ENVIRONMENTAL STANDARDS

Setting the Standards for Innovative Environmental Solutions

Data Validation Report
Tennessee Valley Authority
John Sevier Fossil Plant
Environmental Investigation Plan
Background Soil Samples
Chain-of-Custody Number: JSF_BS_20190124_1B

This data validation report was revised to update the radium-226+228 uncertainty in the Analytical Results (Section 2) for samples where either the individual radium-226 or radium-228 activity results were negative.

This quality assurance (QA) review is based upon an examination of the data generated from the analyses of the 14 background soil samples and three aqueous blanks collected on January 23 and 24, 2018, at the Tennessee Valley Authority (TVA) John Sevier Fossil Plant facility. These samples were collectively analyzed by TestAmerica Laboratories, Inc. (TestAmerica), of St. Louis, Missouri, for radium-226 and for radium-228 by US EPA Method 901.1.

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

Summary

The analytical results and associated laboratory quality control (QC) samples were reviewed to determine the integrity of the reported analytical results and to ensure that the data met the established data quality objectives. This QA review includes all samples in TestAmerica Job Number 180-86110-1.

The samples that have undergone Stage 4 data validation are listed below:

Sample Identification	Laboratory Sample Identification	Job Number	Matrix	Date Sample Collected	Parameter(s) Examined
JSF-BS-BG12-0.8/2.8-20190123	180-86110-1	180-86110-1	Soil	1/23/19	Ra-226, Ra-228, Ra-226/228
JSF-BS-BG12-5.0/10.0-20190123	180-86110-2	180-86110-1	Soil	1/23/19	Ra-226, Ra-228, Ra-226/228
JSF-BS-BG12-10.75/12.75-20190123	180-86110-3	180-86110-1	Soil	1/23/19	Ra-226, Ra-228, Ra-226/228
JSF-BS-BG12-13.5/15.0-20190123	180-86110-4	180-86110-1	Soil	1/23/19	Ra-226, Ra-228, Ra-226/228
JSF-BS-BG12-0.0/0.5-20190123	180-86110-5	180-86110-1	Soil	1/23/19	Ra-226, Ra-228, Ra-226/228
JSF-BS-FB01-20190123 (Field Blank)	180-86110-6	180-86110-1	Aq	1/23/19	Ra-226, Ra-228, Ra-226/228
JSF-BS-BG11-1.1/3.1-20190124	180-86110-7	180-86110-1	Soil	1/24/19	Ra-226, Ra-228, Ra-226/228
JSF-BS-BG11-5.5/8.5-20190124	180-86110-8	180-86110-1	Soil	1/24/19	Ra-226, Ra-228, Ra-226/228
JSF-BS-FD01-20190124 (Field Duplicate of JSF-BS-BG11-5.5/8.5-20190124)	180-86110-9	180-86110-1	Soil	1/24/19	Ra-226, Ra-228, Ra-226/228
JSF-BS-BG11-11.3/13.3-20190124	180-86110-10	180-86110-1	Soil	1/24/19	Ra-226, Ra-228, Ra-226/228
JSF-BS-BG11-0.0/0.5-20190124	180-86110-11	180-86110-1	Soil	1/24/19	Ra-226, Ra-228, Ra-226/228
JSF-BS-EB01-20190124 (Equipment Blank)	180-86110-12	180-86110-1	Aq	1/24/19	Ra-226, Ra-228, Ra-226/228
JSF-BS-FB02-20190124 (Field Blank)	180-86110-13	180-86110-1	Aq	1/24/19	Ra-226, Ra-228, Ra-226/228
JSF-BS-BG10-1.4/3.4-20190124	180-86110-14	180-86110-1	Soil	1/24/19	Ra-226, Ra-228, Ra-226/228
JSF-BS-BG10-6.5/8.5-20190124	180-86110-15	180-86110-1	Soil	1/24/19	Ra-226, Ra-228, Ra-226/228
JSF-BS-BG10-10.5/12.5-20190124	180-86110-16	180-86110-1	Soil	1/24/19	Ra-226, Ra-228, Ra-226/228
JSF-BS-BG10-0.0/0.5-20190124	180-86110-17	180-86110-1	Soil	1/24/19	Ra-226, Ra-228, Ra-226/228

Parameters Examined

Ra-226 - Radium-226 by US EPA Method 901.1.
Ra-228 - Radium-228 by US EPA Method 901.1.
Ra-226/228 - Radium-226/228 Calculation by US EPA Method 901.1.
Aq - Aqueous.

Items Reviewed	
Holding Times	Calibrations
Sample Preservation	Blank Results
Chain-of-Custody (COC) Records and Case Narratives	Sample Preparation
Laboratory Control Sample (LCS) Results	Laboratory and Field Duplicate Results
Quantitation of Positive Results	

Comments and Exceptions

- During a data inquiry associated with a TVA sediment SDG, it was discovered that soil and sediment radium samples were prepared and analyzed on a wet-weight basis. Per the associated QAPP, all radium soil and sediment data must be reported on a dry-weight basis. After several discussions, a decision was made that all radium analyses for soil and sediment samples must be performed using dried, ground material moving forward. In addition, TestAmerica was requested to re-analyze and re-report radium results for all sediment samples using dried and ground material (see Project Correspondence [Section 5]).

- During data review associated with a TVA SDG, it was discovered that the combined radium-226+228 uncertainty for samples was not calculated correctly when either the individual radium-226 or radium-228 activity results were negative. In these instances, the uncertainty for the analyte with the negative activity was set to zero when the combined radium-226+228 uncertainty was calculated. Environmental Standards provided TestAmerica a spreadsheet with all impacted samples, and the corresponding corrected uncertainty. The corrected uncertainty values were validated by TestAmerica and a spreadsheet of validated corrected radium-226+228 uncertainty values was provided by Environmental Standards. The spreadsheet provided to Environmental Standards was used to update all impacted uncertainties in the database. Additionally, TestAmerica has confirmed they corrected the calculation for all future TVA SDGs (see Project Correspondence [Section 5]).

- Radium-226+228 was reported as the summation of the calculated activities for radium-226 and radium-228. The reported results for radium-226+228 for the samples included in this report may have been adjusted and/or qualified in accordance with the TVA reporting protocols and assigned an “S” reason code.

Qualifier Summary

- Any radium-226+228 result reported from the summation of one isotope activity less than the MDA (non-negative value) and one isotope activity greater than the MDA should be considered estimated and have been flagged “J” on the data tables.

Review performed by:	Bryan J. Eck, Quality Assurance Chemist
Review performed by:	Danielle Coles, Quality Assurance Chemist
Review reviewed by:	Ammie L. Martin, Senior Quality Assurance Chemist
Review approved by:	Andrew L. Piasecki, Senior Quality Assurance Chemist
Review approved by:	Rock J. Vitale, CEAC, Technical Director of Chemistry/Principal
Date review completed:	8/12/19

SECTION 2

ANALYTICAL RESULTS

INORGANIC DATA QUALIFIERS

U* This result should be considered “not-detected” because it was detected in a rinsate blank or laboratory blank at a similar level.

UR Unreliable reporting limit; analyte may or may not be present in sample.

R Unreliable positive result; analyte may or may not be present in sample.

J Quantitation is approximate due to limitations identified during data validation.

UJ This analyte was not detected, but the reporting limit may or may not be higher due to a bias identified during data validation.

REASON CODES AND EXPLANATIONS

Reason Code	Explanation
BE	Equipment blank contamination. The result should be considered “not-detected.”
BF	Field blank contamination. The result should be considered “not-detected.”
BL	Laboratory blank contamination. The result should be considered “not-detected.”
BN	Negative laboratory blank contamination.
C	Initial and/or Continuing Calibration issue, indeterminate bias.
C+	Initial and/or Continuing Calibration issue. The result may be biased high.
C-	Initial and/or Continuing Calibration issue. The result may be biased low.
FD	Field duplicate imprecision.
FG	Total versus Dissolved Imprecision.
H	Holding time exceeded.
I	Internal standard recovery outside of acceptance limits.
L	LCS and LCSD recoveries outside of acceptance limits, indeterminate bias.
L+	LCS and/or LCSD recoveries outside of acceptance limits. The result may be biased high.
L-	LCS and/or LCSD recoveries outside of acceptance limits. The result may be biased low.
LD	Laboratory duplicate imprecision.
LP	LCS/LCSD imprecision.
M	MS and MSD recoveries outside of acceptance limits, indeterminate bias.
M+	MS and/or MSD recoveries outside of acceptance limits. The result may be biased high.
M-	MS and/or MSD recoveries outside of acceptance limits. The result may be biased low.
MP	MS/MSD imprecision.
P	Post-digestion spike recoveries outside of acceptance limits, indeterminate bias.
P+	Post-digestion spike recovery outside of acceptance limits. The result may be biased high.
P-	Post-digestion spike recovery outside of acceptance limits. The result may be biased low.
Q	Chemical Preservation issue.
R	RL standards outside of acceptance limits, indeterminate bias.
R+	RL standard(s) outside of acceptance limits. The result may be biased high.
R-	RL standard(s) outside of acceptance limits. The result may be biased low.
RL	Reported result between the MDL and the QL.
S	Radium-226+228 flagged due to reporting protocol for combine results.
T	Temperature preservation issue.
SD	Serial Dilution imprecision.
X	Percent solids < 50%.
Y+	Chemical Yield outside of acceptance limits. The result may be biased high.
Y-	Chemical yield outside of acceptance limits. The result may be biased low.
Z	ICP or ICP/MS Interference.
ZZ	Other.

TVA CCR Program
Facility: John Sevier Fossil Plant
SDG: 180861101

Lab Sample ID	180-86110-1
Sys Sample Code	JSF-BS-BG12-0.8/2.8-20190123
Sample Name	JSF-BS-BG12-0.8/2.8-20190123
Sample Date	1/23/2019 11:19:00 AM
Location	JSF-BG12
Sample Type	N
Parent Sample	

Analytic Method	Chemical Name	CAS Rn	Fraction	Result Unit	Final Result	Final Qual	Reason code	Uncertainty	Final MDL	Final RL	Final QL	Final Detect	Final Report	DF	Basis
EPA 901.1	Radium 226 + radium 228	RA226/228	T	PCI/G	2.68			0.517				Y	Yes	1	DRY
	Radium 228	15262-20-1	T	PCI/G	1.60			0.418	0.230	0.230	1.00	Y	Yes	1	DRY
	Radium-226	13982-63-3	T	PCI/G	1.08			0.304	0.222	0.222	1.00	Y	Yes	1	DRY

TVA CCR Program
Facility: John Sevier Fossil Plant
SDG: 180861101

Lab Sample ID	180-86110-10
Sys Sample Code	JSF-BS-BG11-11.3/13.3-20190124
Sample Name	JSF-BS-BG11-11.3/13.3-20190124
Sample Date	1/24/2019 12:02:00 PM
Location	JSF-BG11
Sample Type	N
Parent Sample	

Analytic Method	Chemical Name	CAS Rn	Fraction	Result Unit	Final Result	Final Qual	Reason code	Uncertainty	Final MDL	Final RL	Final QL	Final Detect	Final Report	DF	Basis
EPA 901.1	Radium 226 + radium 228	RA226/228	T	PCI/G	2.19			0.334				Y	Yes	1	DRY
	Radium 228	15262-20-1	T	PCI/G	1.37			0.278	0.182	0.182	1.00	Y	Yes	1	DRY
	Radium-226	13982-63-3	T	PCI/G	0.820			0.185	0.103	0.103	1.00	Y	Yes	1	DRY

TVA CCR Program
Facility: John Sevier Fossil Plant
SDG: 180861101

Lab Sample ID	180-86110-11
Sys Sample Code	JSF-BS-BG11-0.0/0.5-20190124
Sample Name	JSF-BS-BG11-0.0/0.5-20190124
Sample Date	1/24/2019 12:47:00 PM
Location	JSF-BG11
Sample Type	N
Parent Sample	

Analytic Method	Chemical Name	CAS Rn	Fraction	Result Unit	Final Result	Final Qual	Reason code	Uncertainty	Final MDL	Final RL	Final QL	Final Detect	Final Report	DF	Basis
EPA 901.1	Radium 226 + radium 228	RA226/228	T	PCI/G	2.04			0.481				Y	Yes	1	DRY
	Radium 228	15262-20-1	T	PCI/G	1.30			0.436	0.282	0.282	1.00	Y	Yes	1	DRY
	Radium-226	13982-63-3	T	PCI/G	0.737			0.204	0.153	0.153	1.00	Y	Yes	1	DRY

