

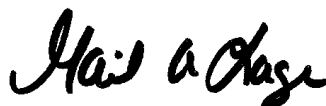
## ANALYTICAL REPORT

Eurofins TestAmerica, Nashville  
2960 Foster Creighton Drive  
Nashville, TN 37204  
Tel: (615)726-0177

Laboratory Job ID: 490-164387-1  
Client Project/Site: CUF\_BS\_20181205\_1B  
Revision: 1

For:  
Environmental Standards Inc.  
1140 Valley Forge Road  
PO BOX 810  
Valley Forge, Pennsylvania 19482-0810

Attn: Jennifer N. Gable



Authorized for release by:  
4/22/2019 12:51:31 PM

Gail Lage, Senior Project Manager  
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### LINKS

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

*The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.*

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*



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## Sample Summary

Client: Environmental Standards Inc.  
Project/Site: CUF\_BS\_20181205\_1B

Job ID: 490-164387-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
490-164387-1	CUF-BS-FB12-20181205	Water	12/05/18 08:45	12/05/18 18:48
490-164387-2	CUF-BS-BG10-0.0/0.5-20181205	Solid	12/05/18 10:46	12/05/18 18:48
490-164387-3	CUF-BS-BG10-1.0/3.0-20181205	Solid	12/05/18 10:30	12/05/18 18:48
490-164387-4	CUF-BS-DUP02-20181205	Solid	12/05/18 00:01	12/05/18 18:48
490-164387-5	CUF-BS-BG10-5.6/7.6-20181205	Solid	12/05/18 10:42	12/05/18 18:48

## Case Narrative

Client: Environmental Standards Inc.  
Project/Site: CUF\_BS\_20181205\_1B

Job ID: 490-164387-1

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**Job ID: 490-164387-1**

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**Laboratory: Eurofins TestAmerica, Nashville**

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### Narrative

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#### Job Narrative 490-164387-1

#### Revised Report

This report was revised to adjust the solid sample results for dry weight using the dry weight results from TA-Nashville. This replaces the previous final report.

#### Receipt

The samples were received on 12/5/2018 6:48 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 5.0° C and 5.2° C.

#### RAD

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

## Definitions/Glossary

Client: Environmental Standards Inc.  
Project/Site: CUF\_BS\_20181205\_1B

Job ID: 490-164387-1

### Qualifiers

#### Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.

### Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

# Client Sample Results

Client: Environmental Standards Inc.  
Project/Site: CUF\_BS\_20181205\_1B

Job ID: 490-164387-1

**Client Sample ID: CUF-BS-FB12-20181205**

**Lab Sample ID: 490-164387-1**

**Date Collected: 12/05/18 08:45**

**Matrix: Water**

**Date Received: 12/05/18 18:48**

**Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count Uncert. (2 $\sigma$ +/-)	Total Uncert. (2 $\sigma$ +/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	18.2	U	9.40	9.57	50.0	35.2	pCi/L	12/08/18 10:14	12/29/18 13:51	1
Radium-228	3.30	U	7.93	7.93	50.0	37.0	pCi/L	12/08/18 10:14	12/29/18 13:51	1
Radium 226 and 228 (positive only)	21.5	U	12.3	12.4			pCi/L	12/08/18 10:14	12/29/18 13:51	1

# Client Sample Results

Client: Environmental Standards Inc.  
Project/Site: CUF\_BS\_20181205\_1B

Job ID: 490-164387-1

**Client Sample ID: CUF-BS-BG10-0.0/0.5-20181205**

**Lab Sample ID: 490-164387-2**

**Date Collected: 12/05/18 10:46**

**Matrix: Solid**

**Date Received: 12/05/18 18:48**

## Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.729		0.174	0.190	1.00	0.145	pCi/g	12/08/18 11:54	12/29/18 11:55	1
Radium-228	0.993		0.238	0.259		0.113	pCi/g	12/08/18 11:54	12/29/18 11:55	1
Radium 226 and 228 (positive only)	1.72		0.295	0.321			pCi/g	12/08/18 11:54	12/29/18 11:55	1

