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

Watts Bar Background Soil

Data Verification was performed in accordance with the Tennessee Valley Authority . 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 Methods utilized by the laboratory for these samples. Environmental Standards, Inc. (Environmental Standards) used professional judgment to determine the usability of the analytical results and compliance relative to the US EPA Methods utilized by the laboratory. This QA review was performed on the data associated with Job Number:

180958571

The findings offered in this report are based on a review of holding times and preservation, method blank results, chemical yield, field blank results, equipment blank results, laboratory control sample/laboratory control sample duplicate recoveries and precision, and/or laboratory and field duplicate precision.

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

Sample	Location	Sample Type	Method	Anayte	T/D	Result	Qual	Reason Code(s)	MDL	QL	Uncertainty	Unit
WBF-BS-BG12-0.0/0.5-20190917	WBF-BG-12	N	EPA 901.1	Radium 226 + radium 228	T	2.05	J	S			0.413	PCI/G

Data Qualifiers	
U*	This result should be considered “not-detected” because it was detected in a rinsate blank or laboratory blank at a similar level.
UR	Unreliable reporting limit; analyte may or may not be present in sample.
R	Unreliable positive result; analyte may or may not be present in sample.
J	Quantitation is approximate due to limitations identified during data validation.
UJ	This analyte was not detected, but the reporting limit may or may not be higher due to a bias identified during data validation.

Reason Codes and Explanations	
BE	Equipment blank contamination. The result should be considered “not-detected.”
BF	Field blank contamination. The result should be considered “not-detected.”
BL	Laboratory blank contamination. The result should be considered “not-detected.”
FD	Field duplicate imprecision.
FG	Total versus Dissolved Imprecision.
H	Holding time exceeded.
L	LCS and LCSD recoveries outside of acceptance limits, indeterminate bias.
L+	LCS and/or LCSD recoveries outside of acceptance limits. The result may be biased high.
L-	LCS and/or LCSD recoveries outside of acceptance limits. The result may be biased low.
LD	Laboratory duplicate imprecision.
LP	LCS/LCSD imprecision.
M	MS and MSD recoveries outside of acceptance limits, indeterminate bias.
M+	MS and/or MSD recoveries outside of acceptance limits. The result may be biased high.
M-	MS and/or MSD recoveries outside of acceptance limits. The result may be biased low.
MP	MS/MSD imprecision.

Q	Chemical preservation issue.
S	Radium-226+228 flagged due to reporting protocol for combined results.
T	Temperature preservation issue.
X	Percent solids < 50%.
Y+	Chemical yield outside of acceptance limits. The result may be biased high.
Y-	Chemical yield outside of acceptance limits. The result may be biased low.

TVA CCR Program
Facility: Watts Bar Fossil Plant
SDG: 180958571

Lab Sample ID	180-95857-1
Sys Sample Code	WBF-BS-BG11-1.5/3.5-20190917
Sample Name	WBF-BS-BG11-1.5/3.5-20190917
Sample Date	9/17/2019 8:32:00 AM
Location	WBF-BG-11
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	2.25			0.459				Y	Yes	1	NA
	Radium 228	15262-20-1	T	PCI/G	1.26			0.394	0.404	0.404	1.00	Y	Yes	1	NA
	Radium-226	13982-63-3	T	PCI/G	0.988			0.235	0.178	0.178	1.00	Y	Yes	1	NA

TVA CCR Program
Facility: Watts Bar Fossil Plant
SDG: 180958571

Lab Sample ID	180-95857-10
Sys Sample Code	WBF-BS-BG12-11.5/13.5-20190917
Sample Name	WBF-BS-BG12-11.5/13.5-20190917
Sample Date	9/17/2019 1:52:00 PM
Location	WBF-BG-12
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	3.18			0.438				Y	Yes	1	NA
	Radium 228	15262-20-1	T	PCI/G	1.79			0.339	0.272	0.272	1.00	Y	Yes	1	NA
	Radium-226	13982-63-3	T	PCI/G	1.39			0.277	0.173	0.173	1.00	Y	Yes	1	NA

Lab Sample ID	180-95857-11
Sys Sample Code	WBF-BS-BG12-16.5/18.5-20190917
Sample Name	WBF-BS-BG12-16.5/18.5-20190917
Sample Date	9/17/2019 2:06:00 PM
Location	WBF-BG-12
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	3.00			0.480				Y	Yes	1	NA
	Radium 228	15262-20-1	T	PCI/G	1.67			0.382	0.240	0.240	1.00	Y	Yes	1	NA
	Radium-226	13982-63-3	T	PCI/G	1.33			0.291	0.195	0.195	1.00	Y	Yes	1	NA

Lab Sample ID	180-95857-12
Sys Sample Code	WBF-BS-BG12-21.5/23.5-20190917
Sample Name	WBF-BS-BG12-21.5/23.5-20190917
Sample Date	9/17/2019 2:31:00 PM
Location	WBF-BG-12
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	2.93			0.560				Y	Yes	1	NA
	Radium 228	15262-20-1	T	PCI/G	1.73			0.456	0.188	0.188	1.00	Y	Yes	1	NA
	Radium-226	13982-63-3	T	PCI/G	1.20			0.325	0.239	0.239	1.00	Y	Yes	1	NA

TVA CCR Program
Facility: Watts Bar Fossil Plant
SDG: 180958571

Lab Sample ID	180-95857-13
Sys Sample Code	WBF-BS-BG12-0.0/0.5-20190917
Sample Name	WBF-BS-BG12-0.0/0.5-20190917
Sample Date	9/17/2019 2:50:00 PM
Location	WBF-BG-12
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	2.05	J	S	0.413				Y	Yes	1	NA
	Radium 228	15262-20-1	T	PCI/G	1.52			0.345	0.193	0.193	1.00	Y	Yes	1	NA
	Radium-226	13982-63-3	T	PCI/G	0.528	U		0.227	0.542	0.542	1.00	N	Yes	1	NA

