eurofins | Environment Testing TestAmerica

ANALYTICAL REPORT

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

Laboratory Job ID: 180-96595-1
Client Project/Site: BRF_BS_20191001_1B
Revision: 1

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

Attn: Amanda Cover

Authorized for release by:
11/4/2019 5:40:01 PM

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LINKS

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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: 180-96595-1

Laboratory: Eurofins TestAmerica, Pittsburgh

Narrative

Job Narrative
180-96595-1

This report was revised to remove the mdc values.

Receipt
The samples were received on 10/2/2019 9:00 AM; the samples arrived in good condition, properly preserved and on ice. The temperatures of the 2 coolers at receipt time were 1.1º C and 3.0º C.

RAD
Method 901.1: Gamma Prep Batch 160-445369
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
Ac-228	Ra-228
Bi-214	Ra-226

BRF-BS-BG13-1.5/3.5-20191001 ~ BRF BG13 (180-96595-1), BRF-BS-BG13-5.0/6.6-20191001 ~ BRF BG13 (180-96595-2), BRF-BS-BG13-0.0/0.5-20191001 ~ BRF BG13 (180-96595-3), BRF-BS-BG05-3.5/5.0-20191001 ~ BRF BG05 (180-96595-4), BRF-BS-BG05-6.5/8.5-20191001 ~ BRF BG05 (180-96595-5), BRF-BS-BG05-6.5/8.5-20191001 ~ BRF BG05 (180-96595-5[DU]), BRF-BS-BG05-11.5/13.5-20191001 ~ BRF BG05 (180-96595-6), BRF-BS-BG05-15.0/17.0-20191001 ~ BRF BG05 (180-96595-7), BRF-BS-BG05-0.0/0.5-20191001 ~ BRF BG05 (180-96595-8), (LCS 160-445369/2-A) and (MB 160-445369/1-A)

Method 901.1: Gamma Prep Batch 160-445202
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
Ac-228	Ra-228
Bi-214	Ra-226

BRF-BS-FB02-20191001 ~ BRF BG05 (180-96595-9), (LCS 160-445202/2-A), (MB 160-445202/1-A), (180-96597-A-1-A) and (180-96597-A-1-B DU)

Method Fill_Geo-21: Gamma Prep Batch 160-445369: Samples BRF-BS-BG05-3.5/5.0-20191001 ~ BRF BG05 (180-96595-4), BRF-BS-BG05-15.0/17.0-20191001 ~ BRF BG05 (180-96595-7) and BRF-BS-BG05-0.0/0.5-20191001 ~ BRF BG05 (180-96595-8) are a light powdered soil exhibiting low density.

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: BRF_BS_20191001_1B

Job ID: 180-96595-1

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: BRF_BS_20191001_1B

Job ID: 180-96595-1

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
California	State	2891	04-30-20
Connecticut	State	PH-0688	09-30-20
Florida	NELAP	E871008	06-30-20
Georgia	State	PA 02-00416	04-30-20
Illinois	NELAP	004375	06-30-20
Kansas	NELAP	E-10350	03-31-20
Kentucky (UST)	State	162013	04-30-20
Kentucky (WW)	State	KY98043	12-31-19
Louisiana	NELAP	04041	06-30-20
Minnesota	NELAP	042-999-482	12-31-19
Nevada	State	PA00164	07-31-20
New Hampshire	NELAP	2030	04-04-20
New Hampshire	NELAP	2030	04-04-20
New Jersey	NELAP	PA005	06-30-20
New York	NELAP	11182	04-01-20
North Carolina (WW/SW)	State	434	12-31-19
North Dakota	State	R-227	04-30-20
Oregon	NELAP	PA-2151	02-06-20
Pennsylvania	NELAP	02-00416	04-30-20
Rhode Island	State	LAO00362	12-30-19
South Carolina	State	89014	04-30-20
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	PA001462019-8	05-31-20
Virginia	NELAP	10043	09-15-20
West Virginia DEP	State	142	01-31-20
Wisconsin	State	998027800	08-31-20

Accreditation/Certification Summary

Client: Environmental Standards Inc.
Project/Site: BRF_BS_20191001_1B

Job ID: 180-96595-1

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	ISO/IEC 17025	L2305	04-06-22
Arizona	State	AZ0813	12-08-19
California	Los Angeles County Sanitation Districts	10259	06-30-20
California	State	2886	06-30-20
Connecticut	State	PH-0241	03-31-21
Florida	NELAP	E87689	06-30-20
HI - RadChem Recognition	State	n/a	06-30-20
Illinois	NELAP	004553	11-30-19
Iowa	State	373	09-17-20
Iowa	State Program	373	12-01-20
Kansas	NELAP	E-10236	10-31-20
Kentucky (DW)	State	KY90125	12-31-19
Louisiana	NELAP	04080	06-30-20
Louisiana (DW)	State	LA011	12-31-19
Maryland	State	310	09-30-20
MI - RadChem Recognition	State	9005	06-30-20
Missouri	State	780	06-30-22
Nevada	State	MO000542020-1	07-31-20
New Jersey	NELAP	MO002	06-30-20
New York	NELAP	11616	04-01-20
North Dakota	State	R-207	06-30-20
NRC	NRC	24-24817-01	12-31-22
Oklahoma	State	9997	08-31-20
Pennsylvania	NELAP	68-00540	02-28-20
South Carolina	State	85002001	06-30-20
Texas	NELAP	T104704193-19-13	07-31-20
US Fish & Wildlife	US Federal Programs	058448	07-31-20
USDA	US Federal Programs	P330-17-00028	02-02-20
Utah	NELAP	MO000542019-11	07-31-20
Virginia	NELAP	10310	06-14-20
Washington	State	C592	08-30-20
Washington	State Program	C592	08-30-20
West Virginia DEP	State	381	10-31-19
West Virginia DEP	State Program	381	12-31-19

