Enclosure 15 to LTR-RAC-20-94 Date: December 18, 2020

Enclosure 15

Response to Request for Additional Information

LTR-RAC-18-81 HF Spiking Station #2 Summary Westinghouse Nuclear Fuel Facility Hopkins, SC Westinghouse Non-Proprietary Class 3



Page 1 of 4

Westinghouse Electric Company LLC Nuclear Fuel Columbia Fuel Site 5801 Bluff Road Hopkins, South Carolina 29061-9121 USA

Ms. Kuhn South Carolina Department of Health and Environmental Control Bureau of Land and Waste Management 2600 Bull Street Columbia, SC 29201 Direct tel: (803) 647-1858 Direct fax: (803) 647-2025 e-mail: annacom@westinghouse.com

Our Ref: LTR-RAC-18-81

Date: November 30, 2018

Subject: HF Spiking Station #2 Summary Westinghouse Nuclear Fuels Facility Hopkins, SC

Dear Ms. Kuhn,

Attached for your review and approval is the Westinghouse Columbia Fuel Fabrication Facility (WCFFF) assessment report for the Hydrofluoric Acid Spiking Station #2 (HFSS2) release that was verbally reported to the South Carolina Department of Health and Environmental Control (SCDHEC) on July 12, 2018. This assessment was completed per the work plan approved by SCDHEC on August 3, 2018 and the subsequent discussions between WCFFF and SCDHEC. This letter and its associated attachments document the findings to date and provide recommendations for SCDHEC's consideration.

Since the notification to SCDHEC, WCFFF has undertaken significant investigation and remediation efforts. Removal of impacted soil and concrete to an excavation depth of approximately 9 to 12 feet is underway to eliminate the potential for future impacts.

The attached *HF Spiking Station #2 Assessment Report* dated November 30, 2018 prepared by AECOM Technical Services (AECOM), an environmental consultant for WCFFF, documents the investigation activities, results and conclusions from the multi-phase environmental assessment. The attached *Technical Basis Document* dated November 30, 2018 prepared by Leidos, an engineering firm with considerable radiation investigation and remediation experience, provides a technical basis for the WCFFF's conclusions and proposed actions to address radiological contamination. These documents propose next steps for SCDHEC's approval to provide added assurance against potential future impacts.

Background

The HFSS2 operation is contained within a concrete secondary containment system lined with an impermeable membrane. Spiking Station operators, as part of normal operations, conduct routine visual inspections for leaks. Additionally, the integrity of the secondary containment is leak tested annually by filling it with water and monitoring for leaks. The annual leak test conducted on HFSS2 in March 2018 did not indicate the presence of a leak in the containment. On June 16, 2018, during a routine shift inspection, an operator noticed a small patch of leaked solution (uranyl nitrate and hydrofluoric acid) outside the secondary containment area, which was cleaned up. The unit was immediately shutdown for further investigation. On June 26, 2018, the Spiking Station equipment was removed to allow for

Westinghouse Non-Proprietary Class 3 © 2018 Westinghouse Electric Company LLC All Rights Reserved inspection of the membrane and the concrete floor beneath the membrane. The inspection of the secondary containment concrete floor identified a small crack. Soil samples taken directly beneath the area in question were found to be impacted by the leak.

Initial Investigation

WCFFF sampled and found no impacts in the closest downgradient monitoring well, approximately 188 feet from the leak. Quarterly monitoring of this well was initiated. WCFFF also contracted AECOM to develop a sampling plan and conduct a subsurface investigation of the HFSS2 in August 2018. *HF Spiking Station #2 Assessment Report* prepared by AECOM and dated November 30, 2018 is attached. During the period August 20 - 22, 2018, AECOM obtained hand auger samples at 12 locations within the secondary containment area to a depth of approximately 6 feet below concrete surface (bcs) or auger refusal. The floor of the building that includes the Spiking Station is approximately 4 feet above natural grade. Soil samples were collected at 2 foot intervals. Samples were analyzed for fluoride, uranium (U), technetium 99 (Tc-99) and pH. Sample analysis indicated the presence of fluoride and U at various depths as well as low pH (<5 standard units).

Subsequent Investigation

On September 6, 7, and 12, 2018, AECOM collected samples to a depth of 12 feet bcs at five locations that had not encountered auger refusal and one location where concrete was able to be removed. SCDHEC also requested three additional borings located outside of the HFSS2 footprint. In addition to the analytes sampled in the initial investigation, nitrate was also analyzed during this subsequent investigation at the request of SCDHEC. Analysis of the soil samples did not identify impact from the release at depths below 9 feet bcs within the boundaries of the HFSS2 footprint, with the exception of soil samples from borehole HF-B1. At this location, U and nitrate were detected at a depth up to the 11-12 foot bcs interval. Samples collected from the three locations external to the HFSS2 footprint also indicated the presence of analytes at various depths.

Remedial Activities

WCFFF contracted Leidos to develop a *Technical Basis Document* to determine target cleanup levels using computer software, RESRAD-ONSITE Version 7.2. Additionally, Leidos evaluated Nuclear Regulatory Commission (NRC) decommissioning guidance, which provides remediation levels for exposure to industrial workers. The identified practical depth of impact based on these levels varies from approximately 9 feet to 12 feet bcs. This allows for removal of soil to concentrations well below the target cleanup level, eliminates risk to employees and minimizes the risk of potential future migration to groundwater. Therefore, WCFFF elected to remediate soils to the practical excavation depth. Remedial activities were initiated in October 2018 and will be completed as soon as feasible, while safely controlling work activities.

Additionally, to eliminate future issues at the HF Spiking Station and similar systems in the plant, the following actions are underway at WCFFF:

- Develop and implement an improved design for both spiking station systems and diked areas to
 prevent spills of process solution from impacting the concrete and to guard against undetected
 deterioration of the concrete floor (e.g., reducing potential leak locations, modifying piping,
 installing new equipment with improved preventative maintenance, and eliminating failure
 modes in the system and dike).
- Develop and implement an improved preventive maintenance procedure(s) for the spiking station system and diked area, including additional inspection criteria to guard against undetected deterioration of the concrete floor.

- Assess similar design configurations where there is a liner/environmental barrier relied on for secondary containment to ensure proper preventive and post maintenance procedures are in place.
- Conduct an extent of condition to verify maintenance procedures have been established throughout the facility for couplings similar to those used in the spiking station.
- Complete an evaluation of the environmental protection program including a review of environmental protection design requirements. If issues are identified, ensure prompt compensatory measures are put in place and a long term improvement plan is developed and implemented through the Corrective Action Program.

Conclusions and Further Environmental Evaluation

Based on the data provided in the *HF Spiking Station #2 Assessment Report* and the *Technical Basis Document*, WCFFF concludes the following:

- Some of the soil below the concrete floor within the HFSS2 area is impacted with fluoride, nitrate, and U, and has localized areas of low pH (<5 standard units).
- With the exception of soil from borehole HF-B1, the analytes do not indicate impact below 7-9 feet bcs within the HFSS2 footprint. In borehole HF-B1 impacted soil was detected to a depth of 11-12 feet bcs.
- U below the concrete floor exists outside of the HFSS2 footprint, in HF-B15, but does not appear to be associated with the HFSS2 release. These results are likely due to past impacts which WCFFF proposes to address through the development of a Conceptual Site Model.
- WCFFF is in the process of removing impacted soil below the HFSS2 to a practical excavation depth of approximately 9 to 12 feet to eliminate risk to the WCFFF employees and risk of potential future migration to the groundwater. Soil samples from the bottom of the excavation will be collected and analyzed to confirm completion of the remedial activities.

Based on these conclusions, WCFFF proposes to implement the following additional activities:

- Fill the area underneath the HFSS2, where the impacted soil was removed, with a suitable fill material.
- Dispose of the impacted soil in an approved facility and submit copies of the waste disposal manifests to SCDHEC.
- Develop and implement a Conceptual Site Model to assist WCFFF in developing and implementing monitoring and remediation strategies as needed for constituents of interest. WCFFF anticipates this model will result in a proposed recommendation for SCDHEC's approval to install a series of monitoring wells oriented east-west along the southern side of the manufacturing area and north-south along the eastern side of the manufacturing area to act as detection monitoring wells. Collectively, the Conceptual Site Model and this proposed well network, in conjunction with the existing groundwater monitoring network will form a robust groundwater monitoring and release detection program for potential impacts from past or future manufacturing operations for the life of the plant.

This additional monitoring will ensure that the facility detection monitoring system is capable of early detection of potential future releases. These data can be used to determine the need for additional assessment and remediation, if needed, to protect human health and the environment.

Closing

We look forward to continuing to work with SCDHEC to finalize the next steps based on this assessment. WCFFF is committed to protecting the safety of its employees, the community, and the environment, and we appreciate SCDHEC's input into this process. If you have any questions or comments, or if we can be of further assistance, please do not hesitate to contact me or Nancy Parr of my staff at (803) 647-3338 or parrnb@westinghouse.com.

Yours very truly,

Michael Annacone Columbia Fuels Operations Vice President

Attachments:

- 1. HF Spiking Station #2 Assessment Report dated November 30, 2018 prepared by AECOM
- 2. Technical Basis Document dated November 30, 2018 prepared by Leidos

cc: E. Wills, Environmental Health & Safety Manager
 V. Kelmeckis, Corporate Environmental Manager
 J. Pricener, Counsel for Environmental Health & Safety
 D. Joyner, Principal Environmental Engineer
 N. Parr, Licensing Manager

ENOVIA records

HF Spiking Station #2 Assessment Report

Westinghouse Columbia Fuel Fabrication Facility 5801 Bluff Road Hopkins, South Carolina

Prepared for: Westinghouse Columbia Fuel Fabrication Facility 5801 Bluff Road Hopkins, South Carolina 29061-9121

Prepared by:



AECOM Technical Services, Inc. 101 Research Drive Columbia, SC 29203

AECOM Project No. 60577539

November 30, 2018

HF Spiking Station #2 Assessment Report

Westinghouse Columbia Fuel Fabrication Facility 5801 Bluff Road Hopkins, South Carolina

Jeremy Sraw

Prepared By Jeremy Grant, P.G., Senior Project Manager

Charles K. Suddeth

Reviewed By Chuck Suddeth, P.G., Project Manager

TABLE OF CONTENTS

Section

<u>Page</u>

LIST	OF T	ABLES	i
LIST	OF FI	GURES	i
LIST	OF A	PPENDICES	5i
LIST	OF A	CRONYMS.	ii
1.0	INTR	ODUCTION	1-1
	1.1	Site Backgr	ound1-1
		1.1.1	Site Description1-1
		1.1.2	Site History1-2
	1.2	Site Investig	gation Objective1-2
2.0	SITE	INVESTIGA	TION ACTIVITIES2-1
	2.1	Field Invest	tigation Activities2-1
		2.1.1	Initial Soil Assessment
		2.1.2	Initial Soil Analytical Results2-2
		2.1.3	Subsequent Soil Assessment
		2.1.4	Subsequent Soil Analytical Results2-3
3.0	CON	CLUSIONS.	
4.0	REF	ERENCES	

LIST OF TABLES

TableTitle1Soil Analytical Results

LIST OF FIGURES

FigureTitle1Topographic Site Location Map2Site Map3HF Spiking Station #2 Soil CoC Map

LIST OF APPENDICES

<u>Appendix</u>	Description
A	Boring Logs
В	Laboratory Analytical Data

i

LIST OF ACRONYMS

AECOM	AECOM Technical Services, Inc.
bcs	below concrete surface
WCFFF	Columbia Fuel Fabrication Facility
GEL	GEL Laboratories, LLC
HF	hydrofluoric acid
PPM	parts per million
SCDHEC	South Carolina Department of Health and Environmental Control

1.0 INTRODUCTION

The Westinghouse Columbia Fuel Fabrication Facility (WCFFF or Westinghouse) uses two spiking stations where hydrofluoric acid (HF) is mixed with uranyl nitrate for the Conversion process. A release of low pH liquid containing uranium occurred within the manufacturing plant and was documented in the July 18, 2018 5-day Notification of HF Spiking Station #2 Dike Leak letter (Westinghouse, 2018) and the subsequent July 30, 2018 well W28 data e-mail to South Carolina Department of Health and Environmental Control (SCDHEC). On July 27, 2018, Mr. G. Kenneth Taylor of SCDHEC issued a letter to Ms. Nancy Parr of Westinghouse requesting that WCFFF define the extent of impacted soil from this release.

According to the 5-day Notification of HF Spiking Station #2 Dike Leak letter, "*The spiking stations are located within diked areas that are additionally lined with polypropylene material to contain any leakage. The liner integrity is inspected annually by filling it with water and then monitoring for leakage. This integrity testing was last performed for spiking station #2 in March of 2018 and the liner passed the inspection.*" When a system leak was discovered in June 2018, a small amount of liquid was observed immediately adjacent to the dike. The polypropylene liner was removed to inspect this area of the dike. Inspection of the area revealed a small crack in the epoxy coating covering the diked area.

Upon removal of the liner, maintenance noticed a small hole about the size of a quarter in the epoxy coating over the concrete. Prodding to investigate further resulted in a ~3 inch hole in the concrete surface. Westinghouse personnel obtained subsurface soils directly below this hole to a depth of 67 inches below the dike surface for analysis by the WCFFF Chemistry Lab. Westinghouse personnel reported that subsurface soils at the total depth of this borehole consisted of a grey clay. As documented in the 5-day Notification of HF Spiking Station #2 Dike Leak letter, uranium, fluoride and low pH (lowest measurement 2.84 standard units) were detected in the subsurface soils.

1.1 Site Background

1.1.1 Site Description

The site is located at 5801 Bluff Road (SC Hwy 48) in a rural portion of Richland County near Hopkins, South Carolina (**Figure 1**) and consists of approximately 1,200 acres. The plant building is located approximately 2,700 feet southwest of Bluff Road on the northern portion of the property.

A manmade dam approximately 1,850 feet south of HF Spiking Station #2 backs up water in Mill Creek, creating Lower Sunset Lake. A second manmade dam cuts across Mill Creek creating Upper Sunset Lake. Upper and lower Sunset Lake are located approximately 1,250 feet southwest of the HF Spiking Station #2 (**Figure 2**) within a natural oxbow. A small, man-made pond is also located approximately 900 feet southwest of HF Spiking Station #2.

The southern portion of the property, including the pond, Mill Creek, and both portions of Sunset Lake are located within the floodplain of Mill Creek and the Congaree River. The plant and the floodplain are

separated by a bluff, approximately 20 feet high, located immediately south of the east-west trending dirt road on the plant property.

1.1.2 Site History

The WCFFF plant was constructed in 1969. Prior to construction the site consisted of farmland, woodlands, and floodplain. The main manufacturing activity at the site has been the assembly of fuel rods for the nuclear power industry.

1.2 Site Investigation Objective

Westinghouse desires to understand the horizontal and vertical extent of the impact from the July 2018 release at the HF Spiking Station #2.

2.0 SITE INVESTIGATION ACTIVITIES

This section discusses the rationale and methods used during the soil investigation.

2.1 Field Investigation Activities

Field investigation activities included the following:

- Initial installation of 12 hand auger borings to collect soil samples; and
- Subsequent installation of: 1) four additional hand auger borings and 2) collection of additional soil samples from some of the existing 12 borings at deeper depths.

2.1.1 Initial Soil Assessment

To protect workers outside of the HF Spiking Station #2 study area from potential exposure to dust during concrete removal and to soil with potentially low pH and uranium during hand augering, a tented structure was set up around the station. An inflatable berm was also installed on the floor to keep potential spills from outside of the study area from reaching the exposed subslab soil.

AECOM personnel installed 12 borings (HF-B1 through HF-B12) within the HF Spiking Station #2 study area from August 20, 2018 through August 22, 2018 (**Figure 3**). These borings were advanced to hand auger refusal or a depth of 6 feet below concrete surface (bcs), whichever was less. The maximum boring depth of 6 feet was based on the report of a clay layer at this depth during the initial subsurface soil screening by Westinghouse personnel. AECOM, Westinghouse and SCDHEC personnel did not want to breach this clay layer if it existed contiguously below the spiking station area, thereby potentially creating a migration pathway to the water table.

Boreholes HF-B2 through HF-B5, HF-B7, HF-B8, HF-B10 and HF-B12 encountered hand auger refusal at depths ranging from 2.5 feet to 5.5 feet during the initial soil assessment. Based upon historical Westinghouse documents, subsurface structures in this area include a former shipment receiving bay, a scale used to weigh materials being delivered to the facility and existing/former building footers. The clay layer was not encountered in the 12 boreholes.

Composite soil samples were collected from the following intervals: 1-2 feet bcs, 3-4 feet bcs and 5-6 bcs, with the exception of borings where hand auger refusal was encountered at shallower depths. To ensure representative samples were collected from the desired depths, AECOM personnel used a tape measure before and after each advancement of the hand auger bucket within the sample interval to document sample depths. Soil from the top of the hand auger bucket were emptied into 3-gallon plastic bags until the measured length of soil remained within the hand auger bucket.

Soil from the sampling interval were emptied onto a 3 foot by 3 foot 4-mil polyethylene plastic mixing square dedicated to the specified interval and homogenized. Homogenized soil samples were placed in pre-cleaned, laboratory-provided sample bottles.

Subsurface lithology from each borehole was logged by a SC professional geologist. Boring logs are included in **Appendix A**.

2.1.2 Initial Soil Analytical Results

Composite soil samples were submitted to GEL Laboratories, LLC (GEL) for analysis of percent moisture using ASTM D 2216 (Modified), fluoride using EPA Method 9056A, isotopic uranium using EPA Method 3050B/6020A and DOE EML HASL-300 (U-02-RC Modified), technetium 99 using DOE EML HASL-300 (Tc-02-RC Modified) and pH using EPA Method 9045D. Soil analytical results are summarized in **Table 1**, displayed on **Figure 3** and contained in **Appendix B**.

Soil from the upper 6 feet in borings HF-B1, HF-B3, HF-B4, HF-B5, HF-B8, HF-B9, HF-B10, HF-B11 and HF-B12 contained uranium and fluoride as well as low pH indicating impact from the release. Composite soil samples from borehole HF-B6 did not indicate impact by the release above the "free releasable" limit of 11 parts per million (PPM) of uranium. Free releasable soils are soils that can be used as clean fill dirt without restrictions on its usage (ANSI/HSP, 2013).

AECOM and Westinghouse personnel met with SCDHEC personnel on August 27, 2018 to discuss the initial soil sampling observations and analytical results. The parties agreed that additional vertical assessment was appropriate. SCDHEC requested one additional borehole (HF-B16) be installed within the area of removed concrete. Three additional boreholes (HF-B13 through HF-B15) were also agreed upon to further assess the vertical and horizontal extent of this release.

2.1.3 Subsequent Soil Assessment

AECOM personnel collected additional soil samples from the boreholes that did not encounter hand auger refusal during the initial soil sampling (HF-B1, HF-B6, HF-B9 and HF-B11) and the additional borehole (HF-B16) requested by SCDHEC in this same area on September 6-7, 2018. Soil samples from boreholes HF-B13 through HF-B15 were collected on September 12, 2018.

These borings were advanced to a depth of 12 feet bcs or hand auger refusal. The maximum depth of 12 feet for these boreholes was selected based upon the approximate historical seasonal high water table of 12-13 feet bcs. The manufacturing building floor is 4 feet above land surface. If the clay layer was encountered during the advancement of these boreholes, SCDHEC requested that on-site personnel call to discuss how to proceed. The clay layer was not encountered during the advancement of these boreholes.