# Client Sample Results

Client: Environmental Standards Inc.  
Project/Site: CUF\_BS\_20181205\_1B

Job ID: 490-164387-1

**Client Sample ID: CUF-BS-BG10-1.0/3.0-20181205**

**Lab Sample ID: 490-164387-3**

**Date Collected: 12/05/18 10:30**

**Matrix: Solid**

**Date Received: 12/05/18 18:48**

## Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2 $\sigma$ +/-)	Total Uncert. (2 $\sigma$ +/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	1.31		0.276	0.306	1.00	0.174	pCi/g	12/08/18 11:54	12/29/18 11:56	1
Radium-228	1.14		0.344	0.362		0.223	pCi/g	12/08/18 11:54	12/29/18 11:56	1
Radium 226 and 228 (positive only)	2.45		0.441	0.474			pCi/g	12/08/18 11:54	12/29/18 11:56	1



# Client Sample Results

Client: Environmental Standards Inc.  
Project/Site: CUF\_BS\_20181205\_1B

Job ID: 490-164387-1

**Client Sample ID: CUF-BS-DUP02-20181205**

**Lab Sample ID: 490-164387-4**

Date Collected: 12/05/18 00:01

Matrix: Solid

Date Received: 12/05/18 18:48

**Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.833		0.254	0.271	1.00	0.245	pCi/g	12/08/18 11:54	12/29/18 11:56	1
Radium-228	1.28		0.559	0.578		0.522	pCi/g	12/08/18 11:54	12/29/18 11:56	1
Radium 226 and 228 (positive only)	2.11		0.614	0.638			pCi/g	12/08/18 11:54	12/29/18 11:56	1

# Client Sample Results

Client: Environmental Standards Inc.  
Project/Site: CUF\_BS\_20181205\_1B

Job ID: 490-164387-1

**Client Sample ID: CUF-BS-BG10-5.6/7.6-20181205**

**Lab Sample ID: 490-164387-5**

**Date Collected: 12/05/18 10:42**

**Matrix: Solid**

**Date Received: 12/05/18 18:48**

## Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.852		0.237	0.252	1.00	0.198	pCi/g	12/08/18 11:54	12/29/18 12:50	1
Radium-228	1.60		0.325	0.363		0.194	pCi/g	12/08/18 11:54	12/29/18 12:50	1
Radium 226 and 228 (positive only)	2.45		0.402	0.442			pCi/g	12/08/18 11:54	12/29/18 12:50	1

# QC Sample Results

Client: Environmental Standards Inc.  
Project/Site: CUF\_BS\_20181205\_1B

Job ID: 490-164387-1

## Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-404676/1-A

Matrix: Water

Analysis Batch: 408258

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 404676

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.3731	U	1.42	1.42	50.0	40.8	pCi/L	12/08/18 10:14	12/29/18 11:07	1
Radium-228	17.04	U	19.0	19.1	50.0	29.6	pCi/L	12/08/18 10:14	12/29/18 11:07	1
Radium 226 and 228 (positive only)	17.41	U	19.1	19.2			pCi/L	12/08/18 10:14	12/29/18 11:07	1

Lab Sample ID: LCS 160-404676/2-A

Matrix: Water

Analysis Batch: 408264

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 404676

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Americium-241	136000	133500		15400		290	pCi/L	98	90 - 111
Cesium-137	45000	44080		4420		87.8	pCi/L	98	90 - 111
Cobalt-60	31100	30340		3000		53.6	pCi/L	97	89 - 110

Lab Sample ID: 490-164296-C-1-B DU

Matrix: Water

Analysis Batch: 408264

Client Sample ID: Duplicate

Prep Type: Total/NA

Prep Batch: 404676

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Radium-226	-15.7	U	-1.358	U	2.67	50.0	32.3	pCi/L	0.74	1
Radium-228	8.07	U	8.702	U	16.1	50.0	19.3	pCi/L	0.02	1
Radium 226 and 228 (positive only)	8.07	U	8.702	U	16.1			pCi/L	0.01	

Lab Sample ID: MB 160-404682/1-A

Matrix: Solid

Analysis Batch: 408256

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 404682

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	-0.1053	U	0.129	0.129	1.00	0.381	pCi/g	12/08/18 11:54	12/29/18 11:14	1
Radium-228	0.1088	U	0.108	0.108		0.155	pCi/g	12/08/18 11:54	12/29/18 11:14	1
Radium 226 and 228 (positive only)	0.1088	U	0.108	0.108			pCi/g	12/08/18 11:54	12/29/18 11:14	1