Sample Summary

Client: Environmental Standards Inc.
Project/Site: BRF_BS_20191001_1B

Job ID: 180-96595-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
180-96595-1	BRF-BS-BG13-1.5/3.5-20191001 ~ BRF BG13	Solid	10/01/19 08:40	10/02/19 09:00	
180-96595-2	BRF-BS-BG13-5.0/6.6-20191001 ~ BRF BG13	Solid	10/01/19 09:00	10/02/19 09:00	
180-96595-3	BRF-BS-BG13-0.0/0.5-20191001 ~ BRF BG13	Solid	10/01/19 09:15	10/02/19 09:00	
180-96595-4	BRF-BS-BG05-3.5/5.0-20191001 ~ BRF BG05	Solid	10/01/19 13:00	10/02/19 09:00	
180-96595-5	BRF-BS-BG05-6.5/8.5-20191001 ~ BRF BG05	Solid	10/01/19 13:35	10/02/19 09:00	
180-96595-6	BRF-BS-BG05-11.5/13.5-20191001 ~ BRF BG05	Solid	10/01/19 14:00	10/02/19 09:00	
180-96595-7	BRF-BS-BG05-15.0/17.0-20191001 ~ BRF BG05	Solid	10/01/19 14:35	10/02/19 09:00	
180-96595-8	BRF-BS-BG05-0.0/0.5-20191001 ~ BRF BG05	Solid	10/01/19 15:00	10/02/19 09:00	
180-96595-9	BRF-BS-FB02-20191001 ~ BRF BG05	Water	10/01/19 15:12	10/02/19 09:00	

Method Summary

Client: Environmental Standards Inc.
Project/Site: BRF_BS_20191001_1B

Job ID: 180-96595-1

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: BRF_BS_20191001_1B

Job ID: 180-96595-1

Client Sample ID: BRF-BS-BG13-1.5/3.5-20191001 ~ BRF BG13 — Lab Sample ID: 180-96595-1

Date Collected: 10/01/19 08:40 — **Matrix: Solid**
Date Received: 10/02/19 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	445214	10/04/19 21:50	KPP	TAL SL
Total/NA	Prep	Fill_Geo-21			351.9 g	1.0 g	445369	10/08/19 07:28	KRS	TAL SL
Total/NA	Analysis	901.1		1			448447	10/31/19 02:12	KLS	TAL SL
	Instrument ID:	GAMMAVISION								

Client Sample ID: BRF-BS-BG13-5.0/6.6-20191001 ~ BRF BG13 — Lab Sample ID: 180-96595-2

Date Collected: 10/01/19 09:00 — **Matrix: Solid**
Date Received: 10/02/19 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	445214	10/04/19 21:50	KPP	TAL SL
Total/NA	Prep	Fill_Geo-21			365 g	1.0 g	445369	10/08/19 07:28	KRS	TAL SL
Total/NA	Analysis	901.1		1			448408	10/31/19 02:25	KLS	TAL SL
	Instrument ID:	GAMMAVISION								

Client Sample ID: BRF-BS-BG13-0.0/0.5-20191001 ~ BRF BG13 — Lab Sample ID: 180-96595-3

Date Collected: 10/01/19 09:15 — **Matrix: Solid**
Date Received: 10/02/19 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	445214	10/04/19 21:50	KPP	TAL SL
Total/NA	Prep	Fill_Geo-21			238.5 g	1.0 g	445369	10/08/19 07:28	KRS	TAL SL
Total/NA	Analysis	901.1		1			448409	10/31/19 02:24	KLS	TAL SL
	Instrument ID:	GAMMAVISION								

Client Sample ID: BRF-BS-BG05-3.5/5.0-20191001 ~ BRF BG05 — Lab Sample ID: 180-96595-4

Date Collected: 10/01/19 13:00 — **Matrix: Solid**
Date Received: 10/02/19 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	445214	10/04/19 21:50	KPP	TAL SL
Total/NA	Prep	Fill_Geo-21			216.1 g	1.0 g	445369	10/08/19 07:28	KRS	TAL SL
Total/NA	Analysis	901.1		1			448408	10/31/19 02:59	KLS	TAL SL
	Instrument ID:	GAMMAVISION								

Client Sample ID: BRF-BS-BG05-6.5/8.5-20191001 ~ BRF BG05 — Lab Sample ID: 180-96595-5

Date Collected: 10/01/19 13:35 — **Matrix: Solid**
Date Received: 10/02/19 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	445214	10/04/19 21:50	KPP	TAL SL
Total/NA	Prep	Fill_Geo-21			316.3 g	1.0 g	445369	10/08/19 07:28	KRS	TAL SL
Total/NA	Analysis	901.1		1			448409	10/31/19 03:01	KLS	TAL SL
	Instrument ID:	GAMMAVISION								

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: BRF_BS_20191001_1B

Job ID: 180-96595-1

Client Sample ID: BRF-BS-BG05-11.5/13.5-20191001 ~ BRF BG05 — Lab Sample ID: 180-96595-6

Date Collected: 10/01/19 14:00 — **Matrix: Solid**
Date Received: 10/02/19 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	445214	10/04/19 21:50	KPP	TAL SL
Total/NA	Prep	Fill_Geo-21			327.2 g	1.0 g	445369	10/08/19 07:28	KRS	TAL SL
Total/NA	Analysis	901.1		1			448447	10/31/19 02:47	KLS	TAL SL
	Instrument ID:	GAMMAVISION								

