120
Selenium	mg/kg	10.9	12.4 ✓	114	80	130
Strontium	mg/kg	36.5	29.5	81 ✓	79	120
Vanadium	mg/kg	9.1	9.0	99 ✓	80	120
Zinc	mg/kg	136	136	100	80	120

J/UJ,L-:

FORM III INORGANIC-1  
BLANKS

Lab Name: Pace Analytical - Green Bay SDG No. : 40182294 Contract : 0777010 CUMBERLAND FOSSIL PLAN

Method Blank Matrix: Tissue Instrument ID: 40HG4

Method Blank Concentration Units: mg/kg

Analyte	Initial Calibration Blank (mg/kg)		Continuing Calibration Blank (mg/kg)						Method Blank	
	02/14/2019 10:14 ✓	C	02/14/2019 13:47 ✓	C	02/14/2019 16:20 ✓	C		C	1825845	C
Mercury	0.020	U	0.020	U	0.020	U			0.0082	J

~~0.0032~~

Clear

Clear

clear

$$0.8183 \text{ ng} \times 5 = 4.0915 \text{ ng}$$

40182294

U<sup>a</sup>: 1-6, 8, 9

40182295

U<sup>a</sup>: 1-3, 5

## **SECTION 4**

### **CASE NARRATIVES AND CHAIN-OF-CUSTODY RECORD**

## SAMPLE SUMMARY

Project: 0777010 CUMBERLAND FOSSIL PLAN  
 Pace Project No.: 40182294

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40182294001	CUF-MFN-CURA-20180605/	Tissue	06/05/18 18:32 ✓	01/17/19 08:55
40182294002	CUF-MFN-CURD-20180607/	Tissue	06/07/18 14:24 ✓	01/17/19 08:55
40182294003	CUF-MFN-CURU-20180607/	Tissue	06/07/18 11:16 ✓	01/17/19 08:55
40182294004	CUF-MFN-WCU-20180605/	Tissue	06/05/18 15:00 ✓	01/17/19 08:55
40182294005	CUF-MFN-WCD-20180605/	Tissue	06/05/18 13:12 ✓	01/17/19 08:55
40182294006	CUF-MFP-CURA-20180607/	Tissue	06/07/18 18:00 ✓	01/17/19 08:55
40182294007	CUF-MFP-CURD-20180606/	Tissue	06/06/18 15:16 ✓	01/17/19 08:55
40182294008	CUF-MFP-CURU-20180606/	Tissue	06/06/18 12:48 ✓	01/17/19 08:55
40182294009	CUF-MFP-WCU-20180606/	Tissue	06/06/18 16:43 ✓	01/17/19 08:55
40182294010	CUF-MFP-WCD-20180606/	Tissue	06/06/18 17:45 ✓	01/17/19 08:55
40182295001	CUF-MFA-CURA-20180622/	Tissue	06/22/18 10:45 ✓	01/17/19 08:55
40182295002	CUF-MFA-CURD-20180619/	Tissue	06/19/18 13:25 ✓	01/17/19 08:55
40182295003	CUF-MFA-CURU-20180623/	Tissue	06/23/18 14:45 ✓	01/17/19 08:55
40182295004	CUF-MFA-WCU-20180622/	Tissue	06/22/18 12:30 ✓	01/17/19 08:55
40182295005	CUF-MFA-WCD-20180622/	Tissue	06/22/18 11:30 ✓	01/17/19 08:55
40182295006	RINSE BLANK 01/23/19	Tissue	01/23/19 14:17	01/23/19 14:17

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
 without the written consent of Pace Analytical Services, LLC.

## PROJECT NARRATIVE

Project: 0777010 CUMBERLAND FOSSIL PLAN  
Pace Project No.: 40182294

---

**Method:** EPA 6020  
**Description:** 6020 MET ICPMS  
**Client:** TENNESSEE VALLEY AUTHORITY  
**Date:** February 22, 2019

**General Information:**

16 samples were analyzed for EPA 6020. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

**Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

**Sample Preparation:**

The samples were prepared in accordance with EPA 3050B with any exceptions noted below.

**Initial Calibrations (including MS Tune as applicable):**

All criteria were within method requirements with any exceptions noted below.

**Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

**Internal Standards:**

All internal standards were within QC limits with any exceptions noted below.

**Method Blank:**

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: 312169

B: Analyte was detected in the associated method blank.