Lab Sample ID: LCS 160-404682/2-A

Matrix: Solid

Analysis Batch: 408257

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 404682

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Americium-241	96.7	99.67		10.5		1.19	pCi/g	103	87 - 116
Cesium-137	28.0	27.67		2.99		0.225	pCi/g	99	87 - 120
Cobalt-60	12.2	12.30		1.31		0.0587	pCi/g	100	87 - 115

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# QC Sample Results

Client: Environmental Standards Inc.  
Project/Site: CUF\_BS\_20181205\_1B

Job ID: 490-164387-1

## Method: 901.1 - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 490-164296-A-2-B DU  
Matrix: Solid  
Analysis Batch: 408256

Client Sample ID: Duplicate  
Prep Type: Total/NA  
Prep Batch: 404682

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Radium-226	9.68		11.64		1.51	1.00	0.443	pCi/g	0.70	1
Radium-228	1.53		1.233	U	0.649		1.25	pCi/g	0.27	1
Radium 226 and 228 (positive only)	11.2		12.87		1.64			pCi/g	0.55	

## QC Association Summary

Client: Environmental Standards Inc.  
Project/Site: CUF\_BS\_20181205\_1B

Job ID: 490-164387-1

### Rad

#### Prep Batch: 404676

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-164387-1	CUF-BS-FB12-20181205	Total/NA	Water	Fill_Geo-21	
MB 160-404676/1-A	Method Blank	Total/NA	Water	Fill_Geo-21	
LCS 160-404676/2-A	Lab Control Sample	Total/NA	Water	Fill_Geo-21	
490-164296-C-1-B DU	Duplicate	Total/NA	Water	Fill_Geo-21	

#### Prep Batch: 404682

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-164387-2	CUF-BS-BG10-0.0/0.5-20181205	Total/NA	Solid	Fill_Geo-21	
490-164387-3	CUF-BS-BG10-1.0/3.0-20181205	Total/NA	Solid	Fill_Geo-21	
490-164387-4	CUF-BS-DUP02-20181205	Total/NA	Solid	Fill_Geo-21	
490-164387-5	CUF-BS-BG10-5.6/7.6-20181205	Total/NA	Solid	Fill_Geo-21	
MB 160-404682/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-404682/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
490-164296-A-2-B DU	Duplicate	Total/NA	Solid	Fill_Geo-21	

# Lab Chronicle

Client: Environmental Standards Inc.  
Project/Site: CUF\_BS\_20181205\_1B

Job ID: 490-164387-1

**Client Sample ID: CUF-BS-FB12-20181205**

**Lab Sample ID: 490-164387-1**

**Date Collected: 12/05/18 08:45**

**Matrix: Water**

**Date Received: 12/05/18 18:48**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Fill_Geo-21			1000 mL	1.0 mL	404676	12/08/18 10:14	MPT	TAL SL
Total/NA	Analysis	901.1		1			408258	12/29/18 13:51	RTM	TAL SL

**Client Sample ID: CUF-BS-BG10-0.0/0.5-20181205**

**Lab Sample ID: 490-164387-2**

**Date Collected: 12/05/18 10:46**

**Matrix: Solid**

**Date Received: 12/05/18 18:48**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Fill_Geo-21			311.4 g	1.0 g	404682	12/08/18 11:54	MPT	TAL SL
Total/NA	Analysis	901.1		1			408261	12/29/18 11:55	CDR	TAL SL

**Client Sample ID: CUF-BS-BG10-1.0/3.0-20181205**

**Lab Sample ID: 490-164387-3**

**Date Collected: 12/05/18 10:30**

**Matrix: Solid**

**Date Received: 12/05/18 18:48**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Fill_Geo-21			287.9 g	1.0 g	404682	12/08/18 11:54	MPT	TAL SL
Total/NA	Analysis	901.1		1			408260	12/29/18 11:56	CDR	TAL SL

**Client Sample ID: CUF-BS-DUP02-20181205**

**Lab Sample ID: 490-164387-4**

**Date Collected: 12/05/18 00:01**

**Matrix: Solid**

**Date Received: 12/05/18 18:48**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Fill_Geo-21			310.4 g	1.0 g	404682	12/08/18 11:54	MPT	TAL SL
Total/NA	Analysis	901.1		1			408263	12/29/18 11:56	CDR	TAL SL

**Client Sample ID: CUF-BS-BG10-5.6/7.6-20181205**

**Lab Sample ID: 490-164387-5**

**Date Collected: 12/05/18 10:42**

**Matrix: Solid**

**Date Received: 12/05/18 18:48**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Fill_Geo-21			289.8 g	1.0 g	404682	12/08/18 11:54	MPT	TAL SL
Total/NA	Analysis	901.1		1			408256	12/29/18 12:50	RTM	TAL SL