Client Sample ID: BRF-BS-BG05-15.0/17.0-20191001 ~ BRF BG05 — Lab Sample ID: 180-96595-7

Date Collected: 10/01/19 14:35 — **Matrix: Solid**
Date Received: 10/02/19 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	445214	10/04/19 21:50	KPP	TAL SL
Total/NA	Prep	Fill_Geo-21			251.2 g	1.0 g	445369	10/08/19 07:28	KRS	TAL SL
Total/NA	Analysis	901.1		1			448446	10/31/19 02:50	KLS	TAL SL
	Instrument ID:	GAMMAVISION								

Client Sample ID: BRF-BS-BG05-0.0/0.5-20191001 ~ BRF BG05 — Lab Sample ID: 180-96595-8

Date Collected: 10/01/19 15:00 — **Matrix: Solid**
Date Received: 10/02/19 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	445214	10/04/19 21:50	KPP	TAL SL
Total/NA	Prep	Fill_Geo-21			241.4 g	1.0 g	445369	10/08/19 07:28	KRS	TAL SL
Total/NA	Analysis	901.1		1			448409	10/31/19 03:54	KLS	TAL SL
	Instrument ID:	GAMMAVISION								

Client Sample ID: BRF-BS-FB02-20191001 ~ BRF BG05 — Lab Sample ID: 180-96595-9

Date Collected: 10/01/19 15:12 — **Matrix: Water**
Date Received: 10/02/19 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	445202	10/04/19 16:06	KRS	TAL SL
Total/NA	Analysis	901.1		1			448406	10/31/19 07:40	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
  - KPP = Kaushal Patel
- Batch Type: Prep
  - KRS = Kurt Slama
- Batch Type: Analysis
  - KLS = Kody Saulters

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: BRF_BS_20191001_1B

Job ID: 180-96595-1

Client Sample ID: BRF-BS-BG13-1.5/3.5-20191001 ~ BRF BG13

Lab Sample ID: 180-96595-1

Date Collected: 10/01/19 08:40
Date Received: 10/02/19 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)	2.47		0.318	0.369			pCi/g	10/08/19 07:28	10/31/19 02:12	1
Radium-226	0.875		0.201	0.221	1.00	0.155	pCi/g	10/08/19 07:28	10/31/19 02:12	1
Radium-228	1.59		0.247	0.296		0.0803	pCi/g	10/08/19 07:28	10/31/19 02:12	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: BRF_BS_20191001_1B

Job ID: 180-96595-1

Client Sample ID: BRF-BS-BG13-5.0/6.6-20191001 ~ BRF BG13

Lab Sample ID: 180-96595-2

Date Collected: 10/01/19 09:00
Date Received: 10/02/19 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)	2.60		0.393	0.439			pCi/g	10/08/19 07:28	10/31/19 02:25	1
Radium-226	0.921		0.269	0.286	1.00	0.225	pCi/g	10/08/19 07:28	10/31/19 02:25	1
Radium-228	1.68		0.286	0.333		0.289	pCi/g	10/08/19 07:28	10/31/19 02:25	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: BRF_BS_20191001_1B

Job ID: 180-96595-1

Client Sample ID: BRF-BS-BG13-0.0/0.5-20191001 ~ BRF BG13

Lab Sample ID: 180-96595-3

Date Collected: 10/01/19 09:15
Date Received: 10/02/19 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)	2.30		0.372	0.408			pCi/g	10/08/19 07:28	10/31/19 02:24	1
Radium-226	1.09		0.242	0.267	1.00	0.169	pCi/g	10/08/19 07:28	10/31/19 02:24	1
Radium-228	1.21		0.283	0.309		0.273	pCi/g	10/08/19 07:28	10/31/19 02:24	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: BRF_BS_20191001_1B

Job ID: 180-96595-1

Client Sample ID: BRF-BS-BG05-3.5/5.0-20191001 ~ BRF BG05

Lab Sample ID: 180-96595-4

Date Collected: 10/01/19 13:00
Date Received: 10/02/19 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)	2.89		0.512	0.557			pCi/g	10/08/19 07:28	10/31/19 02:59	1
Radium-226	1.02		0.252	0.273	1.00	0.158	pCi/g	10/08/19 07:28	10/31/19 02:59	1
Radium-228	1.87		0.446	0.485		0.233	pCi/g	10/08/19 07:28	10/31/19 02:59	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: BRF_BS_20191001_1B

Job ID: 180-96595-1

Client Sample ID: BRF-BS-BG05-6.5/8.5-20191001 ~ BRF BG05

Lab Sample ID: 180-96595-5

Date Collected: 10/01/19 13:35
Date Received: 10/02/19 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)	2.17		0.302	0.341			pCi/g	10/08/19 07:28	10/31/19 03:01	1
Radium-226	0.960		0.182	0.207	1.00	0.0988	pCi/g	10/08/19 07:28	10/31/19 03:01	1
Radium-228	1.21		0.241	0.271		0.226	pCi/g	10/08/19 07:28	10/31/19 03:01	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: BRF_BS_20191001_1B

Job ID: 180-96595-1

Client Sample ID: BRF-BS-BG05-11.5/13.5-20191001 ~ BRF BG05

Lab Sample ID: 180-96595-6

Date Collected: 10/01/19 14:00
Date Received: 10/02/19 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)	1.75		0.296	0.323			pCi/g	10/08/19 07:28	10/31/19 02:47	1
Radium-226	0.650		0.156	0.170	1.00	0.135	pCi/g	10/08/19 07:28	10/31/19 02:47	1
Radium-228	1.10		0.252	0.275		0.156	pCi/g	10/08/19 07:28	10/31/19 02:47	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: BRF_BS_20191001_1B