Boreholes HF-B14 and HF-B16 encountered hand auger refusal at depths of 5.3 feet and 5 feet, respectively. Due to an inadequate volume of soil, a sample was not obtained below 4 feet in HF-B16. These boreholes are in the areas of the subsurface structures described in **Section 2.1.1**.

Composite soil samples were collected from the following intervals in HF-B1, HF-B6, HF-B9, and HF-B-11: 7-8 feet bcs, 9-10 feet bcs and 11-12 bcs. Composite soil samples were collected from the following intervals in HF-B13 and HF-B-15: 1-2 feet bcs, 3-4 feet bcs, 5-6 feet bcs, 7-8 feet bcs, 9-10 feet bcs and 11-12 bcs. In the borings (HF-B14 and HF-B16) where hand auger refusal was encountered, composite samples were collected at the following intervals: 1-2 feet bcs and 3-4 feet bcs; with the exception of boring HF-B14 where a composite soil sample was also collected from the 5-5.3 feet interval. Composite soil samples were collected and homogenized in the same manner as described in **Section 2.1.1**.

Subsurface lithology from each borehole was logged by a SC professional geologist. Boring logs are contained in **Appendix A**.

2.1.4 Subsequent Soil Analytical Results

Composite soil samples were submitted to GEL for analysis of percent moisture using ASTM D 2216 (Modified), fluoride using EPA Method 9056A, isotopic uranium using EPA Method 3050B/6020A and DOE EML HASL-300 (U-02-RC Modified), technetium 99 using DOE EML HASL-300 (Tc-02-RC Modified) and pH using EPA Method 9045D. During the August 27, 2018 meeting, SCDHEC personnel requested that the subsequent soil samples also be analyzed for nitrate. GEL analyzed the subsequent composite soil samples for nitrate using EPA Method 9056A. Soil analytical results are summarized in **Table 1**, displayed on **Figure 3** and contained in **Appendix B**.

Composite soil samples from borehole HF-B13 did not contain evidence of impact related to the release above the free releasable limit of 11 PPM of uranium. Uranium, fluoride, and nitrate as well as low pH were detected in composite soil samples from HF-B14 in the 3-4 feet bcs and 5-5.3 feet bcs intervals. Composite soil samples from boring HF-B15 contained uranium, fluoride, and nitrate as well as low pH in the 3-4 feet bcs, 5-6 feet bcs and 7-8 feet bcs intervals. Within the area of removed concrete, composite soil samples from boring HF-B16 contained uranium, fluoride, and nitrate as well as low pH in the 3-4 feet bcs and 3-4 feet bcs intervals.

3.0 CONCLUSIONS

Based upon the results of this assessment, AECOM concludes the following:

- Some of the soil below the concrete floor within the HF Spiking Station #2 area is impacted with fluoride, nitrate, and uranium, and has localized areas of low pH (<5 standard units).
- With the exception of soil from borehole HF-B1, the soil does not contain uranium concentrations above the releasable limit of 11 PPM below 7-8 feet bcs within the HF Spiking Station #2 footprint. In boreholes HF-B1 impacted soil was detected to a depth of 11-12 feet bcs.
- Uranium below the concrete floor exists outside of the HF Spiking Station #2 footprint, particularly in HF-B15, but does not appear to be associated with the HF Spiking Station #2 release.

4.0 REFERENCES

ANSI/HPS N13.12: Surface and Volume Radioactivity Standards for Clearance, 2013.

Westinghouse to SCDHEC, July 10, 2018, 5-day Notification of HF Spiking Station #2 Dike Leak.

TABLES

Table 1 Westinghouse Columbia Fuel Fabrication Facility HF Spiking Station #2 Assessment Soil Analytical Results

				Reported Values (ICPMS)			PPM		Alpha Spec			Liquid			
Sample Location	Date Collected	F mg/kg	Nitrate mg/kg	U234 ug/kg	U235 ug/kg	U238 ug/kg	Total U ug/kg	Total U mg/kg	U233/34 pCi/g	U235/36 pCi/g	U238 pCi/g	Total U pCi/g	Tc-99 pCi/g	рН	% moisture
HF-B1-(1-2)	8/20/2018	7.62	NA	<10.3	134	4,350	4,484	4.48	4.92	0.281	2.5	7.70	3.85	6.84	7.41
HF-B1-(3-4)	8/20/2018	143	NA	985	108,000	2,890,000	2,998,985	2,999	7,420	375	1,310	9,105	14.6	4.59	7.27
HF-B1-(5-6)	8/20/2018	374	NA	1,000	115,000	3,120,000	3,236,000	3,236	8,750	402	1,640	10,792	6.24	4.04	7.66
HF-B1-(7-8)	9/6/2018	341	717	954	106,000	2,750,000	2,856,954	2,857	5,650	267	1,030	6,947	24.7	3.76	9.77
HF-B1-(9-10)	9/6/2018	5.21	351	72.7	4,910	122,000	126,983	127	417	22.1	73.4	512.5	0.685	4.18	11.9
HF-B1-(11-12)	9/6/2018	0.4J	104	20.5	3,600	91,100	94,721	94.7	316	17.8	61.3	395.1	4.91	4.78	12.6
HF-B2-(1-2)	8/20/2018	12.0	NA	<10.2	230	8,440	8,670	8.67	12.6	0.638	2.96	16.20	14.7	8.84	4.75
HF-B3-(1-2)	8/20/2018	22.0	NA	<9.46	16.1	665	681.1	0.68	1.49	0.195	0.811	2.50	-16.8	4.23	1.04
HF-B3-(3-4)	8/20/2018	50.4	NA	70.8	8,210	196,000	204,281	204	745	36.1	121	902	-2.68	4.29	0.876
HF-B3-(4.5-5)	8/20/2018	118	NA	36.6	4,360	115,000	119,397	119	311	13.6	51.5	376	-1.24	5.19	1.46
HF-B4-(1-2)	8/21/2018	10.8	NA	112	13,600	429,000	442,712	443	793	43.6	173	1,009	15.5	5.30	1.02
HF-B4-(3-4)	8/21/2018	10.8	NA	132	16,600	512,000	528,732	529	999	54.5	224	1,277	5.15	5.30	1.27
HF-B4-(5-5.5)	8/21/2018	22.8	NA	33.2	3,800	109,000	112,833	113	237	9.91	49.8	296	2.51	5.18	2.01
HF-B5-(1-2)	8/21/2018	6.27	NA	4.7J	577	20,400	20,977	21.0	17.1	1.02	4.59	22.71	-1.15	8.01	4.58
HF-B6-(1-2)	8/21/2018	0.514J	NA	<10.3	12.4J	941	953	0.95	1.31	-0.00756	1.00	2.31	3.23	6.66	7.83
HF-B6-(3-4)	8/21/2018	0.915J	NA	<10.1	8.29J	915	923	0.92	0.945	-0.0102	0.700	1.65	19.0	4.72	7.88
HF-B6-(5-6)	8/21/2018	<1.11	NA	<11.0	9.74J	1,170	1,180	1.18	1.16	0.114	0.912	2.19	3.57	5.92	10.3
HF-B6-(7-8)	9/6/2018	<1.10	29.4	<10.6	28.0	1,090	1,118	1.12	1.28	0.0785	0.444	1.80	13.5	6.18	9.27
HF-B6-(9-10)	9/6/2018	<1.14	16.8	<11.2	10.3J	909	919	0.92	0.907	0.0969	0.548	1.55	16.5	6.18	13.0
HF-B6-(11-12)	9/6/2018	<1.13	12.7	<11.1	13.9J	1,030	1044	1.04	1.43	0.142	1.28	2.85	2.94	5.97	12.4
HF-B7-(1-2)	8/21/2018	4.48	NA	<9.84	185	6,340	6,525	6.53	9.68	0.597	2.70	12.98	15.4	8.92	2.14
HF-B8-(1-2)	8/21/2018	5.30	NA	31.2	4,210	131,000	135,241	135	12.8	0.422	2.79	16.01	12.7	9.30	3.86
HF-B9-(1-2)	8/21/2018	0.414J	NA	<10.3	14.1J	1,170	1,184	1.18	1.68	0.146	0.999	2.83	10.7	5.75	7.36
HF-B9-(3-4)	8/21/2018	305	NA	466	53,000	1,410,000	1,463,466	1,463	3690	202	637	4,529	23.1	4.04	7.23
HF-B9-(5-6)	8/21/2018	111	NA	64.7	7,680	183,000	190,745	191	478	28.3	81.1	587	7.95	3.95	11.5
HF-B9-(7-8)	9/6/2018	<1.12	167	<11.1	24.0	1,240	1,264	1.26	1.65	0.0806	0.728	2.46	11.0	5.81	10.8
HF-B9-(9-10)	9/6/2018	<1.12	43.9	<11.1	17.3	1,060	1,077	1.08	1.56	0.147	0.576	2.28	-3.91	6.15	11.2
HF-B9-(11-12)	9/6/2018	<1.15	19.3	<11.3	80.4	2,970	3,050	3.05	6.6	0.527	2.25	9.38	2.81	6.02	13.4
HF-B10-(1-2)	8/21/2018	13.3	NA	53.9	7,020	217,000	224,074	224	430	23.4	96.9	550	16.1	6.40	5.09
HF-B10-(3-4)	8/21/2018	17.6	NA	181	22,300	669,000	691,481	691	1460	74.7	290	1,825	6.99	4.55	2.11
HF-B11-(1-2)	8/22/2018	47.6	NA	12.2	1,470	44,900	46,382	46.4	80.0	4.52	17.1	101.6	20.5	4.48	1.18
HF-B11-(3-4)	8/22/2018	295	NA	400	46,600	1,250,000	1,297,000	1,297	3,300	175	618	4,093	3.24	4.13	3.16
HF-B11-(5-6)	8/22/2018	1180	NA	1,680	192,000	5,600,000	5,793,680	5,794	12,500	630	2,320	15,450	-1.18	3.65	13.3
HF-B11-(7-8)	9/7/2018	497	729	1,550	152,000	3,910,000	4,063,550	4,064	6,650	343	1,170	8,163	13.9	4.06	11.9
HF-B11-(9-10)	9/7/2018	2.59	188	<10.6	286	8,180	8,466	8.47	11.4	0.523	2.78	14.70	11.5	5.83	11.9
HF-B11-(11-12)	9/7/2018	<1.13	34.6	<10.9	323	8,620	8,943	8.94	36.0	2.06	7.19	45.25	-1.17	5.64	12.2
HF-B12-(1-2)	8/22/2018	43.6	NA	399	85,600	10,100,000	10,185,999	10,186	5,170	249	841	6,260	0.935	6.86	2.71
HF-B12-(3-4)	8/22/2018	467	NA	1,010	119,000	2,750,000	2,870,010	2,870	5,900	291	978	7,169	19.4	4.17	4.42

Table 1 Westinghouse Columbia Fuel Fabrication Facility HF Spiking Station #2 Assessment Soil Analytical Results

				Reported Values (ICPMS)		PPM	PPM Alpha Spec				Liquid Scint				
Sample Location	Date Collected	F mg/kg	Nitrate mg/kg	U234 ug/kg	U235 ug/kg	U238 ug/kg	Total U ug/kg	Total U mg/kg	U233/34 pCi/g	U235/36 pCi/g	U238 pCi/g	Total U pCi/g	Tc-99 pCi/g	рН	% moisture
HF-B13-(1-2)	9/12/2018	<1.09	70.8	<10.5	11.4	1,140	1,151	1.15	1.17	0.353	1.16	2.683	11.7	6.18	8.69
HF-B13-(3-4)	9/12/2018	0.99J	67.0	<10.8	10.3J	985	1,000	1.00	0.689	0.178	1.11	1.98	-7.42	4.67	7.83
HF-B13-(5-6)	9/12/2018	<1.09	57.4	<10.5	11J	1,090	1,101	1.10	1.39	0.427	0.981	2.80	-1.48	5.50	8.70
HF-B13-(7-8)	9/12/2018	<1.12	33.6	<11.0	8.28J	914	922	0.92	1.43	0.452	0.581	2.46	0.736	5.05	11.9
HF-B13-(9-10)	9/12/2018	<1.14	29.0	<10.9	7.34J	759	766	0.77	1.38	0.203	1.04	2.62	-0.00596	4.52	12.9
HF-B13-(11-12)	9/12/2018	<1.14	14.6	<10.5	13.8J	824	838	0.84	1.48	0.540	1.14	3.16	2.49	5.22	12.8
HF-B14-(1-2)	9/12/2018	<1.01	6.90	<9.86	4.85	346	341	0.34	0.709	0.205	0.454	1.37	7.11	5.88	1.31
HF-B14-(3-4)	9/12/2018	2.51	8.34	12.3	1,340	33,200	34,552	34.55	94.4	5.00	18.7	118.1	-0.389	5.09	1.17
HF-B14-(5-5.3)	9/12/2018	139	57.8	58.2	6,160	168,000	174,218	174	366	21.3	69.8	457	-2.65	4.64	1.82
HF-B15-(1-2)	9/12/2018	1.18	24.7	<9.42	7.7J	479	487	0.49	1.59	0.280	0.390	2.26	6.64	8.17	0.958
HF-B15-(3-4)	9/12/2018	201	382	529	116,000	3,260,000	3,376,529	3,377	4,760	268	989	6,017	31.6	4.46	6.88
HF-B15-(5-6)	9/12/2018	288	384	531	119,000	3,450,000	3,569,531	3,570	6,560	416	1,480	8,456	-6.56	4.41	7.97
HF-B15-(7-8)	9/12/2018	0.80J	111	10.1J	1,160	31,100	32,270	32.27	101	6.84	23.7	132	10.4	5.12	9.61
HF-B15-(9-10)	9/12/2018	<1.15	40.1	<11.0	34.4	1,580	1,614	1.61	8.04	0.359	2.03	10.43	-1.57	5.1	12.9
HF-B15-(11-12)	9/12/2018	<1.14	14.5	6.01J	642	19,500	20,148	20.15	23.8	2.14	6.52	32.46	3.30	5.29	14.1
HF-B16-(1-2)	9/7/2018	33.7	236	86.7	9,690	284,000	293,777	294	450	23.2	99.1	572	13.2	4.26	5.77
HF-B16-(3-4)	9/7/2018	122	114	1,230	140,000	3,660,000	3,801,230	3,801	7,980	409	1,420	9,809	17.2	4.53	8.38
Free Releasable	Uranium Limit	N/A	N/A	N/A	N/A	N/A	11000	11	N/A	N/A	N/A	30	N/A	N/A	N/A

Notes:

ICPMS - Inductively coupled plasma mass spectometry

PPM - units converted to parts per million

F - Fluoride

mg/kg - milligrams per kilogram

U - Uranium

ug/kg - micrograms per kilogram

pCi/L - Picocuries per liter

NA - Not analyzed

J - Concentratoin is above the method detection limit but below the reporting limit

BOLD values indicates concentration above the free releasable soil limit (11,000 ug/kg or 30 pCi/g)

N/A - Not applicable

FIGURES





Path: O:\60577539 Westinghouse Radionuclide Assessment\900-Work\920-GIS_Surveying\JL_Updates_20181102\CWWLine_SiteMap_20181106.mxd



Legend

- Shallow Aquifer Monitoring Well Location
- Intermediate Aquifer Monitoring Well Location
- Black Mingo Aquifer Monitoring Well Location
- Ditch
- EL East Lagoon
- NL North Lagoon
- SL South Lagoon
- SAN Sanitary Lagoon
- WL1 West Lagoon 1
- WL2 West Lagoon 2





N

		HF-B10 Sample Data									
/	ID#	F	N	U	рН						
	1-2	13.3	NA	224	6.40						
	3-4	17.6	NA	691	4.55						
		h	IF-B4 San	nple Data							

HF-B4 Sample Data								
 ID#	F	N	υ	рН				
1-2	10.8	NA	443	5.30				
3-4	10.8	NA	529	5.30				
5-5.5	22.8	NA	113	5.18				

Sample Data							
Ν	U	рН					
236	294	4.26					
114	3,801	4.53					
114	3,801	4.53					

HF-	<u>-</u> B14

HF-B14 Sample Data									
ID#	F	N	U	рН					
1-2	<1.01	6.90	0.34	5.88					
3-4	2.51	8.34	34.55	5.09					
5-5.3	139	57.8	174	4.64					

Ν	U	рН
NA	6.53	8.92

3" POLE FOR CONDUIT SUPPORT

Sample Data											
N U pH											
NA	0.68	4.23									
NA	204	4.29									
NA 119 5.19											

Sample Data										
N U pH										
NA	4.48	6.84								
NA	2,999	4.59								
NA	3,236	4.04								
717	2,857	3.76								
351	127	4.18								
104	94.7	4.78								



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Figure 3

HF Spiking Station #2 Soil CoC Map

WESTINGHOUSE COLUMBIA FUEL FABRICATION FACILITY HOPKINS, SOUTH CAROLINA

PREPARED BY: HGM	CHECKED BY: JG	APPROVED BY: JG
DATE: NOVEMBER 6, 2018	DATE: NOVEMBER 6, 2018	SHEET: <u>1</u> OF <u>1</u>

APPENDIX A BORING LOGS

	A	co/	М		Те	st Bori	ng F	Report	BOR PAG	ING NO. E 1	HF-B1
PRC	JECT: H	F Spiking	g Station #	2					PROJE	CT NO:	60577539
CLIE	NT: W	estinghou	use						LOCAT		Hopkins, SC
CON	ITRACTOR	: AEC	COM						ELEVA	TION:	
EQU	IPMENT:	Stai	nless Stee	l Hand A	uger				NORTI	HING:	
GRC	UNDWATE	R			DRIL	LING INFORM	ATION		EASTI	NG:	
DATE	HRS	WATER	METHOD			CASING	Т	EMP / PERM	DATE	START:	8/20/2018
			HOLE DIA.			CASING DIA.	С	ASING TYPE	DATE	FINISH:	9/6/2018
			DEPTH			CASING DEPTH	G	ROUT TYPE	DRILLI	ER:	E. Harrington
	0004110		SAMPLING			HAMMER WT	Н	AMMER FALL	OVER	SIGHT:	Jeremy Grant
DEPTH IN FEET	VAPOR SCREENING (PPM)	BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE		FIELD C	LASSIFIC	CATION AND	REMARKS SOIL	. CLASSIFICAT	TION: USCS
					Tan me	edium grain sa	and. Loos	ie.			
					Brown	fine to mediu	m graine	d silty sand. Fi	rm.		
					Redish	brown fine to	medium	grained claye	y sand.		
					T : -1-4 1						
			-		Light t	brown fine to i	neaium g	grained sand.			
- 5 0											
0.0					Tan fir	e grained san	d. Slightl	y moist.			
					Vellow	vish brown fin	e sand w	ith some silt. S	lighty mois	t	
					1 chow	lish brown hin	c sand w	till some sitt. S	inginty mons		
					Vallou	rich brown to	tan madii	im to coarse a	ained silty	cand Fau	mica slightly
					moist		tan meun	uni to coarse gi	amed sitty	sanu. rew	filica, slightly
- 10.0					monse.						
					Yellow	ish brown and	d grey co	arse grained si	lty sand. M	oist, few p	bebbles, few mica.
			-								
1											
- 15.0											
			1								
1			1								
1]								
					1						
1											
00.0			1								
20.0]								
1											
1											
RI OWA	S/FT	ENSITY			SISTENCY	CAMPI		DESCRIP	TIONS	1	NOTES
0-4	VERY LOC	DSE	0-2	VERY SC)FT	SAMPL SS SPLIT S	POON	MOSTLY	50-100%	WD WH	ILE DRILLING
5-10	LOOSE		3-4	SOFT	OTICS	ST SHELBY	TUBE	SOME	30-45%	NE NO	
11-30 31-50	MEDIUM [DENSE	JENSE	5-8 9-15	MEDIUM STIFF	511FF	G GRAB S	CORE	FEW	15-25% 5-10%	UK NO NR NO	RECOVERY
50+	VERY DE	NSE	16-30	VERY ST	IFF		-	TRACE	<5%		-
			31+	HARD		1					