- BLANK for HBN 312169 [MPRP/194 (Lab ID: 1820202)]
  - Chromium
  - Nickel

**Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

**Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 312169

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 40182294001

M0: Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

- MS (Lab ID: 1820206)
  - Calcium
  - Zinc
- MSD (Lab ID: 1820207)
  - Calcium
  - Zinc

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

Page 6 of 41

## PROJECT NARRATIVE

Project: 0777010 CUMBERLAND FOSSIL PLAN  
Pace Project No.: 40182294

**Method:** EPA 6020

**Description:** 6020 MET ICPMS

**Client:** TENNESSEE VALLEY AUTHORITY

**Date:** February 22, 2019

### Additional Comments:

Analyte Comments:

QC Batch: 312169

D3: Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.

- CUF-MFA-CURA-20180622 (Lab ID: 40182295001)
  - Silver
  - Arsenic
  - Boron
  - Beryllium
  - Chromium
  - Lithium
  - Molybdenum
  - Nickel
  - Strontium
  - Vanadium
- CUF-MFA-CURD-20180619 (Lab ID: 40182295002)
  - Silver
  - Arsenic
  - Boron
  - Beryllium
  - Chromium
  - Lithium
  - Molybdenum
  - Nickel
  - Strontium
  - Vanadium
- CUF-MFA-CURU-20180623 (Lab ID: 40182295003)
  - Silver
  - Arsenic
  - Boron
  - Beryllium
  - Chromium
  - Lithium
  - Molybdenum
  - Nickel
  - Strontium
  - Vanadium
- CUF-MFA-WCD-20180622 (Lab ID: 40182295005)
  - Silver
  - Arsenic
  - Boron
  - Beryllium
  - Cadmium
  - Chromium

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

Page 7 of 41

## PROJECT NARRATIVE

Project: 0777010 CUMBERLAND FOSSIL PLAN  
Pace Project No.: 40182294

Method: EPA 6020  
Description: 6020 MET ICPMS  
Client: TENNESSEE VALLEY AUTHORITY  
Date: February 22, 2019

Analyte Comments:

QC Batch: 312169

D3: Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.

- CUF-MFA-WCD-20180622 (Lab ID: 40182295005)
  - Lithium
  - Molybdenum
  - Nickel
  - Strontium
  - Vanadium
- CUF-MFA-WCU-20180622 (Lab ID: 40182295004)
  - Silver
  - Arsenic
  - Boron
  - Beryllium
  - Cadmium
  - Chromium
  - Lithium
  - Molybdenum
  - Nickel
  - Strontium
  - Vanadium
- CUF-MFN-CURA-20180605 (Lab ID: 40182294001)
  - Silver
  - Boron
  - Beryllium
- CUF-MFN-CURD-20180607 (Lab ID: 40182294002)
  - Silver
  - Boron
  - Beryllium
- CUF-MFN-CURU-20180607 (Lab ID: 40182294003)
  - Silver
  - Boron
  - Beryllium
  - Molybdenum
  - Antimony
- CUF-MFN-WCD-20180605 (Lab ID: 40182294005)
  - Silver
  - Boron
  - Beryllium
  - Cadmium
  - Molybdenum
  - Antimony
- CUF-MFN-WCU-20180605 (Lab ID: 40182294004)
  - Silver
  - Boron
  - Beryllium

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

Page 8 of 41

## PROJECT NARRATIVE

Project: 0777010 CUMBERLAND FOSSIL PLAN  
Pace Project No.: 40182294

**Method:** EPA 6020  
**Description:** 6020 MET ICPMS  
**Client:** TENNESSEE VALLEY AUTHORITY  
**Date:** February 22, 2019

Analyte Comments:

QC Batch: 312169

D3: Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.

- CUF-MFN-WCU-20180605 (Lab ID: 40182294004)
  - Cadmium
  - Molybdenum
  - Antimony
- CUF-MFP-CURA-20180607 (Lab ID: 40182294006)
  - Silver
  - Arsenic
  - Boron
  - Beryllium
  - Chromium
  - Lithium
  - Molybdenum
  - Nickel
  - Antimony
  - Vanadium
- CUF-MFP-CURD-20180606 (Lab ID: 40182294007)
  - Silver
  - Arsenic
  - Boron
  - Beryllium
  - Chromium
  - Lithium
  - Molybdenum
  - Nickel
  - Strontium
  - Vanadium
- CUF-MFP-CURU-20180606 (Lab ID: 40182294008)
  - Silver
  - Arsenic
  - Boron
  - Beryllium
  - Chromium
  - Lithium
  - Molybdenum
- CUF-MFP-WCD-20180606 (Lab ID: 40182294010)
  - Silver
  - Arsenic
  - Boron
  - Beryllium
  - Cadmium
  - Chromium
  - Lithium
  - Molybdenum

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

Page 9 of 41

## PROJECT NARRATIVE

Project: 0777010 CUMBERLAND FOSSIL PLAN  
Pace Project No.: 40182294

---

Method: EPA 6020

Description: 6020 MET ICPMS

Client: TENNESSEE VALLEY AUTHORITY

Date: February 22, 2019

Analyte Comments:

QC Batch: 312169

D3: Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.

