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ANALYTICAL REPORT

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive
RIDC Park
Pittsburgh, PA 15238
Tel: (412)963-7058

Laboratory Job ID: 180-94764-1
Client Project/Site: JOF_BS_20190823_1B

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

Attn: Amanda Cover

Authorized for release by:
9/30/2019 8:40:21 AM

Gail Lage, Senior Project Manager
(615)301-5741
gail.lage@testamericainc.com

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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.

PA Lab ID: 02-00416

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Job ID: 180-94764-1

Laboratory: Eurofins TestAmerica, Pittsburgh

Narrative

Job Narrative
180-94764-1

Comments
No additional comments.

Receipt
The samples were received on 8/27/2019 9:00 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.5º C.

RAD
Method(s) 901.1: Gamma Prep Batch 160-441817
Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative.

Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.

Many isotopes requested for analysis do not have any gamma emissions, or the gamma emissions they do have are very poor. Often, such analytes are reported by gamma spectrometry assuming secular equilibrium with a longer-lived parent. The client should ensure that such inference is acceptable for their sample based upon process knowledge. The following assumptions were made for this report:

Inferred from	Reported to Analyte
Th-234	Pa-234
Th-234	U-238
Pb-210	Po-210
Pb-210	Bi-210
Cs-137	Ba-137m
Pb-212	Po-216
Xe-131m	Xe-131
Sb-125	Te-125m
Ag-108m	Ag-108
Rh-106	Ru-106
Pb-212	Th-228
Pb-212	Ra-224
U-235	Th-231
Ac-228	Th-232
Ac-228	Ra-228
Th-227	Ra-223
Th-227	Ac-227
Th-227	Bi-211
Th-227	Pb-211
Bi-214	Ra-226

JOF-BS-BG09-1.5/3.5-20190823 (180-94764-1), JOF-BS-BG09-5.9/7.9-20190823 (180-94764-2), (LCS 160-441817/2-A), (MB 160-441817/1-A) and (180-94764-A-1-C DU)

Method(s) 901.1: Gamma Prep Batch 160-441833
Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative.

Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.

Many isotopes requested for analysis do not have any gamma emissions, or the gamma emissions they do have are very poor. Often, such analytes are reported by gamma spectrometry assuming secular equilibrium with a longer-lived parent. The client should ensure that such inference is acceptable for their sample based upon process knowledge. The following assumptions were made for this report:
Inferred from Reported to Analyte

Job ID: 180-94764-1 (Continued)

Laboratory: Eurofins TestAmerica, Pittsburgh (Continued)

Th-234	Pa-234
Th-234	U-238
Pb-210	Po-210
Pb-210	Bi-210
Cs-137	Ba-137m
Pb-212	Po-216
Xe-131m	Xe-131
Sb-125	Te-125m
Ag-108m	Ag-108
Rh-106	Ru-106
Pb-212	Th-228
Pb-212	Ra-224
U-235	Th-231
Ac-228	Th-232
Ac-228	Ra-228
Th-227	Ra-223
Th-227	Ac-227
Th-227	Bi-211
Th-227	Pb-211
Bi-214	Ra-226

JOF-BS-FB01-20190823 (180-94764-3), (LCS 160-441833/2-A), (MB 160-441833/1-A) and (180-94764-A-3-B DU)

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

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

Definitions/Glossary

Client: Environmental Standards Inc.
Project/Site: JOF_BS_20190823_1B

Job ID: 180-94764-1

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)