	AEC	CON	1		Tes	t Bori	ng R	eport	BOR PAG	ING NO. E <u>1</u>	HF-B2 OF 1			
PRC	JECT: H	F Spiking	station #	2					PROJE	ECT NO:	60577539			
CLIE	ENT: W	vestinghor	use						LOCA	FION:	Hopkins, SC			
CON	TRACTOR	: AEG	COM						ELEVA	TION:				
EQU	JIPMENT:	Stai	nless Stee	l Hand A	uger			NORT	NORTHING:					
GRC	DUNDWATI	ER			DRILL	ING INFORMA	TION		EASTI	NG:				
DATE	HRS	WATER	METHOD		С	ASING	TE	MP / PERM	DATE	START:	8/20/2018			
			HOLE DIA.		С	ASING DIA.	CA	SING TYPE	DATE	FINISH:	8/20/2018			
			DEPTH		С	ASING DEPTH	GR	OUT TYPE	DRILL	ER:	E. Harrington			
			SAMPLING		н	AMMER WT	НА	MMER FALL	OVER	SIGHT:	Jeremy Grant			
DEPTH IN FEET	ORGANIC VAPOR SCREENING (PPM)	SAMPLER BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	Tourfur	FIELD CL	ASSIFIC			CLASSIFICA	TION: USCS			
					Tan fine	e to medium g	grained sa	ind with som	e gravel. Dr	y, loose, f	'ew mica.			
					Refusal	at 28 inches.								
- 5.0														
10.0														
- 10.0														
]											
- 15.0														
]											
			1											
20.0														
20.0														
BLOW	S/FT. D	DENSITY	BLOWS/FT	. CON	SISTENCY	SAMPLE	R ID.	DESCRI	PTIONS		NOTES			
0-4	VERY LO	OSE	0-2	VERY SC)FT	SS SPLIT SP	OON	MOSTLY	50-100%	WD WH	HILE DRILLING			
5-10 11-30	LOOSE MEDIUM I	DENSE	3-4 5-8		STIFF	G GRAB SA	TUBE MPLE	SOME	30-45% 15-25%		T ENCOUNTERED			
31-50	DENSE		9-15	STIFF		MC MACRO-0	ORE	FEW	5-10%	NR NC	RECOVERY			
50+	VERY DE	NSE	16-30 31+	VERY ST HARD	IFF			TRACE	<5%					

	A=	CO/	М		Tes	t Borir	וg R	eport	BOR PAG	ING NO. E 1	HF-B3
PRC	JECT: H	F Spiking	station #	2					PRO.IF	ECT NO:	60577539
CLIE	ENT: W	estingho	use						LOCAT	FION:	Hopkins, SC
CON	ITRACTOR	: AEO	СОМ						ELEVA	TION:	
EQU	IPMENT:	Stai	nless Stee	l Hand A	uger		NORT	HING:			
GRC	DUNDWATI	ER			DRILLI	ING INFORMA	ΓΙΟΝ		EASTI	NG:	
DATE	HRS	WATER	METHOD		C	ASING	TE	MP / PERM	DATE	START:	8/20/2018
			HOLE DIA.		C	ASING DIA.	CA	SING TYPE	DATE	FINISH:	8/20/2018
			DEPTH		C	ASING DEPTH	GR	OUT TYPE	DRILL	ER:	E. Harrington
	OPCANIC		SAMPLING		H	AMMER WT	HA	MMER FALL	OVER	SIGHT:	Jeremy Grant
DEPTH IN FEET	VAPOR SCREENING (PPM)	BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE		FIELD CL	ASSIFIC	ATION AND	REMARKS	CLASSIFICA	.TION: USCS
					Tan fine	to medium g	rained sa	nd. Dry, loos	se, few mica	ι.	
- 50					Refusal	at 5 feet					
0.0											
- 10.0											
- 15.0											
]								
20.0											
]								
						1					
BLOWS	S/FT. D	DENSITY	BLOWS/FT		SISTENCY	SAMPLER	ID.		PTIONS	WD W	
5-10	LOOSE	JJE	3-4	SOFT	9F 1	ST SHELBY T	UBE	SOME	30-45%	NE NO	OT ENCOUNTERED
11-30		DENSE	5-8	MEDIUM	STIFF	G GRAB SAN	/PLE		15-25%		
31-50 50+	VERY DE	NSE	9-15 16-30	STIFF VERY ST	IFF	INIC MACRO-C	JKE	TRACE	5-10% <5%	INK NO	JREGUVERY
			31+	HARD							

	A	CO	М		Tes	st Borir	ng R	eport	BOR PAG	ING NO. E <u>1</u>	HF-B4				
PRC	JECT: H	F Spiking	station #	2					PROJE	ECT NO:	60577539				
CLIE	NT: W	vestingho	use						LOCA	FION:	Hopkins, SC				
CON	ITRACTOR	: AEC	СОМ						ELEVA	ELEVATION:					
EQU	IPMENT:	Stai	nless Steel	l Hand A	uger		NORT	NORTHING:							
GRC	DUNDWAT	ER			DRILI	ING INFORMAT	TION		EASTI	EASTING:					
DATE	HRS	WATER	METHOD		C	CASING	TEI	MP / PERM	DATE	START:	8/21/2018				
			HOLE DIA.		(CASING DIA.	CA	SING TYPE	DATE	FINISH:	8/21/2018				
			DEPTH		(CASING DEPTH	GR	OUT TYPE	DRILL	ER:	E. Harrington				
			SAMPLING		ŀ	HAMMER WT	HA	MMER FALL	OVER	SIGHT:	Jeremy Grant				
DEPTH IN FEET	ORGANIC VAPOR SCREENING (PPM)	SAMPLER BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	T f.	FIELD CL	ASSIFIC		REMARKS SOIL	CLASSIFICA	.TION: USCS				
						e to meatum g		ine: D19, 1005	e, iew inte	4.					
5.0					Refusal	at 5.5 feet.									
10.0															
15.0															
			1												
]												
a															
20.0			1												
]												
]												
BLOW	S/FT. D	DENSITY	BLOWS/FT	CON	SISTENCY	SAMPLER	ID.	DESCRIP	TIONS	WD W	NOTES				
0-4 5-10	LOOSE	USE	0-2 3-4	VERY SC SOFT)F I	SS SPLIT SPC ST SHELBY T	UBE	SOME	50-100% 30-45%	NE NO	HILE DRILLING OT ENCOUNTERED				
11-30	MEDIUM I	DENSE	5-8	MEDIUM	STIFF	G GRAB SAM	IPLE	LITTLE	15-25%	UR NO	OT READ				
31-50 50+		NSF	9-15 16-30	STIFF	IFF	MC MACRO-CO	ORE	FEW TRACE	5-10%	NR NO) RECOVERY				
J UT			31+	HARD				TITLE	~070						

	A	ECO	MC		Tes	st Bori	ng R	eport	BOR PAG	ING NO. E <u>1</u>	HF-B5				
PRC	JECT: H	F Spiking	station #	2					PROJE	ECT NO:	60577539				
CLIE	INT: W	estingho	use						LOCA	FION:	Hopkins, SC				
CON	ITRACTOR	: AEG	COM						ELEVA	ELEVATION:					
EQU	JIPMENT:	Stai	nless Stee	l Hand A	uger		NORT	NORTHING:							
GRC	DUNDWATI	ER			DRILL	ING INFORM	ATION		EASTI	EASTING:					
DATE	HRS	WATER	METHOD		С	ASING	TE	MP / PERM	DATE	START:	8/21/2018				
			HOLE DIA.		С	ASING DIA.	CA	SING TYPE	DATE	FINISH:	8/21/2018				
			DEPTH		С	ASING DEPTH	GF	ROUT TYPE	DRILL	ER:	E. Harrington				
			SAMPLING		н	IAMMER WT	HA	MMER FALL	OVER	SIGHT:	Jeremy Grant				
DEPTH IN FEET	ORGANIC VAPOR SCREENING (PPM)	SAMPLER BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	The second s	FIELD C	LASSIFIC		REMARKS	CLASSIFIC	ATION: USCS				
					Tan fine	e to medium	grained sa	and with some	e black grav	vel. Dry,	loose, few mica.				
					Refusal	at 2.5 feet									
- 5.0															
0.0															
- 10.0															
- 15.0															
			1												
			1												
			j												
	L														
20.0															
			1												
]												
						-									
BLOW	S/FT. D	DENSITY	BLOWS/FT	. CON	SISTENCY	SAMPL	ER ID.	DESCRIP	PTIONS	14/5	NOTES				
0-4 5-10	VERY LOO LOOSE	USE	0-2 3-4	VERY SC SOFT	D⊢T	SS SPLIT S ST SHELBY	YUON YTUBE	MOSTLY SOME	50-100% 30-45%	WD W NE N	HILE DRILLING OT ENCOUNTERED				
11-30	MEDIUM I	DENSE	5-8	MEDIUM	STIFF	G GRAB S	AMPLE	LITTLE	15-25%	UR N	OT READ				
31-50 50+		NSE	9-15 16-30	STIFF	IFF	MC MACRO	-CORE	FEW TRACE	5-10%	NR N	O RECOVERY				
30-	VENTUE	NOL .	31+	HARD				INAUL	~370						

	A	CO	M		Tes	st Bori	ng R	Report	BOR PAG	ING NO. E <u>1</u>	HF-B6OF1			
PRO	JECT: H	F Spiking	g Station #	2					PROJ	ECT NO:	60577539			
CLIE	NT: W	estingho	use						LOCA	TION:	Hopkins, SC			
CON	ITRACTOR	: AEG	COM						ELEVA	TION:				
EQU	IPMENT:	Stai	nless Stee	l <u>Han</u> d A	uger				NORT	HING:				
GRC	DUNDWAT	ER			DRIL	LING INFORM	ATION		EASTI	NG:				
DATE	HRS	WATER	METHOD			CASING	Т	EMP / PERM	DATE	START:	8/21/2018			
			HOLE DIA.		1	CASING DIA.	с	ASING TYPE	DATE	FINISH:	9/6/2018			
			DEPTH		1	CASING DEPTH	G	ROUT TYPE	DRILL	ER:	E. Harrington			
			SAMPLING			HAMMER WT	н	IAMMER FALL	OVER	SIGHT:	Jeremy Grant			
DEPTH IN FEET	ORGANIC VAPOR SCREENING (PPM)	SAMPLER BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE		FIELD C	LASSIFI	CATION AND F		CLASSIFICA	ΓΙΟΝ: USCS			
					Brown	fine to mediu	ım graine	ed sand, few silt	. Dry.					
					Brown	fine to mediu	ım graine	ed silty sand. Dr	y.					
					Tan fin	e grained san	d. Slightl	ly moist.						
- 5.0					Yellow	rish brown fin	e to med	ium grained sil	ty sand. Sl	ightly mo	ist.			
					Light tan fine to medium grained silty sand. Slightly moist.									
					Light vallow find to modium grain cond. Slightly moist									
					Light b	rown and ligh	nt grey m	edium to coarse	e grained c	 clayey san	d. Slightly moist,			
- 10.0					few m	ica.			0					
					Light br	own and light	grey medi	um to coarse gra	ined silty sa	and. Slight Moist fo	ly moist, few mica.			
					Tenow			uned sand with	some site.	10150, 10	w mica.			
- 15.0														
20.0														
BLOWS	S/FT. D	ENSITY	BLOWS/FT	CON	SISTENCY	SAMPLE	ER ID.	DESCRIPT	IONS		NOTES			
0-4 5-10	VERY LOO LOOSE	DSE	0-2 3-4	VERY SC SOFT	0FT	SS SPLIT SI ST SHELBY	POON TUBE	MOSTLY SOME	50-100% 30-45%	WD WH NE NC	HILE DRILLING DT ENCOUNTERED			
11-30	MEDIUM I	DENSE	5-8	MEDIUM	STIFF	G GRAB S	AMPLE		15-25%	UR NC				
31-50 50+	DENSE VERY DEI	NSE	9-15 16-30 31+	STIFF VERY ST HARD	IFF	MC MACRO-	CUKE	TRACE	5-10% <5%	NK NC	I REGUVERY			

	A	CO	M		Tes	st Bori	ng R	eport	BOR PAG	ING NO. E <u>1</u>	HF-B7
PRC	JECT: H	F Spiking	station #	2					PROJE	CT NO:	60577539
CLIE	INT: W	estingho	use						LOCA	TION:	Hopkins, SC
CON		: AEG	COM						ELEVA	TION:	
EQL	IPMENT:	Stai	nless Stee	l Hand A	uger			NORT	HING:		
GRC	UNDWATI	ER			DRILL		ATION		EASTI	NG:	
DATE	HRS	WATER	METHOD		0	CASING	TE	MP / PERM	DATE	START:	8/21/2018
			HOLE DIA.		0	CASING DIA.	CA	SING TYPE	DATE	FINISH:	8/21/2018
			DEPTH		C	CASING DEPTH	GF	ROUT TYPE	DRILL	ER:	E. Harrington
			SAMPLING		ŀ	HAMMER WT	HA	MMER FALL	OVER	SIGHT:	Jeremy Grant
DEPTH IN FEET	ORGANIC VAPOR SCREENING (PPM)	SAMPLER BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE		FIELD CI	LASSIFIC	ATION AND	REMARKS SOIL	CLASSIFICA	TION: USCS
					Tan fin Refusal	e to medium ; at 2.5 feet	grained sa	and with some	gravel and	l pebbles.	Dry, loose.
					Refusul	ut 2.5 1001					
- 5.0											
- 10.0											
- 15.0											
20.0											
BLOW	S/FT. D	ENSITY	BLOWS/FT	CON	SISTENCY	SAMPLE	ER ID.	DESCRIP	TIONS		NOTES
0-4 5-10	VERY LOO LOOSE	DSE	0-2 3-4	VERY SC SOFT	DFT	SS SPLIT SF ST SHELBY	YOON TUBE	MOSTLY SOME	50-100% 30-45%	WD WH	HILE DRILLING
11-30	MEDIUM I	DENSE	5-8	MEDIUM	STIFF	G GRAB SA	AMPLE	LITTLE	15-25%	UR NC)T READ
31-50 50+		NSE	9-15 16-30	STIFF	IFF	MC MACRO-	CORE	FEW TRACE	5-10% <5%	NR NC	RECOVERY
			31+	HARD		1			-070		

	A	CO	М		Tes	t Bori	ng R	eport	BOR PAG	ING NO. E 1	HF-B8				
PRO	JECT: H	F Sniking	station #	2					PROJE		60577539				
CLIE	ENT: \overline{W}	estingho	use	-					LOCAT		Hopkins, SC				
CON		: AEO	COM						ELEVA	TION:					
EQU	JIPMENT:	Stai	nless Stee	l <u>Han</u> d A	uger				NORT	HING:					
GRC	DUNDWAT	ER			DRILL	ING INFORMA	TION		EASTI	EASTING:					
DATE	HRS	WATER	METHOD		С	ASING	TE	MP / PERM	DATE	START:	8/21/2018				
			HOLE DIA.		c	ASING DIA.	CA	SING TYPE	DATE	FINISH:	8/21/2018				
			DEPTH		С	ASING DEPTH	GF	OUT TYPE	DRILL	ER:	E. Harrington				
	OBCANIC		SAMPLING		Н	IAMMER WT	HA	MMER FALL	OVER	SIGHT:	Jeremy Grant				
DEPTH IN FEET	VAPOR SCREENING (PPM)	BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE		FIELD CL	ASSIFIC			CLASSIFICA	TION: USCS				
					Tan fine	e to medium g	grained sa	and with som	e gravel and	l pebbles.	Dry, loose.				
					Refusal	at 2.5 feet									
- 5.0															
			1												
- 10.0															
- 15.0															
]												
		ļ													
		ļ													
20.0															
DI OV			DI CUIST						DTIONO		NOTEO				
BLOWS	VERY LO	OSE	BLOWS/FT 0-2	VERY SC	DFT	SAMPLE SS SPLIT SP	K ID. OON	DESCRI MOSTLY	50-100%	WD W	NOTES HILE DRILLING				
5-10	LOOSE	DENOE	3-4	SOFT	07155	ST SHELBY	TUBE	SOME	30-45%	NE NO	OT ENCOUNTERED				
11-30 31-50	MÉDIUM I DENSE	DENSE	5-8 9-15	MÉDIUM STIFF	STIFF	G GRAB SA MC MACRO-0	MPLE CORE	FEW	15-25% 5-10%	UR NO NR NO	DI READ D RECOVERY				
50+	VERY DE	NSE	16-30 31+	VERY ST HARD	ÎFF			TRACE	<5%						

	A	CO	M		Tes	st Bori	ng R	eport	BOR PAG	ING NO. E <u>1</u>	HF-B9 OF <u>1</u>
PRC	JECT: H	F Spiking	g Station #	2					PROJE	ECT NO:	60577539
CLIE	ENT: W	estingho	use						LOCA	FION:	Hopkins, SC
CON	ITRACTOR	: AEC	COM						ELEVA	TION:	
EQU	JIPMENT:	Stai	nless Stee	l Hand A	uger				NORT	HING:	
GRC	UNDWAT	ER			DRIL	LING INFORMA	ATION		EASTI	NG:	
DATE	HRS	WATER	METHOD		1	CASING	TE	MP / PERM	DATE	START:	8/21/2018
			HOLE DIA.		,	CASING DIA.	CA	ASING TYPE	DATE	FINISH:	9/6/2018
			DEPTH		1	CASING DEPTH	GI	ROUT TYPE	DRILL	ER:	E. Harrington
			SAMPLING			HAMMER WT	HA	AMMER FALL	OVER	SIGHT:	Jeremy Grant
DEPTH IN FEET	ORGANIC VAPOR SCREENING (PPM)	SAMPLER BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE		FIELD CI	ASSIFIC	CATION AND	REMARKS	CLASSIFICA	TION: USCS
					Brown	fine to mediu	m graine	d sand, few si	ilt. Dry.		
					Brown	fine to mediu	m graine	d silty sand. I	Dry.		
					Tan fin	e grained san	d. Slightl	y moist.			
- 5.0											
					Yellow	rish brown fin	e to medi	um grained sa	andy silt. Sl	ightly mo	ist
					Yellow	fine grained	sand, few	v silt. Slightly	moist, few	mica.	
- 10.0					Yellov	v fine to medi	um grain	ed silty sand.	Slightly mo	oist, few n	nica.
					Light b	rown and ligh	t grey me	edium to coar	se grained s	ilty sand.	Slightly moist, few
					inica.						
15.0											
- 15.0											
			j								
20.0											
BLOW	S/FT. D	DENSITY	BLOWS/FT	. CON	SISTENCY	SAMPLE	R ID.	DESCRIF	PTIONS		NOTES
0-4	VERY LO	DSE	0-2	VERY SC	DFT	SS SPLIT SF	OON	MOSTLY	50-100%	WD WH	
5-10 11-30 31-50 50+		DENSE	3-4 5-8 9-15 16-30	SOFT MEDIUM STIFF	STIFF	ST SHELBY G GRAB SA MC MACRO-	IUBE MPLE CORE	SOME LITTLE FEW TRACE	30-45% 15-25% 5-10%	NE NC UR NC NR NC	DI ENCOUNTERED DT READ D RECOVERY
50+	VERTUE	NJE	31+	HARD	II'F			IRAGE	<0%		