- CUF-MFP-WCD-20180606 (Lab ID: 40182294010)
  - Nickel
  - Strontium
  - Vanadium
- CUF-MFP-WCU-20180606 (Lab ID: 40182294009)
  - Silver
  - Arsenic
  - Boron
  - Beryllium
  - Cadmium
  - Chromium
  - Lithium
  - Molybdenum
  - Nickel
  - Strontium
  - Vanadium

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

Page 10 of 41

## PROJECT NARRATIVE

Project: 0777010 CUMBERLAND FOSSIL PLAN  
Pace Project No.: 40182294

**Method:** EPA 7473

**Description:** 7473 Mercury, Tissue

**Client:** TENNESSEE VALLEY AUTHORITY

**Date:** February 22, 2019

### General Information:

16 samples were analyzed for EPA 7473. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

### Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

### Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: 313518

B: Analyte was detected in the associated method blank.

- BLANK for HBN 313518 [MERC/113 (Lab ID: 1825845) ✓
- Mercury

### Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

### Additional Comments:

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

Page 11 of 41

## PROJECT NARRATIVE

Project: 0777010 CUMBERLAND FOSSIL PLAN  
Pace Project No.: 40182294

---

**Method:** ASTM D2974-87

**Description:** Percent Moisture Reportable

**Client:** TENNESSEE VALLEY AUTHORITY

**Date:** February 22, 2019

**General Information:**

15 samples were analyzed for ASTM D2974-87. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

**Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

**Initial Calibrations (including MS Tune as applicable):**

All criteria were within method requirements with any exceptions noted below.

**Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

**Internal Standards:**

All internal standards were within QC limits with any exceptions noted below.

**Surrogates:**

All surrogates were within QC limits with any exceptions noted below.

**Method Blank:**

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

**Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

**Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

**Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

**Additional Comments:**

This data package has been reviewed for quality and completeness and is approved for release.

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.



Tennessee Valley Authority

## TVA Environmental Investigations

40182294

## **Chain-of-Custody / Analytical Request Document**

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

COOLER No.:	1	of	1
COC No.:	CUF_MF_20190117_1A		
1 of 2 Pages			
Task Desc.:	CUF_FH_MF		