Lab Sample ID	180-86110-12
Sys Sample Code	JSF-BS-EB01-20190124
Sample Name	JSF-BS-EB01-20190124
Sample Date	1/24/2019 12:35:00 PM
Location	JSF-BG11
Sample Type	EB
Parent Sample	

Analytic Method	Chemical Name	CAS Rn	Fraction	Result Unit	Final Result	Final Qual	Reason code	Uncertainty	Final MDL	Final RL	Final QL	Final Detect	Final Report	DF	Basis
EPA 901.1	Radium 226 + radium 228	RA226/228	T	PCI/L	30.6	J	S	21.0				Y	Yes	1	NA
	Radium 228	15262-20-1	T	PCI/L	-2.53	U		12.0	28.0	28.0	50.0	N	Yes	1	NA
	Radium-226	13982-63-3	T	PCI/L	30.6			17.2	17.1	17.1	50.0	Y	Yes	1	NA

TVA CCR Program
Facility: John Sevier Fossil Plant
SDG: 180861101

Lab Sample ID	180-86110-13
Sys Sample Code	JSF-BS-FB02-20190124
Sample Name	JSF-BS-FB02-20190124
Sample Date	1/24/2019 2:34:00 PM
Location	JSF-BG10
Sample Type	FB
Parent Sample	

Analytic Method	Chemical Name	CAS Rn	Fraction	Result Unit	Final Result	Final Qual	Reason code	Uncertainty	Final MDL	Final RL	Final QL	Final Detect	Final Report	DF	Basis
EPA 901.1	Radium 226 + radium 228	RA226/228	T	PCI/L	7.98	U		10.6				N	Yes	1	NA
	Radium 228	15262-20-1	T	PCI/L	4.39	U		10.0	33.4	33.4	50.0	N	Yes	1	NA
	Radium-226	13982-63-3	T	PCI/L	3.59	U		3.54	31.4	31.4	50.0	N	Yes	1	NA

TVA CCR Program
Facility: John Sevier Fossil Plant
SDG: 180861101

Lab Sample ID	180-86110-14
Sys Sample Code	JSF-BS-BG10-1.4/3.4-20190124
Sample Name	JSF-BS-BG10-1.4/3.4-20190124
Sample Date	1/24/2019 3:07:00 PM
Location	JSF-BG10
Sample Type	N
Parent Sample	

Analytic Method	Chemical Name	CAS Rn	Fraction	Result Unit	Final Result	Final Qual	Reason code	Uncertainty	Final MDL	Final RL	Final QL	Final Detect	Final Report	DF	Basis
EPA 901.1	Radium 226 + radium 228	RA226/228	T	PCI/G	2.21			0.372				Y	Yes	1	DRY
	Radium 228	15262-20-1	T	PCI/G	1.56			0.310	0.110	0.110	1.00	Y	Yes	1	DRY
	Radium-226	13982-63-3	T	PCI/G	0.647			0.205	0.176	0.176	1.00	Y	Yes	1	DRY

Lab Sample ID	180-86110-15
Sys Sample Code	JSF-BS-BG10-6.5/8.5-20190124
Sample Name	JSF-BS-BG10-6.5/8.5-20190124
Sample Date	1/24/2019 3:27:00 PM
Location	JSF-BG10
Sample Type	N
Parent Sample	

Analytic Method	Chemical Name	CAS Rn	Fraction	Result Unit	Final Result	Final Qual	Reason code	Uncertainty	Final MDL	Final RL	Final QL	Final Detect	Final Report	DF	Basis
EPA 901.1	Radium 226 + radium 228	RA226/228	T	PCI/G	3.72			0.586				Y	Yes	1	DRY
	Radium 228	15262-20-1	T	PCI/G	2.37			0.503	0.170	0.170	1.00	Y	Yes	1	DRY
	Radium-226	13982-63-3	T	PCI/G	1.35			0.300	0.139	0.139	1.00	Y	Yes	1	DRY

Lab Sample ID	180-86110-16
Sys Sample Code	JSF-BS-BG10-10.5/12.5-20190124
Sample Name	JSF-BS-BG10-10.5/12.5-20190124
Sample Date	1/24/2019 3:48:00 PM
Location	JSF-BG10
Sample Type	N
Parent Sample	

Analytic Method	Chemical Name	CAS Rn	Fraction	Result Unit	Final Result	Final Qual	Reason code	Uncertainty	Final MDL	Final RL	Final QL	Final Detect	Final Report	DF	Basis
EPA 901.1	Radium 226 + radium 228	RA226/228	T	PCI/G	2.53			0.462				Y	Yes	1	DRY
	Radium 228	15262-20-1	T	PCI/G	1.75			0.385	0.348	0.348	1.00	Y	Yes	1	DRY
	Radium-226	13982-63-3	T	PCI/G	0.780			0.256	0.218	0.218	1.00	Y	Yes	1	DRY

Lab Sample ID	180-86110-17
Sys Sample Code	JSF-BS-BG10-0.0/0.5-20190124
Sample Name	JSF-BS-BG10-0.0/0.5-20190124
Sample Date	1/24/2019 3:56:00 PM
Location	JSF-BG10
Sample Type	N
Parent Sample	

Analytic Method	Chemical Name	CAS Rn	Fraction	Result Unit	Final Result	Final Qual	Reason code	Uncertainty	Final MDL	Final RL	Final QL	Final Detect	Final Report	DF	Basis
EPA 901.1	Radium 226 + radium 228	RA226/228	T	PCI/G	1.47	J	S	0.371				Y	Yes	1	DRY
	Radium 228	15262-20-1	T	PCI/G	0.538	U		0.284	0.597	0.597	1.00	N	Yes	1	DRY
	Radium-226	13982-63-3	T	PCI/G	0.927			0.239	0.151	0.151	1.00	Y	Yes	1	DRY

Lab Sample ID	180-86110-2
Sys Sample Code	JSF-BS-BG12-5.0/10.0-20190123
Sample Name	JSF-BS-BG12-5.0/10.0-20190123
Sample Date	1/23/2019 12:05:00 PM
Location	JSF-BG12
Sample Type	N
Parent Sample	

Analytic Method	Chemical Name	CAS Rn	Fraction	Result Unit	Final Result	Final Qual	Reason code	Uncertainty	Final MDL	Final RL	Final QL	Final Detect	Final Report	DF	Basis
EPA 901.1	Radium 226 + radium 228	RA226/228	T	PCI/G	2.17			0.402				Y	Yes	1	DRY
	Radium 228	15262-20-1	T	PCI/G	1.57			0.328	0.230	0.230	1.00	Y	Yes	1	DRY
	Radium-226	13982-63-3	T	PCI/G	0.603			0.233	0.219	0.219	1.00	Y	Yes	1	DRY

Lab Sample ID	180-86110-3
Sys Sample Code	JSF-BS-BG12-10.75/12.75-20190123
Sample Name	JSF-BS-BG12-10.75/12.75-20190123
Sample Date	1/23/2019 12:32:00 PM
Location	JSF-BG12
Sample Type	N
Parent Sample	

Analytic Method	Chemical Name	CAS Rn	Fraction	Result Unit	Final Result	Final Qual	Reason code	Uncertainty	Final MDL	Final RL	Final QL	Final Detect	Final Report	DF	Basis
EPA 901.1	Radium 226 + radium 228	RA226/228	T	PCI/G	2.04			0.340				Y	Yes	1	DRY
	Radium 228	15262-20-1	T	PCI/G	1.26			0.265	0.107	0.107	1.00	Y	Yes	1	DRY
	Radium-226	13982-63-3	T	PCI/G	0.779			0.213	0.163	0.163	1.00	Y	Yes	1	DRY

Lab Sample ID	180-86110-4
Sys Sample Code	JSF-BS-BG12-13.5/15.0-20190123
Sample Name	JSF-BS-BG12-13.5/15.0-20190123
Sample Date	1/23/2019 12:44:00 PM
Location	JSF-BG12
Sample Type	N
Parent Sample	

Analytic Method	Chemical Name	CAS Rn	Fraction	Result Unit	Final Result	Final Qual	Reason code	Uncertainty	Final MDL	Final RL	Final QL	Final Detect	Final Report	DF	Basis
EPA 901.1	Radium 226 + radium 228	RA226/228	T	PCI/G	1.79			0.353				Y	Yes	1	DRY
	Radium 228	15262-20-1	T	PCI/G	1.04			0.273	0.460	0.460	1.00	Y	Yes	1	DRY
	Radium-226	13982-63-3	T	PCI/G	0.752			0.223	0.174	0.174	1.00	Y	Yes	1	DRY

Lab Sample ID	180-86110-5
Sys Sample Code	JSF-BS-BG12-0.0/0.5-20190123
Sample Name	JSF-BS-BG12-0.0/0.5-20190123
Sample Date	1/23/2019 12:47:00 PM
Location	JSF-BG12
Sample Type	N
Parent Sample	

Analytic Method	Chemical Name	CAS Rn	Fraction	Result Unit	Final Result	Final Qual	Reason code	Uncertainty	Final MDL	Final RL	Final QL	Final Detect	Final Report	DF	Basis
EPA 901.1	Radium 226 + radium 228	RA226/228	T	PCI/G	0.998	J	S	0.291				Y	Yes	1	DRY
	Radium 228	15262-20-1	T	PCI/G	0.744			0.250	0.141	0.141	1.00	Y	Yes	1	DRY
	Radium-226	13982-63-3	T	PCI/G	0.254	U		0.149	0.482	0.482	1.00	N	Yes	1	DRY

Lab Sample ID	180-86110-6
Sys Sample Code	JSF-BS-FB01-20190123
Sample Name	JSF-BS-FB01-20190123
Sample Date	1/23/2019 3:30:00 PM
Location	JSF-BG12
Sample Type	FB
Parent Sample	

Analytic Method	Chemical Name	CAS Rn	Fraction	Result Unit	Final Result	Final Qual	Reason code	Uncertainty	Final MDL	Final RL	Final QL	Final Detect	Final Report	DF	Basis
EPA 901.1	Radium 226 + radium 228	RA226/228	T	PCI/L	7.52	U		20.5				N	Yes	1	NA
	Radium 228	15262-20-1	T	PCI/L	1.41	U		17.9	29.6	29.6	50.0	N	Yes	1	NA
	Radium-226	13982-63-3	T	PCI/L	6.11	U		10.0	13.9	13.9	50.0	N	Yes	1	NA

Lab Sample ID	180-86110-7
Sys Sample Code	JSF-BS-BG11-1.1/3.1-20190124
Sample Name	JSF-BS-BG11-1.1/3.1-20190124
Sample Date	1/24/2019 11:16:00 AM
Location	JSF-BG11
Sample Type	N
Parent Sample	

Analytic Method	Chemical Name	CAS Rn	Fraction	Result Unit	Final Result	Final Qual	Reason code	Uncertainty	Final MDL	Final RL	Final QL	Final Detect	Final Report	DF	Basis
EPA 901.1	Radium 226 + radium 228	RA226/228	T	PCI/G	2.36			0.387				Y	Yes	1	DRY
	Radium 228	15262-20-1	T	PCI/G	1.53			0.314	0.145	0.145	1.00	Y	Yes	1	DRY
	Radium-226	13982-63-3	T	PCI/G	0.829			0.226	0.174	0.174	1.00	Y	Yes	1	DRY

Lab Sample ID	180-86110-8
Sys Sample Code	JSF-BS-BG11-5.5/8.5-20190124
Sample Name	JSF-BS-BG11-5.5/8.5-20190124
Sample Date	1/24/2019 11:36:00 AM
Location	JSF-BG11
Sample Type	N
Parent Sample	

Analytic Method	Chemical Name	CAS Rn	Fraction	Result Unit	Final Result	Final Qual	Reason code	Uncertainty	Final MDL	Final RL	Final QL	Final Detect	Final Report	DF	Basis
EPA 901.1	Radium 226 + radium 228	RA226/228	T	PCI/G	2.33			0.345				Y	Yes	1	DRY
	Radium 228	15262-20-1	T	PCI/G	1.43			0.283	0.111	0.111	1.00	Y	Yes	1	DRY
	Radium-226	13982-63-3	T	PCI/G	0.897			0.198	0.118	0.118	1.00	Y	Yes	1	DRY