Job ID: 180-96595-1

Client Sample ID: BRF-BS-BG05-15.0/17.0-20191001 ~ BRF BG05

Lab Sample ID: 180-96595-7

Date Collected: 10/01/19 14:35
Date Received: 10/02/19 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)	2.20		0.440	0.467			pCi/g	10/08/19 07:28	10/31/19 02:50	1
Radium-226	1.14		0.262	0.286	1.00	0.206	pCi/g	10/08/19 07:28	10/31/19 02:50	1
Radium-228	1.06		0.353	0.369		0.376	pCi/g	10/08/19 07:28	10/31/19 02:50	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: BRF_BS_20191001_1B

Job ID: 180-96595-1

Client Sample ID: BRF-BS-BG05-0.0/0.5-20191001 ~ BRF BG05

Lab Sample ID: 180-96595-8

Date Collected: 10/01/19 15:00
Date Received: 10/02/19 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)	2.67		0.425	0.481			pCi/g	10/08/19 07:28	10/31/19 03:54	1
Radium-226	0.519		0.221	0.228	1.00	0.507	pCi/g	10/08/19 07:28	10/31/19 03:54	1
Radium-228	2.15		0.363	0.424		0.171	pCi/g	10/08/19 07:28	10/31/19 03:54	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: BRF_BS_20191001_1B

Job ID: 180-96595-1

Client Sample ID: BRF-BS-FB02-20191001 ~ BRF BG05

Lab Sample ID: 180-96595-9

Date Collected: 10/01/19 15:12

Matrix: Water

Date Received: 10/02/19 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)	18.7	U	30.9	31.1			pCi/L	10/04/19 16:06	10/31/19 07:40	1
Radium-226	**18.7**		18.9	19.0	50.0	17.6	pCi/L	10/04/19 16:06	10/31/19 07:40	1
Radium-228	-6.03	U	24.5	24.6	50.0	31.0	pCi/L	10/04/19 16:06	10/31/19 07:40	1

QC Sample Results

Client: Environmental Standards Inc.
Project/Site: BRF_BS_20191001_1B

Job ID: 180-96595-1

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

Lab Sample ID: MB 160-445202/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 448405 — **Prep Batch: 445202**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228 (positive only)	7.792	U	29.9	29.9			pCi/L	10/04/19 16:05	10/31/19 02:21	1
Radium-226	-15.18	U	26.5	26.5	50.0	45.2	pCi/L	10/04/19 16:05	10/31/19 02:21	1
Radium-228	7.792	U	13.8	13.8	50.0	28.7	pCi/L	10/04/19 16:05	10/31/19 02:21	1

Lab Sample ID: LCS 160-445202/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 448405 — **Prep Batch: 445202**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Americium-241	136000	132000		15200		298	pCi/L	97	90 - 111
Cesium-137	44200	42240		4230		112	pCi/L	96	90 - 111
Cobalt-60	27900	27150		2680		46.8	pCi/L	97	89 - 110

Lab Sample ID: 180-96597-A-1-B DU — **Client Sample ID: Duplicate**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 448407 — **Prep Batch: 445202**

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Radium 226 and 228 (positive only)	13.2	U	27.52	U	20.0			pCi/L	0.31	
Radium-226	-11.9	U	-17.88	U	14.5	50.0	36.3	pCi/L	0.18	1
Radium-228	13.2	U	27.52		13.8	50.0	23.1	pCi/L	0.45	1

Lab Sample ID: MB 160-445369/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 448217 — **Prep Batch: 445369**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228 (positive only)	0.1276	U	0.181	0.181			pCi/g	10/08/19 07:28	10/30/19 22:38	1
Radium-226	-0.08836	U	0.136	0.136	1.00	0.526	pCi/g	10/08/19 07:28	10/30/19 22:38	1
Radium-228	0.1276	U	0.120	0.120		0.173	pCi/g	10/08/19 07:28	10/30/19 22:38	1

Lab Sample ID: LCS 160-445369/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 448218 — **Prep Batch: 445369**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Americium-241	96.6	104.4		11.0		1.23	pCi/g	108	87 - 116
Cesium-137	27.4	27.90		2.99		0.231	pCi/g	102	87 - 120
Cobalt-60	11.0	11.11		1.18		0.108	pCi/g	101	87 - 115

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

Lab Sample ID: 180-96595-5 DU
Matrix: Solid
Analysis Batch: 448408

Client Sample ID: BRF-BS-BG05-6.5/8.5-20191001 ~ BRF BG05
Prep Type: Total/NA
Prep Batch: 445369

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Radium 226 and 228 (positive only)	2.17			2.095		0.398			pCi/g			0.10	
Radium-226	0.960			0.9240		0.240	1.00	0.166	pCi/g			0.08	1
Radium-228	1.21			1.171		0.318		0.159	pCi/g			0.07	1

QC Association Summary

Client: Environmental Standards Inc.
Project/Site: BRF_BS_20191001_1B

Job ID: 180-96595-1

Rad

Prep Batch: 445202

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-96595-9	BRF-BS-FB02-20191001 ~ BRF BG05	Total/NA	Water	Fill_Geo-21	
MB 160-445202/1-A	Method Blank	Total/NA	Water	Fill_Geo-21	
LCS 160-445202/2-A	Lab Control Sample	Total/NA	Water	Fill_Geo-21	
180-96597-A-1-B DU	Duplicate	Total/NA	Water	Fill_Geo-21	