-46011719

Required Ship to Lab:		Required Project Information:				Required Sampler Information						
Lab Name:	Pace Green Bay	Site ID #:	Cumberland Fossil Plant			Sampler:	Tyler Baker					
Lab Address:	1241 Bellevue St Suite 9 Green Bay, WI 54302	Project #:	0777010			Sampling Company:	TVA					
		Site Address:	815 Cumberland City Road			Address:	TVA Chickamauga Power Service Center, 4501 N. Access Road					
		City:	Cumberland	State, Zip:	TN 37763	City/State:	Chattanooga, TN		Phone:	423-876-6733		
Lab Manager Contact Information		Site PM Name:	Roy Quinn									
Lab PM:	Tod Nolte Meyer	Phone/Fax:	423-751-3753			Sampling Team Number:	1					
Phone/Fax:	608-232-3300	Site PM Email:	tquinn@tva.gov			Send EDD/Hard Copy to:	tva-el@envstd.com					
Lab Email:	Tod.NolteMeyer@paceelabs.com											
Analysis Turnaround Time												
<input type="checkbox"/> CALENDAR DAYS <input type="checkbox"/> WORKING DAYS												
TAT if different from Below												
<input type="checkbox"/> 24 Hours <input type="checkbox"/> 3 Business Days <input type="checkbox"/> 5 Business Days <input checked="" type="checkbox"/> 10 Business Days (Standard)												
ITEMS #	SAMPLE ID Samples IDs MUST BE UNIQUE	SAMPLE LOCATION	Sample Depth		MATRIX CODE G = GRAB C=COMP	SAMPLE TYPE	SAMPLE DATE	SAMPLE TIME	# OF CONTAINERS	Comments/ Lab Sample I.D.	MS/MSD	
			Depth Unit	Feet								Start Depth
1	CUF-MFN-CuRA-20180605	CURA	NA	NA	MF	C	N	6/5/2018 ✓	1832	1	001	<input type="checkbox"/>
2	CUF-MFN-CuRD-20180607	CURD	NA	NA	MF	C	N	6/7/2018 ✓	1424	1	002	<input type="checkbox"/>
3	CUF-MFN-CuRU-20180607	CURU	NA	NA	MF	C	N	6/7/2018 ✓	1116	1	003	<input type="checkbox"/>
4	CUF-MFN-WCU-20180605	WCU	NA	NA	MF	C	N	6/5/2018 ✓	1500	1	003	<input type="checkbox"/>
5	CUF-MFN-WCD-20180605	WCD✓	NA	NA	MF	C	N	6/5/2018 ✓	1312	1	004	<input type="checkbox"/>
6	CUF-MFP-CuRA-20180607	CURA	NA	NA	MF	C	N	6/7/2018 ✓	1800	1	005	<input type="checkbox"/>
7	CUF-MFP-CuRD-20180606	CURD	NA	NA	MF	C	N	6/6/2018 ✓	1516	1	006	<input type="checkbox"/>
8	CUF-MFP-CuRU-20180606	CURU	NA	NA	MF	C	N	6/6/2018 ✓	1248	1	007	<input type="checkbox"/>
9	CUF-MFP-WCU-20180606	WCU	NA	NA	MF	C	N	6/6/2018 ✓	1643	1	008	<input type="checkbox"/>
10	CUF-MFP-WCD-20180606	WCD✓	NA	NA	MF	C	N	6/6/2018 ✓	1745	1	009	<input type="checkbox"/>
11											010	<input type="checkbox"/>
12												<input type="checkbox"/>
13												<input type="checkbox"/>
RELINQUISHED BY / AFFILIATION												
<i>Tyler Baker / TVA</i>						DATE	TIME	ACCEPTED BY / AFFILIATION		DATE	TIME	
						1-17-19	1651	<i>Present Tyler Pace</i>		1-18-19	0855	
SHIPPING METHOD:												
Fedex						SAMPLER NAME AND SIGNATURE						
Tyler Baker						<i>Tyler Baker</i>						
Temperature In °C												
Sample on Ice?												
Sample Intact?												
Trip Blank?												

Client Name: TVA

## Sample Preservation Receipt Form

Project # U0187794

R&B Analytical Services, LLC  
1241 Bellevue Street, Suite 400  
Green Bay, WI 54302

Page 37

All containers needing preservation have been checked and noted below:  Yes  No  N/A

Lab Lot# of pH paper:

Lab Std #ID of preservation (if pH adjusted):

Initial when completed:

Date/  
Time:

Pace Lab #	AG1U	AG1H	AG4S	AG4U	AG5U	AG2S	BG3U	BP1U	BP2N	BP2Z	BP3U	BP3C	BP3N	BP3S	DG9A	DG9T	Vials	VG9U	VG9H	VG9M	VG9D	JGFU	WGFU	WPFU	SP5T	ZPLC	GN	VOA Vials (>6mm)*	H2SO4 pH ≤2	NaOH+Zn Act pH ≥9	NaOH pH ≥12	HNO3 pH ≤2	pH after adjusted	Volume (mL)
001																													2.5 / 5 / 10					
002																													2.5 / 5 / 10					
003																													2.5 / 5 / 10					
004																													2.5 / 5 / 10					
005																													2.5 / 5 / 10					
006																													2.5 / 5 / 10					
007																													2.5 / 5 / 10					
008																													2.5 / 5 / 10					
009																													2.5 / 5 / 10					
010																													2.5 / 5 / 10					
011																													2.5 / 5 / 10					
012																													2.5 / 5 / 10					
013																													2.5 / 5 / 10					
014																													2.5 / 5 / 10					
015																													2.5 / 5 / 10					
016																													2.5 / 5 / 10					
017																													2.5 / 5 / 10					
018																													2.5 / 5 / 10					
019																													2.5 / 5 / 10					
020																													2.5 / 5 / 10					

Exceptions to preservation check: VOA, Coliform, TOC, TOX, TOH, O&amp;G, WI DRO, Phenolics, Other:

Headspace in VOA Vials (>6mm) :  Yes  No  N/A \*If yes look in headspace column

AG1U	1 liter amber glass	BP1U	1 liter plastic unpres	DG9A	40 mL amber ascorbic	JGFU	4 oz amber jar unpres
AG1H	1 liter amber glass HCl	BP2N	500 mL plastic HNO3	DG9T	40 mL amber Na Thio	WGFU	4 oz clear jar unpres
AG4S	125 mL amber glass H2SO4	BP2Z	500 mL plastic NaOH, Znact	VG9U	40 mL clear vial unpres	WPFU	4 oz plastic jar unpres
AG4U	120 mL amber glass unpres	BP3U	250 mL plastic unpres	VG9H	40 mL clear vial HCl		
AG5U	100 mL amber glass unpres	BP3C	250 mL plastic NaOH	VG9M	40 mL clear vial MeOH	SP5T	120 mL plastic Na Thiosulfate
AG2S	500 mL amber glass H2SO4	BP3N	250 mL plastic HNO3	VG9D	40 mL clear vial DI	ZPLC	ziploc bag
BG3U	250 mL clear glass unpres	BP3S	250 mL plastic H2SO4			GN:	207 clear glass unpreserved

### Sample Condition Upon Receipt Form (SCUR)

Client Name: **TVA**

Project #: **L11117796**

Courier:  CS Logistics  FedEx  Speedee  UPS  Waltco

Client  Pace  Other:

Tracking #: **785033156381**

WO#: **40182294**



**40182294**

Custody Seal on Cooler/Box Present:  Yes  no Seals intact:  Yes  no

Custody Seal on Samples Present:  Yes  No Seals intact:  Yes  no

Packing Material:  Bubble Wrap  Bubble Bags  None  Other

Thermometer Used **SR - 9** Type of Ice: Wet Blue  Dry  None  Samples on ice, cooling process has begun

Cooler Temperature Uncorr: **-7.5** /Corr: **Q**

Temp Blank Present:  Yes  No

Biological Tissue is Frozen:  Yes  No

Temp should be above freezing to 6°C.

Biota Samples may be received at ≤ 0°C.

Person examining contents:

Date: **1-19-19**

Initials: **SEW**

Chain of Custody Present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.
Chain of Custody Filled Out:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	2.
Chain of Custody Relinquished:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3.
Sampler Name & Signature on COC:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	4.
Samples Arrived within Hold Time: - VOA Samples frozen upon receipt	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	5. Date/Time:
Short Hold Time Analysis (<72hr):	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	6.
Rush Turn Around Time Requested:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	7.
Sufficient Volume: For Analysis: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No MS/MSD: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A		8.
Correct Containers Used: -Pace Containers Used: -Pace IR Containers Used:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	9.
Containers Intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	10.
Filtered volume received for Dissolved tests	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	11.
Sample Labels match COC: -Includes date/time/ID/Analysis Matrix: <b>B</b>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	12. <i>Bugp</i> <b>1-19-19</b> <b>SEW</b>
Trip Blank Present:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	13.
Trip Blank Custody Seals Present	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Pace Trip Blank Lot # (if purchased):		

#### Client Notification/ Resolution:

If checked, see attached form for additional comments

Person Contacted: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Comments/ Resolution: \_\_\_\_\_

Project Manager Review: **Rmn for TW**

Date: **6/12/19**



Tennessee Valley Authority

## TVA Environmental Investigations

2

COOLER No.:	1	of	1
COC No.:	CUF_MF_20190117_1A		
2 of 2 Pages			
Task Desc.:	CUF_EHMF tbc01179		