Accreditation/Certification Summary

Client: Environmental Standards Inc.
Project/Site: JOF_BS_20190823_1B

Job ID: 180-94764-1

Laboratory: Eurofins TestAmerica, Pittsburgh

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

Authority	Program	Identification Number	Expiration Date
Arkansas DEQ	State	19-033-0	06-27-20
Arkansas DEQ	State Program	88-0690	06-27-20
California	State	2891	04-30-20
California	State Program	2891	04-30-20
Connecticut	State	PH-0688	09-30-20
Connecticut	State Program	PH-0688	09-30-20
Florida	NELAP	E871008	06-30-20
Florida	NELAP	E871008	06-30-20
Illinois	NELAP	200005	06-30-20
Illinois	NELAP	004375	06-30-20
Kansas	NELAP	E-10350	01-31-20
Kansas	NELAP	E-10350	03-31-20
Kentucky (UST)	State	162013	04-30-20
Kentucky (UST)	State Program	162013	04-30-20
Kentucky (WW)	State	KY98043	12-31-19
Kentucky (WW)	State Program	KY98043	12-31-19
Louisiana	NELAP	04041	06-30-20
Louisiana	NELAP	04041	06-30-20
Minnesota	NELAP	042-999-482	12-31-19
Minnesota	NELAP	042-999-482	12-31-19
Nevada	State	PA00164	07-31-20
Nevada	State Program	PA00164	07-31-20
New Hampshire	NELAP	2030	04-04-20
New Jersey	NELAP	PA005	06-30-20
New Jersey	NELAP	PA005	06-30-20
New York	NELAP	11182	03-31-20
New York	NELAP	11182	04-01-20
North Carolina (WW/SW)	State Program	434	12-31-19
North Dakota	State	R-227	04-30-20
North Dakota	State Program	R-227	04-30-20
Oregon	NELAP	PA-2151	02-06-20
Oregon	NELAP	PA-2151	02-06-20
Pennsylvania	NELAP	02-00416	04-30-20
Pennsylvania	NELAP	02-00416	04-30-20
Rhode Island	State	LAO00362	12-30-19
Rhode Island	State Program	LAO00362	12-30-19
South Carolina	State Program	89014	04-30-20
Texas	NELAP	T104704528-15-2	03-31-20
Texas	NELAP	T104704528	03-31-20
US Fish & Wildlife	US Federal Programs	058448	07-31-20
USDA	Federal	P-Soil-01	06-26-22
USDA	US Federal Programs	P330-16-00211	06-26-22
Utah	NELAP	PA001462015-4	05-31-20
Utah	NELAP	PA001462019-8	05-31-20
Virginia	NELAP	460189	09-14-20
Virginia	NELAP	10043	09-15-20
West Virginia DEP	State	142	01-31-20
West Virginia DEP	State Program	142	01-31-20
Wisconsin	State	998027800	08-31-20
Wisconsin	State Program	998027800	08-31-20

Accreditation/Certification Summary

Client: Environmental Standards Inc.
Project/Site: JOF_BS_20190823_1B

Job ID: 180-94764-1

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	Identification Number	Expiration Date
ANAB	Dept. of Defense ELAP	L2305	04-06-22
ANAB	Dept. of Energy	L2305.01	04-06-22
ANAB	DoD	L2305	04-06-22
ANAB	DOE	L2305.01	04-06-22
ANAB	ISO/IEC 17025	L2305	04-06-22
Arizona	State	AZ0813	12-08-19
Arizona	State Program	AZ0813	12-08-19 *
California	State	2886	06-30-20
California	State Program	2886	06-30-20
Connecticut	State	PH-0241	03-31-21
Connecticut	State Program	PH-0241	03-31-21
Florida	NELAP	E87689	06-30-20
Florida	NELAP	E87689	06-30-20
Hawaii	State Program	NA	06-30-20
HI - RadChem Recognition	State	n/a	06-30-20
Illinois	NELAP	200023	11-30-19
Illinois	NELAP	004553	11-30-19
Iowa	State Program	373	12-01-20
Kansas	NELAP	E-10236	10-31-19 *
Kentucky (DW)	State	KY90125	12-31-19
Kentucky (DW)	State Program	KY90125	12-31-19
Louisiana	NELAP	04080	06-30-20
Louisiana	NELAP	04080	06-30-20
Louisiana (DW)	NELAP	LA011	12-31-19
Louisiana (DW)	State	LA011	12-31-19
Maryland	State	310	09-30-20
Maryland	State Program	310	09-30-20
MI - RadChem Recognition	State	9005	06-30-20
Michigan	State Program	9005	06-30-20
Missouri	State	780	06-30-22
Missouri	State Program	780	06-30-20
Nevada	State	MO000542020-1	07-31-20
Nevada	State Program	MO000542018-1	07-31-20
New Jersey	NELAP	MO002	06-30-20
New Jersey	NELAP	MO002	06-30-20
New York	NELAP	11616	03-31-20
New York	NELAP	11616	04-01-20
North Dakota	State	R-207	06-30-20
North Dakota	State Program	R207	06-30-20
NRC	NRC	24-24817-01	12-31-22
Oklahoma	State	9997	08-31-20
Oklahoma	State Program	9997	08-31-20
Pennsylvania	NELAP	68-00540	02-28-20
Pennsylvania	NELAP	68-00540	02-28-20
South Carolina	State	85002001	06-30-20
South Carolina	State Program	85002001	06-30-20
Texas	NELAP	T104704193-19-14	07-31-20
Texas	NELAP	T104704193-19-13	07-31-20
US Fish & Wildlife	Federal	058448	07-31-20
US Fish & Wildlife	US Federal Programs	058448	07-31-20