	A=	CO	М		Tes	t Bori	ng R	eport	BOR PAG	ING NC	0. <u>HF-B10</u> 1 OF <u>1</u>		
PRO	JECT: H	F Spiking	Station #	2					PROJE	ECT NO	: 60577539		
CLIENT: Westinghouse											Hopkins, SC		
CON	ITRACTOR	: AEC	COM						ELEVA	TION:			
EQU	IPMENT:	Stai	nless Stee	l Hand A	uger				NORT	HING:			
GRC	UNDWAT	ER			DRILLING INFORMATION				EASTI	NG:			
DATE	HRS	WATER	METHOD		С	ASING	TE	MP / PERM	DATE	START:	8/21/2018		
			HOLE DIA.		С	ASING DIA.	CA	SING TYPE	DATE	FINISH:	8/21/2018		
			DEPTH		С	ASING DEPTH	GF	OUT TYPE	DRILL	ER:	E. Harrington		
DEPTH IN	ORGANIC VAPOR SCREENING	SAMPLER BLOWS PER	SAMPLING	SAMPLE DEPTH	н	FIELD CL	Jeremy Grant						
FEET	(PPM)	6 INCHES	HUMBER	RANGE	SOIL CLASSIFICATION: USCS Tan fine to medium grained sand. Dry, loose.								
					Brown f	ine to mediu	m grainec	l silty sand. S	lightly moi	st.			
					Yellow fine to medium grained sand. Slightly moist.								
- 5.0					Refusal	at 4.7 feet.							
- 10.0													
- 15.0													
20.0													
20.0													
						1							
BLOWS	S/FT. D	DENSITY	BLOWS/FT		SISTENCY	SAMPLE	R ID.	DESCRIP MOSTLY	7TIONS	WD			
5-10 11-30 31-50 50+	VERY LOOSE LOOSE) MEDIUM DENSE) DENSE VERY DENSE		3-4 5-8 9-15 16-30 31+	SOFT MEDIUM STIFF VERY ST HARD	STIFF	G GRAB SA MC MACRO-0	TUBE MPLE CORE	SOME LITTLE FEW TRACE	30-45% 15-25% 5-10% <5%	NE UR NR	NOT ENCOUNTERED NOT READ NO RECOVERY		

	A	ECC	M		Tes	st Bori	ng R	eport	BOR PAG	ING NO. E <u>1</u>	HF-B11 OF 1		
PRO	JECT: H	F Spiking	g Station #	2					PROJ	ECT NO:	60577539		
CLIE	NT: W	estingho	LOCA	TION:	Hopkins, SC								
CON	ITRACTOR	a AEC	COM						ELEVA	ATION:			
EQU	IPMENT:	Stai	nless Stee	l Hand A	uger				NORT	HING:			
GRC	UNDWAT	ER				EASTI	EASTING:						
DATE	HRS	WATER	METHOD		c	CASING	TE	MP / PERM	DATE	START:	8/22/2018		
			HOLE DIA.		c	CASING DIA.	CA	ASING TYPE	DATE	FINISH:	9/7/2018		
			DEPTH		c	CASING DEPTH	GI	ROUT TYPE	DRILL	ER:	E. Harrington		
			SAMPLING		ŀ	HAMMER WT	HA	AMMER FALL	OVER	SIGHT:	Jeremy Grant		
DEPTH IN FEET	VAPOR SCREENING (PPM)	BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE		FIELD CL	ASSIFIC	SSIFICATION AND REMARKS SOIL CLASSIFICATION: USCS					
					Tan fin	e to medium g	grained s	and. Dry, loos	se, few mica				
					Tan tine to medium grained sand. Loose, dry, few mica. Slightly moist at 4.25 feet.								
- 5.0					renewish brown mile to medium granicu snty sand. Snghtty moist.								
					Yellowish brown fine to medium grained sandy silt. Slightly moist.								
					Yellowish brown fine to medium grained silty sand. Slightly moist								
					1 CHOW			uni granicu s	inty sailu. Si	ignity mo	15t.		
					Yellow	ish brown and	l light ye	llow fine to n	nedium grai	ned silty s	and. Slightly moist,		
					tew mica.								
- 10.0					Light yellow and grey medium to coarse grained silty sand. Moist, few mica, few quartz pebbles								
15.0]										
- 15.0													
]										
20.0													
								1		T			
BLOWS	S/FT. D	DENSITY	BLOWS/FT	CON	SISTENCY	SAMPLE	R ID.	DESCRI	PTIONS	WD W			
0-4 5-10	VERY LO	USE	0-2 3-4	VERY SC SOFT	ירו	ST SHELBY	TUBE	SOME	30-100% 30-45%	NE NC			
11-30	MEDIUM I	DENSE	5-8	MEDIUM	STIFF	G GRAB SA	MPLE	LITTLE	15-25%				
31-50 50+	DENSE VERY DEI	NSE	9-15 16-30	STIFF VERY ST	IFF	INC MACRO-	JUKE	TRACE	5-10% <5%	INK NO	REGUVERY		
			31+	HARD									

	A	CO	Μ		Tes	st Bor	ing R	eport	BOR PAG	ING NO. E <u>1</u>	HF-B12					
PRC	JECT: H	F Spiking	station #	2					PRO.IF	ECT NO.	60577539					
CLIE	INT: W	estingho	LOCA	FION:	Hopkins, SC											
CON	ITRACTOR	: AEO	COM						ELEVA	TION:						
EQU	IPMENT:	Stai	nless Steel	l Hand A	uger				NORT	HING:						
GRC	UNDWAT	ER			DRILL	ING INFORM	ATION	<u> </u>	EASTI	NG:						
DATE	HRS	WATER	METHOD		C	CASING	TE	MP / PERM	DATE	START:	8/22/2018					
			HOLE DIA.		(CASING DIA.	CA	ASING TYPE	DATE	FINISH:	8/22/2018					
			DEPTH		(CASING DEPTH	GF	ROUT TYPE	DRILL	ER:	E. Harrington					
	ODCANIC		SAMPLING		ŀ	HAMMER WT	HA	AMMER FALL	OVER	SIGHT:	Jeremy Grant					
DEPTH IN FEET	VAPOR SCREENING (PPM)	BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS SOIL CLASSIFICATION: USCS											
					Tan fin	e to medium	n grained sa	and. Dry, loo	se, few mica	a.						
					Brown fine to medium grained silty sand. Slightly moist.											
					Tan fine to modium agained and Firm allabely maint Defeed at 4.5.6											
					1 an fin	e to medium	i grained sa	ana. Firm, sli	gnuy moist.	Kefusal	at 4.5 ft					
5.0																
10.0																
45.0			1													
15.0]													
			j													
20.0																
		·	j													
						-										
BLOW	S/FT.	DENSITY	BLOWS/FT	. CON	SISTENCY	SAMP	LER ID.	DESCRI	PTIONS	WD ·	NOTES					
5-10	VERY LO	JSE	0-2 3-4	VERY SC SOFT	JF I	SS SPLIT	SPOON SY TUBE	SOME	50-100% 30-45%	NE N						
11-30	MEDIUM I	DENSE	5-8	MEDIUM	STIFF	G GRAB	SAMPLE		15-25%							
31-50 50+	DENSE VERY DEI	NSE	9-15 16-30	STIFF VERY ST	IFF	MC MACRO	J-CORE	FEW TRACE	5-10% <5%	NK I	NU RECOVERY					
-			31+	HARD												
	A	CO	M		Tes	st Bori	ng R	Report	BOR PAG	ING NO. E <u>1</u>	HF-B13 OF 1					
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PRC	JECT: H	F Spiking	g Station #	2					PROJ	ECT NO:	60577539					
CLIE	NT: W	estinghou	use						LOCA		Hopkins, SC					
CON	ITRACTOR	: AEC	COM						ELEVA	TION:						
EQL	IPMENT:	Stai	nless Stee	l Hand A	uger				NORT	HING:						
GRC	UNDWATI	ER			DRILI	ING INFORM	ATION		EASTI	NG:	0.41.0.40					
DATE	HRS	WATER	METHOD		(CASING	TI	EMP / PERM	DATE	START:	9/12/2018					
			HOLE DIA.		(CASING DIA.	C	ASING TYPE	DATE	FINISH:	9/12/2018					
			DEPTH			CASING DEPTH	G	ROUT TYPE			E. Harrington					
DEPTH IN	ORGANIC VAPOR SCREENING	SAMPLER BLOWS PER	SAMPLING SAMPLE NUMBER	SAMPLE DEPTH BANGE		FIELD C		Jerenny Orant								
	(PPM)	6 INCHES		NANGL	Tan fin	e to medium	grained s	and. Dry, loo	son ose, few mica	. CLASSIFICA a.	FION: USCS					
					Light b	rown fine to i	medium o	mained cilty	cand Slight	v moist						
					Brown	Brown fine to medium grained sandy clay Slightly moist tight										
					Light brown fine to medium grained sand, few silt. Slightly moist.											
5.0																
- 5.0																
					Vallewich brown fing to madium ansight silts and filishtly maint											
					renow	ISH Drown IIH	le to medi	ium grained	sinty sand. Si	ignuy mo	181.					
					Grey and yellowish brown fine to medium grained silty sand. Slightly moist, few											
					mica.											
- 10.0																
					Grey ar	nd yellowish l	orown me	edium to coa	rse grained s	ilty sand.	Moist, few mica,					
					iew qua	artz peobles.										
- 15.0																
			1													
20.0																
PLOW					SISTENOV	CAMPI		DEOOS			NOTES					
0-4	VERY LO	DSE	0-2	VERY SC	SISTENCY DFT	SAMPLE SS SPLIT SE	POON	MOSTLY	50-100%	WD WI	HILE DRILLING					
5-10 11-30	LOOSE MEDIUM I	DENSE	3-4 5-8	SOFT MEDIUM	STIFF	ST SHELBY G GRAB S	TUBE AMPLE	SOME LITTLE	30-45% 15-25%	NE NO UR NO)T ENCOUNTERED)T READ					
31-50	DENSE		9-15	STIFF		MC MACRO-	CORE	FEW	5-10%	NR NC	RECOVERY					
50+	VERY DEI	NOE	16-30 31+	VERY ST HARD	IFF			TRACE	<5%							

	4 <i>=</i> C	OM	I		Tes	t Borir	ng R	eport	BOR PAG	ING NO. E <u>1</u>	HF-B14
PRC	JECT H	F Sniking	station #	2					PRO.IF		60577539
CLIF	ENT: W	estingho	use	-					LOCAT		Hopkins, SC
CON		: AEO	COM						ELEVA	TION:	1 .,
EQU	IPMENT:	Stai	nless Stee	l Hand A	uger				NORTH	HING:	
GRC	DUNDWATI	ER			DRILL	ING INFORMA	TION		EASTI	NG:	
DATE	HRS	WATER	METHOD		с	ASING	TE	MP / PERM	DATE	START:	9/12/2018
			HOLE DIA.		С	ASING DIA.	CA	SING TYPE	DATE	FINISH:	9/12/2018
			DEPTH		c	ASING DEPTH	GR	OUT TYPE	DRILLI	ER:	E. Harrington
	ODCANIC		SAMPLING		н	AMMER WT	HA	MMER FALL	OVER	SIGHT:	Jeremy Grant
DEPTH IN FEET	VAPOR SCREENING (PPM)	BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE		ATION: USCS					
					Light ta	to medium g	sand.	ina. Dry, 100s6	e, Iew mica		
- 5.0					Refusal	at 64 inches					
					Kelusai	at 04 menes.					
- 10.0											
- 15.0											
]								
			1								
20.0											
BLOW	S/FT. C	DENSITY	BLOWS/FT	CON	SISTENCY	SAMPLER	R ID.	DESCRIP	TIONS		NOTES
0-4	VERY LOO	DSE	0-2	VERY SC)FT	SS SPLIT SPC		MOSTLY	50-100%	WD W	
11-30	MEDIUM I	DENSE	5-8	MEDIUM	STIFF	G GRAB SAM	/IPLE	LITTLE	30-43% 15-25%	UR N	OT READ
31-50			9-15	STIFF	IEE	MC MACRO-C	ORE	FEW	5-10%	NR N	O RECOVERY
30+	VERTUE	NJE	31+	HARD	11 F			IRAGE	<0%		

	AE	CON	1		Tes	st Bori	ing F	Report	BOF PAG	RING NO. E <u>1</u>	HF-B15 OF 1						
PRC	JECT: H	F Spiking	g Station #	2					PROJ	ECT NO:	60577539						
CLIE	NT: W	estinghout	use						LOCA	TION:	Hopkins, SC						
CON	ITRACTOR	: <u>AEC</u>	COM						ELEVA	ATION:							
EQU	IPMENT:	Stai	nless Stee	l Hand A	uger				NORT	HING:							
GRC	DUNDWATI	ER			DRILI	ING INFORM	ATION		EASTI	NG:	0/10/2010						
DATE	HRS	WATER	METHOD		(CASING	Т	EMP / PERM	DATE	START:	9/12/2018						
			HOLE DIA.		(CASING DIA.	C	ASING TYPE	DATE	FINISH:	9/12/2018 E. Harrington						
			SAMPLING				G			ек: SIGHT:	L. Harrington						
DEPTH IN FEET	ORGANIC VAPOR SCREENING	SAMPLER BLOWS PER	SAMPLE NUMBER	SAMPLE DEPTH RANGE													
	(PPW)	6 INCHES			Tan fin	e to medium	grained s	and. Dry, lo	ose, few mica	a.	10N. 03C3						
					Light ta	in fine graine	ed sand. I	Dry, loose.									
					Tan fin	Tan fine to medium grained sand. Slightly moist, few mica.											
					Light b	rown fine gra	ained silty	y sand. Sligh	tly moist.								
					Light b	rown fine gra	ained san	dy silt. Sligh	tly moist								
- 5.0																	
					Light ta	Light tan fine grained sand. Slightly moist, few mica.											
					Vallar												
					Yellowish brown fine to medium grained silty sand. Slightly moist. Grey and yellowish brown fine to medium grained sandy silt, some clay. Slightly												
					moist, f	ew mica.			-								
- 10.0					Crow	area arainad	ailtre con	d Moist for	miaa								
					Giey co	arse grameu	sinty same	u. Moist, iew	/ mica.								
- 15.0																	
20.0																	
						_		-		•							
BLOW	S/FT. D	DENSITY	BLOWS/FT	CON	SISTENCY	SAMPL	ER ID.	DESC			NOTES						
0-4 5-10	LOOSE	JSE	0-2 3-4	SOFT		SS SPLITS ST SHELBY	TUBE	SOME	30-45%	NE NO							
11-30 31-50		DENSE	5-8 9-15	MEDIUM	STIFF	G GRABS		LITTLE	15-25% 5-10%		OT READ						
50+	VERY DEI	NSE	16-30 31+	VERY ST HARD	ÎFF		JONE	TRACE	<5%		JALOOVENI						

	4 <i>=</i> C	OM	I		Te	st Bori	ing F	Report	BOR	RING NO. E <u>1</u>	HF-B16					
PRC	JECT: H	F Spiking	g Station #	2					PROJ	ECT NO:	60577539					
CLIE	INT: W	estingho	use						LOCA	TION:	Hopkins, SC					
CON	ITRACTOR	: AEC	COM						ELEV	ATION:						
EQU	IPMENT:	Stai	nless Stee	l Hand A	uger				NORT	HING:						
GRC	UNDWATI	ER			DRIL	LING INFORM	ATION		EASTI	NG:						
DATE	HRS	WATER	METHOD			CASING	т	EMP / PERM	DATE	START:	9/7/2018					
			HOLE DIA.			CASING DIA.	c	ASING TYPE	DATE	FINISH:	9/7/2018					
			DEPTH			CASING DEPTH	G	ROUT TYPE	DRILL	ER:	E. Harrington					
			SAMPLING			HAMMER WT	Н	AMMER FALL	OVER	SIGHT:	Jeremy Grant					
DEPTH IN FEET	ORGANIC VAPOR SCREENING (PPM)	BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	Light v	FIELD C	LASSIFI	CATION AN	D REMARKS	CLASSIFIC	ATION: USCS					
					Brown	Brown fine to medium grained sand, few silt. Slightly moist.										
					Brown	Brown to reddish brown fine to medium grained silty sand. Slightly moist.										
					Dark b	Dark brown fine to medium grained sand, few silt. Slightly moist.										
					Light h	Light brown fine grained sand, few silt. Slightly moist.										
					3 0	Br		,	0 9							
- 5.0					Auger	refusal at 5 fe	eet									
10.0																
- 10.0																
- 15.0																
]													
20.0																
20.0																
BLOW	S/FT. D	DENSITY	BLOWS/FT	. CON	SISTENCY	SAMPL	ER ID.	DESC	RIPTIONS	1	NOTES					
0-4	VERY LO	DSE	0-2	VERY SC)FT	SS SPLIT S	POON	MOSTLY	50-100%	WD V	VHILE DRILLING					
5-10 11-30	LOOSE	DENSE	3-4 5-8	SOFT	STIFF	G GRABS	Y TUBE	SOME	30-45% 15-25%		JOT ENCOUNTERED					
31-50	DENSE		9-15	STIFF	5111	MC MACRO	-CORE	FEW	5-10%	NR N	IO RECOVERY					
50+	VERY DE	NSE	16-30 31+	VERY ST HARD	ÏFF			TRACE	<5%							

APPENDIX B

LABORATORY ANALYTICAL RESULTS



a member of The GEL Group INC



PO Box 30712 Charleston, SC 29417 2040 Savage Road Charleston, SC 29407 P 843.556.8171 F 843.766.1178

gel.com

September 06, 2018

Ms. Cynthia Logsdon Westinghouse Electric Company, LLC PO Drawer R Columbia, South Carolina 29205

Re: Soil and Vegetation Analysis Work Order: 457991

Dear Ms. Logsdon:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on August 23, 2018. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4778.