*40182295*

## Chain-of-Custody / Analytical Request Document

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

Required Ship to Lab:		Required Project Information:				Required Sampler Information													
Lab Name:	Pace Green Bay	Site ID #:	Cumberland Fossil Plant			Sampler:	Tyler Baker												
Lab Address:	1241 Bellevue St Suite 9 Green Bay, WI 54302	Project #:	077010			Sampling Company:	TVA												
		Site Address:	815 Cumberland City Road			Address:	TVA Chickamauga Power Service Center, 4601 N Access Road												
		City:	Cumberland	State, Zip:	TN, 37763	City/State:	Chattanooga, TN	Phone:	423-876-6733										
Lab Manager Contact Information																			
Lab PM:	Tod Noltemeyer	Site PM Name:	Roy Quinn			Sampling Team Number:	1												
Phone/Fax:	608-232-3300	Phone/Fax:	423-751-3753			Send EDD/Hard Copy to:	tva-ei@envstd.com												
Lab Email:	Tod.Noltemeyer@pacelabs.com																		
ITEMS #	SAMPLE ID Samples IDs MUST BE UNIQUE	SAMPLE LOCATION	Sample Depth		MATRIX CODE	G= GRAB C=COMP	SAMPLE TYPE	Analysis Turnaround Time				Preserve	Analyze						
			Start Depth	End Depth				Depth Unit	Feet	CALENDAR DAYS	WORKING DAYS								
1	CUF-MFA-CuRA-20180622	CURA	NA	NA	MF	C	N	6/22/2018 ✓	1045 ✓	1	001	<input type="checkbox"/>							
2	CUF-MFA-CuRD-20180619	CURD	NA	NA	MF	C	N	6/19/2018 ✓	1325 ✓	1	002	<input type="checkbox"/>							
3	CUF-MFA-CuRU-20180623	CURU	NA	NA	MF	C	N	6/23/2018 ✓	1445 ✓	1	003	<input type="checkbox"/>							
4	CUF-MFA-WCU-20180622	WCU	NA	NA	MF	C	N	6/22/2018 ✓	1230 ✓	1	004	<input type="checkbox"/>							
5	CUF-MFA-WCD-20180622	WCD	NA	NA	MF	C	N	6/22/2018 ✓	1130 ✓	1	005	<input type="checkbox"/>							
6												<input type="checkbox"/>							
7												<input type="checkbox"/>							
8												<input type="checkbox"/>							
9												<input type="checkbox"/>							
10												<input type="checkbox"/>							
11												<input type="checkbox"/>							
12												<input type="checkbox"/>							
13												<input type="checkbox"/>							
Additional Comments/Special Instructions:								RELINQUISHED BY / AFFILIATION		DATE	TIME	ACCEPTED BY / AFFILIATION		DATE	TIME	Sample Receipt Conditions			
								Tyler Baker / TVA		1-17-A 1650		Susan Updegraff		10/19/0855		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
																<input type="checkbox"/> Yes <input type="checkbox"/> No</td			

Client Name: TVA

## Sample Preservation Receipt Form

Project # C101822951241 Bellevue Street, Suite  
Green Bay, WI 54303All containers needing preservation have been checked and noted below:  Yes  No  N/A

Lab Lot# of pH paper:

Lab Std #ID of preservation (if pH adjusted):

Initial when completed:

Date/  
Time:

Page 40 of 483

Pace Lab #	AG1U	AG1H	AG4S	AG4U	AG5U	AG2S	BG3U	BP1U	BP2N	BP2Z	BP3U	BP3C	BP3N	BP3S	DG9A	DG9T	VG9U	VG9H	VG9M	VG9D	JGFU	WGFU	WPFU	SP5T	ZPLC	GN	VOA Vials (>6mm)*	H2SO4 pH ≤2	NaOH+Zn Act pH ≥9	NaOH pH ≥12	HNO3 pH ≤2	pH after adjusted	Volume (mL)
001																													2.5 / 5 / 10				
002																													2.5 / 5 / 10				
003																													2.5 / 5 / 10				
004																													2.5 / 5 / 10				
005																													2.5 / 5 / 10				
006																													2.5 / 5 / 10				
007																													2.5 / 5 / 10				
008																													2.5 / 5 / 10				
009																													2.5 / 5 / 10				
010																													2.5 / 5 / 10				
011																													2.5 / 5 / 10				
012																													2.5 / 5 / 10				
013																													2.5 / 5 / 10				
014																													2.5 / 5 / 10				
015																													2.5 / 5 / 10				
016																													2.5 / 5 / 10				
017																													2.5 / 5 / 10				
018																													2.5 / 5 / 10				
019																													2.5 / 5 / 10				
020																													2.5 / 5 / 10				

Exceptions to preservation check: VOA, Coliform, TOC, TOX, TOH, O&G, WI DRO, Phenolics, Other: Headspace in VOA Vials (>6mm) :  Yes  No  N/A \*If yes look in headspace column