Lab Sample ID	180-95857-14
Sys Sample Code	WBF-BS-DUP03-20190917
Sample Name	WBF-BS-DUP03-20190917
Sample Date	9/17/2019 12:00:00 AM
Location	WBF-BG-11
Sample Type	FD
Parent Sample	WBF-BS-BG11-0.0/0.5-20190917

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	2.94			0.446				Y	Yes	1	NA
	Radium 228	15262-20-1	T	PCI/G	1.53			0.347	0.250	0.250	1.00	Y	Yes	1	NA
	Radium-226	13982-63-3	T	PCI/G	1.41			0.280	0.157	0.157	1.00	Y	Yes	1	NA

Lab Sample ID	180-95857-2
Sys Sample Code	WBF-BS-BG11-6.5/8.5-20190917
Sample Name	WBF-BS-BG11-6.5/8.5-20190917
Sample Date	9/17/2019 8:48:00 AM
Location	WBF-BG-11
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	3.43			0.554				Y	Yes	1	NA
	Radium 228	15262-20-1	T	PCI/G	2.10			0.428	0.159	0.159	1.00	Y	Yes	1	NA
	Radium-226	13982-63-3	T	PCI/G	1.33			0.352	0.283	0.283	1.00	Y	Yes	1	NA

Lab Sample ID	180-95857-3
Sys Sample Code	WBF-BS-BG11-11.5/13.5-20190917
Sample Name	WBF-BS-BG11-11.5/13.5-20190917
Sample Date	9/17/2019 9:08:00 AM
Location	WBF-BG-11
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	2.91			0.517				Y	Yes	1	NA
	Radium 228	15262-20-1	T	PCI/G	1.65			0.415	0.266	0.266	1.00	Y	Yes	1	NA
	Radium-226	13982-63-3	T	PCI/G	1.26			0.309	0.278	0.278	1.00	Y	Yes	1	NA

TVA CCR Program
Facility: Watts Bar Fossil Plant
SDG: 180958571

Lab Sample ID	180-95857-4
Sys Sample Code	WBF-BS-BG11-16.5/18.5-20190917
Sample Name	WBF-BS-BG11-16.5/18.5-20190917
Sample Date	9/17/2019 9:28:00 AM
Location	WBF-BG-11
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	3.09			0.468				Y	Yes	1	NA
	Radium 228	15262-20-1	T	PCI/G	1.91			0.378	0.238	0.238	1.00	Y	Yes	1	NA
	Radium-226	13982-63-3	T	PCI/G	1.18			0.276	0.166	0.166	1.00	Y	Yes	1	NA

Lab Sample ID	180-95857-5
Sys Sample Code	WBF-BS-BG11-0.0/0.5-20190917
Sample Name	WBF-BS-BG11-0.0/0.5-20190917
Sample Date	9/17/2019 10:04:00 AM
Location	WBF-BG-11
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	2.49			0.372				Y	Yes	1	NA
	Radium 228	15262-20-1	T	PCI/G	1.25			0.284	0.202	0.202	1.00	Y	Yes	1	NA
	Radium-226	13982-63-3	T	PCI/G	1.24			0.241	0.140	0.140	1.00	Y	Yes	1	NA

Lab Sample ID	180-95857-6
Sys Sample Code	WBF-BS-FB09-20190917
Sample Name	WBF-BS-FB09-20190917
Sample Date	9/17/2019 9:57:00 AM
Location	WBF-BG-11
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	16.6	U		22.2				N	Yes	1	NA
	Radium 228	15262-20-1	T	PCI/L	14.2	U		21.9	26.0	26.0	50.0	N	Yes	1	NA
	Radium-226	13982-63-3	T	PCI/L	2.35	U		3.48	37.9	37.9	50.0	N	Yes	1	NA

Lab Sample ID	180-95857-7
Sys Sample Code	WBF-BS-EB03-20190917
Sample Name	WBF-BS-EB03-20190917
Sample Date	9/17/2019 10:12:00 AM
Location	WBF-BG-11
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	15.1	U		17.7				N	Yes	1	NA
	Radium 228	15262-20-1	T	PCI/L	4.39	U		12.6	26.8	26.8	50.0	N	Yes	1	NA
	Radium-226	13982-63-3	T	PCI/L	10.7	U		12.5	16.7	16.7	50.0	N	Yes	1	NA

Lab Sample ID	180-95857-8
Sys Sample Code	WBF-BS-BG12-1.5/3.5-20190917
Sample Name	WBF-BS-BG12-1.5/3.5-20190917
Sample Date	9/17/2019 1:18:00 PM
Location	WBF-BG-12
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	3.23			0.548				Y	Yes	1	NA
	Radium 228	15262-20-1	T	PCI/G	1.85			0.441	0.461	0.461	1.00	Y	Yes	1	NA
	Radium-226	13982-63-3	T	PCI/G	1.38			0.326	0.191	0.191	1.00	Y	Yes	1	NA

Lab Sample ID	180-95857-9
Sys Sample Code	WBF-BS-BG12-6.5/8.5-20190917
Sample Name	WBF-BS-BG12-6.5/8.5-20190917
Sample Date	9/17/2019 1:30:00 PM
Location	WBF-BG-12
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	3.44			0.654				Y	Yes	1	NA
	Radium 228	15262-20-1	T	PCI/G	1.90			0.537	0.582	0.582	1.00	Y	Yes	1	NA
	Radium-226	13982-63-3	T	PCI/G	1.54			0.373	0.263	0.263	1.00	Y	Yes	1	NA