Sincerely,

DROC

Hope Taylor Project Manager

Purchase Order: 4500745037 Enclosures



2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis Report for

WNUC007 Westinghouse Electric Co, LLC

Client SDG: 457991 GEL Work Order: 457991

The Qualifiers in this report are defined as follows:

- * A quality control analyte recovery is outside of specified acceptance criteria
- ** Analyte is a Tracer compound
- ** Analyte is a surrogate compound
- H Analytical holding time was exceeded
- J Value is estimated
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the limit as defined in the 'U' qualifier above.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Hope Taylor.

top 00

Reviewed by

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Certificate of Analysis

Report Date: September 6, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B1-(1-2) Soil Boring Project: WNUC00518 Sample ID: 457991001 Client ID: WNUC007 Matrix: Soil Collect Date: 20-AUG-18 14:26 23-AUG-18 Receive Date: Collector: Client Moisture: 7.41% RL PF Qualifier DL Units Parameter Result DF Analyst Date Time Batch Method Ion Chromatography SW846 9056A Fluoride "Dry Weight Corrected" 7.62 0.366 1.08 mg/kg 9.98 1 MAR1 08/28/18 2107 1796417 1 Metals Analysis-ICP-MS SW846 3050B/6020A Uranium Solid "Dry Weight Corrected" Uranium-234 10.3 2 PRB 1025 1796296 2 U ND 2.05 ug/Kg 95.1 08/29/18 Uranium-235 134 2.05 14.4 ug/Kg 95.1 2 PRB 08/29/18 1347 1796296 3 Uranium-238 4350 41.1 ug/Kg 2 13.6 95.1 4540 13.6 41.1 ug/Kg 95.1 2 PRB 08/29/18 1712 1796296 4 Titration and Ion Analysis SW9045D Corrosivity (pH<2or>14) "As Received" 0.010 0.100 SU Н 6.84 1 RXB5 08/24/18 1706 1794362 5 The following Prep Methods were performed: Description Analyst Date Time Prep Batch SW846 3050B ICP-MS 3050BS PREP SXW1 08/24/18 0932 1796295 SW846 9056A SW846 9056A Total Anions in Soil MAR1 08/27/18 1042 1796416 The following Analytical Methods were performed: Description Analyst Comments SW846 9056A SW846 3050B/6020A SW846 3050B/6020A

Notes:

Fluoride

Uranium

Corrosivity

Method

Method

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Column headers are defined as follows: DF: Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

SW846 3050B/6020A

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Report Date: September 6, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B1-(3-4) Soil Boring Project: WNUC00518 Sample ID: 457991002 Client ID: WNUC007 Matrix: Soil Collect Date: 20-AUG-18 14:50 23-AUG-18 Receive Date: Collector: Client Moisture: 7.27% RL PF Qualifier DL Units Parameter Result DF Analyst Date Time Batch Method Ion Chromatography SW846 9056A Fluoride "Dry Weight Corrected" 143 1.82 5.36 mg/kg 9.95 5 MAR1 08/28/18 1558 1796414 1 Metals Analysis-ICP-MS SW846 3050B/6020A Uranium Solid "Dry Weight Corrected" Uranium-234 985 103 96.0 20 PRB 08/29/18 1032 1796296 2 20.7 ug/Kg Uranium-235 108000 2070 14500 ug/Kg 96.0 2000 PRB 08/29/18 1355 1796296 3 Uranium-238 13700 41400 ug/Kg 96.0.2000 2890000 3030000 13700 41400 ug/Kg 96.0 2000 PRB 08/29/18 1721 1796296 4 Titration and Ion Analysis SW9045D Corrosivity (pH<2or>14) "As Received" 0.010 0.100 SU Н 4.59 1 RXB5 08/24/18 1708 1794362 5 The following Prep Methods were performed: Description Analyst Date Time Prep Batch SW846 3050B ICP-MS 3050BS PREP SXW1 08/24/18 0932 1796295 SW846 9056A SW846 9056A Total Anions in Soil MAR1 08/27/18 0722 1796413 The following Analytical Methods were performed: Description Analyst Comments SW846 9056A

1 2 SW846 3050B/6020A 3 SW846 3050B/6020A 4 SW846 3050B/6020A 5 SW846 9045D

Notes:

Fluoride

Uranium

Corrosivity

Method

Method

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Certificate of Analysis

Report Date: September 6, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B1-(5-6) Soil Boring Project: WNUC00518 Sample ID: 457991003 Client ID: WNUC007 Matrix: Soil Collect Date: 20-AUG-18 15:30 23-AUG-18 Receive Date: Collector: Client Moisture: 7.66% RL PF Qualifier DL Units Parameter Result DF Analyst Date Time Batch Method Ion Chromatography SW846 9056A Fluoride "Dry Weight Corrected" Fluoride 374 3.65 10.7 mg/kg 9.93 10 MAR1 08/28/18 2137 1796417 1 Metals Analysis-ICP-MS SW846 3050B/6020A Uranium Solid "Dry Weight Corrected" Uranium-234 101 93.6 20 PRB 08/29/18 1034 1796296 2 1000 20.3 ug/Kg Uranium-235 115000 2030 14200 ug/Kg 93.6 2000 PRB 08/29/18 1357 1796296 3 3120000 Uranium-238 13400 40600 ug/Kg 93.6 2000 Uranium 3200000 13400 40600 ug/Kg 93.6 2000 PRB 08/29/18 1722 1796296 4 Titration and Ion Analysis SW9045D Corrosivity (pH<2or>14) "As Received" 0.010 0.100 SU Corrosivity Н 4.04 1 RXB5 08/24/18 1709 1794362 5 The following Prep Methods were performed: Method Description Analyst Date Time Prep Batch SW846 3050B ICP-MS 3050BS PREP SXW1 08/24/18 0932 1796295 SW846 9056A SW846 9056A Total Anions in Soil MAR1 08/27/18 1042 1796416 The following Analytical Methods were performed: Method Description Analyst Comments SW846 9056A SW846 3050B/6020A SW846 3050B/6020A SW846 3050B/6020A SW846 9045D

Notes:

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Certificate of Analysis

Report Date: September 6, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B2-(1-2) Soil Boring Project: WNUC00518 Sample ID: 457991004 Client ID: WNUC007 Matrix: Soil Collect Date: 20-AUG-18 17:01 23-AUG-18 Receive Date: Collector: Client 4.75% Moisture: RL PF Qualifier DL Units DF Analyst Date Parameter Result Time Batch Method Ion Chromatography SW846 9056A Fluoride "Dry Weight Corrected" Fluoride 12.0 0.356 1.05 mg/kg 9.98 1 MAR1 08/28/18 2208 1796417 1 Metals Analysis-ICP-MS SW846 3050B/6020A Uranium Solid "Dry Weight Corrected" Uranium-234 10.2 2 PRB 2 U ND 2.03 ug/Kg 96.7 08/29/18 1039 1796296 Uranium-235 230 10.2 71.1 ug/Kg 96.7 10 PRB 08/29/18 1404 1796296 3 Uranium-238 8440 40.6 ug/Kg 96.7 08/29/18 1402 1796296 4 13.4 2 PRR Uranium 8970 13.4 40.6 ug/Kg 2 PRB 08/29/18 1728 1796296 5 96.7 Titration and Ion Analysis SW9045D Corrosivity (pH<2or>14) "As Received" 0.010 0.100 SU Corrosivity Н 8.84 1 RXB5 08/24/18 1709 1794362 6 The following Prep Methods were performed: Method Description Analyst Date Time Prep Batch SW846 3050B ICP-MS 3050BS PREP SXW1 08/24/18 0932 1796295 SW846 9056A SW846 9056A Total Anions in Soil MAR1 08/27/18 1042 1796416 The following Analytical Methods were performed: Method Description Analyst Comments SW846 9056A SW846 3050B/6020A SW846 3050B/6020A SW846 3050B/6020A SW846 3050B/6020A

Notes:

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Column headers are defined as follows: DF: Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL:** Reporting Limit MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: September 6, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B3-(1-2) Soil Boring Project: WNUC00518 Sample ID: 457991005 Client ID: WNUC007 Matrix: Soil Collect Date: 21-AUG-18 08:40 23-AUG-18 Receive Date: Collector: Client Moisture: 1.04% Parameter DL RL PF Qualifier Units DF Analyst Date Result Time Batch Method Ion Chromatography SW846 9056A Fluoride "Dry Weight Corrected" 0.342 22.0 1.01 mg/kg 9.95 1 MAR1 08/28/18 2239 1796417 1 Metals Analysis-ICP-MS SW846 3050B/6020A Uranium Solid "Dry Weight Corrected" 93.6 Uranium-234 9.46 2 PRB 08/29/18 1041 1796296 2 U ND 1.89 ug/Kg Uranium-235 16.1 1.89 13.2 ug/Kg 93.6 2 PRB 08/29/18 1405 1796296 3 Uranium-238 12.5 37.8 ug/Kg 2 665 93.6 718 12.5 37.8 ug/Kg 93.6 2 PRB 08/29/18 1730 1796296 4 Titration and Ion Analysis SW9045D Corrosivity (pH<2or>14) "As Received" 0.010 0.100 SU Н 4.23 1 RXB5 08/24/18 1711 1794362 5 The following Prep Methods were performed: Description Analyst Date Time Prep Batch SW846 3050B ICP-MS 3050BS PREP SXW1 08/24/18 0932 1796295 SW846 9056A SW846 9056A Total Anions in Soil MAR1 08/27/18 1042 1796416 The following Analytical Methods were performed: Description Analyst Comments SW846 9056A SW846 3050B/6020A SW846 3050B/6020A SW846 3050B/6020A

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Notes:

Fluoride

Uranium

Corrosivity

Method

Method

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Column headers are defined as follows:	
DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentrati	on SQL: Sample Quantitation Limit
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Certificate of Analysis

Report Date: September 6, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B3-(3-4) Soil Boring Project: WNUC00518 Sample ID: 457991006 Client ID: WNUC007 Matrix: Soil Collect Date: 21-AUG-18 08:58 23-AUG-18 Receive Date: Collector: Client Moisture: .876% RL PF Qualifier DL Units DF Analyst Date Parameter Result Time Batch Method Ion Chromatography SW846 9056A Fluoride "Dry Weight Corrected" Fluoride 50.4 0.343 1.01 mg/kg 10.0 1 MAR1 08/28/18 2310 1796417 1 Metals Analysis-ICP-MS SW846 3050B/6020A Uranium Solid "Dry Weight Corrected" Uranium-234 1.98 9.91 2 PRB 1043 1796296 2 70.8 ug/Kg 98.2 08/29/18 Uranium-235 8210 198 1390 ug/Kg 98.2 200 PRB 08/29/18 1407 1796296 3 98.2 200 Uranium-238 196000 1310 3960 ug/Kg Uranium 199000 1310 3960 ug/Kg 98.2 200 PRB 08/29/18 1731 1796296 4 Titration and Ion Analysis SW9045D Corrosivity (pH<2or>14) "As Received" 0.010 0.100 SU Corrosivity Н 4.29 1 RXB5 08/24/18 1712 1794362 5 The following Prep Methods were performed: Method Description Analyst Date Time Prep Batch SW846 3050B ICP-MS 3050BS PREP SXW1 08/24/18 0932 1796295 SW846 9056A SW846 9056A Total Anions in Soil MAR1 08/27/18 1042 1796416 The following Analytical Methods were performed: Method Description Analyst Comments SW846 9056A SW846 3050B/6020A SW846 3050B/6020A SW846 3050B/6020A SW846 9045D

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Certificate of Analysis

Report Date: September 6, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis HF-B3-(4.5-5) Soil Boring Client Sample ID: Project: WNUC00518 Sample ID: 457991007 Client ID: WNUC007 Matrix: Soil Collect Date: 21-AUG-18 09:10 23-AUG-18 Receive Date: Collector: Client Moisture: 1.46% RL PF Parameter Qualifier DL Units DF Analyst Date Result Time Batch Method Ion Chromatography SW846 9056A Fluoride "Dry Weight Corrected" Fluoride 118 1.73 5.07 mg/kg 10.0 5 MAR1 08/28/18 2341 1796417 1 Metals Analysis-ICP-MS SW846 3050B/6020A Uranium Solid "Dry Weight Corrected" Uranium-234 2.02 10.1 99.6 2 PRB 08/29/18 1045 1796296 2 36.6 ug/Kg Uranium-235 4360 202 1420 ug/Kg 99.6 200 PRB 08/29/18 1410 1796296 3 99.6 200 Uranium-238 115000 1330 4040 ug/Kg Uranium 114000 167 505 ug/Kg 99.6 25 PRB 08/29/18 1733 1796296 4 Titration and Ion Analysis SW9045D Corrosivity (pH<2or>14) "As Received" 0.010 0.100 SU Corrosivity Н 5.19 1 RXB5 08/24/18 1713 1794362 5 The following Prep Methods were performed: Method Description Analyst Date Time Prep Batch SW846 3050B ICP-MS 3050BS PREP SXW1 08/24/18 0932 1796295 SW846 9056A SW846 9056A Total Anions in Soil MAR1 08/27/18 1042 1796416 The following Analytical Methods were performed: Method Description Analyst Comments SW846 9056A SW846 3050B/6020A SW846 3050B/6020A SW846 3050B/6020A SW846 9045D Notes:

Column headers are defined as follows: DF: Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: September 6, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B4-(1-2) Soil Boring Project: WNUC00518 Sample ID: 457991008 Client ID: WNUC007 Matrix: Soil Collect Date: 21-AUG-18 09:46 23-AUG-18 Receive Date: Collector: Client Moisture: 1.02% RL PF Qualifier DL Units Parameter Result DF Analyst Date Time Batch Method Ion Chromatography SW846 9056A Fluoride "Dry Weight Corrected" 0.341 Fluoride 10.8 1.00 mg/kg 9.93 1 MAR1 08/29/18 0012 1796417 1 Metals Analysis-ICP-MS SW846 3050B/6020A Uranium Solid "Dry Weight Corrected" Uranium-234 10.1 2 PRB 1046 1796296 2 112 2.02 ug/Kg 100 08/29/18 Uranium-235 13600 202 1410 ug/Kg 100 200 PRB 08/29/18 1412 1796296 3 Uranium-238 429000 1330 4040 ug/Kg 100 200 Uranium 447000 1330 4040 ug/Kg 100 200 PRB 08/29/18 1735 1796296 4 Titration and Ion Analysis SW9045D Corrosivity (pH<2or>14) "As Received" 0.010 0.100 SU Corrosivity Н 5.30 1 RXB5 08/24/18 1714 1794362 5 The following Prep Methods were performed: Method Description Analyst Date Time Prep Batch SW846 3050B ICP-MS 3050BS PREP SXW1 08/24/18 0932 1796295 SW846 9056A SW846 9056A Total Anions in Soil MAR1 08/27/18 1042 1796416 The following Analytical Methods were performed: Method Description Analyst Comments SW846 9056A

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 SW846 9056A

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 SW846 3050B/6020A

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 SW846 3050B/6020A

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 SW846 3050B/6020A

 5
 SW846 9045D

Notes:

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Certificate of Analysis

Report Date: September 6, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B4-(3-4) Soil Boring Project: WNUC00518 Sample ID: 457991009 Client ID: WNUC007 Matrix: Soil Collect Date: 21-AUG-18 09:59 23-AUG-18 Receive Date: Collector: Client Moisture: 1.27% RL PF Qualifier DL Units Parameter Result DF Analyst Date Time Batch Method Ion Chromatography SW846 9056A Fluoride "Dry Weight Corrected" 0.341 10.8 1.00 mg/kg 9.90 1 MAR1 08/29/18 0043 1796417 1 Metals Analysis-ICP-MS SW846 3050B/6020A Uranium Solid "Dry Weight Corrected" Uranium-234 10.0 2 PRB 1048 1796296 2 132 2.01 ug/Kg 99.2 08/29/18 Uranium-235 16600 251 1760 ug/Kg 99.2 250 PRB 08/29/18 1422 1796296 3 99.2 250 Uranium-238 512000 1660 5020 ug/Kg Uranium 535000 1330 4020 ug/Kg 99.2 200 PRB 08/29/18 1736 1796296 4 Titration and Ion Analysis SW9045D Corrosivity (pH<2or>14) "As Received" 0.010 0.100 SU Corrosivity Н 5.30 1 RXB5 08/24/18 1717 1796197 5 The following Prep Methods were performed: Method Description Analyst Date Time Prep Batch SW846 3050B ICP-MS 3050BS PREP SXW1 08/24/18 0932 1796295 SW846 9056A SW846 9056A Total Anions in Soil MAR1 08/27/18 1042 1796416 The following Analytical Methods were performed: Method Description Analyst Comments SW846 9056A

1 2 SW846 3050B/6020A 3 SW846 3050B/6020A 4 SW846 3050B/6020A 5 SW846 9045D

Notes:

Fluoride

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Certificate of Analysis

Report Date: September 6, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis HF-B4-(5-5.5) Soil Boring Client Sample ID: Project: WNUC00518 Sample ID: 457991010 Client ID: WNUC007 Matrix: Soil Collect Date: 21-AUG-18 10:10 23-AUG-18 Receive Date: Collector: Client Moisture: 2.01% RL PF Qualifier DL Units DF Analyst Date Parameter Result Time Batch Method Ion Chromatography SW846 9056A Fluoride "Dry Weight Corrected" Fluoride 22.8 0.343 1.01 mg/kg 9.88 1 MAR1 08/28/18 0846 1796417 1 Metals Analysis-ICP-MS SW846 3050B/6020A Uranium Solid "Dry Weight Corrected" Uranium-234 1.93 9.65 PRB 2 33.2 ug/Kg 94.5 2 08/29/18 1050 1796296 Uranium-238 109000 127 386 ug/Kg 94.5 20 PRB 08/29/18 1424 1796296 3 1426 1796296 Uranium-235 3800 193 1350 08/29/18 4 ug/Kg 94.5 200 PRB Uranium 116000 127 386 ug/Kg 94.5 20 PRB 08/29/18 1738 1796296 5 Titration and Ion Analysis SW9045D Corrosivity (pH<2or>14) "As Received" 0.010 0.100 SU Corrosivity Н 5.18 1 RXB5 08/24/18 1719 1796197 6 The following Prep Methods were performed: Method Description Analyst Date Time Prep Batch SW846 3050B ICP-MS 3050BS PREP SXW1 08/24/18 0932 1796295 SW846 9056A SW846 9056A Total Anions in Soil MAR1 08/27/18 1042 1796416 The following Analytical Methods were performed: Method Description Analyst Comments SW846 9056A SW846 3050B/6020A SW846 3050B/6020A SW846 3050B/6020A SW846 3050B/6020A SW846 9045D Notes:

Column headers are defined as follows: DF: Dilution Factor **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity MDC: Minimum Detectable Concentration

Lc/LC: Critical Level **RL:** Reporting Limit SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: September 6, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B5-(1-2) Soil Boring Project: WNUC00518 Sample ID: 457991011 Client ID: WNUC007 Matrix: Soil Collect Date: 21-AUG-18 11:01 23-AUG-18 Receive Date: Collector: Client Moisture: 4.58% Parameter DL RL PF Qualifier Units DF Analyst Date Result Time Batch Method Ion Chromatography SW846 9056A Fluoride "Dry Weight Corrected" 0.354 6.27 1.04 mg/kg 9.93 1 MAR1 08/29/18 0317 1796420 1 Metals Analysis-ICP-MS SW846 3050B/6020A Uranium Solid "Dry Weight Corrected" 2 Uranium-234 9.41 89.8 2 PRB 08/29/18 1051 1796296 J 4.70 1.88 ug/Kg Uranium-235 577 18.8 132 ug/Kg 89.8 20 PRB 08/29/18 1427 1796296 3 Uranium-238 20400 124 376 ug/Kg 89.8 20 21300 124 376 ug/Kg 89.8 20 PRB 08/29/18 1740 1796296 4 Titration and Ion Analysis SW9045D Corrosivity (pH<2or>14) "As Received" 0.010 0.100 SU Н 8.01 1 RXB5 08/24/18 1722 1796197 5 The following Prep Methods were performed: Description Analyst Date Time Prep Batch SW846 3050B ICP-MS 3050BS PREP SXW1 08/24/18 0932 1796295 SW846 9056A SW846 9056A Total Anions in Soil MAR1 08/28/18 0756 1796419 The following Analytical Methods were performed: Description Analyst Comments SW846 9056A SW846 3050B/6020A SW846 3050B/6020A SW846 3050B/6020A SW846 9045D

Notes:

Fluoride

Uranium

Corrosivity

Method

Method

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Column headers are defined as follows:	
DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentratio	n SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: September 6, 2018