## Laboratory References:

TAL SL = Eurofins TestAmerica, St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Eurofins TestAmerica, Nashville

## Method Summary

Client: Environmental Standards Inc.  
Project/Site: CUF\_BS\_20181205\_1B

Job ID: 490-164387-1

Method	Method Description	Protocol	Laboratory
901.1	Radium-226 & Other Gamma Emitters (GS)	EPA	TAL SL
Fill_Geo-21	Fill Geometry, 21-Day In-Growth	None	TAL SL

### Protocol References:

EPA = US Environmental Protection Agency  
None = None

### Laboratory References:

TAL SL = Eurofins TestAmerica, St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

# Accreditation/Certification Summary

Client: Environmental Standards Inc.  
Project/Site: CUF\_BS\_20181205\_1B

Job ID: 490-164387-1

## Laboratory: Eurofins TestAmerica, Nashville

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
A2LA	ISO/IEC 17025		0453.07	12-31-19
Alaska (UST)	State Program	10	UST-087	06-30-19
Arizona	State Program	9	AZ0473	05-05-19
Arkansas DEQ	State Program	6	88-0737	04-25-20
California	State Program	9	2938	06-30-19
Connecticut	State Program	1	PH-0220	12-31-19
Florida	NELAP	4	E87358	06-30-19
Georgia	State Program	4	NA: NELAP & A2LA	12-31-19
Illinois	NELAP	5	200010	12-09-19
Iowa	State Program	7	131	04-01-20
Kansas	NELAP	7	E-10229	10-31-19
Kentucky (UST)	State Program	4	19	06-30-19
Kentucky (WW)	State Program	4	90038	12-31-19
Louisiana	NELAP	6	30613	06-30-19
Maine	State Program	1	TN00032	11-03-19
Maryland	State Program	3	316	03-31-20
Massachusetts	State Program	1	M-TN032	06-30-19
Minnesota	NELAP	5	047-999-345	12-31-19
Mississippi	State Program	4	N/A	06-30-19
Montana (UST)	State Program	8	NA	02-17-19
Nevada	State Program	9	TN00032	07-31-19
New Hampshire	NELAP	1	2963	10-09-19
New Jersey	NELAP	2	TN965	06-30-19
New York	NELAP	2	11342	03-31-20
North Carolina (WW/SW)	State Program	4	387	12-31-19
North Dakota	State Program	8	R-146	06-30-19
Ohio VAP	State Program	5	CL0033	07-06-19
Oklahoma	State Program	6	9412	08-31-19
Oregon	NELAP	10	TN200001	04-26-19
Pennsylvania	NELAP	3	68-00585	07-31-19
Rhode Island	State Program	1	LAO00268	12-30-19
South Carolina	State Program	4	84009 (001)	02-28-19 *
Tennessee	State Program	4	2008	02-23-20
Texas	NELAP	6	T104704077	08-31-19
USDA	Federal		P330-13-00306	04-10-20
Utah	NELAP	8	TN00032	07-31-19
Virginia	NELAP	3	460152	06-14-19
Washington	State Program	10	C789	07-19-19
West Virginia DEP	State Program	3	219	02-28-19 *
Wisconsin	State Program	5	998020430	08-31-19
Wyoming (UST)	A2LA	8	453.07	12-31-19

\* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Eurofins TestAmerica, Nashville