Lab Sample ID	180-86110-9
Sys Sample Code	JSF-BS-FD01-20190124
Sample Name	JSF-BS-FD01-20190124
Sample Date	1/24/2019 11:21:00 AM
Location	JSF-BG11
Sample Type	FD
Parent Sample	JSF-BS-BG11-5.5/8.5-20190124

Analytic Method	Chemical Name	CAS Rn	Fraction	Result Unit	Final Result	Final Qual	Reason code	Uncertainty	Final MDL	Final RL	Final QL	Final Detect	Final Report	DF	Basis
EPA 901.1	Radium 226 + radium 228	RA226/228	T	PCI/G	2.09			0.419				Y	Yes	1	DRY
	Radium 228	15262-20-1	T	PCI/G	1.22			0.348	0.289	0.289	1.00	Y	Yes	1	DRY
	Radium-226	13982-63-3	T	PCI/G	0.872			0.234	0.163	0.163	1.00	Y	Yes	1	DRY

SECTION 3

SUPPORTING DOCUMENTATION FOR QUALIFIERS

ENVIRONMENTAL STANDARDS

RADIOLOGICAL ANALYSIS SUPPORT DOCUMENTATION

ESI project name:	TVA	Reviewed by:	BE 3/8/19
Sample Collection Dates:	1/23/19-1/24/19	Approved by:	[illegible]
Job Number:	20188396.A000	Completion Date:	06/2019
Project Manager:	AC		
Laboratory:	TA St. Louis		

Applicable Sample No's ( ) Refer to Table 1 in the Quality Assurance Review

Deliverable:			Sample No.	Lab Control No.
	Level IV (Full)	(X)	180-86110-1	
	Limited	( )		
	Other:			

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

	Criteria Examined in Detail Check (√) if Yes or Footnote Letter for Comments Below					Problems Identified Check (√) if Yes or Footnote Letter for Comments Below					Support Documentation Attachments Check (√) if Yes or Footnote Letter for Comments Below				
	Ra-226	Ra-228	Ra-226+228			Ra-226	Ra-228	Ra-226+228			Ra-226	Ra-228	Ra-226+228		
Holding Times	X	X	X								X	X	X		
Blank Analysis Results	X	X	X								X	X	X		
Laboratory Control Standard (LCS)	X	X	X								X	X	X		
Tracer/Chemical Yield	X	X	X								X	X	X		
Duplicate Analysis: ( ) Field (X) Lab	X	X	X								X	X	X		
Matrix Spike Results															
Quantitation of Results	X	X	X								X	X	X		
Detection Limit	X	X									X	X			
Efficiency/Energy Calibrations	X	X	X								X	X	X		
Initial Calibration Verifications	X	X	X								X	X	X		
Annual Calibration Verifications															
Continuing Calibration Checks	X	X	X								X	X	X		
Continuing Calibration Backgrounds															
Sample Preservation	X	X	X								X	X	X		
Condition on Receipt	X	X	X								X	X	X		
Others:	X	X	X					X			X	X	X		

Comments:

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: JSF_BS_20190124_1B

Job ID: 180-86110-1

Client Sample ID: JSF-BS-BG12-0.0/0.5-20190123
Date Collected: 01/23/19 12:47
Date Received: 01/26/19 09:30

Lab Sample ID: 180-86110-5
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	0.254	U	0.147	0.149	1.00	0.482	pCi/g	01/30/19 00:23	02/20/19 09:34	1
Radium-228	0.744		0.238	0.250		0.141	pCi/g	01/30/19 00:23	02/20/19 09:34	1
Radium 226 and Radium 228	0.998 J,S		0.280	0.291			pCi/g	01/30/19 00:23	02/20/19 09:34	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: JSF_BS_20190124_1B

Job ID: 180-86110-1

Client Sample ID: JSF-BS-EB01-20190124

Date Collected: 01/24/19 12:35
Date Received: 01/26/19 09:30

Lab Sample ID: 180-86110-12

Matrix: Water

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	30.6		16.9	17.2	50.0	17.1	pCi/L	01/29/19 22:58	02/19/19 09:40	1
Radium-228	-2.53	U	12.0	12.0	50.0	28.0	pCi/L	01/29/19 22:58	02/19/19 09:40	1
Radium 226 and Radium 228	30.6	J,S	16.9	~~17.2~~ 21.0			pCi/L	01/29/19 22:58	02/19/19 09:40	1

MRD > 250, no qual

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: JSF_BS_20190124_1B

Job ID: 180-86110-1

Client Sample ID: JSF-BS-BG10-0.0/0.5-20190124

Date Collected: 01/24/19 15:56
Date Received: 01/26/19 09:30

Lab Sample ID: 180-86110-17

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	**0.927**		0.219	0.239	1.00	0.151	pCi/g	01/30/19 00:23	02/20/19 11:51	1
Radium-228	0.538	U	0.278	0.284		0.597	pCi/g	01/30/19 00:23	02/20/19 11:51	1
Radium 226 and Radium 228	**1.47**	J,S	0.354	0.371			pCi/g	01/30/19 00:23	02/20/19 11:51	1

SECTION 4

CASE NARRATIVE AND CHAIN-OF-CUSTODY RECORD

Sample Summary

Client: Environmental Standards Inc.
Project/Site: JSF_BS_20190124_1B

TestAmerica Job ID: 180-86110-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
180-86110-1	JSF BS-BG12-0.8/2.8-20190123	Solid	01/23/19 11:19	01/26/19 09:30
180-86110-2	JSF-BS-BG12-5.0/10.0-20190123	Solid	01/23/19 12:05	01/26/19 09:30
180-86110-3	JSF-BS-BG12-10.25/12.75-20190123	Solid	01/23/19 12:32	01/26/19 09:30
180-86110-4	JSF-BS-BG12-13.5/15.0-20190123	Solid	01/23/19 12:44	01/26/19 09:30
180-86110-5	JSF BS-BG12-0.0/0.5-20190123	Solid	01/23/19 12:47	01/26/19 09:30
180-86110-6	JSF-BS-FB01-20190123	Water	01/23/19 15:30	01/26/19 09:30
180-86110-7	JSF-BS-BG11-1.1/3.1-20190124	Solid	01/24/19 11:16	01/26/19 09:30
180-86110-8	JSF-BS-BG11-5.5/8.5-20190124	Solid	01/24/19 11:36	01/26/19 09:30
180-86110-9	JSF-BS-FD01-20190124	Solid	01/24/19 11:21	01/26/19 09:30
180-86110-10	JSF-BS-BG11-11.3/13.3-20190124	Solid	01/24/19 12:02	01/26/19 09:30
180-86110-11	JSF-BS-BG11-0.0/0.5-20190124	Solid	01/24/19 12:47	01/26/19 09:30
180-86110-12	JSF-BS-EB01-20190124	Water	01/24/19 12:35	01/26/19 09:30
180-86110-13	JSF-BS-FB02-20190124	Water	01/24/19 14:34	01/26/19 09:30
180-86110-14	JSF-BS-BG10-1.4/3.4-20190124	Solid	01/24/19 15:07	01/26/19 09:30
180-86110-15	JSF-BS-BG10-6.5/8.5-20190124	Solid	01/24/19 15:27	01/26/19 09:30
180-86110-16	JSF-BS-BG10-10.5/12.5-20190124	Solid	01/24/19 15:48	01/26/19 09:30
180-86110-17	JSF-BS-BG10-0.0/0.5-20190124	Solid	01/24/19 15:56	01/26/19 09:30

Job ID: 180-86110-1

Laboratory: Eurofins TestAmerica, Pittsburgh

Narrative

Job Narrative
180-86110-1

Revised Report
This report was revised to update the results for sample 3 to adjust the solid sample results for dry weight using the dry weight results from TA-Pittsburgh This replaces the previous final report.

Receipt
The samples were received on 1/26/2019 9:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 5 coolers at receipt time were 0.8° C, 1.8° C, 2.4° C, 2.6° C and 3.1° C.

Receipt Exceptions
The container label for the following sample did not match the information listed on the Chain-of-Custody (COC):
JSF-BS-BG10-0.0/0.5-20190124 (180-86109-17). The container labels list a sample collection time of 1548, while the COC lists 1556. The collection time of 1556 was confirmed by the client.

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

TVA Environmental Investigations

Tennessee Valley Authority

COOLER No:			of	5
COC No:	JSF_BS_20190124_1B			
1 of 2 Pages				
Task Desc:	JSF_BS			

Rev-1 DC 1/29/19

Chain-of-Custody / Analytical Request Document

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

180-86110 Chain of Custody

Required Ship to Lab:		Required Project Information:		Required Sampler Information	
Lab Name:	TestAmerica Nashville	Site ID #:	JOHN SEVIER FOSSIL PLANT	Sampler:	Andrew Stevens & Elizabeth Dibone
Lab Address:	2960 Foster Creighton Dr	Project #:	175552235	Sampling Company:	Stantec
	Nashville, TN 37204	Site Address:	606 Old Highway 70 S	Address:	601 Grassmere Park
		City:	Rogersville State, Zip: TN 37857	City/State:	Nashville/TN Phone: 615-885-1144
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:	[illegible]	Send EDD/Hard Copy to:	[illegible]
Lab Email:	Gail.Lage@testamericainc.com				

Analysis Turnaround Time

☐ CALENDAR DAYS ☐ WORKING DAYS

TAT if different from below: _____

☐ 24 Hours
☐ 2 Business Days
☐ 3 Business Days
✓ 10 Business Days (Standard) DC 1/29/19

Item #	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.	DIN/SID	Analysis: [illegible]	Analysis: [illegible]
1	JSF-BS-BG12-0.8/2.8-20190123	BG12	0.8	2.8	S	G	N	1/23/2019	1119	2			X	
2	JSF-BS-BG12-5.0/10.0-20190123	BG12	5.0	10.0	S	G	N	1/23/2019	1205	2			X	
3	JSF-BS-BG12-10.25/12.75-20190123	BG12	~~10.3~~	~~12.8~~	S	G	N	1/23/2019	1232	2			X	
4	JSF-BS-BG12-13.5/15.0-20190123	BG12	13.5	15.0	S	G	N	1/23/2019	1244	2			X	
5	JSF-BS-BG12-0.0/0.5-20190123	BG12	0.0	0.5	S	G	N	1/23/2019	1247	2			X	
6	JSF-BS-FB01-20190123	BG12	NA	NA	W	G	FB	1/23/2019	1530	3				X
7	JSF-BS-BG11-1.1/3.1-20190124	BG11	1.1	3.1	S	G	N	1/24/2019	1116	2			X	
8	JSF-BS-BG11-5.5/8.5-20190124	BG11	5.5	8.5	S	G	N	1/24/2019	1136	2			X	
9	JSF-BS-FD01-20190124	NA	NA	NA	S	G	FD	1/24/2019	1121	2			X	
10	JSF-BS-BG11-11.3/13.3-20190124	BG11	11.3	13.3	S	G	N	1/24/2019	1202	2			X	
11	JSF-BS-BG11-0.0/0.5-20190124	BG11	0.0	0.5	S	G	N	1/24/2019	1247	2			X	
12	JSF-BS-EB01-20190124	BG11	NA	NA	W	G	EB	1/24/2019	1235	3				X
13	JSF-BS-FB02-20190124	BG10	NA	NA	W	G	FB	1/24/2019	1434	3				X

AS 1/24/19

Additional Comments/Special Instructions:

AS 1/24/19

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Andrew Stevens	1/24/19	1900	TA NSH	1/24/19	1900

SHIPPING METHOD	SAMPLER NAME AND SIGNATURE
Fedex	Andrew Stevens

Sample Receipt Conditions: Temperature in °C | Sample on Ice? | Sample Intact? | Chain Signed?