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

Accreditation/Certification Summary

Client: Environmental Standards Inc.
Project/Site: JOF_BS_20190823_1B

Job ID: 180-94764-1

Laboratory: Eurofins TestAmerica, St. Louis (Continued)

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

Authority	Program	Identification Number	Expiration Date
USDA	Federal	P330-17-0028	02-02-20
USDA	US Federal Programs	P330-17-00028	02-02-20
Utah	NELAP	MO000542019-11	07-31-20
Utah	NELAP	MO000542019-11	07-31-20
Virginia	NELAP	460230	06-14-20
Virginia	NELAP	10310	06-14-20
Washington	State Program	C592	08-30-19 *
West Virginia DEP	State Program	381	10-31-19 *

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

Sample Summary

Client: Environmental Standards Inc.
Project/Site: JOF_BS_20190823_1B

Job ID: 180-94764-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
180-94764-1	JOF-BS-BG09-1.5/3.5-20190823	Solid	08/23/19 09:27	08/27/19 09:00	
180-94764-2	JOF-BS-BG09-5.9/7.9-20190823	Solid	08/23/19 09:34	08/27/19 09:00	
180-94764-3	JOF-BS-FB01-20190823	Water	08/23/19 10:42	08/27/19 09:00	

Method Summary

Client: Environmental Standards Inc.
Project/Site: JOF_BS_20190823_1B

Job ID: 180-94764-1

Method	Method Description	Protocol	Laboratory
901.1	Radium-226 & Other Gamma Emitters (GS)	EPA	TAL SL
Dry and Grind	Preparation, Dry and Grind	None	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

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: JOF_BS_20190823_1B

Job ID: 180-94764-1

Client Sample ID: JOF-BS-BG09-1.5/3.5-20190823 — Lab Sample ID: 180-94764-1

Date Collected: 08/23/19 09:27 — **Matrix: Solid**
Date Received: 08/27/19 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	441607	09/03/19 09:13	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			247.5 g	1.0 g	441817	09/05/19 13:12	KRS	TAL SL
Total/NA	Analysis	901.1		1			444208	09/26/19 06:46	KLS	TAL SL
	Instrument ID:	GAMMAVISION								

Client Sample ID: JOF-BS-BG09-5.9/7.9-20190823 — Lab Sample ID: 180-94764-2

Date Collected: 08/23/19 09:34 — **Matrix: Solid**
Date Received: 08/27/19 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	441607	09/03/19 09:13	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			210 g	1.0 g	441817	09/05/19 13:12	KRS	TAL SL
Total/NA	Analysis	901.1		1			444209	09/26/19 06:46	KLS	TAL SL
	Instrument ID:	GAMMAVISION								

Client Sample ID: JOF-BS-FB01-20190823 — Lab Sample ID: 180-94764-3

Date Collected: 08/23/19 10:42 — **Matrix: Water**
Date Received: 08/27/19 09:00

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 g	441833	09/05/19 15:10	KRS	TAL SL
Total/NA	Analysis	901.1		1			444233	09/26/19 09:00	KLS	TAL SL
	Instrument ID:	GAMMAVISION								