# Accreditation/Certification Summary

Client: Environmental Standards Inc.  
Project/Site: CUF\_BS\_20181205\_1B

Job ID: 490-164387-1

## Laboratory: Eurofins TestAmerica, St. Louis

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Alaska	State Program	10	MO00054	06-30-19
ANAB	DoD / DOE		L2305	04-06-22
Arizona	State Program	9	AZ0813	12-08-19
California	State Program	9	2886	06-30-19 *
Connecticut	State Program	1	PH-0241	03-31-21
Florida	NELAP	4	E87689	06-30-19 *
Hawaii	State Program	9	NA	06-30-19
Illinois	NELAP	5	200023	11-30-19
Iowa	State Program	7	373	12-01-20
Kansas	NELAP	7	E-10236	10-31-19
Kentucky (DW)	State Program	4	KY90125	12-31-19
Louisiana	NELAP	6	04080	06-30-19
Louisiana (DW)	NELAP	6	LA011	12-31-19
Maryland	State Program	3	310	09-30-19
Michigan	State Program	5	9005	06-30-19
Missouri	State Program	7	780	06-30-19
Nevada	State Program	9	MO000542018-1	07-31-19
New Jersey	NELAP	2	MO002	06-30-19 *
New York	NELAP	2	11616	03-31-20
North Dakota	State Program	8	R207	06-30-19 *
NRC	NRC		24-24817-01	12-31-22
Oklahoma	State Program	6	9997	08-31-19
Pennsylvania	NELAP	3	68-00540	02-28-20
South Carolina	State Program	4	85002001	06-30-19
Texas	NELAP	6	T104704193-18-13	07-31-19
US Fish & Wildlife	Federal		058448	07-31-19
USDA	Federal		P330-17-0028	02-02-20
Utah	NELAP	8	MO000542018-10	07-31-19
Virginia	NELAP	3	460230	06-14-19 *
Washington	State Program	10	C592	08-30-19
West Virginia DEP	State Program	3	381	08-31-19

\* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Eurofins TestAmerica, Nashville

## COOLER RECEIPT FORM



490-164387 Chain of Custody

Cooler Received/Opened On 12-05-2018 @ 1848

Time Samples Removed From Cooler 09:47 Time Samples Placed In Storage 10:36 (2 Hour Window)

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

2. Temperature of rep. sample or temp blank when opened: 5.0 Degrees Celsius

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

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

If yes, how many and where: 1 Front 1 Back

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

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

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

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

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

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

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

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

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

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

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

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



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

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

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

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

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

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

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

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

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

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

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

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

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

## COOLER RECEIPT FORM

Cooler Received/Opened On 12-05-2018 @ 1848  
Time Samples Removed From Cooler 09:47 Time Samples Placed In Storage 10:36 (2 Hour Window)

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

2. Temperature of rep. sample or temp blank when opened: 5.2 Degrees Celsius

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

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

If yes, how many and where: 1 Front 1 Back

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

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

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

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

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

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

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

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

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

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

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

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



Larger than this.

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

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

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

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

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

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

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

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

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

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

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

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

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



# TVA Environmental Investigations

Tennessee Valley Authority

Loc: 490  
164387

## Chain-of-Custody / Analytical Request Document

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

COOLER No.:	1	of	2
COC No.:	CUF_BS_20181205_1B		
Task Desc:	CUF_BS		

Required Ship to Lab:		Required Project Information:		Required Sampler Information:	
Lab Name:	TestAmerica Nashville	Site ID #:	CUMBERLAND FOSSIL PLANT	Sampler:	M. Edmunds, S. Bolden and W. Padgett
Lab Address:	2980 Foster Creighton Drive Nashville, TN 37204	Project #:	49014071	Sampling Company:	Stantec
		Site Address:	815 Cumberland City Road	Address:	Warehouse Row North 1110 Market Street, Suite
		City:	Cumberland City	City/State:	Chattanooga
		Site PM Name:	Roy Quinn	Phone:	901-319-9767
Lab Manager Contact Information:					
Lab PM:	Gail Lage	Phone/Fax:	423-761-3753	Sampling Team Number:	1
Phone/Fax:	615-301-5741/615-726-3404	Site PM Email:	groland@tva.gov	Send EDD/Hard Copy to:	tva_delivery@stantec.com
Lab Email:	Gail.Lage@testamericainc.com				

Sample Depth		Matrix Code		Sample Type		Comments/ Lab Sample I.D.	# OF CONTAINERS	SAMPLE TIME	SAMPLE DATE
Depth Unit	Select Unit	G= GRAB C=COMP	End Depth	Start Depth					
1	CUF-BS-FB12-20181205	NA	NA	NA	0845		3		12/5/2018
2	CUF-BS-BG10-0.0/0.5-20181205	0.0	0.5	S	1046		2		12/5/2018
3	CUF-BS-BG10-1.0/3.0-20181205	1.0	3.0	S	1030		2		12/5/2018
4	CUF-BS-DUP02-20181205	-	-	S	-		2		12/5/2018
5	CUF-BS-BG10-5.6/7.6-20181205	5.6	7.6	S	1042		2		12/5/2018