	Company : Address :	West PO E	tinghouse Drawer R	Electric Compa	ny, LLC	2								
	Contact: Project:	Colu Ms. (Soil :	mbia, Sou Cynthia L and Vege	ith Carolina 292 ogsdon tation Analysis	205									
	Client Sample ID:	D: HF-E	36-(1-2) S	oil Boring			Pro	oject:		WNU	C00518			
	Matrix:	Soil	91012				CI			WINU	007			
	Collect Date:	21_A	UG-18-1	1.27										
	Receive Date:	21 A	UG-18	1.27										
	Collector:	Clier	nt											
	Moisture:	7.839	%											
Parameter	Qu	alifier	Result		DL	RL	Units	PF	DF	Analy	st Date	Time	Batch	Method
Ion Chroma	atography													
SW846 905	66A Fluoride "Dr	y Weight	Corrected	1"										
Fluoride		J	0.514		0.369	1.08	mg/kg	10.0	1	MAR1	08/29/18	0348	1796420	1
Metals Ana	Ilysis-ICP-MS	0.111		. 1 . 0										
SW846 305	0B/6020A Urani	um Solid	"Dry We	ight Corrected"	2.05	10.2	$u \alpha / V \alpha$	047	2	DDD	08/20/18	1052	1706206	2
Uranium-235		J	ND 12.4		2.05	10.5	ug/Kg ug/Kg	94.7 94.7	2	PRB	08/29/18	1055	1796296	2
Uranium-238		U	941		13.6	41.1	ug/Kg	94.7	2	1102		1010		-
Uranium			969		13.6	41.1	ug/Kg	94.7	2	PRB	08/29/18	1742	1796296	4
Titration an	d Ion Analysis													
SW9045D	Corrosivity (pH<	2or>14) "	'As Recei	ved"										
Corrosivity		Н	6.66		0.010	0.100	SU		1	RXB5	08/24/18	1723	1796197	5
The followi	ing Prep Methods	s were per	rformed:											
Method	De	escription				Analyst	Date		Гime	e Pr	ep Batch			
SW846 3050E	B ICH	P-MS 3050E	3S PREP	ns in Soil		SXW1 MAP1	08/24/18	()932	179	96295 26419			
The follow	ving Analytical M	ethods w	ere perfor	med:		MARI	00/20/10	(1150	172	70417			
Method	Des	scription					A	Analyst	Cor	nments	3			
1	SW	846 9056A												
2	SW	846 3050B/	6020A											
3	SW	846 3050B/ 846 3050B/	6020A											
5	SW	846 9045D	0020A											
Notes:														
Column he	aders are defined	as follow	vs:											
DF: Dilutio	on Factor			Lc/LC: Critical Level										
DL: Detect	ion Limit	A		PF: Prep Factor	r T :									
MDA: Min MDC: Min	umum Detectable iimum Detectable	e Activity e Concent	ration	RL: Reporting SQL: Sample (Limit Quantita	tion Limit								

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Report Date: September 6, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B6-(3-4) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 457991013 Matrix: Soil Collect Date: 21-AUG-18 11:45 23-AUG-18 Receive Date: Collector: Client 7.88% Moisture: RL PF Qualifier DL Units Parameter Result DF Analyst Date Time Batch Method Ion Chromatography SW846 9056A Fluoride "Dry Weight Corrected" J 0.915 0.368 1.08 mg/kg 9.98 1 MAR1 08/29/18 0419 1796420 1 Metals Analysis-ICP-MS SW846 3050B/6020A Uranium Solid "Dry Weight Corrected" Uranium-234 10.1 PRB 1058 1796296 2 U ND 2.02 ug/Kg 93.1 2 08/29/18 Uranium-235 J 8.29 2.02 14.1 ug/Kg 93.1 2 PRB 08/29/18 1511 1796296 3 Uranium-238 40.4 ug/Kg 2 915 13.3 93.1 910 13.3 40.4 ug/Kg 93.1 2 PRB 08/29/18 1747 1796296 4 Titration and Ion Analysis SW9045D Corrosivity (pH<2or>14) "As Received" 0.010 0.100 SU Н 4.72 1 RXB5 08/24/18 1724 1796197 5 The following Prep Methods were performed: Description Analyst Date Time Prep Batch SW846 3050B ICP-MS 3050BS PREP SXW1 08/24/18 0932 1796295 SW846 9056A SW846 9056A Total Anions in Soil MAR1 08/28/18 0756 1796419 The following Analytical Methods were performed: Description Analyst Comments SW846 9056A SW846 3050B/6020A SW846 3050B/6020A SW846 3050B/6020A

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Notes:

Fluoride

Uranium

Corrosivity

Method

Method

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Column headers are defined as follows: DF: Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: September 6, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B6-(5-6) Soil Boring Project: WNUC00518 Sample ID: 457991014 Client ID: WNUC007 Matrix: Soil Collect Date: 21-AUG-18 13:47 23-AUG-18 Receive Date: Collector: Client Moisture: 10.3% RL PF Qualifier DL Units Parameter Result DF Analyst Date Time Batch Method Ion Chromatography SW846 9056A Fluoride "Dry Weight Corrected" 0.377 U ND 1.11 mg/kg 9.95 1 MAR1 08/29/18 0450 1796420 1 Metals Analysis-ICP-MS SW846 3050B/6020A Uranium Solid "Dry Weight Corrected" Uranium-234 11.0 2 PRB 1100 1796296 2 U ND 2.19 ug/Kg 98.4 08/29/18 Uranium-235 J 9.74 2.19 15.4 ug/Kg 98.4 2 PRB 08/29/18 1513 1796296 3 Uranium-238 1170 14.5 43.9 ug/Kg 2 98.4 1160 14.5 43.9 ug/Kg 98.4 2 PRB 08/29/18 1748 1796296 4 Titration and Ion Analysis SW9045D Corrosivity (pH<2or>14) "As Received" 0.010 0.100 SU Н 5.92 1 RXB5 08/24/18 1725 1796197 5 The following Prep Methods were performed: Description Analyst Date Time Prep Batch SW846 3050B ICP-MS 3050BS PREP SXW1 08/24/18 0932 1796295 SW846 9056A SW846 9056A Total Anions in Soil MAR1 08/28/18 0756 1796419 The following Analytical Methods were performed: Description Analyst Comments SW846 9056A SW846 3050B/6020A SW846 3050B/6020A

Notes:

Fluoride

Uranium

Corrosivity

Method

Method

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Column headers are defined as follows: DF: Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

SW846 3050B/6020A

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Report Date: September 6, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B7-(1-2) Soil Boring Project: WNUC00518 Sample ID: 457991015 Client ID: WNUC007 Matrix: Soil Collect Date: 21-AUG-18 14:51 23-AUG-18 Receive Date: Collector: Client Moisture: 2.14% RL PF Parameter Qualifier DL Units DF Analyst Date Result Time Batch Method Ion Chromatography SW846 9056A Fluoride "Dry Weight Corrected" 4.48 0.345 1.01 mg/kg 9.93 1 MAR1 08/29/18 0521 1796420 1 Metals Analysis-ICP-MS SW846 3050B/6020A Uranium Solid "Dry Weight Corrected" Uranium-234 1.97 9.84 2 PRB 08/29/18 1102 1796296 2 U ND ug/Kg 96.3 Uranium-235 185 4.92 34.5 ug/Kg 96.3 5 PRB 08/29/18 1436 1796296 3 Uranium-238 6340 98.4 ug/Kg 5 32.5 96.3 6830 13.0 39.4 ug/Kg 96.3 2 PRB 08/29/18 1750 1796296 4 Titration and Ion Analysis SW9045D Corrosivity (pH<2or>14) "As Received" 0.010 0.100 SU Corrosivity Н 8.92 1 RXB5 08/24/18 1726 1796197 5 The following Prep Methods were performed: Description Analyst Date Time Prep Batch SW846 3050B ICP-MS 3050BS PREP SXW1 08/24/18 0932 1796295 SW846 9056A SW846 9056A Total Anions in Soil MAR1 08/28/18 0756 1796419 The following Analytical Methods were performed: Description Analyst Comments

Method SW846 9056A 1 2 SW846 3050B/6020A 3 SW846 3050B/6020A 4 SW846 3050B/6020A 5 SW846 9045D

Notes:

Fluoride

Uranium

Method

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Report Date: September 6, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B8-(1-2) Soil Boring Project: WNUC00518 Sample ID: 457991016 Client ID: WNUC007 Matrix: Soil Collect Date: 21-AUG-18 15:10 23-AUG-18 Receive Date: Collector: Client Moisture: 3.86% RL PF Qualifier DL Units DF Analyst Date Parameter Result Time Batch Method Ion Chromatography SW846 9056A Fluoride "Dry Weight Corrected" Fluoride 5.30 0.353 1.04 mg/kg 9.98 1 MAR1 08/29/18 0552 1796420 1 Metals Analysis-ICP-MS SW846 3050B/6020A Uranium Solid "Dry Weight Corrected" Uranium-234 1.91 9.53 91.6 2 PRB 2 31.2 ug/Kg 08/29/18 1104 1796296 Uranium-238 131000 126 381 ug/Kg 91.6 20 PRB 08/29/18 1441 1796296 3 Uranium-235 4210 191 1330 ug/Kg 91.6 200 PRB 08/29/18 1443 1796296 4 Uranium 136000 126 381 ug/Kg 91.6 20 PRB 08/29/18 1752 1796296 5 Titration and Ion Analysis SW9045D Corrosivity (pH<2or>14) "As Received" 0.010 0.100 SU Corrosivity Н 9.30 1 RXB5 08/24/18 1729 1796197 6 The following Prep Methods were performed: Method Description Analyst Date Time Prep Batch SW846 3050B ICP-MS 3050BS PREP SXW1 08/24/18 0932 1796295 SW846 9056A SW846 9056A Total Anions in Soil MAR1 08/28/18 0756 1796419 The following Analytical Methods were performed: Method Description Analyst Comments SW846 9056A SW846 3050B/6020A SW846 3050B/6020A SW846 3050B/6020A SW846 3050B/6020A SW846 9045D Notes:

Column headers are defined as follows: DF: Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL:** Reporting Limit MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Report Date: September 6, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B9-(1-2) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 457991017 Matrix: Soil Collect Date: 21-AUG-18 16:17 23-AUG-18 Receive Date: Collector: Client 7.36% Moisture: RL Qualifier DL Units PF Parameter Result DF Analyst Date Time Batch Method Ion Chromatography SW846 9056A Fluoride "Dry Weight Corrected" J 0.414 0.365 1.07 mg/kg 9.95 1 MAR1 08/29/18 0623 1796420 1 Metals Analysis-ICP-MS SW846 3050B/6020A Uranium Solid "Dry Weight Corrected" Uranium-234 10.3 2 PRB 1105 1796296 2 U ND 2.07 ug/Kg 95.8 08/29/18 Uranium-235 J 14.1 2.07 14.5 ug/Kg 95.8 2 PRB 08/29/18 1515 1796296 3 Uranium-238 1170 41.4 ug/Kg 2 13.6 95.8 1280 13.6 41.4 ug/Kg 95.8 2 PRB 08/29/18 1753 1796296 4 Titration and Ion Analysis SW9045D Corrosivity (pH<2or>14) "As Received" 0.010 0.100 SU Н 5.75 1 RXB5 08/24/18 1730 1796197 5 The following Prep Methods were performed: Description Analyst Date Time Prep Batch SW846 3050B ICP-MS 3050BS PREP SXW1 08/24/18 0932 1796295 SW846 9056A SW846 9056A Total Anions in Soil MAR1 08/28/18 0756 1796419 The following Analytical Methods were performed: Description Analyst Comments SW846 9056A SW846 3050B/6020A SW846 3050B/6020A SW846 3050B/6020A

Notes:

Fluoride

Uranium

Corrosivity

Method

Method

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Column headers are defined as follows: DF: Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Report Date: September 6, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B9-(3-4) Soil Boring Project: WNUC00518 Sample ID: 457991018 Client ID: WNUC007 Matrix: Soil Collect Date: 21-AUG-18 16:58 23-AUG-18 Receive Date: Collector: Client 7.23% Moisture: RL PF Qualifier DL Units Parameter Result DF Analyst Date Time Batch Method Ion Chromatography SW846 9056A Fluoride "Dry Weight Corrected" Fluoride 305 3.66 10.8 mg/kg 9.98 10 MAR1 08/29/18 1030 1796420 1 Metals Analysis-ICP-MS SW846 3050B/6020A Uranium Solid "Dry Weight Corrected" Uranium-234 98.6 10 PRB 2 466 10.6 53.2 ug/Kg 08/29/18 1107 1796296 Uranium-238 1410000 1400 4250 ug/Kg 98.6 200 PRB 08/29/18 1446 1796296 3 Uranium-235 2130 14900 ug/Kg 08/29/18 1448 1796296 4 53000 98.6.2000 PRB Uranium 1440000 1400 4250 ug/Kg 98.6 200 PRB 08/29/18 1755 1796296 5 Titration and Ion Analysis SW9045D Corrosivity (pH<2or>14) "As Received" 0.010 0.100 SU Corrosivity Н 4.04 1 RXB5 08/24/18 1731 1796197 6 The following Prep Methods were performed: Method Description Analyst Date Time Prep Batch SW846 3050B ICP-MS 3050BS PREP SXW1 08/24/18 0932 1796295 SW846 9056A SW846 9056A Total Anions in Soil MAR1 08/28/18 0756 1796419 The following Analytical Methods were performed: Method Description Analyst Comments SW846 9056A SW846 3050B/6020A SW846 3050B/6020A SW846 3050B/6020A SW846 3050B/6020A

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Column headers are defined as follows: DF: Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL:** Reporting Limit MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Report Date: September 6, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B9-(5-6) Soil Boring Project: WNUC00518 Sample ID: 457991019 Client ID: WNUC007 Matrix: Soil Collect Date: 21-AUG-18 17:23 23-AUG-18 Receive Date: Collector: Client 11.5% Moisture: RL PF Qualifier DL Units DF Analyst Date Parameter Result Time Batch Method Ion Chromatography SW846 9056A Fluoride "Dry Weight Corrected" Fluoride 111 1.92 5.65 mg/kg 10.0 5 MAR1 08/29/18 1101 1796420 1 Metals Analysis-ICP-MS SW846 3050B/6020A Uranium Solid "Dry Weight Corrected" Uranium-234 10.8 95.4 2 PRB 2 64.7 2.16 ug/Kg 08/29/18 1109 1796296 Uranium-238 183000 178 539 ug/Kg 95.4 25 PRB 08/29/18 1450 1796296 3 Uranium-235 7680 1510 ug/Kg 08/29/18 1451 1796296 4 216 95.4 200 PRB Uranium 194000 178 539 ug/Kg 95.4 25 PRB 08/29/18 1757 1796296 5 Titration and Ion Analysis SW9045D Corrosivity (pH<2or>14) "As Received" 0.010 0.100 SU Corrosivity Н 3.95 1 RXB5 08/24/18 1732 1796197 6 The following Prep Methods were performed: Method Description Analyst Date Time Prep Batch SW846 3050B ICP-MS 3050BS PREP SXW1 08/24/18 0932 1796295 SW846 9056A SW846 9056A Total Anions in Soil MAR1 08/28/18 0756 1796419 The following Analytical Methods were performed: Method Description Analyst Comments SW846 9056A SW846 3050B/6020A SW846 3050B/6020A SW846 3050B/6020A SW846 3050B/6020A SW846 9045D

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Report Date: September 6, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B10-(1-2) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 457991020 Matrix: Soil Collect Date: 22-AUG-18 08:40 23-AUG-18 Receive Date: Collector: Client Moisture: 5.09% RL PF Parameter Qualifier DL Units DF Analyst Date Result Time Batch Method Ion Chromatography SW846 9056A Fluoride "Dry Weight Corrected" Fluoride 13.3 0.356 1.05 mg/kg 9.93 1 MAR1 08/29/18 0857 1796420 1 Metals Analysis-ICP-MS SW846 3050B/6020A Uranium Solid "Dry Weight Corrected" Uranium-234 2 PRB 1110 1796296 2 53.9 2.08 10.4 ug/Kg 98.8 08/29/18 Uranium-235 7020 208 1460 ug/Kg 98.8 200 PRB 08/29/18 1455 1796296 3 Uranium-238 217000 1370 4160 ug/Kg 98.8 200 Uranium 218000 1370 4160 ug/Kg 98.8 200 PRB 08/29/18 1805 1796296 4 Titration and Ion Analysis SW9045D Corrosivity (pH<2or>14) "As Received" 0.010 0.100 SU Corrosivity Н 6.40 1 RXB5 08/24/18 1734 1796197 5 The following Prep Methods were performed: Method Description Analyst Date Time Prep Batch SW846 3050B ICP-MS 3050BS PREP SXW1 08/24/18 0932 1796295 SW846 9056A SW846 9056A Total Anions in Soil MAR1 08/28/18 0756 1796419 The following Analytical Methods were performed: Method Description Analyst Comments SW846 9056A SW846 3050B/6020A SW846 3050B/6020A SW846 3050B/6020A SW846 9045D

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Report Date: September 6, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis HF-B10-(3-4) Soil Boring Client Sample ID: Project: WNUC00518 Sample ID: 457991021 Client ID: WNUC007 Matrix: Soil Collect Date: 22-AUG-18 08:55 23-AUG-18 Receive Date: Collector: Client Moisture: 2.11% RL PF Qualifier DL Units DF Analyst Date Parameter Result Time Batch Method Ion Chromatography SW846 9056A Fluoride "Dry Weight Corrected" Fluoride 17.6 0.346 1.02 mg/kg 9.98 1 MAR1 08/27/18 2024 1796414 1 Metals Analysis-ICP-MS SW846 3050B/6020A Uranium Solid "Dry Weight Corrected" Uranium-238 1300 3940 96.5 200 PRB 2 669000 ug/Kg 08/29/18 1525 1796299 Uranium-235 22300 986 6900 ug/Kg 96.5 1000 PRB 08/29/18 1532 1796299 3 Uranium 689000 1300 3940 ug/Kg 08/29/18 1810 1796299 4 965 200 PRB Uranium-234 181 9.86 49.3 ug/Kg 96.5 10 PRB 08/29/18 1121 1796299 5 Titration and Ion Analysis SW9045D Corrosivity (pH<2or>14) "As Received" 0.010 0.100 SU Corrosivity Н 4.55 1 RXB5 08/24/18 1736 1796197 6 The following Prep Methods were performed: Method Description Analyst Date Time Prep Batch SW846 3050B ICP-MS 3050BS PREP SXW1 08/24/18 0930 1796298 SW846 9056A SW846 9056A Total Anions in Soil MAR1 08/27/18 0722 1796413 The following Analytical Methods were performed: Method Description Analyst Comments SW846 9056A SW846 3050B/6020A SW846 3050B/6020A SW846 3050B/6020A SW846 3050B/6020A SW846 9045D Notes:

Column headers are defined as follows: DF: Dilution Factor **DL:** Detection Limit MDA: Minimum Detectable Activity MDC: Minimum Detectable Concentration

Lc/LC: Critical Level PF: Prep Factor **RL:** Reporting Limit SQL: Sample Quantitation Limit