Leach Batch: 445214

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-96595-1	BRF-BS-BG13-1.5/3.5-20191001 ~ BRF BG13	Total/NA	Solid	Dry and Grind	
180-96595-2	BRF-BS-BG13-5.0/6.6-20191001 ~ BRF BG13	Total/NA	Solid	Dry and Grind	
180-96595-3	BRF-BS-BG13-0.0/0.5-20191001 ~ BRF BG13	Total/NA	Solid	Dry and Grind	
180-96595-4	BRF-BS-BG05-3.5/5.0-20191001 ~ BRF BG05	Total/NA	Solid	Dry and Grind	
180-96595-5	BRF-BS-BG05-6.5/8.5-20191001 ~ BRF BG05	Total/NA	Solid	Dry and Grind	
180-96595-6	BRF-BS-BG05-11.5/13.5-20191001 ~ BRF BG05	Total/NA	Solid	Dry and Grind	
180-96595-7	BRF-BS-BG05-15.0/17.0-20191001 ~ BRF BG05	Total/NA	Solid	Dry and Grind	
180-96595-8	BRF-BS-BG05-0.0/0.5-20191001 ~ BRF BG05	Total/NA	Solid	Dry and Grind	
180-96595-5 DU	BRF-BS-BG05-6.5/8.5-20191001 ~ BRF BG05	Total/NA	Solid	Dry and Grind	

Prep Batch: 445369

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-96595-1	BRF-BS-BG13-1.5/3.5-20191001 ~ BRF BG13	Total/NA	Solid	Fill_Geo-21	445214
180-96595-2	BRF-BS-BG13-5.0/6.6-20191001 ~ BRF BG13	Total/NA	Solid	Fill_Geo-21	445214
180-96595-3	BRF-BS-BG13-0.0/0.5-20191001 ~ BRF BG13	Total/NA	Solid	Fill_Geo-21	445214
180-96595-4	BRF-BS-BG05-3.5/5.0-20191001 ~ BRF BG05	Total/NA	Solid	Fill_Geo-21	445214
180-96595-5	BRF-BS-BG05-6.5/8.5-20191001 ~ BRF BG05	Total/NA	Solid	Fill_Geo-21	445214
180-96595-6	BRF-BS-BG05-11.5/13.5-20191001 ~ BRF BG05	Total/NA	Solid	Fill_Geo-21	445214
180-96595-7	BRF-BS-BG05-15.0/17.0-20191001 ~ BRF BG05	Total/NA	Solid	Fill_Geo-21	445214
180-96595-8	BRF-BS-BG05-0.0/0.5-20191001 ~ BRF BG05	Total/NA	Solid	Fill_Geo-21	445214
MB 160-445369/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-445369/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
180-96595-5 DU	BRF-BS-BG05-6.5/8.5-20191001 ~ BRF BG05	Total/NA	Solid	Fill_Geo-21	445214

TVA Environmental Investigations

Tennessee Valley Authority

COOLER No.:	1	of	2
COC No:	BRF_BS_20191001_1B		
1 of 1 Pages			
Task Desc:	BRF_BS		

Rev 1 BJ 10/22/19

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 #:	Bull Run Fossil Plant		
Project #:	175568274		
Site Address	1265 Edgemoor Road		
City	Clinton	State, Zip:	TN, 37716
Site PM Name:	Roy Quinn		
Phone/Fax:	423-751-3753		
Site PM Email:	jrquinn@tva.gov		

Required Sampler Information

Sampler:	Kevin Nguyen		
Sampling Company:	Stantec		
Address	601 Grassmere Park Suite 22		
City/State	Nashville	Phone:	615-88
Sampling Team Number:	1		
Send EDD/Hard Copy to:	tva_deliverables@envsld.com		

180-96595 Chain of Custody

Analysis Turnaround Time

☐ CALENDAR DAYS ☑ WORKING DAYS

TAT if different from Below _____

☐ 24 Hours

☐ 3 Business Days

☒ 5 Business Days

☐ 10 Business Days

BJ 10/22/19

ITEMS #	SAMPLE ID Samples IDs MUST BE UNIQUE	SAMPLE LOCATION	Sample Depth: Start Depth (Depth Unit)	Sample Depth: End 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 (Preserve: None)	Analysis: BACKGROUNDSOIL_BLANKS_RAD (Preserve: HNO3)
1	BRF-BS-BG13-1.5/3.5-20191001	BRF BG13	1.5	3.5	BS	G	N	10/1/2019	0840	2	NA	☐	X	
2	BRF-BS-BG13-5.0/6.6-20191001	BRF BG13	5.0	6.6	BS	G	N	10/1/2019	0900	2	NA	☐	X	
3	BRF-BS-BG13-0.0/0.5-20191001	BRF BG13	0.0	0.5	BS	G	N	10/1/2019	0915	2	NA	☐	X	
4	BRF-BS-BG05-3.5/5.0-20191001	BRF BG05	3.5	5.0	BS	G	N	10/1/2019	1300	2	NA	☐	X	
5	BRF-BS-BG05-6.5/8.5-20191001	BRF BG05	6.5	8.5	BS	G	N	10/1/2019	1335	3	NA	☒	X	
6	BRF-BS-BG05-11.5/13.5-20191001	BRF BG05	11.5	13.5	BS	G	N	10/1/2019	1400	2	NA	☐	X	
7	BRF-BS-BG05-15.0/17.0-20191001	BRF BG05	15.0	17.0	BS	G	N	10/1/2019	1435	2	NA	☐	X	
8	BRF-BS-BG05-0.0/0.5-20191001	BRF BG05	0.0	0.5	BS	G	N	10/1/2019	1500	2	NA	☐	X	
9	BRF-BS-FB02-20191001	BRF BG05	--	--	AQ	G	FB	10/1/2019	1512	3	NA	☐		X

KN 10/1/19

Additional Comments/Special Instructions:

Additional volume collected should be used for laboratory duplicate analysis.