AG1U	1 liter amber glass	BP1U	1 liter plastic unpres	DG9A	40 mL amber ascorbic	JGFU	4 oz amber jar unpres
AG1H	1 liter amber glass HCL	BP2N	500 mL plastic HNO3	DG9T	40 mL amber Na Thio	WGFU	4 oz clear jar unpres
AG4S	125 mL amber glass H2SO4	BP2Z	500 mL plastic NaOH, Znact	VG9U	40 mL clear vial unpres	WPFU	4 oz plastic jar unpres
AG4U	120 mL amber glass unpres	BP3U	250 mL plastic unpres	VG9H	40 mL clear vial HCL		
AG5U	100 mL amber glass unpres	BP3C	250 mL plastic NaOH	VG9M	40 mL clear vial MeOH	SP5T	120 mL plastic Na Thiosulfate
AG2S	500 mL amber glass H2SO4	BP3N	250 mL plastic HNO3	VG9D	40 mL clear vial DI	ZPLC	ziploc bag
BG3U	250 mL clear glass unpres	BP3S	250 mL plastic H2SO4			GN:	16oz clear glass unpreserved

Page 1 of 2

### Sample Condition Upon Receipt Form (SCUR)

Client Name: TVA

Project #:

**WO# : 40182295**

Courier:  CS Logistics  Fed Ex  Speedee  UPS  Waltco  
 Client  Pace Other:

Tracking #: 785033156381



40182295

Custody Seal on Cooler/Box Present:  yes  no Seals intact:  yes  no

Custody Seal on Samples Present:  yes  no Seals intact:  yes  no

Packing Material:  Bubble Wrap  Bubble Bags  None  Other

Thermometer Used SR - 9 Type of Ice: Wet  Blue  Dry  None  Samples on ice, cooling process has begun

Cooler Temperature Uncorr: -15 Com: 0

Temp Blank Present:  yes  no

Biological Tissue is Frozen:  yes  no

Person examining contents:

Date: 1-19-19

Initials: SEW

Temp should be above freezing to 6°C.

Biota Samples may be received at ≤ 0°C.

Chain of Custody Present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.
Chain of Custody Filled Out:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	2.
Chain of Custody Relinquished:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3.
Sampler Name & Signature on COC:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	4.
Samples Arrived within Hold Time: - VOA Samples frozen upon receipt	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	5. Date/Time:
Short Hold Time Analysis (<72hr):	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	6.
Rush Turn Around Time Requested:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	7.
Sufficient Volume:		8.
For Analysis: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No MS/MSD: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A		
Correct Containers Used: -Pace Containers Used: -Pace IR Containers Used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	9.
Containers Intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	10.
Filtered volume received for Dissolved tests	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	11.
Sample Labels match COC: -Includes date/time/ID/Analysis Matrix:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	12. <u>Bugp</u>
Trip Blank Present:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	13.
Trip Blank Custody Seals Present	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Pace Trip Blank Lot # (if purchased):		

#### Client Notification/ Resolution:

If checked, see attached form for additional comments

Person Contacted: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Comments/ Resolution: \_\_\_\_\_

Project Manager Review:

RMR for TR

Date: 01/21/19 ✓



## CASE NARRATIVE - METALS ANALYSIS

Lab Report Number (SDG): 40182294

Client: TENNESSEE VALLEY AUTHORITY

Project Name: CUMBERLAND FOSSIL PLANT

Project Number: 0777010

### 1. RECEIPT

Samples were received frozen on dry ice and kept frozen at less than -10°C until time of preparation. Sample RINSE BLANK 01/23/19 was generated in the laboratory by rinsing the equipment used to stir the tissue samples with deionized water.

### 2. HOLDING TIMES

- A. **Sample Preparation:** The samples, with the exception of RINSE BLANK 01/23/19, were kept frozen prior to analysis, therefore the sample hold-time criteria is not applicable.
- B. **Sample Analysis:** All method required holding times were met.

### 3. METHOD

**Preparation:** SW846 3050B, 7473

**Analysis:** SW846 6020A, 7473

### 4. PREPARATION

Sample preparation proceeded normally. Although sample RINSE BLANK 01/23/19 consists of deionized water, the sample was prepared in a manner consistent with the other tissue samples in this SDG (i.e., as if it were a tissue sample).

### 5. ANALYSIS

#### A. Calibration:

- 1. **Initial verification:** All method acceptance criteria were met.
- 2. **Continuing verification:** All method acceptance criteria were met.
- 3. **Reporting limit verification (CRDL):** All method acceptance criteria were met. Due to software limitations, the percent recoveries for Calcium, Copper, and Strontium are based on the water reporting limits rather than the tissue reporting limits and appear to recover two (Ca) and five (Cu, Sr) times higher than the true value.