Additional Comments/Special Instructions:		RELINQUISHED BY / AFFILIATION		DATE		TIME		ACCEPTED BY / AFFILIATION		DATE		TIME		Sample Receipt Conditions	
<div>CUF-BS-FB12-20181205</div> <div>CUF-BS-BG10-0.0/0.5-20181205</div> <div>CUF-BS-BG10-1.0/3.0-20181205</div> <div>CUF-BS-DUP02-20181205</div> <div>CUF-BS-BG10-5.6/7.6-20181205</div>		Suanna Bolden (Stantec)		12/05/2018		1600		Suanna Bolden		12/05/2018		1600		Temperature in °C	
														Sample on Ice?	
														Sample Intact?	
														Trip Blank?	
Shipping Method:		Suanna Bolden		Walker Padgett		Matt Edmunds									

164387

**Tennessee Valley Authority**

## Chain-of-Custody / Analytical Request Document

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

COOLER No.:	2	of	2
COC No:	CUF_BS_20181205_1B		
1 of 1 Pages			
Task Desc:	CUF_BS		

Required Ship to Lab:		Required Project Information:		Required Sampler Information	
Lab Name:	TestAmerica Nashville	Site ID #:	CUMBERLAND FOSSIL PLANT	Sampler:	M Edmunds, S Bolden and W. Padgett
Lab Address:	2960 Foster Creighton Drive Nashville, TN 37204	Project #:	49014071	Sampling Company:	Starftec
		Site Address	815 Cumberland City Road	Address	Warehouse Row North 1110 Market Street, Suite
		City	Cumberland City	City/State	Chattanooga Phone: 901-319-8787
		Site PM Name:	Roy Quinn		
		Phone/Fax:	423-751-3753	Sampling Team Number:	1
		Site PM Email:	rquinn@va.gov	Send EDD/Hard Copy to:	tva_deliverables@envystd.com
Lab Manager Contact Information					
Lab PM:	Gail Lage				
Phone/Fax:	615-301-5741/615-726-3404				
Lab Email:	Gail.Lage@testamericainc.com				
					Analysis Turnaround Time
				<input type="checkbox"/> CALENDAR DAYS	<input checked="" type="checkbox"/> WORKING DAYS

Sample Depth	Select	M	P	E
<div style="display: flex; justify-content: space-between;"> <div> <input type="checkbox"/> 24 Hours  <input type="checkbox"/> 3 Business Days  <input checked="" type="checkbox"/> 5 Business Days  <input type="checkbox"/> 10 Business Days (Standard) </div> <div> TAT if different from Below _____ </div> </div>				

ITEMS #	SAMPLE ID Samples IDs MUST BE UNIQUE	SAMPLE LOCATION	Unit		MATRIX CODE	SAMPLE TYPE	SAMPLE DATE	SAMPLE TIME	# OF CONTAINERS	Comments/ Lab Sample I.D.	MS/MSD
			Start Depth	End Depth							
1	CUF-BS-FB12-20181205	BG-10	NA	NA	W	G	FB	12/5/2018	0845	3	
2	CUF-BS-BG10-0.0/0.5-20181205	BG-10	0.0	0.5	S	G	N	12/5/2018	1046	2	
3	CUF-BS-BG10-1.0/3.0-20181205	BG-10	1.0	3.0	S	G	N	12/5/2018	1030	2	
4	CUF-BS-DUP02-20181205	-	-	-	S	G	N	12/5/2018	-	2	
5	CUF-BS-BG10-5.6/7.6-20181205	BG-10	5.6	7.6	S	G	N	12/5/2018	1042	2	

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION
Suama Bolden (Starisc)	<i>[Signature]</i>	12/05/2018	<i>[Signature]</i> TR-MA
	<i>EB</i> 12/5/2018		
		<i>CB</i> 12/5/2018	
<b>SHIPPING METHOD:</b>			
Courier			<b>SAMPLER NAME AND SIGNATURE:</b>
			Suama Bolden
			Walker Padgett
			Matt Edmunds