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Report Date: September 6, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B11-(1-2) Soil Boring Project: WNUC00518 Sample ID: 457991022 Client ID: WNUC007 Matrix: Soil Collect Date: 22-AUG-18 09:42 23-AUG-18 Receive Date: Collector: Client Moisture: 1.18% RL PF Parameter Qualifier DL Units DF Analyst Date Result Time Batch Method Ion Chromatography SW846 9056A Fluoride "Dry Weight Corrected" 0.342 Fluoride 47.6 1.00 mg/kg 9.93 1 MAR1 08/27/18 2055 1796414 1 Metals Analysis-ICP-MS SW846 3050B/6020A Uranium Solid "Dry Weight Corrected" Uranium-234 9.37 92.6 2 PRB 1132 1796299 2 12.2 1.87 ug/Kg 08/29/18 Uranium-235 1470 23.4 164 ug/Kg 92.6 25 PRB 08/29/18 1544 1796299 3 Uranium-238 44900 469 ug/Kg 155 92.6 25 Uranium 46300 155 469 ug/Kg 92.6 25 PRB 08/29/18 1820 1796299 4 Titration and Ion Analysis SW9045D Corrosivity (pH<2or>14) "As Received" 0.010 0.100 SU Corrosivity Н 4.48 1 RXB5 08/24/18 1736 1796197 5 The following Prep Methods were performed: Method Description Analyst Date Time Prep Batch SW846 3050B ICP-MS 3050BS PREP SXW1 08/24/18 0930 1796298 SW846 9056A SW846 9056A Total Anions in Soil MAR1 08/27/18 0722 1796413 The following Analytical Methods were performed: Method Description Analyst Comments SW846 9056A SW846 3050B/6020A SW846 3050B/6020A SW846 3050B/6020A

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Report Date: September 6, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B11-(3-4) Soil Boring Project: WNUC00518 Sample ID: 457991023 Client ID: WNUC007 Matrix: Soil Collect Date: 22-AUG-18 10:05 23-AUG-18 Receive Date: Collector: Client Moisture: 3.16% RL PF Qualifier DL Units DF Analyst Date Parameter Result Time Batch Method Ion Chromatography SW846 9056A Fluoride "Dry Weight Corrected" Fluoride 295 3.50 10.3 mg/kg 9.98 10 MAR1 08/28/18 1629 1796414 1 Metals Analysis-ICP-MS SW846 3050B/6020A Uranium Solid "Dry Weight Corrected" Uranium-234 92.8 10 PRB 2 400 9.58 47.9 ug/Kg 08/29/18 1133 1796299 Uranium 1320000 1260 3830 ug/Kg 92.8 200 PRB 08/29/18 1822 1796299 3 1546 1796299 Uranium-238 1250000 1260 3830 92.8 200 PRB 08/29/18 4 ug/Kg Uranium-235 46600 1920 13400 ug/Kg 92.8 2000 PRB 08/29/18 1547 1796299 5 Titration and Ion Analysis SW9045D Corrosivity (pH<2or>14) "As Received" 0.010 0.100 SU Corrosivity Н 4.13 1 RXB5 08/24/18 1738 1796197 6 The following Prep Methods were performed: Method Description Analyst Date Time Prep Batch SW846 3050B ICP-MS 3050BS PREP SXW1 08/24/18 0930 1796298 SW846 9056A SW846 9056A Total Anions in Soil MAR1 08/27/18 0722 1796413 The following Analytical Methods were performed: Method Description Analyst Comments SW846 9056A SW846 3050B/6020A SW846 3050B/6020A SW846 3050B/6020A SW846 3050B/6020A SW846 9045D Notes:

Column headers are defined as follows: DF: Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL:** Reporting Limit MDC: Minimum Detectable Concentration

SQL: Sample Quantitation Limit

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Report Date: September 6, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B11-(5-6) Soil Boring Project: WNUC00518 Sample ID: 457991024 Client ID: WNUC007 Matrix: Soil Collect Date: 22-AUG-18 10:42 23-AUG-18 Receive Date: Collector: Client 13.3% Moisture: RL PF Qualifier DL Units DF Analyst Date Parameter Result Time Batch Method Ion Chromatography SW846 9056A Fluoride "Dry Weight Corrected" Fluoride 1180 9.78 28.8 mg/kg 9.98 25 MAR1 08/28/18 1659 1796414 1 Metals Analysis-ICP-MS SW846 3050B/6020A Uranium Solid "Dry Weight Corrected" Uranium-234 131 90.9 25 PRB 2 1680 26.2 ug/Kg 08/29/18 1135 1796299 Uranium-238 5600000 13800 42000 ug/Kg 90.9 2000 PRB 08/29/18 1549 1796299 3 08/29/18 1551 1796299 Uranium-235 4200 29400 ug/Kg 4 192000 90.9.4000 PRB Uranium 5640000 13800 42000 ug/Kg 90.9 2000 PRB 08/29/18 1824 1796299 5 Titration and Ion Analysis SW9045D Corrosivity (pH<2or>14) "As Received" 0.010 0.100 SU Corrosivity Н 3.65 1 RXB5 08/24/18 1739 1796197 6 The following Prep Methods were performed: Method Description Analyst Date Time Prep Batch SW846 3050B ICP-MS 3050BS PREP SXW1 08/24/18 0930 1796298 SW846 9056A SW846 9056A Total Anions in Soil MAR1 08/27/18 0722 1796413 The following Analytical Methods were performed: Method Description Analyst Comments SW846 9056A SW846 3050B/6020A SW846 3050B/6020A SW846 3050B/6020A SW846 3050B/6020A SW846 9045D Notes: Column headers are defined as follows:

DF: Dilution Factor **DL:** Detection Limit MDA: Minimum Detectable Activity MDC: Minimum Detectable Concentration

Lc/LC: Critical Level PF: Prep Factor **RL:** Reporting Limit SQL: Sample Quantitation Limit

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Report Date: September 6, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B12-(1-2) Soil Boring Project: WNUC00518 Sample ID: 457991025 Client ID: WNUC007 Matrix: Soil Collect Date: 22-AUG-18 11:21 23-AUG-18 Receive Date: Collector: Client 2.71% Moisture: RL PF Qualifier DL Units DF Analyst Date Parameter Result Time Batch Method Ion Chromatography SW846 9056A Fluoride "Dry Weight Corrected" Fluoride 43.6 0.347 1.02 mg/kg 9.93 1 MAR1 08/27/18 2228 1796414 1 Metals Analysis-ICP-MS SW846 3050B/6020A Uranium Solid "Dry Weight Corrected" Uranium-234 9.92 96.5 10 PRB 2 399 49.6 ug/Kg 08/29/18 1137 1796299 Uranium-238 10100000 13100 39700 ug/Kg 96.5 2000 PRB 08/29/18 1552 1796299 3 Uranium-235 3970 27800 ug/Kg 08/29/18 1554 1796299 4 85600 96 5 4000 PRB Uranium 10400000 13100 39700 ug/Kg 96.5 2000 PRB 08/29/18 1825 1796299 5 Titration and Ion Analysis SW9045D Corrosivity (pH<2or>14) "As Received" 0.010 0.100 SU Corrosivity Н 6.86 1 RXB5 08/24/18 1740 1796197 6 The following Prep Methods were performed: Method Description Analyst Date Time Prep Batch SW846 3050B ICP-MS 3050BS PREP SXW1 08/24/18 0930 1796298 SW846 9056A SW846 9056A Total Anions in Soil MAR1 08/27/18 0722 1796413 The following Analytical Methods were performed: Method Description Analyst Comments SW846 9056A SW846 3050B/6020A SW846 3050B/6020A SW846 3050B/6020A SW846 3050B/6020A SW846 9045D Notes:

Column headers are defined as follows: DF: Dilution Factor **DL:** Detection Limit MDA: Minimum Detectable Activity MDC: Minimum Detectable Concentration

Lc/LC: Critical Level PF: Prep Factor **RL:** Reporting Limit SQL: Sample Quantitation Limit

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Report Date: September 6, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B12-(3-4) Soil Boring Project: WNUC00518 Sample ID: 457991026 Client ID: WNUC007 Matrix: Soil Collect Date: 22-AUG-18 11:38 23-AUG-18 Receive Date: Collector: Client Moisture: 4.42% RL PF Parameter Qualifier DL Units DF Analyst Date Result Time Batch Method Ion Chromatography SW846 9056A Fluoride "Dry Weight Corrected" 467 7.06 20.8 mg/kg 9.93 20 MAR1 08/28/18 1730 1796414 1 Metals Analysis-ICP-MS SW846 3050B/6020A Uranium Solid "Dry Weight Corrected" Uranium-234 98.1 93.8 20 PRB 08/29/18 1139 1796299 2 1010 19.6 ug/Kg 13700 Uranium-235 119000 1960 ug/Kg 93.8 2000 PRB 08/29/18 1556 1796299 3 Uranium-238 2750000 13000 39300 ug/Kg 93.8 2000 Uranium 2900000 13000 39300 ug/Kg 93.8 2000 PRB 08/29/18 1827 1796299 4 Titration and Ion Analysis SW9045D Corrosivity (pH<2or>14) "As Received" 0.010 0.100 SU Corrosivity Н 4.17 1 RXB5 08/24/18 1742 1796197 5 The following Prep Methods were performed: Method Description Analyst Date Time Prep Batch SW846 3050B ICP-MS 3050BS PREP SXW1 08/24/18 0930 1796298 SW846 9056A SW846 9056A Total Anions in Soil MAR1 08/27/18 0722 1796413 The following Analytical Methods were performed: Method Description Analyst Comments SW846 9056A SW846 3050B/6020A SW846 3050B/6020A SW846 3050B/6020A

Notes:

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Fluoride

Column headers are defined as follows: DF: Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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QC	Summary

Report Date: September 6, 2018

Page 1 of 6

Westingho	use Electric Company, LLC
PO Drawe	r R
Columbia,	South Carolina
NOA	• • •

Ms. Cynthia Logsdon

Workorder:

Contact:

Workorder:	457991												
Parmname			NOM	Sample (Qual	QC	Units	RPD%	REC%	Range A	nlst	Date	Time
Ion Chromatograp Batch 17	hy '96414												
QC1204100742 Fluoride	457991026	DUP		467		467	mg/kg	0.0703		(0%-20%) 1	MAR1	08/28/1	8 18:01
QC1204100741 Fluoride	LCS		25.0			24.7	mg/kg		98.9	(90%-110%)		08/27/1	8 19:22
QC1204100740 Fluoride	MB				U	ND	mg/kg					08/27/1	8 18:51
QC1204100743 Fluoride	457991026	MS	26.1	467		463	mg/kg		N/A	(30%-135%)		08/28/1	8 18:32
Batch 17	96417												
QC1204100746 Fluoride	457991010	DUP		22.8		23.3	mg/kg	1.83		(0%-20%) 1	MAR1	08/28/1	8 09:17
QC1204100745 Fluoride	LCS		25.0			25.3	mg/kg		101	(90%-110%)		08/28/1	8 20:36
QC1204100744 Fluoride	MB				U	ND	mg/kg					08/28/1	8 20:05
QC1204100747 Fluoride	457991010	MS	25.2	22.8		48.5	mg/kg		102	(30%-135%)		08/28/1	8 09:47
Batch 17	96420												
QC1204100750 Fluoride	457991020	DUP		13.3		12.5	mg/kg	6.38		(0%-20%) 1	MAR1	08/29/1	8 09:28
QC1204100749 Fluoride	LCS		25.0			25.6	mg/kg		103	(90%-110%)		08/29/1	8 02:46

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QC Summary

Workorder: 457991										Page 2 of 6
Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Ion Chromatography Batch 1796420										
QC1204100748 MB Fluoride			U	ND	mg/kg				MAR1	08/29/18 02:15
QC1204100751 457991020 MS Fluoride	26.2	13.3		30.3	mg/kg		64.8	(30%-135%))	08/29/18 09:59
Metals Analysis - ICPMS Batch 1796296 —										
QC1204100481 457991001 DUI Uranium	D.	4540		6640	ug/Kg	37.7*		(0%-20%)) PRB	08/29/18 17:14
Uranium-234	U	ND	U	ND	ug/Kg	N/A				08/29/18 10:27
Uranium-235		134		194	ug/Kg	36.7*		(0%-20%))	08/29/18 13:48
Uranium-238		4350		6420	ug/Kg	38.5*		(0%-20%))	
QC1204100480 LCS Uranium	4800			4660	ug/Kg		97.1	(80%-120%))	08/29/18 17:11
Uranium-235	34.5			31.3	ug/Kg		90.5	(80%-120%))	08/29/18 13:45
Uranium-238	4760			4280	ug/Kg		89.9	(80%-120%))	
QC1204100498 LCS Uranium-234	50.9			41.9	ug/Kg		82.2	(80%-120%))	08/29/18 10:24
QC1204100479 MB Uranium			U	ND	ug/Kg					08/29/18 17:09
Uranium-234			U	ND	ug/Kg					08/29/18 10:22
Uranium-235			U	ND	ug/Kg					08/29/18 13:43

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QC Summary

Workorder: 457991										Page 3 of 6
Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Metals Analysis - ICPMS Batch 1796296										
Uranium-238			U	ND	ug/Kg				PRB	08/29/18 13:43
QC1204100482 457991001 MS Uranium	5170	4540		9640	ug/Kg		98.8	(75%-125%)		08/29/18 17:16
Uranium-235	37.2	134		171	ug/Kg		99.3	(75%-125%)		08/29/18 13:50
Uranium-238	5140	4350		9280	ug/Kg		96.1	(75%-125%)		
QC1204100499 457991001 MS Uranium-234	56.7 U	ND		52.6	ug/Kg		90.9	(75%-125%)		08/29/18 10:29
QC1204100483 457991001 SDILT Uranium		22.1		4.20	ug/L	4.94		(0%-10%)		08/29/18 17:19
Uranium-234	U	ND	U	ND	ug/L	N/A				08/29/18 10:31
Uranium-235		0.653		0.137	ug/L	4.53		(0%-10%)		08/29/18 13:53
Uranium-238		21.2		4.25	ug/L	.383		(0%-10%)		
Potch 1706200										
QC1204100486 457991021 DUP Uranium		689000		645000	ug/Kg	6.6		(0%-20%)	PRB	08/29/18 18:12
Uranium-234		181		175	ug/Kg	3.51 /	λ.	(+/-49.2))	08/29/18 11:23
Uranium-235		22300		19400	ug/Kg	13.8 /	λ,	(+/-6890))	08/29/18 15:34
Uranium-238		669000		625000	ug/Kg	6.84		(0%-20%)		08/29/18 15:27
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QC Summary

Workorder:	457991								Page 4 of 6
Parmname		NOM	Sample Qua	l QC	Units	RPD%	REC%	Range Anlst	Date Time
Metals Analysis - Io Batch 17	C PMS 796299								
QC1204100485 Uranium	LCS	4690		4160	ug/Kg		88.7	(80%-120%) PR	B 08/29/18 18:09
Uranium-235		33.8		30.5	ug/Kg		90.2	(80%-120%)	08/29/18 15:23
Uranium-238		4660		4120	ug/Kg		88.5	(80%-120%)	
QC1204100500 Uranium-234	LCS	53.4		48.9	ug/Kg		91.6	(80%-120%)	08/29/18 11:19
QC1204100484 Uranium	MB		U	ND	ug/Kg				08/29/18 18:07
Uranium-234			U	ND	ug/Kg				08/29/18 11:18
Uranium-235			U	ND	ug/Kg				08/29/18 15:22
Uranium-238			U	ND	ug/Kg				
QC1204100487 Uranium	457991021	MS 5040	689000	684000	ug/Kg		N/A	(75%-125%)	08/29/18 18:14
Uranium-235		36.3	22300	21500	ug/Kg		N/A	(75%-125%)	08/29/18 15:35
Uranium-238		5000	669000	641000	ug/Kg		N/A	(75%-125%)	08/29/18 15:28
QC1204100501 Uranium-234	457991021	MS 51.6	181	262	ug/Kg		156*	(75%-125%)	08/29/18 11:25
QC1204103557 Uranium-234	457991021	PS 1.38	0.184	1.45	ug/L		91.8	(80%-120%)	08/29/18 12:00

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QC Summary

Workorder: 457991										Page 5 of 6
Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Metals Analysis - ICPMS Batch 1796299										
QC1204100488 457991021 SDILT Uranium		34.9		6.37	ug/L	8.77		(0%-10%)	PRB	08/29/18 18:15
Uranium-234		0.184	J	0.035	ug/L	4.89				08/29/18 11:26
Uranium-235		0.226	J	0.0433	ug/L	4.12		(0%-10%)		08/29/18 15:37
Uranium-238		33.9		6.56	ug/L	3.3		(0%-10%)		08/29/18 15:30
Titration and Ion Analysis Batch 1794362										
QC1204096010 457499001 DUP Corrosivity	Н	7.15	Н	7.14	SU	0.14		(0%-10%)	RXB5	08/24/18 17:04
QC1204096009 LCS Corrosivity	7.00			7.05	SU		101	(95%-105%)		08/24/18 16:59
Batch 1796197 QC1204100258 457991009 DUP Corrosivity	Н	5.30	Н	5.31	SU	0.189		(0%-10%)	RXB5	08/24/18 17:18
QC1204100259 457991010 DUP Corrosivity	Н	5.18	Н	5.30	SU	2.29		(0%-10%)		08/24/18 17:20
QC1204100257 LCS Corrosivity	7.00			7.05	SU		101	(95%-105%)		08/24/18 17:01

Notes:

The Qualifiers in this report are defined as follows:

- < Result is less than value reported
- > Result is greater than value reported
- B The target analyte was detected in the associated blank.
- $E \qquad \ \ \, \% difference \ of \ sample \ and \ SD \ is > 10\%. \ \ Sample \ concentration \ must \ meet \ flagging \ criteria$

E General Chemistry--Concentration of the target analyte exceeds the instrument calibration range

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QC Summary

Workor	der:	457991		•								Pag	ge 6 of 6
Parmnai	me		NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
FB	Mercu invali	ary was found d for reporting	present at quantifiable to regulatory agencie	e concentrations in s	field blan	ks received	with these	e samples. D	ata associate	ed with the	blank are	deemed	
Н	Analy	tical holding t	ime was exceeded										
J	Value	is estimated											
Ν	MetalsThe Matrix spike sample recovery is not within specified control limits												
N/A	RPD or %Recovery limits do not apply.												
N1	See case narrative												
ND	Analy	te concentratio	on is not detected above	ve the detection lir	nit								
NJ	Consu	ılt Case Narrat	tive, Data Summary pa	ackage, or Project	Manager c	concerning	this qualifi	er					
Q	One o	r more quality	control criteria have a	not been met. Refe	er to the ap	plicable na	rrative or I	DER.					
R	Per se purpo	ection 9.3.4.1 o ses.	of Method 1664 Revis	ion B, due to matr	ix spike re	ecovery issu	es, this res	sult may not	be reported	or used for	regulatory	y complia	ance
II.	Analy	te was analyze	ed for but not detected	above the MDL	MDA MI	OC or LOD							
X	Consu	ilt Case Narrat	tive. Data Summary pa	ackage, or Project	Manager o	concerning	this qualifi	er					
Y	Other	specific qualif	fiers were required to	properly define the	e results. C	Consult case	narrative.						
Z	Paint	Filter TestPa	rticulates passed throu	igh the filter, how	ever no fre	e liquids w	ere observ	ed.					
٨	RPD o	of sample and	duplicate evaluated us	sing +/-RL. Conce	entrations a	are <5X the	RL. Qual	ifier Not Ap	plicable for	Radiochem	istry.		
d	5-day BODThe 2:1 depletion requirement was not met for this sample												
e	5-day BODTest replicates show more than 30% difference between high and low values. The data is qualified per the method and can be used for reporting purposes												
h	Prepa	ration or prese	rvation holding time v	vas exceeded									
N/A ind ^ The Re five time	licates t elative es (5X)	hat spike reco Percent Differ the contract re	very limits do not appl rence (RPD) obtained a equired detection limit	ly when sample co from the sample d t (RL). In cases wi	oncentratio uplicate (I here either	n exceeds s DUP) is eva the sample	pike conc. aluated aga or duplica	by a factor of the second seco	of 4 or more ptance criter ess than 5X t	or %RPD 1 ria when the he RL, a co	not applica e sample i ontrol limi	able. s greater t of +/- t	than he

RL is used to evaluate the DUP result.