Form TVA 30092AA

TVA Environmental Investigations

Tennessee Valley Authority

COOLER No.:	1	of	5
COC No:	JSF_BS_20190124_1B		
2 of 2 Pages	[redacted]		
Task Desc:	JSF_BS		

Rev-1 DC 1/24/19

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:		Required Project Information:		Required Sampler Information	
Lab Name:	TestAmerica Nashville	Site ID #:	JOHN SEVIER FOSSIL PLANT	Sampler:	Andrew Stevens & Elizabeth Dillon
Lab Address:	2960 Foster Creighton Dr	Project #:	175548225	Sampling Company:	Stantec
	Nashville, TN 37204	Site Address	806 Old Highway 70 S	Address	601 Grassmere Park
		City	Rogersville State, Zip: TN 37857	City/State	Nashville/TN Phone: 615-885-1144
Lab Manager Contact Information		Site PM Name	Roy Quinn		
Lab PM:	Gail Lage	Phone/Fax:	423-751-3763	Sampling Team Number:	1
Phone/Fax:	615-301-5741/615-726-3404	Site PM Email:	[redacted]	Send EDD/Hard Copy to:	[redacted]
Lab Email:	Gail.Lage@testamericainc.com				

Analysis Turnaround Time

X CALENDAR DAYS — X WORKING DAYS

TAT Reference Date Below

- 24 Hours
- 3 Business Days
- 5 Business Days
- ✓ 10 Business Days (Standard) DC 1/24/19

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	Filtered	Preserve Type	Analysis: PCB_BACKGROUND_BAS	Analysis: PCB_BACKGROUND_BL_BAS
1	JSF-BS-BG10-1.4/3.4-20190124	BG10	1.4	3.4	S	G	N	1/24/2019	1507	2					X	
2	JSF-BS-BG10-6.5/8.5-20190124	BG10	6.5	8.5	S	G	N	1/24/2019	1527	2					X	
3	JSF-BS-BG10-10.5/12.5-20190124	BG10	10.5	12.5	S	G	N	1/24/2019	1548	2					X	
4	JSF-BS-BG10-0.0/0.5-20190124	BG10	0.0	0.5	S	G	N	1/24/2019	1556	2					X	
5																
6																
7																
8																
9																
10																
11																
12																
13																

AS 1/24/19 — AS 1/24/19 — AS 1/24/19 — AS 1/24/19 — MD 1/24/19 — PCS 1/24/19 — DC 1/24/19

Additional Comments/Special Instructions:

AS 1/24/19

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Andrew Stevens	1/24/19	1900	[signature]	1/24/19	1931

SHIPPING METHOD	SAMPLER NAME AND SIGNATURE
Fedex	Andrew Stevens

Sample Receipt Conditions: Ipack/ice in °C — sample on ice? — sample intact? — trip Blank?

Form TVA 39057A

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.:	1 of 5
COC No:	JSF_BS_20190124_1B
1 of 2 Pages	
Task Desc:	JSF_BS

180-86110 Chain of Custody

Required Ship to Lab:

Lab Name:	TestAmerica Nashville
Lab Address:	2960 Foster Creighton Dr 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

Required Project Information:

Site ID #:	JOHN SEVIER FOSSIL PLANT
Project #:	175588225
Site Address	606 Old Highway 70 S
City	Rogersville State, Zip: TN, 37857
Site PM Name:	Roy Quinn
Phone/Fax:	423-751-3753
Site PM Email:	rquinn@tva.gov

Required Sampler Information

Sampler:	Andrew Stevens & Elizabeth Dillons
Sampling Company:	Stantec
Address	601 Grassmere Park
City/State	Nashville/TN Phone: 615-885-1144
Sampling Team Number:	1
Send EDD/Hard Copy to:	tva-ei@stantec.com

Analysis Turnaround Time

☐ CALENDAR DAYS ☐ WORKING DAYS

TAT if different from Below _____

- ☐ 24 Hours
- ☐ 2 Business Days
- ☐ 5 Business Days
- ☐ 10 Business Days (Standard)

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.	SIGNED	Analysis: CCP_MASS(SRC/DISS)_AAD	Analysis: CCP_ELEMENTS(DISS)_PLASMA_EAD	Preserve	Ice	Bottle
1	JSF-BS-BG12-0.8/2.8-20190123	BG12	0.8	2.8	S	G	N	1/23/2019	1119	2		▪	X				
2	JSF-BS-BG12-5.0/10.0-20190123	BG12	5.0	10.0	S	G	N	1/23/2019	1205	2		▪	X				
3	JSF-BS-BG12-10.25/12.75-20190123	BG12	10.3	12.8	S	G	N	1/23/2019	1232	2		▪	X				
4	JSF-BS-BG12-13.5/15.0-20190123	BG12	13.5	15.0	S	G	N	1/23/2019	1244	2		▪	X				
5	JSF-BS-BG12-0.0/0.5-20190123	BG12	0.0	0.5	S	G	N	1/23/2019	1247	2		▪	X				
6	JSF-BS-FB01-20190123	BG12	NA	NA	W	G	FB	1/23/2019	1530	3		▪		X			
7	JSF-BS-BG11-1.1/3.1-20190124	BG11	1.1	3.1	S	G	N	1/24/2019	1116	2		▪	X				
8	JSF-BS-BG11-5.5/8.5-20190124	BG11	5.5	8.5	S	G	N	1/24/2019	1136	2		▪	X				
9	JSF-BS-FD01-20190124	NA	NA	NA	S	G	FD	1/24/2019	1121	2		▪	X				
10	JSF-BS-BG11-11.3/13.3-20190124	BG11	11.3	13.3	S	G	N	1/24/2019	1202	2		▪	X				
11	JSF-BS-BG11-0.0/0.5-20190124	BG11	0.0	0.5	S	G	N	1/24/2019	1247	2		▪	X				
12	JSF-BS-EB01-20190124	BG11	NA	NA	W	G	EB	1/24/2019	1235	3		▪		X			
13	JSF-BS-FB02-20190124	BG10	NA	NA	W	G	FB	1/24/2019	1434	3		▪		X			

AS 1/24/19

Additional Comments/Special Instructions:

AS 1/24/19

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Andrew Stevens	1/24/19	1900	TAPNN	1/25/19	930

Sample Receipt Conditions:

Cooler ☐ Yes ☐ No	Custody Seals ☐ Yes ☐ No	Cooler/Bottles Intact ☐ Yes ☐ No	Correct bottles used ☐ 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?

SHIPPING METHOD	SAMPLER NAME AND SIGNATURE
fedex	Andrew Stevens

Form TVA 39006AA

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.:	1 of 5
COC No:	JSF_BS_20190124_1B
2 of 2 Pages	
Task Desc:	JSF_BS

Required Ship to Lab:

Lab Name: TestAmerica Nashville
Lab Address: 28380 Foster Creighton Dr, Nashville, TN 37204

Lab Manager Contact Information

Lab PM: Gail Lage
Phone/Fax: 615-301-5741/615-728-3404
Lab Email: Gail.Lage@testamericainc.com

Required Project Information:

Site ID #: JOHN SEVIER FOSSIL PLANT
Project #: 175968223
Site Address: 608 Old Highway 70 S
City: Rogersville State, Zip: TN, 37857
Site PM Name: Roy Quinn
Phone/Fax: 423-751-3753
Site PM Email: [illegible]

Required Sampler Information

Sampler: Andrew Stevens & Elizabeth Dilbeck
Sampling Company: Stantec
Address: 801 Grassmere Park
City/State: Nashville/TN Phone: 615-885-1144
Sampling Team Number: 1
Send EDD/Hard Copy to: [illegible]@stantec.com

Analysis Turnaround Time

☐ CALENDAR DAYS ☐ WORKING DAYS

TAT if different from Below: _____

☐ 24 Hours
☐ 3 Business Days
☐ 5 Business Days
☐ 10 Business Days (Standard)

Item #	SAMPLE ID Samples IDs MUST BE UNIQUE	SAMPLE LOCATION	Sample Depth Start Depth	Sample Depth End Depth	MATRIX CODE	G= GRAB C=COMP	SAMPLE TYPE	SAMPLE DATE	SAMPLE TIME	# OF CONTAINERS	Comments/ Lab Sample I.D.	MS/MSD	Filtered	Preserve Type	Analysis
1	JSF-BS-BG10-1.4/3.4-20190124	BG10	1.4	3.4	S	G	N	1/24/2019	1507	2		☐			X
2	JSF-BS-BG10-6.5/8.5-20190124	BG10	6.5	8.5	S	G	N	1/24/2019	1527	2		☐			X
3	JSF-BS-BG10-10.5/12.5-20190124	BG10	10.5	12.5	S	G	N	1/24/2019	1548	2		☐			X
4	JSF-BS-BG10-0.0/0.5-20190124	BG10	0.0	0.5	S	G	N	1/24/2019	1558	2		☐			X
5												☐			
6												☐			
7												☐			
8												☐			
9												☐			
10												☐			
11												☐			
12												☐			
13												☐			

AS 1/24/19

Additional Comments/Special Instructions:

AS 1/24/19

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Andrew Stevens	1/24/19	1900	[illegible]	1/25/19	931

SHIPPING METHOD	SAMPLER NAME AND SIGNATURE
Fedex	Andrew Stevens

Sample Receipt Conditions: ☐ Yes ☐ No

Page 1 of 1

Form TVA 30067A

TVA Environmental Investigations

Tennessee Valley Authority

COOLER No.:	2	of	5
COC No:	JSF_BS_20190124_1B		
1 of 2 Pages			
Task Desc:	JSF_BS		

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 Nashville	Site ID #:	JOHN SEVIER FOSSIL PLANT	Sampler:	Andrew Stevens & Elizabeth Dillons
Lab Address:	2960 Foster Creighton Dr	Project #:	175488225	Sampling Company:	Stantec
	Nashville, TN 37204	Site Address:	606 Old Highway 70 S	Address:	601 Grassmere Park
		City:	Rogersville, State, Zip: TN, 37857	City/State:	Nashville/TN, Phone: 615-885-1144
Lab Manager Contact Information		Site PM Name:	Roy Quinn		
Lab PM:	Gail Lage	Phone/Fax:	423-761-3763	Sampling Team Number:	1
Phone/Fax:	615-301-5741/615-726-3404	Site PM Email:	rquinn@tva.gov	Send EDD/Hard Copy to:	be-st@stantec.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 (Standard)

Item #	SAMPLE ID (Samples IDs MUST BE UNIQUE)	SAMPLE LOCATION	Sample Depth: Depth Unit / Select Unit: Start Depth	End Depth	MATRIX CODE	G= GRAB C=COMP	SAMPLE TYPE	SAMPLE DATE	SAMPLE TIME	# OF CONTAINERS	Comments/ Lab Sample I.D.	MS/MSD	Analysis: CUF_SUCCHORONIDES_PAD	CUF_SUCCHORONIDES_PLANTS_PAD	Filtered	Preserve: Yes	NO
1	JSF-BS-BG12-0.8/2.8-20190123	BG12	0.8	2.8	S	G	N	1/23/2019	1119	2		▪	X				
2	JSF-BS-BG12-5.0/10.0-20190123	BG12	5.0	10.0	S	G	N	1/23/2019	1205	2		▪	X				
3	JSF-BS-BG12-10.25/12.75-20190123	BG12	10.3	12.8	S	G	N	1/23/2019	1232	2		▪	X				
4	JSF-BS-BG12-13.5/15.0-20190123	BG12	13.5	15.0	S	G	N	1/23/2019	1244	2		▪	X				
5	JSF-BS-BG12-0.0/0.5-20190123	BG12	0.0	0.5	S	G	N	1/23/2019	1247	2		▪	X				
6	JSF-BS-FB01-20190123	BG12	NA	NA	W	G	FB	1/23/2019	1530	3		▪		X			
7	JSF-BS-BG11-1.1/3.1-20190124	BG11	1.1	3.1	S	G	N	1/24/2019	1116	2		▪	X				
8	JSF-BS-BG11-5.5/8.5-20190124	BG11	6.5	8.5	S	G	N	1/24/2019	1138	2		▪	X				
9	JSF-BS-FD01-20190124	NA	NA	NA	S	G	FD	1/24/2019	1121	2		▪	X				
10	JSF-BS-BG11-11.3/13.3-20190124	BG11	11.3	13.3	S	G	N	1/24/2019	1202	2		▪	X				
11	JSF-BS-BG11-0.0/0.5-20190124	BG11	0.0	0.5	S	G	N	1/24/2019	1247	2		▪	X				
12	JSF-BS-EB01-20190124	BG11	NA	NA	W	G	EB	1/24/2019	1235	3		▪		X			
13	JSF-BS-FB02-20190124	BG10	NA	NA	W	G	FB	1/24/2019	1434	3		▪		X			

AS 1/24/19

Additional Comments/Special Instructions:

AS 1/24/19

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Andrew Stevens	1/24/19	1900	[illegible]	1/24/19	930

Sample Receipt Conditions: ☐ Yes ☐ No

SHIPPING METHOD	SAMPLER NAME AND SIGNATURE
Fedex	Andrew Stevens

Temperature in °C | Samples on Ice? | Samples Intact? | Chg Bottles?