Laboratory References:

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

Analyst References:

Lab: TAL SL
- Batch Type: Leach
  - DRO = David Oetter
- Batch Type: Prep
  - KRS = Kurt Slama
- Batch Type: Analysis
  - KLS = Kody Saulters

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: JOF_BS_20190823_1B

Job ID: 180-94764-1

Client Sample ID: JOF-BS-BG09-1.5/3.5-20190823

Lab Sample ID: 180-94764-1

Date Collected: 08/23/19 09:27
Date Received: 08/27/19 09:00

Matrix: Solid

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 and 228 (positive only)	1.90		0.398	0.422			pCi/g	09/05/19 13:12	09/26/19 06:46	1
Radium-226	0.981		0.231	0.253	1.00	0.146	pCi/g	09/05/19 13:12	09/26/19 06:46	1
Radium-228	0.923		0.324	0.338		0.203	pCi/g	09/05/19 13:12	09/26/19 06:46	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: JOF_BS_20190823_1B

Job ID: 180-94764-1

Client Sample ID: JOF-BS-BG09-5.9/7.9-20190823

Lab Sample ID: 180-94764-2

Date Collected: 08/23/19 09:34

Matrix: Solid

Date Received: 08/27/19 09:00

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 and 228 (positive only)	2.90		0.462	0.510			pCi/g	09/05/19 13:12	09/26/19 06:46	1
Radium-226	1.16		0.304	0.327	1.00	0.256	pCi/g	09/05/19 13:12	09/26/19 06:46	1
Radium-228	1.74		0.348	0.391		0.197	pCi/g	09/05/19 13:12	09/26/19 06:46	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: JOF_BS_20190823_1B

Job ID: 180-94764-1

Client Sample ID: JOF-BS-FB01-20190823

Lab Sample ID: 180-94764-3

Date Collected: 08/23/19 10:42

Matrix: Water

Date Received: 08/27/19 09:00

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	-10.2	U	22.2	22.2	50.0	37.9	pCi/L	09/05/19 15:10	09/26/19 09:00	1
Radium-228	8.95	U	21.2	21.2	50.0	26.0	pCi/L	09/05/19 15:10	09/26/19 09:00	1
Radium 226 and 228 (positive only)	8.95	U	30.7	30.7			pCi/L	09/05/19 15:10	09/26/19 09:00	1

QC Sample Results

Client: Environmental Standards Inc.
Project/Site: JOF_BS_20190823_1B

Job ID: 180-94764-1

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

Lab Sample ID: MB 160-441817/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 444206 — **Prep Batch: 441817**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	-0.03702	U	0.0646	0.0648	1.00	0.292	pCi/g	09/05/19 13:12	09/26/19 06:44	1
Radium 226 and 228 (positive only)	0.05153	U	0.152	0.152			pCi/g	09/05/19 13:12	09/26/19 06:44	1
Radium-228	0.05153	U	0.138	0.138		0.176	pCi/g	09/05/19 13:12	09/26/19 06:44	1

Lab Sample ID: LCS 160-441817/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 444207 — **Prep Batch: 441817**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Americium-241	96.6	97.69		11.5		1.23	pCi/g	101	87 - 116
Cesium-137	27.5	30.75		3.24		0.325	pCi/g	112	87 - 120
Cobalt-60	11.1	12.01		1.26		0.110	pCi/g	108	87 - 115

Lab Sample ID: 180-94764-1 DU — **Client Sample ID: JOF-BS-BG09-1.5/3.5-20190823**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 444206 — **Prep Batch: 441817**

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Radium-226	0.981		0.8977		0.202	1.00	0.132	pCi/g	0.18	1
Radium 226 and 228 (positive only)	1.90		1.976		0.330			pCi/g	0.1	
Radium-228	0.923		1.078		0.261		0.109	pCi/g	0.26	1