KN 10/1/19

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Kevin Nguyen / Stantec	10/1/19	1715	[illegible]	10/2/19	9:24
KN	10/1/19				

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
☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No

SHIPPING METHOD:	SAMPLER NAME AND SIGNATURE
Courier	Kevin Nguyen

Form TVA 30067A

TVA Environmental Investigations

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:	BRF_BS_20191001_1B
Pages	1 of 1
Task Desc:	BRF_BS

Rev 1 BB 10/22/19

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 #:	Bull Run Fossil Plant		
Project #:	175568274		
Site Address	1265 Edgemoor Road		
City	Clinton	State, Zip:	TN, 37716
Site PM Name:	Roy Quinn		
Phone/Fax:	423-751-3753		
Site PM Email:	jrquinn@tva.gov		

Required Sampler Information

Sampler:	Kevin Nguyen		
Sampling Company:	Stantec		
Address	601 Grassmere Park Suite 22		
City/State	Nashville	Phone:	615-885-114
Sampling Team Number:	1		
Send EDD/Hard Copy to:	tva_deliverables@onvstd.com		

Analysis Turnaround Time

☐ CALENDAR DAYS ☑ WORKING DAYS

TAT if different from Below _____

☐ 24 Hours

☐ 3 Business Days

☐ 5 Business Days BB 10/22/19

☒ 10 Business Days

ITEMS #	SAMPLE ID Samples IDs MUST BE UNIQUE	SAMPLE LOCATION	Sample Depth: Start Depth (Depth Unit)	Sample Depth: End 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	BRF-BS-BG13-1.5/3.5-20191001	BRF BG13	1.5	3.5	BS	G	N	10/1/2019	0840	2	NA	☐	X					
2	BRF-BS-BG13-5.0/6.6-20191001	BRF BG13	5.0	6.6	BS	G	N	10/1/2019	0900	2	NA	☐	X					
3	BRF-BS-BG13-0.0/0.5-20191001	BRF BG13	0.0	0.5	BS	G	N	10/1/2019	0915	2	NA	☐	X					
4	BRF-BS-BG05-3.5/5.0-20191001	BRF BG05	3.5	5.0	BS	G	N	10/1/2019	1300	2	NA	☐	X					
5	BRF-BS-BG05-6.5/8.5-20191001	BRF BG05	6.5	8.5	BS	G	N	10/1/2019	1335	3	NA	☒	X					
6	BRF-BS-BG05-11.5/13.5-20191001	BRF BG05	11.5	13.5	BS	G	N	10/1/2019	1400	2	NA	☐	X					
7	BRF-BS-BG05-15.0/17.0-20191001	BRF BG05	15.0	17.0	BS	G	N	10/1/2019	1435	2	NA	☐	X					
8	BRF-BS-BG05-0.0/0.5-20191001	BRF BG05	0.0	0.5	BS	G	N	10/1/2019	1500	2	NA	☐	X					
9	BRF-BS-FB02-20191001	BRF BG05	--	--	AQ	G	FB	10/1/2019	1512	3	NA	☐		X				

KN 10/1/19

Additional Comments/Special Instructions:

Additional volume collected should be used for laboratory duplicate analysis.

KN 10/1/19

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Kevin Nguyen / Stantec	10/1/19	1715	[illegible]	10/2/19	900
KN 10/1/19					

SHIPPING METHOD:	SAMPLER NAME AND SIGNATURE
Courier	Kevin Nguyen

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
☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No

Form TVA 30067A

TVA Environmental Investigations

Tennessee Valley Authority

COOLER No.:	1	of	2
COC No:	BRF_BS_20191001_1B		
1 of 1 Pages			
Task Desc:	BRF_BS		

Chain-of-Custody / Analytical Request Document

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

180-96595 Chain of Custody

Required Ship to Lab:		Required Project Information:		Required Sampler Information	
Lab Name:	TestAmerica Pittsburgh	Site ID #:	Bull Run Fossil Plant	Sampler:	Kevin Nguyen
Lab Address:	301 Alpha Drive	Project #:	175568274	Sampling Company:	Stantec
	Pittsburgh, PA 15238	Site Address	1265 Edgemoor Road	Address	601 Grassmere Park Suite 22
		City	Clinton State, Zip: TN, 37716	City/State	Nashville Phone: 615-88
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	Preserve: None	Preserve: HNO3
1	BRF-BS-BG13-1.5/3.5-20191001	BRF BG13	1.5	3.5	BS	G	N	10/1/2019	0840	2	NA	☐	X			
2	BRF-BS-BG13-5.0/6.6-20191001	BRF BG13	5.0	6.6	BS	G	N	10/1/2019	0900	2	NA	☐	X			
3	BRF-BS-BG13-0.0/0.5-20191001	BRF BG13	0.0	0.5	BS	G	N	10/1/2019	0915	2	NA	☐	X			
4	BRF-BS-BG05-3.5/5.0-20191001	BRF BG05	3.5	5.0	BS	G	N	10/1/2019	1300	2	NA	☐	X			
5	BRF-BS-BG05-6.5/8.5-20191001	BRF BG05	6.5	8.5	BS	G	N	10/1/2019	1335	3	NA	☑	X			
6	BRF-BS-BG05-11.5/13.5-20191001	BRF BG05	11.5	13.5	BS	G	N	10/1/2019	1400	2	NA	☐	X			
7	BRF-BS-BG05-15.0/17.0-20191001	BRF BG05	15.0	17.0	BS	G	N	10/1/2019	1435	2	NA	☐	X			
8	BRF-BS-BG05-0.0/0.5-20191001	BRF BG05	0.0	0.5	BS	G	N	10/1/2019	1500	2	NA	☐	X			
9	BRF-BS-FB02-20191001	BRF BG05	--	--	AQ	G	FB	10/1/2019	1512	3	NA	☐		X		