Form TVA 39088DR

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	5
COC No:	JSF_BS_20190124_1B		
2 of 2 Pages			
Task Desc:	JSF_BS		

Required Ship to Lab:

Lab Name:	TestAmerica Nashville
Lab Address:	2960 Foster Creighton Dr 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

Required Project Information:

Site ID #:	JOHN SEVIER FOSSIL PLANT
Project #:	17688228
Site Address:	609 Old Highway 70 S
City:	Rogersville; State, Zip: TN, 37857
Site PM Name:	Roy Quinn
Phone/Fax:	423-751-3753
Site PM Email:	rquinn@tva.gov

Required Sampler Information

Sampler:	Andrew Stevens & Elizabeth Dilbone
Sampling Company:	Stantec
Address:	501 Grassmere Park
City/State:	Nashville/TN; Phone: 615-885-1144
Sampling Team Number:	1
Send EDD/Hard Copy to:	tva-sd@tvaxsd.com

Analysis Turnaround Time

☐ CALENDAR DAYS ☐ WORKING DAYS

TAT if different from Below _____

☐ 24 Hours
☐ 2 Business Days
☐ 3 Business Days
☐ 10 Business Days (Standard)

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: GLP_BACKGROUND_RAD	Analysis: GLP_BACKGROUND_MODEL_PLASTIC_RAD
1	JSF-BS-BG10-1.4/3.4-20190124	BG10	1.4	3.4	S	G	N	1/24/2019	1507	2		☐	X	
2	JSF-BS-BG10-6.5/8.5-20190124	BG10	6.5	8.5	S	G	N	1/24/2019	1527	2		☐	X	
3	JSF-BS-BG10-10.5/12.5-20190124	BG10	10.5	12.5	S	G	N	1/24/2019	1548	2		☐	X	
4	JSF-BS-BG10-0.0/0.5-20190124	BG10	0.0	0.5	S	G	N	1/24/2019	1556	2		☐	X	
5												☐		
6												☐		
7												☐		
8												☐		
9												☐		
10												☐		
11												☐		
12												☐		
13												☐		

AS 1/24/19

Preserve: Filtered ☐ ☐; Preserve ☐ ☐; Analysis: AS 1/24/19; RJD 1/24/19; PS 1/24/19

Additional Comments/Special Instructions:

AS 1/24/19

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Andrew Stevens	1/24/19	1900		1/24/19	910

SHIPPING METHOD:	SAMPLER NAME AND SIGNATURE:
fedex	Andrew Stevens

Sample Receipt Conditions: Coolers Intact ☐ Yes ☐ No; Custody Seals Intact ☐ Yes ☐ No; Cooler Temp ☐ Yes ☐ No; Temp Blank ☐ Yes ☐ No; Samples in °C; Samples on Ice?; Samples Intact?; Trip Blank?

Form TVA 30087A

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.:	3 of 5
COC No:	JSF_BS_20190124_1B
1 of 2 Pages	
Test Desc:	JSF_BS

Required Ship to Lab:

Lab Name:	TestAmerica Nashville
Lab Address:	20380 Foster Creighton Dr 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

Required Project Information:

Site ID #:	JOHN SEVIER FOSSIL PLANT
Project #:	175694225
Site Address:	606 Old Highway 70 S
City:	Rogersville, State, Zip: TN, 37857
Site PM Name:	Roy Quinn
Phone/Fax:	423-751-3753
Site PM Email:	rmquinn@tva.gov

Required Sampler Information

Sampler:	Andrew Stevens & Elizabeth Dilbone
Sampling Company:	Stantec
Address:	601 Grassmere Park
City/State:	Nashville/TN, Phone: 615-885-1144
Sampling Team Number:	1
Send EDD/Hard Copy to:	tvf-sdl@arcadis.com

Analysis Turnaround Time

☐ CALENDAR DAYS ☐ WORKING DAYS

TAT if different from Below _____

- 24 Hours
- 3 Business Days
- 5 Business Days
- 10 Business Days (Standard)

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.	Preserved	Analysis: CCP_MICROWAVE_PAD	Analysis: CCP_MICROWAVE_BLANK_PAD
1	JSF-BS-BG12-0.8/2.8-20190123	BG12	0.8	2.8	S	G	N	1/23/2019	1119	2			X	
2	JSF-BS-BG12-5.0/10.0-20190123	BG12	5.0	10.0	S	G	N	1/23/2019	1205	2			X	
3	JSF-BS-BG12-10.25/12.75-20190123	BG12	10.3	12.8	S	G	N	1/23/2019	1232	2			X	
4	JSF-BS-BG12-13.5/15.0-20190123	BG12	13.5	15.0	S	G	N	1/23/2019	1244	2			X	
5	JSF-BS-BG12-0.0/0.5-20190123	BG12	0.0	0.5	S	G	N	1/23/2019	1247	2			X	
6	JSF-BS-FB01-20190123	BG12	NA	NA	W	G	FB	1/23/2019	1530	3				X
7	JSF-BS-BG11-1.1/3.1-20190124	BG11	1.1	3.1	S	G	N	1/24/2019	1116	2			X	
8	JSF-BS-BG11-5.5/8.5-20190124	BG11	5.5	8.5	S	G	N	1/24/2019	1136	2			X	
9	JSF-BS-FD01-20190124	NA	NA	NA	S	G	FD	1/24/2019	1121	2			X	
10	JSF-BS-BG11-11.3/13.3-20190124	BG11	11.3	13.3	S	G	N	1/24/2019	1202	2			X	
11	JSF-BS-BG11-0.0/0.5-20190124	BG11	0.0	0.5	S	G	N	1/24/2019	1247	2			X	
12	JSF-BS-EB01-20190124	BG11	NA	NA	W	G	EB	1/24/2019	1235	3				X
13	JSF-BS-FB02-20190124	BG10	NA	NA	W	G	FB	1/24/2019	1434	3				X

AS 1/24/19

Additional Comments/Special Instructions:

AS 1/24/19

RELINQUISHED BY - AFFILIATION	DATE	TIME	ACCEPTED BY - AFFILIATION	DATE	TIME
Andrew Stevens	1/24/19	1900	TAPITT	1/25/19	630

SHIPPING METHOD	SAMPLE DELIVERY AND SIGNATURE
fedex	Andrew Stevens

Sample Receipt Conditions:

temperature in °C | seals on box? | seals intact? | chain intact?

Form TVA 38098A

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.:	3 of 5
COC No:	JSF_BS_20190124_1B
2 of 2 Pages	
Task Desc:	JSF_BS

Required Ship to Lab:

Lab Name:	TestAmerica Nashville
Lab Address:	2960 Foster Creighton Dr 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

Required Project Information:

Site ID #:	JOHN SEVIER FOSSIL PLANT		
Project #:	176662236		
Site Address	608 Old Highway 70 S		
City	Rogersville	State, Zip:	TN, 37857
Site PM Name:	Roy Quinn		
Phone/Fax:	423-751-3753		
Site PM Email:	rquinn@tva.gov		

Required Sampler Information

Sampler:	Andrew Stevens & Elizabeth Dibone		
Sampling Company:	Stantec		
Address	601 Grassmere Park		
City/State	Nashville/TN	Phone:	615-885-1144
Sampling Team Number:	1		
Send EDD/Hard Copy to:	tva-ed@stantec.com		

Analysis Turnaround Time

☐ CALENDAR DAYS ☐ WORKING DAYS

TAT if different from Below _____

- ☐ 24 Hours
- ☐ 3 Business Days
- ☐ 5 Business Days
- ☐ 10 Business Days (Standard)

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	Filtered (Y/N)	Preserve (Yes/No)	Analysis CW_MACROCONSTITUENTS_SW6	Analysis SUP_MACROCONSTITUENTS_PLANTS_SW6
1	JSF-BS-BG10-1.4/3.4-20190124	BG10	1.4	3.4	S	G	N	1/24/2019	1507	2		☐			X	
2	JSF-BS-BG10-6.5/8.5-20190124	BG10	6.5	8.5	S	G	N	1/24/2019	1527	2		☐			X	
3	JSF-BS-BG10-10.5/12.5-20190124	BG10	10.5	12.5	S	G	N	1/24/2019	1548	2		☐			X	
4	JSF-BS-BG10-0.0/0.5-20190124	BG10	0.0	0.5	S	G	N	1/24/2019	1556	2		☐			X	
5												☐				
6												☐				
7												☐				
8												☐				
9												☐				
10												☐				
11												☐				
12												☐				
13												☐				

AS 1/24/19

AS 1/24/19

AS 1/24/19

AS 1/24/19

AS 1/24/19

Additional Comments/Special Instructions:

AS 1/24/19

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Andrew Stevens	1/24/19	1900	[illegible]	1/24/19	5:10

SHIPPING METHOD	SAMPLER NAME AND SIGNATURE
Fedex	Andrew Stevens

Sample Receipt Conditions: ☐ Yes ☐ No

Form TVA 38087A

TVA Environmental Investigations

Tennessee Valley Authority

COOLER No.:	4	of	5
COC No:	JSF_BS_20190124_1B		
1 of 2 Pages	[redacted]		
Task Desc:	JSF_BS		

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 Nashville	Site ID #:	JOHN SEVIER FOSSIL PLANT	Sampler:	Andrew Stevens & Elizabeth Dillons
Lab Address:	29360 Foster Creighton Dr	Project #:	17548228	Sampling Company:	Stantec
	Nashville, TN 37204	Site Address:	606 Old Highway 70 S	Address:	601 Grassmere Park
		City:	Rogersville; State, Zip: TN, 37857	City/State:	Nashville/TN; Phone: 615-885-1144
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:	[illegible]	Send EDD/Hard Copy to:	[illegible]
Lab Email:	Gail.Lage@testamericainc.com				

Analysis Turnaround Time: ☐ CALENDAR DAYS ☐ WORKING DAYS

TAT if different from Below _____

- ☐ 24 Hour
- ☐ 3 Business Days
- ☐ 5 Business Days
- ☐ 10 Business Days (Standard)

Item #	SAMPLE ID (Samples IDs MUST BE UNIQUE)	SAMPLE LOCATION	Sample Depth: Start Depth	Sample Depth: End Depth	MATRIX CODE	G= GRAB C=COMP	SAMPLE TYPE	SAMPLE DATE	SAMPLE TIME	# OF CONTAINERS	Comments/ Lab Sample I.D.	Identico	Analysis: CLP_PACKAGE/VOCS_PAD	Analysis: CLP_PACKAGE/VOCS_BLANKS_PAD
1	JSF-BS-BG12-0.8/2.8-20190123	BG12	0.8	2.8	S	G	N	1/23/2019	1119	2		☐	X	
2	JSF-BS-BG12-5.0/10.0-20190123	BG12	5.0	10.0	S	G	N	1/23/2019	1205	2		☐	X	
3	JSF-BS-BG12-10.25/12.75-20190123	BG12	10.3	12.8	S	G	N	1/23/2019	1232	2		☐	X	
4	JSF-BS-BG12-13.5/15.0-20190123	BG12	13.5	15.0	S	G	N	1/23/2019	1244	2		☐	X	
5	JSF-BS-BG12-0.0/0.5-20190123	BG12	0.0	0.5	S	G	N	1/23/2019	1247	2		☐	X	
6	JSF-BS-FB01-20190123	BG12	NA	NA	W	G	FB	1/23/2019	1530	3		☐		X
7	JSF-BS-BG11-1.1/3.1-20190124	BG11	1.1	3.1	S	G	N	1/24/2019	1116	2		☐	X	
8	JSF-BS-BG11-5.5/8.5-20190124	BG11	5.5	8.5	S	G	N	1/24/2019	1136	2		☐	X	
9	JSF-BS-FD01-20190124	NA	NA	NA	S	G	FD	1/24/2019	1121	2		☐	X	
10	JSF-BS-BG11-11.3/13.3-20190124	BG11	11.3	13.3	S	G	N	1/24/2019	1202	2		☐	X	
11	JSF-BS-BG11-0.0/0.5-20190124	BG11	0.0	0.5	S	G	N	1/24/2019	1247	2		☐	X	
12	JSF-BS-EB01-20190124	BG11	NA	NA	W	G	EB	1/24/2019	1235	3		☐		X
13	JSF-BS-FB02-20190124	BG10	NA	NA	W	G	FB	1/24/2019	1434	3		☐		X

Preserved: X X — AS 1/24/19

Preserve: Ice, HCO — AS 1/24/19

AS 1/24/19

AS 1/24/19

AS 1/24/19

Additional Comments/Special Instructions:

AS 1/24/19

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Andrew Stevens	1/24/19	1900	[illegible]	1/24/19	1900

Sample Receipt Conditions: [illegible]

SHIPPING METHOD	SAMPLER NAME AND SIGNATURE
Fedex	Andrew Stevens

[illegible] temp to °C | [illegible] on Ice? | [illegible] Intact? | [illegible]?

