

This quality assurance (QA) review is based upon an examination of the data generated from the analyses of the samples collected as part of the:

Cumberland Fish

Data Verification was performed in accordance with the Tennessee Valley Authority Environmental Investigation Plan, Cumberland Fossil Plant (CUF EIP; Revision 3 Final, June 2018). This review was performed with guidance from the National Functional Guidelines for Inorganic Data Review (US EPA, October 2004); the US EPA Region IV Environmental Investigations Standard Operating Procedures and Quality Assurance Manual (November 2001); and the US EPA Region IV Data Validation Standard Operating Procedures. These validation guidance documents specifically address analyses performed in accordance with the Contract Laboratory Program (CLP) analytical methods and are not completely applicable to the type of analyses and analytical protocols performed for the US EPA, SW-846, and Standard Methods utilized by the laboratory for these samples. Environmental Standards, Inc. (Environmental Standards) used professional judgment to determine the usability of the analytical results and compliance relative to the US EPA, SW-846, and Standard Methods utilized by the laboratory. This QA review was performed on the data associated with Job Number:

40189621

The findings offered in this report are based on a review of holding times and preservation, method blank results, field blank results, filter blank results, equipment blank results, tubing blank results, matrix spike/matrix spike duplicate recoveries and precision, laboratory control sample/laboratory control sample duplicate recoveries and precision, laboratory and field duplicate precision, total and dissolved results comparisons, and/or positive results between the method detection limit and quantitation limit.

The following results were qualified based on the data verification effort:

Sample	Location	Sample Type	Method	Analyte	T/D	Result	Qual	Reason Code(s)	MDL	QL	Unit
CUF-FH-LB-F-EB01-20190509		EB	SW-846 7473	Mercury	T		UJ	H	0.0031	0.020	MG/KG
CUF-FH-CC-F-EB01-20190522		EB	SW-846 7473	Mercury	T		UJ	H	0.0031	0.020	MG/KG
CUF-FH-CC-F-EB01-20190524		EB	SW-846 7473	Mercury	T		UJ	H	0.0031	0.020	MG/KG

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	
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."
FD	Field duplicate imprecision.
FG	Total versus Dissolved Imprecision.
H	Holding time exceeded.
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.
Q	Chemical Preservation issue.
RL	Reported Results between the MDL and RL.
T	Temperature preservation issue.
X	Percent solids < 50%.
Y+	Chemical Yield outside of acceptance limits. The result may be biased high.
Y-	Chemical yield outside of acceptance limits. The result may be biased low.

Lab Sample ID	40189621001
Sys Sample Code	CUF-FH-LB-F-EB01-20190509
Sample Name	CUF-FH-LB-F-EB01-20190509
Sample Date	5/9/2019 10:35:00 AM
Location	
Sample Type	EB
Parent Sample	

Analytic Method	Chemical Name	CAS Rn	Fraction	Result Unit	Final Result	Final Qual	Reason code	Final MDL	Final RL	Final QL	Final Detect	Final Report	DF	Basis
	Percent Moisture:			%	0									
SW-846 6020A	Antimony	7440-36-0	T	MG/KG		U		0.016	0.016	0.10	N	Yes	1	WET
	Arsenic	7440-38-2	T	MG/KG		U		0.030	0.030	0.10	N	Yes	1	WET
	Barium	7440-39-3	T	MG/KG		U		0.031	0.031	0.10	N	Yes	1	WET
	Beryllium	7440-41-7	T	MG/KG		U		0.033	0.033	0.11	N	Yes	1	WET
	Boron	7440-42-8	T	MG/KG		U		0.70	0.70	2.3	N	Yes	1	WET
	Cadmium	7440-43-9	T	MG/KG		U		0.014	0.014	0.10	N	Yes	1	WET
	Calcium	7440-70-2	T	MG/KG		U		25.4	25.4	84.7	N	Yes	1	WET
	Chromium	7440-47-3	T	MG/KG		U		0.088	0.088	0.29	N	Yes	1	WET
	Cobalt	7440-48-4	T	MG/KG		U		0.0082	0.0082	0.10	N	Yes	1	WET
	Copper	7440-50-8	T	MG/KG		U		0.28	0.28	0.95	N	Yes	1	WET
	Lead	7439-92-1	T	MG/KG		U		0.026	0.026	0.087	N	Yes	1	WET
	Lithium	7439-93-2	T	MG/KG		U		0.021	0.021	0.10	N	Yes	1	WET
	Molybdenum	7439-98-7	T	MG/KG		U		0.036	0.036	0.12	N	Yes	1	WET
	Nickel	7440-02-0	T	MG/KG		U		0.041	0.041	0.14	N	Yes	1	WET
	Selenium	7782-49-2	T	MG/KG		U		0.051	0.051	0.17	N	Yes	1	WET
	Silver	7440-22-4	T	MG/KG		U		0.011	0.011	0.050	N	Yes	1	WET
	Strontium	7440-24-6	T	MG/KG		U		0.16	0.16	0.54	N	Yes	1	WET
	Thallium	7440-28-0	T	MG/KG		U		0.013	0.013	0.10	N	Yes	1	WET
	Vanadium	7440-62-2	T	MG/KG		U		0.033	0.033	0.11	N	Yes	1	WET
	Zinc	7440-66-6	T	MG/KG		U		1.7	1.7	5.7	N	Yes	1	WET
SW-846 7473	Mercury	7439-97-6	T	MG/KG		UJ	H	0.0031	0.0031	0.020	N	Yes	1	WET

Lab Sample ID	40189621002
Sys Sample Code	CUF-FH-CC-F-EB01-20190522
Sample Name	CUF-FH-CC-F-EB01-20190522
Sample Date	5/22/2019 1:10:00 PM
Location	
Sample Type	EB
Parent Sample	