KN 10/1/19

Additional Comments/Special Instructions:

Additional volume collected should be used for laboratory duplicate analysis.

KN 10/1/19

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Kevin Nguyen / Stantec	10/1/19	1715	[signature]	10/2/19	900
KN	10/1/19				

SHIPPING METHOD:	SAMPLER NAME AND SIGNATURE
Courier	Kevin Nguyen

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
☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No

Form TVA 30067A

TVA Environmental Investigations

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:	BRF_BS_20191001_1B
1 of 1 Pages	
Task Desc:	BRF_BS

Required Ship to Lab:		Required Project Information:		Required Sampler Information	
Lab Name:	TestAmerica Pittsburgh	Site ID #:	Bull Run Fossil Plant	Sampler:	Kevin Nguyen
Lab Address:	301 Alpha Drive	Project #:	175568274	Sampling Company:	Stantec
	Pittsburgh, PA 15238	Site Address	1265 Edgemoor Road	Address	601 Grassmere Park Suite 22
		City	Clinton State, Zip: TN, 37716	City/State	Nashville Phone: 615-885-114
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	Preserve: None	Preserve: HNO3	Filtered: N	Filtered: N
1	BRF-BS-BG13-1.5/3.5-20191001	BRF BG13	1.5	3.5	BS	G	N	10/1/2019	0840	2	NA	☐	X					
2	BRF-BS-BG13-5.0/6.6-20191001	BRF BG13	5.0	6.6	BS	G	N	10/1/2019	0900	2	NA	☐	X					
3	BRF-BS-BG13-0.0/0.5-20191001	BRF BG13	0.0	0.5	BS	G	N	10/1/2019	0915	2	NA	☐	X					
4	BRF-BS-BG05-3.5/5.0-20191001	BRF BG05	3.5	5.0	BS	G	N	10/1/2019	1300	2	NA	☐	X					
5	BRF-BS-BG05-6.5/8.5-20191001	BRF BG05	6.5	8.5	BS	G	N	10/1/2019	1335	3	NA	☑	X					
6	BRF-BS-BG05-11.5/13.5-20191001	BRF BG05	11.5	13.5	BS	G	N	10/1/2019	1400	2	NA	☐	X					
7	BRF-BS-BG05-15.0/17.0-20191001	BRF BG05	15.0	17.0	BS	G	N	10/1/2019	1435	2	NA	☐	X					
8	BRF-BS-BG05-0.0/0.5-20191001	BRF BG05	0.0	0.5	BS	G	N	10/1/2019	1500	2	NA	☐	X					
9	BRF-BS-FB02-20191001	BRF BG05	--	--	AQ	G	FB	10/1/2019	1512	3	NA	☐		X				

KN 10/1/19

Additional Comments/Special Instructions:

Additional volume collected should be used for laboratory duplicate analysis.

KN 10/1/19

RELINQISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Kevin Nguyen / Stantec	10/1/19	1715	[illegible]	10/2/19	900

KN 10/1/19

SHIPPING METHOD:	SAMPLER NAME AND SIGNATURE
Courier	Kevin Nguyen

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

Form TVA 30067A

180-96595 Waybill

Custody Seal
DATE
SIGNATURE
10-1-19
eurofins
Environment Testing
TestAmerica

Custody Seal
DATE
SIGNATURE
eurofins
Environment Testing
TestAmerica

SHIP DATE: 01OCT
ACTWGT: 82.70 LB
CAD: 006995125/SS
DIMS: 23x13x13 IN
BILL THIRD PARTY

AMERICA
RIDGE PARK
A 15238
REF:
DEPT:

4 of 6
MPS# 7764 3385 9261
0681
Mstr# 8120 5914 9376
0215
NA AGCA

WED - 02 OCT
STANDARD OVERNIGHT
AHS
15238
PA-US PIT

Uncorrected temp 2.0 °C
Thermometer ID 10
Initials

ORIGIN ID:GKTA (865) 621-1653
DAVE MYERS
TESTAMERICA KNOXVILLE LAB
5815 MIDDLEBROOK PIKE

KNOXVILLE, TN 37921
UNITED STATES US

SHIP DATE: 01OCT19
ACTWGT: 62.70 LB
CAD: 006995125/SSFE2C
DIMS: 23x13x13 IN

BILL THIRD PARTY

TO SAMPLE RECIEVING
EUROFINS TEST AMERICA
301 ALPHA DR RIDGE PARK

PITTSBURGH PA 15238

(412) 963-7058

REF:
INV:
PO:
DEPT:

Fedl
Exp

REL#
37663

6 of 6

MPS# 0681 7764 3385 9283

Mstr# 8120 5914 9376

0215

WED - 02 OCT 3
STANDARD OVERNI

15

PA-US

NA AGCA

Uncorrected temp 10 °C
Thermometer ID
CF 0 Initials B

PT-WI-SR-001 effective 11/8/18

Custody Seal
DATE 10-1-19
SIGNATURE

eurofins | Environment Testing TestAmerica

Custody Seal
DATE
SIGNATURE

eurofins | Environment Testing TestAmerica

eurofins | Environment Testing TestAmerica

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: Rumble, Jennifer L	Carrier Tracking No(s):	COC No: 180-375193.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: jennifer.rumble@testamericainc.com	State of Origin: Tennessee	Page: Page 1 of 2
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note):		Job #: 180-96595-1
Address: 13715 Rider Trail North, ,	Due Date Requested: 10/14/2019			
City: Earth City	TAT Requested (days):			
State, Zip: MO, 63045				
Phone: 314-298-8566(Tel) 314-298-8757(Fax)	PO #:			
Email:	WO #:			
Project Name: BRF_BS_20191001_1B	Project #: 18019624			
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 Radium-226/228	901.1_Ra/Fill_Geo_21 Radium-226/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:							
BRF-BS-BG13-1.5/3.5-20191001 ~ BRF BG13 (180-96595-1)	10/1/19	08:40 Eastern		Solid			X		2	TVA - Batch alone. Quarantine zone soil. Contact PM if insufficient volume for Tuna
BRF-BS-BG13-5.0/6.6-20191001 ~ BRF BG13 (180-96595-2)	10/1/19	09:00 Eastern		Solid			X		2	TVA - Batch alone. Quarantine zone soil. Contact PM if insufficient volume for Tuna
BRF-BS-BG13-0.0/0.5-20191001 ~ BRF BG13 (180-96595-3)	10/1/19	09:15 Eastern		Solid			X		2	TVA - Batch alone. Quarantine zone soil. Contact PM if insufficient volume for Tuna
BRF-BS-BG05-3.5/5.0-20191001 ~ BRF BG05 (180-96595-4)	10/1/19	13:00 Eastern		Solid			X		2	TVA - Batch alone. Quarantine zone soil. Contact PM if insufficient volume for Tuna
BRF-BS-BG05-6.5/8.5-20191001 ~ BRF BG05 (180-96595-5)	10/1/19	13:35 Eastern		Solid			X		2	TVA - Batch alone. Quarantine zone soil. Contact PM if insufficient volume for Tuna
BRF-BS-BG05-6.5/8.5-20191001 ~ BRF BG05 (180-96595-5DU)	10/1/19	13:35 Eastern	DU	Solid			X		1	TVA - Batch alone. Quarantine zone soil. Contact PM if insufficient volume for Tuna
BRF-BS-BG05-11.5/13.5-20191001 ~ BRF BG05 (180-96595-6)	10/1/19	14:00 Eastern		Solid			X		2	TVA - Batch alone. Quarantine zone soil. Contact PM if insufficient volume for Tuna
BRF-BS-BG05-15.0/17.0-20191001 ~ BRF BG05 (180-96595-7)	10/1/19	14:35 Eastern		Solid			X		2	TVA - Batch alone. Quarantine zone soil. Contact PM if insufficient volume for Tuna
BRF-BS-BG05-0.0/0.5-20191001 ~ BRF BG05 (180-96595-8)	10/1/19	15:00 Eastern		Solid			X		2	TVA - Batch alone. Quarantine zone soil. Contact PM if insufficient volume for Tuna

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:	Date/Time: 10/3/19 1700	Company: TAMA	Received by:	Date/Time: 10/4/19 09:20	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

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)

Client Contact: Shipping/Receiving
Company: TestAmerica Laboratories, Inc.
Address: 13715 Rider Trail North, ,
City: Earth City
State, Zip: MO, 63045
Phone: 314-298-8566(Tel) 314-298-8757(Fax)
Email:
Project Name: BRF_BS_20191001_1B
Site:

Sampler:
Phone:
Due Date Requested: 10/14/2019
TAT Requested (days):
PO #:
WO #:
Project #: 18019624
SSOW#:

Lab PM: Rumble, Jennifer L
E-Mail: jennifer.rumble@testamericainc.com
Carrier Tracking No(s):
State of Origin: Tennessee
Accreditations Required (See note):

COC No: 180-375193.2
Page: Page 2 of 2
Job #: 180-96595-1

Analysis Requested

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 Radium-226/228	901.1_Ra/Fill_Geo_21 Radium-226/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:							
BRF-BS-FB02-20191001 ~ BRF BG05 (180-96595-9)	10/1/19	15:12 Eastern		Water				X	3	TVA - Batch alone

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:

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. I

Possible Hazard Identification
Unconfirmed

Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*

Special Instructions/QC Requirements:

Empty Kit Relinquished by: Date: Time: Method of Shipment:

Relinquished by	Date/Time	Company	Received by	Date/Time	Company
[signature]	10/3/19 1700	DAPIN	[signature]	10/4/19 05:20	TASTL

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: 180-96595-1

Login Number: 96595
List Number: 1
Creator: Say, Thomas C

List Source: Eurofins TestAmerica, Pittsburgh

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

Login Sample Receipt Checklist

Client: Environmental Standards Inc.

Job Number: 180-96595-1

Login Number: 96595
List Number: 2
Creator: Harris, Lorin C

List Source: Eurofins TestAmerica, St. Louis
List Creation: 10/04/19 03:45 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: 180-96595-1

Login Number: 96595
List Number: 3
Creator: Harris, Lorin C

List Source: Eurofins TestAmerica, St. Louis
List Creation: 10/04/19 03:50 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	