Form TVA 3020MA

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.:	4 of 5
COC No:	JSF_BS_20190124_1B
2 of 2 Pages	
Task Desc:	JSF_BS

Required Ship to Lab:

Lab Name: TestAmerica Nashville
Lab Address: 2960 Foster Creighton Dr, 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

Required Project Information:

Site ID #: JOHN SEVIER FOSSIL PLANT
Project #: 17888228
Site Address: 608 Old Highway 70 S
City: Rogersville | State, Zip: TN, 37857
Site PM Name: Roy Quinn
Phone/Fax: 423-751-3753
Site PM Email: rquinn@tva.gov

Required Sampler Information

Sampler: Andrew Stevens & Elizabeth Gibbons
Sampling Company: Stantec
Address: 601 Grassmere Park
City/State: Nashville/TN | Phone: 615-885-1144
Sampling Team Number: 1
Send EDD/Hard Copy to: ben-ellis@stantec.com

Analysis Turnaround Time

CALENDAR DAYS | WORKING DAYS

TAT if different from Below

- 24 Hour
- 3 Business Days
- 5 Business Days
- 10 Business Days (Standard)

mass #	SAMPLE ID Samples IDs MUST BE UNIQUE	SAMPLE LOCATION	Sample Depth: Start Depth	Sample Depth: End Depth	MATRIX CODE	G= GRAB C=COMP	SAMPLE TYPE	SAMPLE DATE	SAMPLE TIME	# OF CONTAINERS	Comments/ Lab Sample I.D.	MS/MSD	Analysis: CUF_BACKGROUNDSOIL_BAD	Analysis: CUF_BANKGROUNDSOIL_BLANKS_BAD
1	JSF-BS-BG10-1.4/3.4-20190124	BG10	1.4	3.4	S	G	N	1/24/2019	1507	2			X	
2	JSF-BS-BG10-6.5/8.5-20190124	BG10	6.5	8.5	S	G	N	1/24/2019	1527	2			X	
3	JSF-BS-BG10-10.5/12.5-20190124	BG10	10.5	12.5	S	G	N	1/24/2019	1548	2			X	
4	JSF-BS-BG10-0.0/0.5-20190124	BG10	0.0	0.5	S	G	N	1/24/2019	1556	2			X	
5														
6														
7														
8														
9														
10														
11														
12														
13														

AS 1/24/19

Preserved: AS 1/24/19

Preservative Lot: AS 1/24/19

Analysis: AS 1/24/19

Additional Comments/Special Instructions:

AS 1/24/19

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Andrew Stevens	1/24/19	1900	JMBB	1/25/19	930

SHIPPING METHOD	SAMPLER NAME AND SIGNATURE
Fedex	Andrew Stevens

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 20087A

TVA Environmental Investigations

Tennessee Valley Authority

COOLER No.:	5 of 5
COC No:	JSF_BS_20190124_1B
1 of 2 Pages	
Task Done:	JSF_BS

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 Nashville	Site ID #:	JOHN SEVIER FOSSIL PLANT	Sampler:	Andrew Stevens & Elizabeth Dillons
Lab Address:	2960 Foster Creighton Dr	Project #:	175884225	Sampling Company:	Stantec
	Nashville, TN 37204	Site Address:	909 Old Highway 70 S	Address:	601 Grassmere Park
		City:	Rogersville State, Zip: TN, 37857	City/State:	Nashville/TN Phone: 615-885-1144
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:	rquinn@tva.gov	Send EDD/Hard Copy to:	trd-edt@stantec.com
Lab Email:	Gail.Lage@testamericainc.com				

Analysis Turnaround Time: # CALENDAR DAYS # WORKING DAYS

TAT if different from below _____

- 24 Hours
- 2 Business Days
- 5 Business Days
- 10 Business Days (Standard)

ITEMS #	SAMPLE ID (Samples IDs MUST BE UNIQUE)	SAMPLE LOCATION	Sample Depth: Depth Unit / Select Unit: Start Depth	End Depth	MATRIX CODE	G= GRAB C=COMP	SAMPLE TYPE	SAMPLE DATE	SAMPLE TIME	# OF CONTAINERS	Comments/ Lab Sample I.D.	MS/MSD	Analysis: CCP_BACKGROUND_RAD	CCP_BACKGROUND_BLANK_RAD
1	JSF-BS-BG12-0.8/2.8-20190123	BG12	0.8	2.8	S	G	N	1/23/2019	1119	2		*	X	
2	JSF-BS-BG12-5.0/10.0-20190123	BG12	5.0	10.0	S	G	N	1/23/2019	1205	2		*	X	
3	JSF-BS-BG12-10.25/12.75-20190123	BG12	10.3	12.8	S	G	N	1/23/2019	1232	2		*	X	
4	JSF-BS-BG12-13.5/15.0-20190123	BG12	13.5	15.0	S	G	N	1/23/2019	1244	2		*	X	
5	JSF-BS-BG12-0.0/0.5-20190123	BG12	0.0	0.5	S	G	N	1/23/2019	1247	2		*	X	
6	JSF-BS-FB01-20190123	BG12	NA	NA	W	G	FB	1/23/2019	1530	3		*		X
7	JSF-BS-BG11-1.1/3.1-20190124	BG11	1.1	3.1	S	G	N	1/24/2019	1116	2		*	X	
8	JSF-BS-BG11-5.5/8.5-20190124	BG11	5.5	8.5	S	G	N	1/24/2019	1136	2		*	X	
9	JSF-BS-FD01-20190124	NA	NA	NA	S	G	FD	1/24/2019	1121	2		*	X	
10	JSF-BS-BG11-11.3/13.3-20190124	BG11	11.3	13.3	S	G	N	1/24/2019	1202	2		*	X	
11	JSF-BS-BG11-0.0/0.5-20190124	BG11	0.0	0.5	S	G	N	1/24/2019	1247	2		*	X	
12	JSF-BS-EB01-20190124	BG11	NA	NA	W	G	EB	1/24/2019	1235	3		*		X
13	JSF-BS-FB02-20190124	BG10	NA	NA	W	G	FB	1/24/2019	1434	3		*		X

Preserved: Yes / No — AS 1/24/19

Preserve: Yes / No — AS 1/24/19

Analysis — AS 1/24/19

Additional Comments/Special Instructions:

AS 1/24/19

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Andrew Stevens	1/24/19	1900	[illegible]	1/25/19	930

Sample Receipt Conditions: Yes / No

SHIPPING METHOD	SAMPLER NAME AND SIGNATURE
Fedex	Andrew Stevens

temperature in °C | sample on ice? | sample intact? | Field Filtered?

Form TVA 2809BA

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.:	5 of 5
COC No:	JSF_BS_20190124_1B
2 of 2 Pages	[redacted]
Task Code:	JSF_BS

Required Ship to Lab:

Lab Name:	TestAmerica Nashville
Lab Address:	29360 Foster Creighton Dr 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

Required Project Information:

Site ID #:	JOHN SEVIER FOSSIL PLANT		
Project #:	176[illegible]		
Site Address	606 Old Highway 70 S		
City	Rogersville	State, Zip:	TN, 37857
Site PM Name:	Roy Quinn		
Phone/Fax:	423-751-3753		
Site PM Email:	[illegible]		

Required Sampler Information

Sampler:	Andrew Stevens & Elizabeth Dibona		
Sampling Company:	Stantec		
Address	601 Grassmere Park		
City/State	Nashville/TN	Phone:	615-883-1144
Sampling Team Number:	1		
Send EDD/Hard Copy to:	[illegible]		

Analysis Turnaround Time

○ CALENDAR DAYS ● WORKING DAYS

TAT if different from Below _____

- ○ 24 Hours
- ○ 3 Business Days
- ○ 5 Business Days
- ● 10 Business Days (Standard)

[redacted]

Item #	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: GJF_MAGNESIUM,SODIUM,POTASSIUM,CALCIUM,IRON,MANGANESE,ALUMINUM,BORON	Analysis: GSF_MAGNESIUM,SODIUM,POTASSIUM,CALCIUM,IRON,MANGANESE,ALUMINUM,BORON	Preserved: Ice	Preserved: Ice	Preserved: HNO3
1	JSF-BS-BG10-1.4/3.4-20190124	BG10	1.4	3.4	S	G	N	1/24/2019	1507	2		○	X				
2	JSF-BS-BG10-6.5/8.5-20190124	BG10	6.5	8.5	S	G	N	1/24/2019	1527	2		○	X				
3	JSF-BS-BG10-10.5/12.5-20190124	BG10	10.5	12.5	S	G	N	1/24/2019	1548	2		○	X				
4	JSF-BS-BG10-0.0/0.5-20190124	BG10	0.0	0.5	S	G	N	1/24/2019	1556	2		○	X				
5												○					
6												○					
7												○					
8												○					
9												○					
10												○					
11												○					
12												○					
13												○					

AS 1/24/19

Additional Comments/Special Instructions:

AS 1/24/19

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Andrew Stevens	1/24/19	1900	[illegible]	1/24/19	930

SHIPPING METHOD	SAMPLER NAME AND SIGNATURE
Fedex	Andrew Stevens

Sample Receipt Conditions

Temp in °C	Seals on box?	Seals intact?	Trip Blank?

Form TVA 30087A

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:	1 of 5
COC No:	JSF_BS_20190124_1B
1 of 2 Pages	
Task Desc:	JSF_BS

Rev-1 DC 1/24/19

REV 2 CT 4/8/19

180-86110 Chain of Custody

Required Ship to Lab:		Required Project Information:				Required Sampler Information			
Lab Name	TestAmerica Nashville	Site ID #:	JOHN SEVER FOSSIL PLANT			Sampler:	Andrew Stevens & Elizabeth Dibone		
Lab Address	2960 Foster Creighton Dr	Project #:	175568225			Sampling Company:	Stantec		
	Nashville, TN 37204	Site Address	606 Old Highway 70 S			Address	601 Grassmere Park		
		City	Rogersville	State, Zip:	TN 37857	City/State	Nashville/TN	Phone:	615-885-1144
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:	roquinn@tva.gov			Send EDD/Hard Copy to:	tva-eddadmin@stantec.com		
Lab Email	Gail.Lage@testamericainc.com								

CT 4/8/19 10.75

Analysis Turnaround Time

☐ CALENDAR DAYS ☐ WORKING DAYS

TAT if different from below

☐ 24 hours

☐ 2 Business Days

☐ 5 Business Days

✓ 10 Business Days (Standard) DC 1/29/19

CT 4/8/19

JSF-BS-BG12-10.75/12.75-20190123

~~10.25~~ 12.75 DC 1/29/19

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	Preserve Type	Preserve Type	Analysis: BACKGROUNDSOIL_RAD	Analysis: BACKGROUNDSOIL_BLANKS_RAD
			Start Depth	End Depth												
1	JSF-BS-BG12-0 8/2 8-20190123	BG12	0 8	2.8	S	G	N	1/23/2019	1119	2				X		
2	JSF-BS-BG12-5.0/10 0-20190123	BG12	5.0	10 0	S	G	N	1/23/2019	1205	2				X		
3	~~JSF-BS-BG12-10 25/12.75-20190123~~	BG12	~~10.3~~	~~12.8~~	S	G	N	1/23/2019	1232	2				X		
4	JSF-BS-BG12-13 5/15.0-20190123	BG12	13.5	15.0	S	G	N	1/23/2019	1244	2				X		
5	JSF-BS-BG12-0 0/0 5-20190123	BG12	0.0	0 5	S	G	N	1/23/2019	1247	2				X		
6	JSF-BS-FB01-20190123	BG12	NA	NA	W	G	FB	1/23/2019	1530	3					X	
7	JSF-BS-BG11-1 1/3 1-20190124	BG11	1.1	3.1	S	G	N	1/24/2019	1116	2				X		
8	JSF-BS-BG11-5 5/8 5-20190124	BG11	5.5	8.5	S	G	N	1/24/2019	1136	2				X		
9	JSF-BS-FD01-20190124	NA	NA	NA	S	G	FD	1/24/2019	1121	2				X		
10	JSF-BS-BG11-11 3/13.3-20190124	BG11	11 3	13.3	S	G	N	1/24/2019	1202	2				X		
11	JSF-BS-BG11-0 0/0 5-20190124	BG11	0.0	0.5	S	G	N	1/24/2019	1247	2				X		
12	JSF-BS-EB01-20190124	BG11	NA	NA	W	G	EB	1/24/2019	1235	3					X	
13	JSF-BS-FB02-20190124	BG10	NA	NA	W	G	FB	1/24/2019	1434	3					X	

AS 1/24/19

DC 1/29/19

Additional Comments/Special Instructions:

AS 1/24/19

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Andrew Stevens	1/24/19	1700		1/25/19	930

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?