#### B. Blanks:

- 1. **Initial calibration:** All method acceptance criteria were met.
- 2. **Continuing calibration:** All method acceptance criteria were met.
- 3. **Method:** All project specific acceptance criteria were met. Chromium and Nickel (6020A) and Mercury (7473) were detected in the method blanks above the laboratory method detection limit (MDL) but below the laboratory reporting limit (PQL). All associated sample results greater than the MDL but less than ten times the blank values were reported with the "B" data qualifier.
- 4. **Chicken:** A chicken blank is prepared and analyzed with each sample batch to determine the background contamination levels of the chicken used for the laboratory control spike (LCS). The chicken blank is analyzed down to the laboratory MDL. Calcium, Selenium, and Zinc were detected at levels above the MDL in the chicken blank. The chicken blank results for these analytes were subtracted from the associated LCS results prior to calculating the percent recoveries of the spike.

#### C. Spikes:

- 1. **Lab Control Spike (LCS):** The associated LCS met all in-house accuracy criteria.
- 2. **SRM:** A Standard Reference Material was analyzed with each analytical batch. The in-house accuracy criteria were met.



3. **Matrix Spike / Duplicate (MS/MSD):** Sample CUF-MFN-CURA-20180605 was designated as the 6020A matrix spike sample for this SDG. Sample CUF-MFA-CURA-20180622 was designated as the 7473 matrix spike sample for this SDG. All in-house accuracy and precision criteria were met with the following exceptions. The recoveries of Calcium and Zinc were below control criteria in CUF-MFN-CURA-20180605 MS and MSD. The "M0" data qualifier was applied to the final report.
- D. **Sample Duplicates:** Not applicable.
- E. **Internal Standards:** All in-house acceptance criteria were met for the internal standards used for quantification.
- F. **ICPMS Interference Check Samples:** All acceptance criteria were met.
- G. **ICPMS Serial Dilution:** All applicable acceptance criteria were met. Serial dilution % Difference is not evaluated for parent results less than fifty times the water reporting limit.
- H. **Samples:** Sample analyses proceeded normally.
- I. **Dilutions:** All 6020A samples with the exception of RINSE BLANK 01/23/19 were analyzed at a dilution to reduce matrix interference. The "D3" data qualifier was applied to diluted results less than the reporting limit on the final report.
- J. **Reanalysis:** None required for this SDG.
- K. **Comments:** Samples were reported on a wet weight basis.

I certify that this data package is in compliance, with the terms and conditions agreed to by **Pace Analytical Services, LLC** and by the client, both technically and for completeness, except for the conditions detailed above. The Laboratory Manager or his designee, as verified by the following signature, has authorized release of the data contained in this completed data package:

Signed: Jill A. Duranceau Date: 02/19/19  
Name: Jill A Duranceau Position: Quality Assurance Auditor



## CASE NARRATIVE - GENERAL CHEMISTRY ANALYSIS

**Lab Report Number (SDG):** 40182294

**Client:** TENNESSEE VALLEY AUTHORITY

**Project Name:** CUMBERLAND FOSSIL PLANT

**Project Number:** 0777010

### 1. RECEIPT

Samples were received frozen on dry ice and kept frozen at less than -10°C until time of preparation.

### 2. HOLDING TIMES

- A. **Sample Preparation:** The samples were kept frozen prior to analysis therefore the sample hold-time criteria is not applicable.
- B. **Sample Analysis:** All method recommended holding times were met.

### 3. METHOD

- A. **Preparation:** NA
- B. **Analysis:** ASTM D2974-87

### 4. PREPARATION

Sample preparation proceeded normally.

### 5. ANALYSIS

- A. **Blanks:**
  - 1. **Method:** Not applicable to this SDG.
- B. **Sample Duplicates:** Sample CUF-MFN-CURA-20180605 was designated as the parent sample for the duplicate analysis for the Percent Moisture. The in-house precision criteria were met. ✓
- C. **Samples:** Sample analyses proceeded normally.
- D. **Dilutions:** Not applicable to this SDG.
- E. **Reanalysis:** None required for this SDG.
- F. **Comments:** No additional comments are needed.

I certify that this data package is in compliance with the terms and conditions agreed to by **Pace Analytical Services, LLC**, and by the client, both technically and for completeness, except for the conditions detailed above. The Laboratory Manager or his designee, as verified by the following signature, has authorized release of the data contained in this completed data package:

Signed: Leigh A. Begalske Date: 02/19/19  
Name: Leigh A. Begalske Position: Quality Assurance Auditor