Lab Sample ID: MB 160-441833/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 444233 — **Prep Batch: 441833**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	-9.850	U	18.3	18.4	50.0	31.5	pCi/L	09/05/19 15:10	09/26/19 05:14	1
Radium 226 and 228 (positive only)	19.89	U	24.7	24.8			pCi/L	09/05/19 15:10	09/26/19 05:14	1
Radium-228	19.89		16.6	16.7	50.0	19.3	pCi/L	09/05/19 15:10	09/26/19 05:14	1

Lab Sample ID: LCS 160-441833/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 444234 — **Prep Batch: 441833**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Americium-241	136000	128200		14800		285	pCi/L	94	90 - 111
Cesium-137	44300	41860		4190		112	pCi/L	95	90 - 111
Cobalt-60	28200	27430		2710		47.7	pCi/L	97	89 - 110

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

Lab Sample ID: 180-94764-3 DU
Matrix: Water
Analysis Batch: 444234

Client Sample ID: JOF-BS-FB01-20190823
Prep Type: Total/NA
Prep Batch: 441833

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Radium-226	-10.2	U		0.9926	U	1.43	50.0	36.8	pCi/L			0.48	1
Radium 226 and 228 (positive only)	8.95	U		0.9926	U	25.9			pCi/L			0.14	
Radium-228	8.95	U		-8.964	U	25.9	50.0	29.1	pCi/L			0.38	1

QC Association Summary

Client: Environmental Standards Inc.
Project/Site: JOF_BS_20190823_1B

Job ID: 180-94764-1

Rad

Leach Batch: 441607

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-94764-1	JOF-BS-BG09-1.5/3.5-20190823	Total/NA	Solid	Dry and Grind	
180-94764-2	JOF-BS-BG09-5.9/7.9-20190823	Total/NA	Solid	Dry and Grind	
180-94764-1 DU	JOF-BS-BG09-1.5/3.5-20190823	Total/NA	Solid	Dry and Grind	

Prep Batch: 441817

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-94764-1	JOF-BS-BG09-1.5/3.5-20190823	Total/NA	Solid	Fill_Geo-21	441607
180-94764-2	JOF-BS-BG09-5.9/7.9-20190823	Total/NA	Solid	Fill_Geo-21	441607
MB 160-441817/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-441817/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
180-94764-1 DU	JOF-BS-BG09-1.5/3.5-20190823	Total/NA	Solid	Fill_Geo-21	441607

Prep Batch: 441833

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-94764-3	JOF-BS-FB01-20190823	Total/NA	Water	Fill_Geo-21	
MB 160-441833/1-A	Method Blank	Total/NA	Water	Fill_Geo-21	
LCS 160-441833/2-A	Lab Control Sample	Total/NA	Water	Fill_Geo-21	
180-94764-3 DU	JOF-BS-FB01-20190823	Total/NA	Water	Fill_Geo-21	

TVA Environmental Investigations

Tennessee Valley Authority

COOLER No.:	1	of	1
COC No:	JOF_BS_20190823_1B		
1 of 1 Pages			
Task Desc:	Background Soil Investigation		

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:	TestAmerica Pittsburgh	Site ID #:	Johnsonville Fossil Plant	Sampler: Catherine Burton	
Lab Address:	301 Alpha Drive	Project #:	175568286	Sampling Company:	Stantec
	Pittsburgh, PA 15238	Site Address	535 Steam Plant Road	Address: 3052 Beaumont Centre Cir	
		City	New Johnsonville State, Zip: TN, 37134	City/State: Lexington, KY	Phone: 8593382791
Lab Manager Contact Information		Site PM Name:	Roy Quinn		
Lab PM:	Gail Lage	Phone/Fax:	423-751-3753	Sampling Team Number:	1
Phone/Fax:	615-301-5741/615-726-3404	Site PM Email:	jrquinn@tva.gov	Send EDD/Hard Copy to:	tva_deliverables@envstd.com
Lab Email:	Gail.Lage@testamericainc.com				