SHIPPING METHOD:	SAMPLER NAME AND SIGNATURE
Hand	Andrew Stevens

Form TVA 30082AA

TVA Environmental Investigations

Tennessee Valley Authority

COOLER No.:	1	of	5
COC No:	JSF_BS_20190124_1B		
2 of 2 Pages			
Task Desc:	JSF_BS		

Rev-1
DC 1/29/19

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:		Required Project Information:		Required Sampler Information	
Lab Name:	TestAmerica Nashville	Site ID #:	JOHN SEVIER FOSSIL PLANT	Sampler:	Andrew Stevens & Elizabeth Dilbone
Lab Address:	29360 Foster Creighton Dr	Project #:	175568225	Sampling Company:	Stantec
	Nashville, TN 37204	Site Address	605 Old Highway 70 S	Address	601 Grassmere Park
		City	Rogersville, State, Zip: TN 37857	City/Sta #	Nashville/TN, Phone: 615-855-1144
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:	[illegible]	Send EDD/Hard Copy to:	[illegible]
Lab Email:	Gail.Lage@testamericainc.com				

Analysis Turnaround Time
C CALENDAR DAYS — W WORKING DAYS
TAT Deferred from Below
24 Hours
3 Business Days
5 Business Days
✓ 10 Business Days (Standard) DC 1/29/19

ITEMS #	SAMPLE ID Samples IDs MUST BE UNIQUE	SAMPLE LOCATION	Sample Depth Start Depth	Sample Depth End Depth	MATRIX CODE	G= GRAB C=COMP	SAMPLE TYPE	SAMPLE DATE	SAMPLE TIME	# OF CONTAINERS	Comments/ Lab Sample I.D.	MS/MSD	Analysis: GR_BACKGROUNDSOIL_RAD	Analysis: NR_BACKGROUNDSOIL_BLANKS_RAD
1	JSF-BS-BG10-1.4/3.4-20190124	BG10	1.4	3.4	S	G	N	1/24/2019	1507	2			X	
2	JSF-BS-BG10-6.5/8.5-20190124	BG10	6.5	8.5	S	G	N	1/24/2019	1527	2			X	
3	JSF-BS-BG10-10.5/12.5-20190124	BG10	10.5	12.5	S	G	N	1/24/2019	1548	2			X	
4	JSF-BS-BG10-0.0/0.5-20190124	BG10	0.0	0.5	S	G	N	1/24/2019	1556	2			X	
5														
6														
7														
8														
9														
10														
11														
12														
13														

AS 1/24/19

Filtered: AS 1/24/19
Preserve: MS 1/24/19
Analysis: AS 1/24/19 DC 1/29/19

Additional Comments/Special Instructions:

AS 1/24/19

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Andrew Stevens	1/24/19	1900	[illegible]	1/24/19	431

SHIPPING METHOD	SAMPLER NAME AND SIGNATURE
Fedex	Andrew Stevens

Sample Receipt Conditions: Temperature in °C; Sample on Ice?; Sample Intact?; Trip Blank?

Form TVA 30067A

IF THIS SHIPMENT

160-86110 Waybill

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ORIGIN ID:RNCA (615) 726-0177
SHIPPING
TEST AMERICA
2960 FOSTER CREIGHTON DR

NASHVILLE, TN 37204
UNITED STATES US.

SHIP DATE: 25
ACTWGT: 10.00
CAD: 820425/

BILL RECIPIENT.

TO SAMPLE LOG IN
TESTAMERICA
301 ALPHA DRIVE
RIDC PARK
PITTSBURG PA 152382907

(412) 963- 7058
INV:
PO:
REF:
DEPT:

Custody Seal
DATE 11-25-2014
SIGNATURE

3 of 12

MPS# 0263 4820 8841 6076

Metr# 4820 8841 6054

0201

SATURDAY 12:00
PRIORITY OVERNIGHT

XO AGCA

15238
PA-US PIT

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
631648

Uncorrected temp 3.4 °C
Thermometer ID 10
CF 0 Initials JB

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

Crystal

TestAmerica
586713

America

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

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Lage, Gail	Carrier Tracking No(s):	COC No: 180-353454.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: gail.lage@testamericainc.com	State of Origin: Tennessee	Page: Page 1 of 2
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note):		Job #: 180-86110-1
Address: 13715 Rider Trail North,	Due Date Requested: 2/7/2019			
City: Earth City	TAT Requested (days):			
State, Zip: MO, 63045				
Phone: 314-298-8566(Tel) 314-298-8757(Fax)	PO #:			
Email:	WO #:			
Project Name: JSF_BS_20190124_1B	Project #: 18019862			
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 (Water, Solid, Oil/solid, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	901.1_Ra/Fill_Geo_21 (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
JSF-BS-BG12-0.8/2.8-20190123 (180-86110-1)	1/23/19	11:19 Eastern		Solid			X	2	TVA
JSF-BS-BG12-5.0/10.0-20190123 (180-86110-2)	1/23/19	12:05 Eastern		Solid			X	2	TVA
JSF-BS-BG12-10.25/12.75-20190123 (180-86110-3)	1/23/19	12:32 Eastern		Solid			X	2	TVA
JSF-BS-BG12-13.5/15.0-20190123 (180-86110-4)	1/23/19	12:44 Eastern		Solid			X	2	TVA
JSF-BS-BG12-0.0/0.5-20190123 (180-86110-5)	1/23/19	12:47 Eastern		Solid			X	2	TVA
JSF-BS-FB01-20190123 (180-86110-6)	1/23/19	15:30 Eastern		Water			X	3	TVA
JSF-BS-BG11-1.1/3.1-20190124 (180-86110-7)	1/24/19	11:16 Eastern		Solid			X	2	TVA
JSF-BS-BG11-5.5/8.5-20190124 (180-86110-8)	1/24/19	11:36 Eastern		Solid			X	2	TVA
JSF-BS-FD01-20190124 (180-86110-9)	1/24/19	11:21 Eastern		Solid			X	2	TVA

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 analysed, 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 compliance 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: 1/28/19 1700	Company: TASPIT	Received by: [signature]	Date/Time: 1-29-19 0925	Company: TA STL
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: 09/20/2016

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

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Lage, Gail	Carrier Tracking No(s):	COC No: 180-353454.2
Client Contact: Shipping/Receiving	Phone:	E-Mail: gail.lage@testamericainc.com	State of Origin: Tennessee	Page: Page 2 of 2
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note):		Job #: 180-86110-1
Address: 13715 Rider Trail North,	Due Date Requested: 2/7/2019			
City: Earth City	TAT Requested (days):			
State, Zip: MO, 63045				
Phone: 314-298-8566(Tel) 314-298-8757(Fax)	PO #:			
Email:	WO #:			
Project Name: JSF_BS_20190124_1B	Project #: 18019862			
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 (Water, Soil, Oil, Sediment, ST=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	901.1_Ra/Rn_Geo_21 (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
JSF-BS-BG11-11.3/13.3-20190124 (180-86110-10)	1/24/19	12:02 Eastern		Solid			X	2	TVA
JSF-BS-BG11-0.0/0.5-20190124 (180-86110-11)	1/24/19	12:47 Eastern		Solid			X	2	TVA
JSF-BS-EB01-20190124 (180-86110-12)	1/24/19	12:35 Eastern		Water			X	3	TVA
JSF-BS-FB02-20190124 (180-86110-13)	1/24/19	14:34 Eastern		Water			X	3	TVA
JSF-BS-BG10-1.4/3.4-20190124 (180-86110-14)	1/24/19	15:07 Eastern		Solid			X	2	TVA
JSF-BS-BG10-6.5/8.5-20190124 (180-86110-15)	1/24/19	15:27 Eastern		Solid			X	2	TVA
JSF-BS-BG10-10.5/12.5-20190124 (180-86110-16)	1/24/19	15:48 Eastern		Solid			X	2	TVA
JSF-BS-BG10-0.0/0.5-20190124 (180-86110-17)	1/24/19	15:56 Eastern		Solid			X	2	TVA

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.

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ 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:	Company	Received by:	Date/Time:	Company
[signature]	1/28/19 1700	TAPIT	[signature]	1-29-19 0925	TAST
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: 09/20/2016

Login Sample Receipt Checklist

Client: Environmental Standards Inc.

Job Number: 180-86110-1

Login Number: 86110
List Number: 1
Creator: Kovitch, Christina M

List Source: 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: 180-86110-1

Login Number: 86110
List Number: 2
Creator: Hellm, Michael

List Source: TestAmerica St. Louis
List Creation: 01/29/19 02:57 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.	N/A	
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	0.1, 0.8, 1.1, 1.2
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.	N/A	
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: 180-86110-1

Login Number: 86110
List Number: 3
Creator: Hellm, Michael

List Source: TestAmerica St. Louis
List Creation: 01/29/19 03:41 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.	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	20.0
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 <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	

SECTION 5

PROJECT CORRESPONDENCE

Danielle Coles

From: Andrew Piasecki
Sent: Tuesday, April 2, 2019 12:29 PM
To: Danielle Coles
Subject: FW: TVA background soil and CCR material samples
Attachments: solid radium re-reporting.xlsx

Importance: High

From: Jennifer Gable
Sent: Friday, March 29, 2019 4:27 PM
To: CSO – TVA Projects <TVAProjects@testamericainc.com>
Cc: Quinn, James Roy III <jrquinn@tva.gov>; Rock J. Vitale <rvitale@envstd.com>; Amanda Cover <ACover@envstd.com>; TVA_Deliverables <tva_deliverables@envstd.com>; Andrew Piasecki <apiasecki@envstd.com>; Romanko, Terry <Terry.Romanko@testamericainc.com>
Subject: TVA background soil and CCR material samples
Importance: High

After discussion with TDEC, we have confirmed that radium analyses for all **background soil** and **CCR material** samples must be conducted using dried, ground material moving forward. For any background soil or CCR material samples currently on hold for radium analyses, please proceed with drying the samples prior to analysis.

Additionally, we will need all previously reported radium data for **background soil** and **CCR material** samples to be dry-weight corrected using the moisture content determined by TestAmerica Pittsburgh and re-reported on a dry-weight basis. I have attached a list of SDGs impacted, please confirm that I haven't missed any.

We are continuing discussions regarding radium data for sediment samples and will advise early next week on the path forward for sediments.

Thanks
Jen

Jennifer N. Gable
Associate Principal Chemist
Environmental Standards, Inc.
1140 Valley Forge Road • PO Box 810 • Valley Forge, PA 19482
610.935.5577 ext. 414 • www.envstd.com • jgable@envstd.com

Emergency Response Quality Assurance Hotline: 855.374.7272

ENVIRONMENTAL® STANDARDS

Andrew Piasecki

From: Andrew Piasecki
Sent: Friday, May 10, 2019 5:02 PM
To: CSO – TVA Projects
Cc: TVA_Deliverables; Amanda Cover; Mark Haslett; Danielle Coles
Subject: JSF BGS - Request for 180-86110-1 - Dry-weight correction

Hi Gail,

In job 180-86110-1, it appears that the results for sample -3 were not dry-weight corrected. Please confirm and provide revisions.

Thanks,

Andrew L. Piasecki
Quality Assurance Chemist
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ENVIRONMENTAL STANDARDS

Amanda Cover

From: Lage, Gail <Gail.Lage@testamericainc.com>
Sent: Tuesday, July 30, 2019 1:09 PM
To: Jennifer Gable; Andrew Piasecki; CSO – TVA Projects
Cc: TVA_Deliverables; Amanda Cover; Danielle Coles; Ammie Martin; Rock J. Vitale; Vicinie, Rusty; Carnes, Jodie
Subject: RE: TVA TDEC - Method 901.1 Combined Rad Uncertainty Calc
Attachments: CAR 901.1 Ra-226 + Ra-228 Uncertainty.pdf; 901.1_uncertainties_072619.pdf

Jen – I apologize for the delay. Attached is the letter and updated table. Please let me know if you need anything else.