5.0, 5.2





Tennessee Valley Authority

# TVA Environmental Investigations

Loc: 490  
164387

## Chain-of-Custody / Analytical Request Document

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

COOLER No.:	1	of	2
COC No.:	CUF_BS_20181205_1B		
1	of	1	Pages
Task Desc:	CUF_BS		

R-20-1  
12/17/18

<b>Required Ship to Lab:</b> Lab Name: TestAmerica Nashville Lab Address: 2960 Foster Creighton Drive Nashville, TN 37204 Lab Manager Contact Information: Lab PM: Gail Lage Phone/Fax: 615-301-5741/615-726-3404 Lab Email: Gail.Lage@testamericainc.com		<b>Required Project Information:</b> Sample: M. Edmunds, S. Bolden and W. Padgett Sampling Company: Stantec Address: Warehouse Row North 1110 Market Street, Suite Chattanooga Phone: 901-319-8787 City/State: TN 3763 Sampling Team Number: 1 Send EDD/Hard Copy to: bna.gedwards@stantec.com		<b>Required Sampler Information:</b> Sample: M. Edmunds, S. Bolden and W. Padgett Sampling Company: Stantec Address: Warehouse Row North 1110 Market Street, Suite Chattanooga Phone: 901-319-8787 City/State: TN 3763 Sampling Team Number: 1 Send EDD/Hard Copy to: bna.gedwards@stantec.com	
<b>Lab Manager Contact Information:</b> Lab PM: Gail Lage Phone/Fax: 615-301-5741/615-726-3404 Lab Email: Gail.Lage@testamericainc.com		<b>Analysis Turnaround Time</b> <input type="checkbox"/> CALENDAR DAYS <input type="checkbox"/> 24 Hours <input type="checkbox"/> 3 Business Days <input checked="" type="checkbox"/> 5 Business Days <input type="checkbox"/> 10 Business Days (Standard) TAT if different from below:		<b>Analysis</b> MS/MSD Comments/ Lab Sample I.D.	
<b>Sample ID</b> Samples IDs MUST BE UNIQUE		<b>SAMPLE LOCATION</b>		<b>SAMPLE DATE</b>	
BG-10 BG-10 BG-10 BG-10 BG-10		BG-10 BG-10 BG-10 BG-10 BG-10		12/5/2018 12/5/2018 12/5/2018 12/5/2018 12/5/2018	
<b>Sample Depth</b> Depth Unit: Select Unit End Depth: NA Start Depth: 0.0 1.0 - 5.6		<b>SAMPLE TYPE</b> G= GRAB C=COMP Matrix Code: NA W S S S S		<b>DATE</b> 12/5/2018 12/5/2018 12/5/2018 12/5/2018 12/5/2018	
<b>ITEMS #</b>		<b>RELINQUISHED BY / AFFILIATION</b>		<b>DATE</b>	
1 2 3 4 5		Suana Bolden (Stantec) FB 12/15/2018 12/15/2018 12/15/2018 12/15/2018 12/15/2018		12/5/2018 12/5/2018 12/5/2018 12/5/2018 12/5/2018	
<b>Additional Comments/Special Instructions:</b>		<b>SHIPPING METHOD:</b>		<b>SAMPLER NAME AND SIGNATURE</b>	
12/15/2018 12/15/2018 12/15/2018 12/15/2018 12/15/2018		Courier Suana Bolden Walker Padgett Matt Edmunds		Suana Bolden Walker Padgett Matt Edmunds	
<b>TEMPERATURE IN °C</b>		<b>Sample on Ice?</b>		<b>Sample Intact?</b>	
Yes No Yes No Yes No Yes No Yes No		Yes No Yes No Yes No Yes No Yes No		Yes No Yes No Yes No Yes No Yes No	
<b>Trip Blank?</b>		<b>Sample Intact?</b>		<b>Sample on Ice?</b>	
Yes No Yes No Yes No Yes No Yes No		Yes No Yes No Yes No Yes No Yes No		Yes No Yes No Yes No Yes No Yes No	

S.O.S.12

## Login Sample Receipt Checklist

Client: Environmental Standards Inc.

Job Number: 490-164387-1

**Login Number: 164387**

**List Number: 2**

**Creator: Hellm, Michael**

**List Source: Eurofins TestAmerica, St. Louis**

**List Creation: 12/07/18 03:15 PM**

Question	Answer	Comment
Radioactivity wasn't checked or is $\leq$ background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	19.0
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

## Login Sample Receipt Checklist

Client: Environmental Standards Inc.

Job Number: 490-164387-1

**Login Number: 164387**

**List Number: 3**

**Creator: Hellm, Michael**

**List Source: Eurofins TestAmerica, St. Louis**

**List Creation: 12/07/18 03:44 PM**

Question	Answer	Comment
Radioactivity wasn't checked or is $\leq$ background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	19.0
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	