Analysis Turnaround Time

☐ CALENDAR DAYS ☑ WORKING DAYS

TAT if different from Below _____

☐ 24 Hours
☐ 3 Business Days
☐ 5 Business Days
☐ 10 Business Days

ITEMS #	SAMPLE ID Samples IDs MUST BE UNIQUE	SAMPLE LOCATION	Sample Depth: Depth Unit / Start Depth	Sample Depth: Select Unit / End Depth	MATRIX CODE	G= GRAB C=COMP	SAMPLE TYPE	SAMPLE DATE	SAMPLE TIME	# OF CONTAINERS	Comments/ Lab Sample I.D.	MS/MSD	Analysis: BACKGROUNDSOIL_RAD	Analysis: BACKGROUNDSOIL_BLANKS_RAD	Filtered N	Filtered N	Preserve None	Preserve HNO3
1	JOF-BS-BG09-1.5/3.5-20190823	JOF-BG09	1.5	3.5	BS	G	N	8/23/2019	0927	2		☐	X					
2	JOF-BS-BG09-5.9/7.9-20190823	JOF-BG09	5.9	7.9	BS	G	N	8/23/2019	0934	2		☐	X					
3	JOF-BS-FB01-20190628	JOF-BG09	NA	NA	AQ	G	N	8/23/2019	1042	2		☐	X					
4												☐		X				
5												☐						
6												☐						
7												☐						
8												☐						
9												☐						
10												☐						
11												☐						
12												☐						
13												☐						

08/23/2019 CSB

08/23/2019 CSB

08/23/2019

180-94764 Chain of Custody

Additional Comments/Special Instructions:

Additional volume collected should be used for laboratory duplicate analysis.

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Catherine Burton/Stantec Catherine S. Burton	08/23/19	1:20pm	Casey Mullett Stantec	8/23/19	1:20
			Mullett TAMA	8/23/19	900

Sample Receipt Conditions

Temperature in °C	Sample on Ice?	Sample Intact?	Trip Blank?
	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No

SHIPPING METHOD:

SAMPLER NAME AND SIGNATURE

Catherine Burton/Stantec Catherine S. Burton

Casey Mullett/Stantec Casey Mullett

480 8847 5237 Tanth10

2.8 cf = 0.3 - 2.5

Form TVA 30067A

TVA Environmental Investigations

Tennessee Valley Authority

COOLER No.:	1	of	1
COC No:	JOF_BS_20190823_1B		
1 of 1 Pages			
Task Desc:	Background Soil Investigation		

Rev 1 BB 8/30/19

9/30/2019

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:

Lab Name:	TestAmerica Pittsburgh
Lab Address:	301 Alpha Drive Pittsburgh, PA 15238

Lab Manager Contact Information

Lab PM:	Gail Lage
Phone/Fax:	615-301-5741/615-726-3404
Lab Email:	Gail.Lage@testamericainc.com

Required Project Information:

Site ID #:	Johnsonville Fossil Plant
Project #:	175568286
Site Address	535 Steam Plant Road
City	New Johnsonville State, Zip: TN, 37134
Site PM Name:	Roy Quinn
Phone/Fax:	423-751-3753
Site PM Email:	rquinn@tva.gov

Required Sampler Information

Sampler: Catherine Burton	
Sampling Company:	Stantec
Address: 3952 Beaumont Centre Cir	
City/State: Lexington, KY	Phone: 8593382791
Sampling Team Number:	1
Send EDD/Hard Copy to:	tva_deliverables@envsid.com