Analytic Method	Chemical Name	CAS Rn	Fraction	Result Unit	Final Result	Final Qual	Reason code	Final MDL	Final RL	Final QL	Final Detect	Final Report	DF	Basis
	Percent Moisture:			%	0									
SW-846 6020A	Antimony	7440-36-0	T	MG/KG		U		0.016	0.016	0.10	N	Yes	1	WET
	Arsenic	7440-38-2	T	MG/KG		U		0.030	0.030	0.10	N	Yes	1	WET
	Barium	7440-39-3	T	MG/KG		U		0.031	0.031	0.10	N	Yes	1	WET
	Beryllium	7440-41-7	T	MG/KG		U		0.033	0.033	0.11	N	Yes	1	WET
	Boron	7440-42-8	T	MG/KG		U		0.70	0.70	2.3	N	Yes	1	WET
	Cadmium	7440-43-9	T	MG/KG		U		0.014	0.014	0.10	N	Yes	1	WET
	Calcium	7440-70-2	T	MG/KG		U		25.4	25.4	84.7	N	Yes	1	WET
	Chromium	7440-47-3	T	MG/KG		U		0.088	0.088	0.29	N	Yes	1	WET
	Cobalt	7440-48-4	T	MG/KG		U		0.0082	0.0082	0.10	N	Yes	1	WET
	Copper	7440-50-8	T	MG/KG		U		0.28	0.28	0.95	N	Yes	1	WET
	Lead	7439-92-1	T	MG/KG		U		0.026	0.026	0.087	N	Yes	1	WET
	Lithium	7439-93-2	T	MG/KG		U		0.021	0.021	0.10	N	Yes	1	WET
	Molybdenum	7439-98-7	T	MG/KG		U		0.036	0.036	0.12	N	Yes	1	WET
	Nickel	7440-02-0	T	MG/KG		U		0.041	0.041	0.14	N	Yes	1	WET
	Selenium	7782-49-2	T	MG/KG		U		0.051	0.051	0.17	N	Yes	1	WET
	Silver	7440-22-4	T	MG/KG		U		0.011	0.011	0.050	N	Yes	1	WET
	Strontium	7440-24-6	T	MG/KG		U		0.16	0.16	0.54	N	Yes	1	WET
	Thallium	7440-28-0	T	MG/KG		U		0.013	0.013	0.10	N	Yes	1	WET
	Vanadium	7440-62-2	T	MG/KG		U		0.033	0.033	0.11	N	Yes	1	WET
	Zinc	7440-66-6	T	MG/KG		U		1.7	1.7	5.7	N	Yes	1	WET
SW-846 7473	Mercury	7439-97-6	T	MG/KG		UJ	H	0.0031	0.0031	0.020	N	Yes	1	WET

Lab Sample ID	40189621003
Sys Sample Code	CUF-FH-CC-F-EB01-20190524
Sample Name	CUF-FH-CC-F-EB01-20190524
Sample Date	5/24/2019 8:55:00 AM
Location	
Sample Type	EB
Parent Sample	

Analytic Method	Chemical Name	CAS Rn	Fraction	Result Unit	Final Result	Final Qual	Reason code	Final MDL	Final RL	Final QL	Final Detect	Final Report	DF	Basis
	Percent Moisture:			%	0									
SW-846 6020A	Antimony	7440-36-0	T	MG/KG		U		0.016	0.016	0.10	N	Yes	1	WET
	Arsenic	7440-38-2	T	MG/KG		U		0.030	0.030	0.10	N	Yes	1	WET
	Barium	7440-39-3	T	MG/KG		U		0.031	0.031	0.10	N	Yes	1	WET
	Beryllium	7440-41-7	T	MG/KG		U		0.033	0.033	0.11	N	Yes	1	WET
	Boron	7440-42-8	T	MG/KG		U		0.70	0.70	2.3	N	Yes	1	WET
	Cadmium	7440-43-9	T	MG/KG		U		0.014	0.014	0.10	N	Yes	1	WET
	Calcium	7440-70-2	T	MG/KG		U		25.4	25.4	84.7	N	Yes	1	WET
	Chromium	7440-47-3	T	MG/KG		U		0.088	0.088	0.29	N	Yes	1	WET
	Cobalt	7440-48-4	T	MG/KG		U		0.0082	0.0082	0.10	N	Yes	1	WET
	Copper	7440-50-8	T	MG/KG		U		0.28	0.28	0.95	N	Yes	1	WET
	Lead	7439-92-1	T	MG/KG		U		0.026	0.026	0.087	N	Yes	1	WET
	Lithium	7439-93-2	T	MG/KG		U		0.021	0.021	0.10	N	Yes	1	WET
	Molybdenum	7439-98-7	T	MG/KG		U		0.036	0.036	0.12	N	Yes	1	WET
	Nickel	7440-02-0	T	MG/KG		U		0.041	0.041	0.14	N	Yes	1	WET
	Selenium	7782-49-2	T	MG/KG		U		0.051	0.051	0.17	N	Yes	1	WET
	Silver	7440-22-4	T	MG/KG		U		0.011	0.011	0.050	N	Yes	1	WET
	Strontium	7440-24-6	T	MG/KG		U		0.16	0.16	0.54	N	Yes	1	WET
	Thallium	7440-28-0	T	MG/KG		U		0.013	0.013	0.10	N	Yes	1	WET
	Vanadium	7440-62-2	T	MG/KG		U		0.033	0.033	0.11	N	Yes	1	WET
	Zinc	7440-66-6	T	MG/KG		U		1.7	1.7	5.7	N	Yes	1	WET
SW-846 7473	Mercury	7439-97-6	T	MG/KG		UJ	H	0.0031	0.0031	0.020	N	Yes	1	WET