Thanks

Gail Lage
Senior Project Manager

Eurofins TestAmerica
2960 Foster Creighton Drive
Nashville, TN 37204
USA

Phone: 615-301-5741

From: Jennifer Gable [mailto:jgable@envstd.com]
Sent: Friday, July 26, 2019 11:34 AM
To: Andrew Piasecki; Lage, Gail; CSO – TVA Projects
Cc: TVA_Deliverables; Amanda Cover; Danielle Coles; Ammie Martin; Rock J. Vitale; Vicinie, Rusty; Carnes, Jodie
Subject: RE: TVA TDEC - Method 901.1 Combined Rad Uncertainty Calc
Importance: High

External Email

Can we please get an update on this issue? We are holding data finalization pending resolution.

Thanks
Jen

Jennifer N. Gable
Associate Principal Chemist
Environmental Standards, Inc.
(610) 935.5577 x 414

From: Andrew Piasecki <apiasecki@envstd.com>
Sent: Monday, July 22, 2019 5:02 PM
To: Lage, Gail <Gail.Lage@testamericainc.com>; Jennifer Gable <jgable@envstd.com>; CSO – TVA Projects <TVAProjects@testamericainc.com>
Cc: TVA_Deliverables <tva_deliverables@envstd.com>; Amanda Cover <ACover@envstd.com>; Danielle Coles <dcoles@envstd.com>; Ammie Martin <amartin@envstd.com>; Rock J. Vitale <rvitale@envstd.com>
Subject: RE: TVA TDEC - Method 901.1 Combined Rad Uncertainty Calc

Hi Gail,

Attached are outstanding email requests for the "older" radium samples. We need to have these radium data requests resolved by the end of this week (or sooner). This includes the combined radium uncertainty calcuation issues. Do you have any updates?

Thanks,
Andrew

From: Andrew Piasecki
Sent: Wednesday, July 17, 2019 4:45 PM
To: 'Lage, Gail' <Gail.Lage@testamericainc.com>; Jennifer Gable <jgable@envstd.com>; CSO – TVA Projects <TVAProjects@testamericainc.com>
Cc: TVA_Deliverables <tva_deliverables@envstd.com>; Amanda Cover <ACover@envstd.com>; Danielle Coles <dcoles@envstd.com>; Ammie Martin <amartin@envstd.com>; Rock J. Vitale <rvitale@envstd.com>
Subject: RE: TVA TDEC - Method 901.1 Combined Rad Uncertainty Calc

Hi Gail,

These samples were not included in the spreadsheet that I sent on July 5th. Please include them in your review:

Sample Name	analytic_method	lab_sdg	lab_sample_id	Reported Uncertainty for Radium-226+228
JOF-SED-BH02-CORRB-0.0/0.5-20190124	EPA 901.1	180861851	180-86185-60	0.200
JSF-CCR-FB16-20190423	EPA 901.1	180894481	180-89448-5	19.1
JSF-CCR-EB03-20190409	EPA 901.1	180888511	180-88851-4	15.2
JSF-CCR-EB05-20190501	EPA 901.1	180896681	180-89668-1	12.2
JSF-CCR-FB19-20190501	EPA 901.1	180896681	180-89668-5	0.00000
JSF-CCR-FB20-20190513	EPA 901.1	180901011	180-90101-1	19.7
JSF-CCR-FB21-20190514	EPA 901.1	180901041	180-90104-1	0.00000

Thanks,
Andrew

From: Lage, Gail <Gail.Lage@testamericainc.com>
Sent: Wednesday, July 10, 2019 6:39 PM
To: Jennifer Gable <jgable@envstd.com>; Andrew Piasecki <apiasecki@envstd.com>; CSO – TVA Projects <TVAProjects@testamericainc.com>
Cc: TVA_Deliverables <tva_deliverables@envstd.com>; Amanda Cover <ACover@envstd.com>; Danielle Coles <dcoles@envstd.com>; Ammie Martin <amartin@envstd.com>; Rock J. Vitale <rvitale@envstd.com>
Subject: RE: TVA TDEC - Method 901.1 Combined Rad Uncertainty Calc

Jen – understood.

Thanks

Gail Lage

Senior Project Manager

Eurofins TestAmerica
2960 Foster Creighton Drive
Nashville, TN 37204
USA

Phone: 615-301-5741

From: Jennifer Gable [mailto:jgable@envstd.com]
Sent: Wednesday, July 10, 2019 5:25 PM
To: Andrew Piasecki; Lage, Gail; CSO – TVA Projects
Cc: TVA_Deliverables; Amanda Cover; Danielle Coles; Ammie Martin; Rock J. Vitale
Subject: RE: TVA TDEC - Method 901.1 Combined Rad Uncertainty Calc

[redacted]

Hi Gail,

To proceed with our proposed plan below, we need Eurofins TestAmerica to provide confirmation, on your letterhead, of the corrected uncertainties for the samples impacted by this issue. You're welcome to use our calculation spreadsheet or perform your own calculations, but we won't be able to perform any updates until this information is provided formally by Eurofins TestAmerica.

Please let me know if you have any questions.

Thanks
Jen

Jennifer N. Gable
Associate Principal Chemist
Environmental Standards, Inc.
(610) 935.5577 x 414

From: Andrew Piasecki
Sent: Friday, July 5, 2019 1:31 PM
To: Lage, Gail <Gail.Lage@testamericainc.com>; CSO – TVA Projects <TVAProjects@testamericainc.com>
Cc: TVA_Deliverables <tva_deliverables@envstd.com>; Jennifer Gable <jgable@envstd.com>; Amanda Cover <ACover@envstd.com>; Danielle Coles <dcoles@envstd.com>; Ammie Martin <amartin@envstd.com>; Rock J. Vitale <rvitale@envstd.com>
Subject: RE: TVA TDEC - Method 901.1 Combined Rad Uncertainty Calc

Hi Gail,

The uncertainties associated the negative results should be used to calculate the total uncertainty for combined radium 226+228 similar to the way it is being reported for methods 903.0 and 904.0. The reported uncertainty for combined radium-226+228 should be calculated as the combined uncertainty of the individual isotope results, calculated as the square root of the sum of the squared individual uncertainties (see the equation below).

Our plan is to write a memo and manually update the database with the correct uncertainties for combined radium 226+228. I've attached a spreadsheet comparing the currently reported uncertainties to the uncertainties calculated using the equation listed below. Please review the calculated uncertainties (column AG of the attachment), and confirm

that they are correct. Upon your confirmation, we will manually update the database. Also, please ensure that the uncertainties for combined rad 226+228 are calculated and reported correctly for all data going forward.

$$\text{Total uncertainty for combined Rad 226 and 228} = \sqrt{(\text{rad 226 uncertainty})^2 + (\text{rad 228 uncertainty})^2}$$

Thank you,

Andrew L. Piasecki
Quality Assurance Chemist
Environmental Standards, Inc.
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610.935.5577 ext. 433 • www.envstd.com • apiasecki@envstd.com

Emergency Response Quality Assurance Hotline: 855.374.7272

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From: Lage, Gail [mailto:Gail.Lage@testamericainc.com]
Sent: Wednesday, June 26, 2019 6:25 PM
To: Jennifer Gable <jgable@envstd.com>; Andrew Piasecki <apiasecki@envstd.com>; CSO – TVA Projects <TVAProjects@testamericainc.com>
Cc: TVA_Deliverables <tva_deliverables@envstd.com>; Amanda Cover <ACover@envstd.com>; Danielle Coles <dcoles@envstd.com>; Ammie Martin <amartin@envstd.com>; Rock J. Vitale <rvitale@envstd.com>
Subject: RE: TVA TDEC - Method 901.1 Combined Rad Uncertainty Calc

I know why it is doing what it is doing. For the results, only the positive numbers are used to calculate the total for TVA. Therefore it is not using the uncertainty from the negative result to calculate the total uncertainty.

Gail Lage
Senior Project Manager

Eurofins TestAmerica
2960 Foster Creighton Drive
Nashville, TN 37204
USA

Phone: 615-301-5741

From: Jennifer Gable [mailto:jgable@envstd.com]
Sent: Wednesday, June 26, 2019 1:22 PM
To: Andrew Piasecki; CSO – TVA Projects
Cc: TVA_Deliverables; Amanda Cover; Danielle Coles; Ammie Martin; Rock J. Vitale
Subject: RE: TVA TDEC - Method 901.1 Combined Rad Uncertainty Calc
Importance: High

External Email

Gail - please hold on this request for now, we have some thoughts on resolution that I'd like to discuss internally. We'll get back to you shortly.

Jennifer N. Gable
Associate Principal Chemist
Environmental Standards, Inc.
(610) 935.5577 x 414

From: Andrew Piasecki
Sent: Wednesday, June 26, 2019 1:40 PM
To: CSO – TVA Projects <TVAProjects@testamericainc.com>
Cc: TVA_Deliverables <tva_deliverables@envstd.com>; Amanda Cover <ACover@envstd.com>; Jennifer Gable <jgable@envstd.com>; Danielle Coles <dcoles@envstd.com>; Ammie Martin <amartin@envstd.com>; Rock J. Vitale <rvitale@envstd.com>
Subject: TVA TDEC - Method 901.1 Combined Rad Uncertainty Calc

Hi Gail,

For the Method 901.1 rad data, it appears that the total uncertainties for combined radium 226+228 were not reported correctly when a negative value was reported for one (or both) of the isotopes. In these instances, it appears that the uncertainty for the isotope was treated as zero instead of being calculated as part of the root sum square. For example, in SDG 180-87481-1, the results for sample 180-87481-2 were reported as:

Method 901.1	Result (pCI/g)	Uncertainty
Rad-226	0.391	0.173
Rad-228	-0.221	0.528
Combined Rad 226+228	0.391	0.173

According to the reporting protocols, the combined rad 226+228 uncertainty should have been reported as ~0.556 in this example.

I've attached a list of samples where this issue has been identified. Please review the total uncertainty calculations and revise the data as appropriate.

Thank you,

Andrew L. Piasecki
Quality Assurance Chemist
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From: Ammie Martin
Sent: Friday, June 21, 2019 2:10 PM
To: Andrew Piasecki <apiasecki@envstd.com>
Subject: Total Uncertainty Calculation Discrepancy

During review of report 180-87481-1, it was noted that the total uncertainty (2σ) for combined radium-226/-228 in the US EPA Method 901.1 portion of sample 180-87481-2 did not take into account the result from the radium-228 analysis. The total uncertainty (2σ) reported was equal to that of radium-226. This is not consistent with the calculation of the total uncertainty (2σ) for combined radium-226/-228 in the other methods or samples reported. It appears that the system used zero for the radium-228 total uncertainty (2σ) in the calculation in the same manner it used zero for the negative radium-228 activity when calculating the combined radium-226/-228 activity. For all US EPA Method 901.1 samples where both components were positive (whether > MDC or < MDC) and for all GFPC samples, the total uncertainty was correctly calculated as the root sum square (RSS; the square root of the sum of the squared individual uncertainties).

Ammie Martin
Corporate Quality Assurance and Training Specialist/
Senior Quality Assurance Chemist
Environmental Standards, Inc.
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<image001.gif>

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July 30, 2019

Environmental Standards, Inc.
1140 Valley Forge Road
Valley Forge, PA 19482

RE: EPA 901.1 Radium-226 + Radium-228, Incorrect Uncertainty Calculation

Dear Ms. Gable

It was recently discovered that sample uncertainty was being incorrectly calculated for the summation analyte Radium-226 + Radium-228 by EPA method 901.1. When either of the analyte results was negative, the uncertainty for that analyte was being set to zero.

Environmental Standards provided Eurofins TestAmerica with a spreadsheet of affected data that included the corrected uncertainty. This spreadsheet was then validated by the Quality Assurance Manager on July 26th, 2019. One error was found (sample JOF-SED-BH02-CORRB-0.0/0.5-20190124, lab ID 180-86185-60). This was corrected, and a PDF of the spreadsheet has been included (see attachment "901.1_uncertainties_072619").

The uncertainty calculation for Ra-226 + Ra-228 has been corrected by the Eurofins TestAmerica IT department, and has been verified by Terry Romanko, the Technical Director at the St. Louis facility.

Eurofins TestAmerica St. Louis prides itself on supplying its clients with reliable quality data. We deeply apologize for the calculation error and any difficulties this may have caused.

Regards,

Kristen Ely
Quality Assurance Manager
Kristen.Ely@testamericainc.com