Analysis Turnaround Time

☐ CALENDAR DAYS ☑ WORKING DAYS

TAT if different from Below _____

☐ 24 Hours
☐ 3 Business Days
☐ 5 Business Days
☐ 10 Business Days

ITEMS #	SAMPLE ID Samples IDs MUST BE UNIQUE	SAMPLE LOCATION	Sample Depth: Depth Unit	Sample Depth: Select Unit	MATRIX CODE	G= GRAB C=COMP	SAMPLE TYPE	SAMPLE DATE	SAMPLE TIME	# OF CONTAINERS	Comments/ Lab Sample I.D.	MS/MSD	Analysis: BACKGROUNDSOIL_RAD	Analysis: BACKGROUNDSOIL_BLANKS_RAD	Filtered: N	Filtered: N	Preserve: None	Preserve: HNO3
1	JOF-BS-BG09-1.5/3.5-20190823	JOF-BG09	1.5	3.5	BS	G	N	8/23/2019	0927	2		☐						
2	JOF-BS-BG09-5.9/7.9-20190823	JOF-BG09	5.9	7.9	BS	G	N	8/23/2019	0934	2		☐	X					
3	JOF-BS-FB01-~~20190828~~ 2019 0823 BB 8/30/19	JOF-BG09	NA	NA	AQ	G	~~N~~ FB BB 8/30/19	8/23/2019	1042	2		☐	X	X BB 8/30/19				
4												☐						
5												☐						
6												☐						
7												☐						
8												☐						
9												☐						
10												☐						
11												☐						
12												☐						
13												☐						

08/23/2019 CSB

08/23/2019 CSB

08/23/2019

180-94764 Chain of Custody

Additional Comments/Special Instructions:

Additional volume collected should be used for laboratory duplicate analysis.

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Catherine Burton/Stantec Catherine S. Burton	08/23/19	1:20pm	Casey Mullett Stantec	8/23/19	1:20
			Mullett TAMA	8/27/19	900

Sample Receipt Conditions

Temperature in °C	Sample on Ice?	Sample Intact?	Trip Blank?
	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No

SHIPPING METHOD:	SAMPLER NAME AND SIGNATURE	
	Catherine Burton/Stantec	Catherine S. Burton
	Casey Mullett/Stantec	Casey Mullett

480 8847 5237 Truck
2.8 cf = 0.5 = 2.5

Form TVA 30067A

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive RIDC Park
Pittsburgh, PA 15238
Phone: 412-963-7058 Fax: 412-963-2468

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Lage, Gail	Carrier Tracking No(s):	COC No: 180-372153.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: gail.lage@testamericainc.com	State of Origin: Tennessee	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note):		Job #: 180-94764-1
Address: 13715 Rider Trail North, ,	Due Date Requested: 9/27/2019			
City: Earth City	TAT Requested (days):			
State, Zip: MO, 63045				
Phone: 314-298-8566(Tel) 314-298-8757(Fax)	PO #:			
Email:	WO #:			
Project Name: JOF_BS_20190823_1B	Project #: 18020000			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	901.1_Ra/Dry_Grind Positive Combined Radium-226/228	901.1_Ra/Fill_Geo_21 Positive Combined Radium-226/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:							
JOF-BS-BG09-1.5/3.5-20190823 (180-94764-1)	8/23/19	09:27 Central		Solid			X		2	TVA - Batch alone. Quarantine zone soil. Contact PM if insufficient volume for Tuna
JOF-BS-BG09-5.9/7.9-20190823 (180-94764-2)	8/23/19	09:34 Central		Solid			X		2	TVA - Batch alone. Quarantine zone soil. Contact PM if insufficient volume for Tuna
JOF-BS-FB019-20190823 (180-94764-3)	8/23/19	10:42 Central		Water				X	3	TVA - Batch alone

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

Possible Hazard Identification *Unconfirmed*	***Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)*** ☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:		
Relinquished by: [signature]	Date/Time: 8/29/19 1700	Company TAPA	Received by: [signature]	Date/Time: 8/30/19 0915	Company TASTL
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks:		

Ver: 01/16/2019

Login Sample Receipt Checklist

Client: Environmental Standards Inc.

Job Number: 180-94764-1

Login Number: 94764
List Number: 1
Creator: Kovitch, Christina M

List Source: Eurofins TestAmerica, Pittsburgh

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

Login Sample Receipt Checklist

Client: Environmental Standards Inc.

Job Number: 180-94764-1

Login Number: 94764
List Number: 2
Creator: Harris, Lorin C

List Source: Eurofins TestAmerica, St. Louis
List Creation: 08/30/19 01:27 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	False	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	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: 180-94764-1

Login Number: 94764
List Number: 3
Creator: Harris, Lorin C

List Source: Eurofins TestAmerica, St. Louis
List Creation: 08/30/19 01:58 PM

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