* Indicates that a Quality Control parameter was not within specifications.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

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Certificate of Analysis

Report Date: September 6, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B1-(1-2) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 457991001 Matrix: Soil Collect Date: 20-AUG-18 14:26 23-AUG-18 Receive Date: Collector: Client 7.41% Moisture: RL Parameter Qualifier MDC Units PF Result Uncertainty DF Analyst Date Time Batch Method Gravimetric Solids ASTM D 2216 % Moisture "As Received" Moisture 7.41 percent CXB7 08/23/18 1614 1796278 1 Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 0.500 pCi/g JXR5 08/29/18 1222 1797288 2 4.92 +/-1.130.493 Uranium-235/236 U 0.281 +/-0.355 0.442 0.500 pCi/g Uranium-238 +/-0.801 0.309 0.500 pCi/g 2.50 Rad Liquid Scintillation Analysis Liquid Scint Tc99, Soil "As Received" Technetium-99 3.85 +/-12.7 21.8 50.0 pCi/g TXJ1 08/29/18 0827 1796303 3 U The following Prep Methods were performed: Method Date Prep Batch Description Analyst Time Dry Soil Prep Dry Soil Prep GL-RAD-A-021 CXB7 08/23/18 1796278 1614 The following Analytical Methods were performed: Method Description Analyst Comments ASTM D 2216 (Modified) DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Surrogate/Tracer Recovery Test Result Nominal Recovery% Acceptable Limits Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 63.7 (15%-125%) Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" 96.6 (15%-125%) Notes: Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). Column headers are defined as follows: **DF:** Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: September 6, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B1-(3-4) Soil Boring Project: WNUC00518 Sample ID: 457991002 Client ID: WNUC007 Matrix: Soil Collect Date: 20-AUG-18 14:50 23-AUG-18 Receive Date: Collector: Client 7.27% Moisture: RL Parameter Qualifier MDC Units PF Result Uncertainty DF Analyst Date Time Batch Method Gravimetric Solids ASTM D 2216 % Moisture "As Received" Moisture 7.27 percent CXB7 08/23/18 1614 1796278 1 Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 +/-158 0.500 pCi/g JXR5 08/29/18 1222 1797288 2 7420 6.96 Uranium-235/236 375 +/-39.6 0.500 pCi/g 6.63 Uranium-238 +/-66.4 0.500 pCi/g 1310 6.49 Rad Liquid Scintillation Analysis Liquid Scint Tc99, Soil "As Received" Technetium-99 14.6 +/-14.2 23.7 50.0 pCi/g TXJ1 08/28/18 0544 1796303 3 U The following Prep Methods were performed: Method Date Prep Batch Description Analyst Time Dry Soil Prep Dry Soil Prep GL-RAD-A-021 CXB7 08/23/18 1796278 1614 The following Analytical Methods were performed: Method Description Analyst Comments ASTM D 2216 (Modified) DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Surrogate/Tracer Recovery Test Result Nominal Recovery% Acceptable Limits Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 84.1 (15%-125%) 96.5 Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" (15%-125%) Notes: Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). Column headers are defined as follows: **DF:** Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: September 6, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B1-(5-6) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 457991003 Matrix: Soil Collect Date: 20-AUG-18 15:30 23-AUG-18 Receive Date: Collector: Client Moisture: 7.66% RL Parameter Qualifier MDC Units PF Result Uncertainty DF Analyst Date Time Batch Method Gravimetric Solids ASTM D 2216 % Moisture "As Received" Moisture 7.66 percent CXB7 08/23/18 1614 1796278 1 Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 +/-166 0.500 pCi/g JXR5 08/29/18 1222 1797288 2 8750 12.3 Uranium-235/236 402 +/-39.6 4.85 0.500 pCi/g Uranium-238 1640 +/-71.7 0.500 5.39 pCi/g Rad Liquid Scintillation Analysis Liquid Scint Tc99, Soil "As Received" Technetium-99 6.24 +/-16.4 28.1 50.0 pCi/g TXJ1 08/28/18 0606 1796303 3 U The following Prep Methods were performed: Method Date Prep Batch Description Analyst Time Dry Soil Prep Dry Soil Prep GL-RAD-A-021 CXB7 08/23/18 1796278 1614 The following Analytical Methods were performed: Method Description Analyst Comments ASTM D 2216 (Modified) DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Surrogate/Tracer Recovery Test Result Nominal Recovery% Acceptable Limits Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 90.8 (15%-125%) 98.7 Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" (15%-125%) Notes: Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). Column headers are defined as follows: **DF:** Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Report Date: September 6, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B2-(1-2) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 457991004 Matrix: Soil Collect Date: 20-AUG-18 17:01 23-AUG-18 Receive Date: Collector: Client 4.75% Moisture: RL Parameter Qualifier MDC Units PF Result Uncertainty DF Analyst Date Time Batch Method Gravimetric Solids ASTM D 2216 % Moisture "As Received" Moisture 4.75 percent CXB7 08/23/18 1614 1796278 1 Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 +/-1.41 0.500 pCi/g JXR5 08/29/18 1222 1797288 2 12.6 0.336 Uranium-235/236 0.638 +/-0.368 0.240 0.500 pCi/g Uranium-238 +/-0.688 0.500 2.96 0.247 pCi/g Rad Liquid Scintillation Analysis Liquid Scint Tc99, Soil "As Received" Technetium-99 14.7 +/-13.2 22.0 50.0 pCi/g TXJ1 08/28/18 0627 1796303 3 U The following Prep Methods were performed: Method Date Prep Batch Description Analyst Time Dry Soil Prep Dry Soil Prep GL-RAD-A-021 CXB7 08/23/18 1614 1796278 The following Analytical Methods were performed: Method Description Analyst Comments ASTM D 2216 (Modified) DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Surrogate/Tracer Recovery Result Nominal Recovery% Acceptable Limits Test Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 90.6 (15%-125%) 94.3 Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" (15%-125%) Notes: Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). Column headers are defined as follows: **DF:** Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Report Date: September 6, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B3-(1-2) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 457991005 Matrix: Soil Collect Date: 21-AUG-18 08:40 23-AUG-18 Receive Date: Collector: Client 1.04% Moisture: RL Parameter Qualifier MDC Units PF Result Uncertainty DF Analyst Date Time Batch Method Gravimetric Solids ASTM D 2216 % Moisture "As Received" Moisture 1.04 percent CXB7 08/23/18 1614 1796278 1 Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 +/-0.490 0.274 0.500 pCi/g JXR5 08/29/18 1222 1797288 2 1.49 Uranium-235/236 0.195 +/-0.215 0.146 0.500 pCi/g Uranium-238 0.811 +/-0.374 0.292 0.500 pCi/g Rad Liquid Scintillation Analysis Liquid Scint Tc99, Soil "As Received" Technetium-99 -16.8 +/-24.4 43.2 50.0 pCi/g TXJ1 08/29/18 0849 1796303 3 U The following Prep Methods were performed: Method Prep Batch Description Analyst Date Time Dry Soil Prep GL-RAD-A-021 CXB7 08/23/18 Dry Soil Prep 1614 1796278 The following Analytical Methods were performed: Method Description Analyst Comments ASTM D 2216 (Modified) DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Surrogate/Tracer Recovery Result Nominal Recovery% Acceptable Limits Test Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 91.1 (15%-125%) 77.2 Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" (15%-125%) Notes: Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). Column headers are defined as follows: **DF:** Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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2

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Report Date: September 6, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B3-(3-4) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 457991006 Matrix: Soil Collect Date: 21-AUG-18 08:58 23-AUG-18 Receive Date: Collector: Client .876% Moisture: RL Parameter Qualifier MDC Units PF Result Uncertainty DF Analyst Date Time Batch Method Gravimetric Solids ASTM D 2216 % Moisture "As Received" Moisture 0.876 percent CXB7 08/23/18 1614 1796278 1 Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 +/-15.1 0.500 pCi/g JXR5 08/29/18 1429 1797288 2 745 0.837 Uranium-235/236 36.1 +/-3.70 0.471 0.500 pCi/g Uranium-238 +/-6.07 0.500 121 0.752 pCi/g Rad Liquid Scintillation Analysis Liquid Scint Tc99, Soil "As Received" Technetium-99 -2.68 +/-12.1 21.2 50.0 pCi/g TXJ1 08/28/18 0711 1796303 3 U The following Prep Methods were performed: Method Prep Batch Description Analyst Date Time Dry Soil Prep GL-RAD-A-021 CXB7 08/23/18 Dry Soil Prep 1614 1796278 The following Analytical Methods were performed: Analyst Comments Method Description ASTM D 2216 (Modified) DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Surrogate/Tracer Recovery Result Nominal Recovery% Acceptable Limits Test Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 85.9 (15%-125%) Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" 94.8 (15%-125%) Notes: Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). Column headers are defined as follows: **DF:** Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: September 6, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B3-(4.5-5) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 457991007 Matrix: Soil Collect Date: 21-AUG-18 09:10 23-AUG-18 Receive Date: Collector: Client Moisture: 1.46% RL Parameter Qualifier MDC Units PF Result Uncertainty DF Analyst Date Time Batch Method Gravimetric Solids ASTM D 2216 % Moisture "As Received" Moisture 1.46 percent CXB7 08/23/18 1614 1796278 1 Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 +/-10.2 0.500 pCi/g JXR5 08/29/18 1222 1797288 2 311 0.586 Uranium-235/236 13.6 +/-2.39 0.516 0.500 pCi/g Uranium-238 +/-4.17 0.500 51.5 0.756 pCi/g Rad Liquid Scintillation Analysis Liquid Scint Tc99, Soil "As Received" Technetium-99 -1.24 +/-15.5 27.050.0 pCi/g TXJ1 08/28/18 0733 1796303 3 U The following Prep Methods were performed: Method Date Prep Batch Description Analyst Time Dry Soil Prep Dry Soil Prep GL-RAD-A-021 CXB7 08/23/18 1614 1796278 The following Analytical Methods were performed: Analyst Comments Method Description ASTM D 2216 (Modified) DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Surrogate/Tracer Recovery Result Nominal Recovery% Acceptable Limits Test Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 87.5 (15%-125%) Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" 88.5 (15%-125%) Notes: Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). Column headers are defined as follows: **DF:** Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: September 6, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B4-(1-2) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 457991008 Matrix: Soil Collect Date: 21-AUG-18 09:46 23-AUG-18 Receive Date: Collector: Client 1.02% Moisture: RL Parameter Qualifier MDC Units PF Result Uncertainty DF Analyst Date Time Batch Method Gravimetric Solids ASTM D 2216 % Moisture "As Received" Moisture 1.02 percent CXB7 08/23/18 1614 1796278 1 Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 0.500 pCi/g JXR5 08/29/18 1222 1797288 2 793 +/-17.10.635 Uranium-235/236 43.6 +/-4.45 0.354 0.500 pCi/g Uranium-238 +/-7.97 0.529 0.500 pCi/g 173 Rad Liquid Scintillation Analysis Liquid Scint Tc99, Soil "As Received" Technetium-99 15.5 +/-16.8 28.2 50.0 pCi/g TXJ1 08/28/18 0755 1796303 3 U The following Prep Methods were performed: Method Date Prep Batch Description Analyst Time Dry Soil Prep Dry Soil Prep GL-RAD-A-021 CXB7 08/23/18 1796278 1614 The following Analytical Methods were performed: Method Description Analyst Comments ASTM D 2216 (Modified) DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Surrogate/Tracer Recovery Test Result Nominal Recovery% Acceptable Limits Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 82 (15%-125%) 98.9 Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" (15%-125%) Notes: Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). Column headers are defined as follows: **DF:** Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: September 6, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B4-(3-4) Soil Boring Project: WNUC00518 Sample ID: 457991009 Client ID: WNUC007 Matrix: Soil Collect Date: 21-AUG-18 09:59 23-AUG-18 Receive Date: Collector: Client 1.27% Moisture: RL Parameter Qualifier MDC Units PF Result Uncertainty DF Analyst Date Time Batch Method Gravimetric Solids ASTM D 2216 % Moisture "As Received" Moisture 1.27 percent CXB7 08/23/18 1614 1796278 1 Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 0.596 0.500 pCi/g JXR5 08/29/18 1222 1797288 2 999 +/-18.5Uranium-235/236 54.5 +/-4.81 0.529 0.500 pCi/g Uranium-238 +/-8.77 0.495 0.500 pCi/g 224 Rad Liquid Scintillation Analysis Liquid Scint Tc99, Soil "As Received" Technetium-99 5.15 +/-16.1 27.6 50.0 pCi/g TXJ1 08/28/18 0816 1796303 3 U The following Prep Methods were performed: Method Date Prep Batch Description Analyst Time Dry Soil Prep Dry Soil Prep GL-RAD-A-021 CXB7 08/23/18 1796278 1614 The following Analytical Methods were performed: Method Description Analyst Comments ASTM D 2216 (Modified) DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Surrogate/Tracer Recovery Test Result Nominal Recovery% Acceptable Limits Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 72.8 (15%-125%) 90.5 Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" (15%-125%) Notes: Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). Column headers are defined as follows: **DF:** Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: September 6, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B4-(5-5.5) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 457991010 Matrix: Soil Collect Date: 21-AUG-18 10:10 23-AUG-18 Receive Date: Collector: Client Moisture: 2.01% RL Parameter Qualifier MDC Units PF Result Uncertainty DF Analyst Date Time Batch Method Gravimetric Solids ASTM D 2216 % Moisture "As Received" Moisture 2.01 percent CXB7 08/23/18 1614 1796278 1 Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 0.500 pCi/g JXR5 08/29/18 1222 1797288 2 237 +/-8.640.468 Uranium-235/236 9.91 +/-1.97 0.303 0.500 pCi/g Uranium-238 49.8 +/-3.97 0.634 0.500 pCi/g Rad Liquid Scintillation Analysis Liquid Scint Tc99, Soil "As Received" Technetium-99 2.51 +/-14.1 24.4 50.0 pCi/g TXJ1 08/28/18 0838 1796303 3 U The following Prep Methods were performed: Method Date Prep Batch Description Analyst Time Dry Soil Prep Dry Soil Prep GL-RAD-A-021 CXB7 08/23/18 1796278 1614 The following Analytical Methods were performed: Method Description Analyst Comments ASTM D 2216 (Modified) DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Surrogate/Tracer Recovery Test Result Nominal Recovery% Acceptable Limits Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 75.3 (15%-125%) Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" 97 (15%-125%) Notes: Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). Column headers are defined as follows: **DF:** Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Report Date: September 6, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B5-(1-2) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 457991011 Matrix: Soil Collect Date: 21-AUG-18 11:01 23-AUG-18 Receive Date: Collector: Client 4.58% Moisture: RL Parameter Qualifier MDC Units PF Result Uncertainty DF Analyst Date Time Batch Method Gravimetric Solids ASTM D 2216 % Moisture "As Received" Moisture 4.58 percent CXB7 08/23/18 1614 1796278 1 Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 +/-1.57 0.500 pCi/g JXR5 08/29/18 1422 1797288 2 17.1 0.331 Uranium-235/236 1.02 +/-0.453 0.355 0.500 pCi/g Uranium-238 +/-0.817 0.500 pCi/g 4.59 0.260 Rad Liquid Scintillation Analysis Liquid Scint Tc99, Soil "As Received" Technetium-99 -1.15 +/-13.4 23.4 50.0 pCi/g TXJ1 08/28/18 0900 1796303 3 U The following Prep Methods were performed: Method Date Prep Batch Description Analyst Time Dry Soil Prep Dry Soil Prep GL-RAD-A-021 CXB7 08/23/18 1796278 1614 The following Analytical Methods were performed: Method Description Analyst Comments ASTM D 2216 (Modified) DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Surrogate/Tracer Recovery Test Result Nominal Recovery% Acceptable Limits Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 71.8 (15%-125%) 98.1 Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" (15%-125%) Notes: Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). Column headers are defined as follows: **DF:** Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Report Date: September 6, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B6-(1-2) Soil Boring Project: WNUC00518 Sample ID: 457991012 Client ID: WNUC007 Matrix: Soil Collect Date: 21-AUG-18 11:27 23-AUG-18 Receive Date: Collector: Client 7.83% Moisture: RL Parameter Qualifier MDC Units PF Result Uncertainty DF Analyst Date Time Batch Method Gravimetric Solids ASTM D 2216 % Moisture "As Received" Moisture 7.83 percent CXB7 08/23/18 1614 1796278 1 Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 +/-0.408 0.500 pCi/g JXR5 08/29/18 1422 1797288 2 1.31 0.250 Uranium-235/236 U -0.00756 +/-0.113 0.265 0.500 pCi/g Uranium-238 +/-0.3500.500 pCi/g 1.00 0.147 Rad Liquid Scintillation Analysis Liquid Scint Tc99, Soil "As Received" Technetium-99 3.23 +/-12.8 22.1 50.0 pCi/g TXJ1 08/28/18 0922 1796303 3 U The following Prep Methods were performed: Method Date Prep Batch Description Analyst Time Dry Soil Prep Dry Soil Prep GL-RAD-A-021 CXB7 08/23/18 1796278 1614 The following Analytical Methods were performed: Method Description Analyst Comments ASTM D 2216 (Modified) DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Surrogate/Tracer Recovery Test Result Nominal Recovery% Acceptable Limits Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 85.8 (15%-125%) 98.3 Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" (15%-125%) Notes: Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). Column headers are defined as follows: **DF:** Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: September 6, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B6-(3-4) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 457991013 Matrix: Soil Collect Date: 21-AUG-18 11:45 23-AUG-18 Receive Date: Collector: Client 7.88% Moisture: RL Parameter Qualifier MDC Units PF Result Uncertainty DF Analyst Date Time Batch Method Gravimetric Solids ASTM D 2216 % Moisture "As Received" Moisture 7.88 percent CXB7 08/23/18 1614 1796278 1 Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 +/-0.380 0.301 0.500 pCi/g JXR5 08/29/18 1422 1797288 2 0.945 Uranium-235/236 U -0.0102 +/-0.0883 0.205 0.500 pCi/g Uranium-238 0.700 +/-0.319 0.500 0.211 pCi/g Rad Liquid Scintillation Analysis Liquid Scint Tc99, Soil "As Received" 30.9 Technetium-99 19.0 +/-18.5 50.0 pCi/g TXJ1 08/28/18 0944 1796303 3 U The following Prep Methods were performed: Method Date Prep Batch Description Analyst Time Dry Soil Prep Dry Soil Prep GL-RAD-A-021 CXB7 08/23/18 1796278 1614 The following Analytical Methods were performed: Method Description Analyst Comments ASTM D 2216 (Modified) DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Surrogate/Tracer Recovery Test Result Nominal Recovery% Acceptable Limits Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 79.1 (15%-125%) 96.8 Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" (15%-125%) Notes: Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). Column headers are defined as follows: **DF:** Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: September 6, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B6-(5-6) Soil Boring Project: WNUC00518 Sample ID: 457991014 Client ID: WNUC007 Matrix: Soil Collect Date: 21-AUG-18 13:47 23-AUG-18 Receive Date: Collector: Client 10.3% Moisture: RL Parameter Qualifier MDC Units PF Result Uncertainty DF Analyst Date Time Batch Method Gravimetric Solids ASTM D 2216 % Moisture "As Received" Moisture 10.3 percent CXB7 08/23/18 1614 1796278 1 Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 +/-0.482 0.500 pCi/g JXR5 08/29/18 1222 1797293 2 1.16 0.364 Uranium-235/236 U 0.114 +/-0.196 0.171 0.500 pCi/g Uranium-238 0.912 +/-0.416 0.221 0.500 pCi/g Rad Liquid Scintillation Analysis Liquid Scint Tc99, Soil "As Received" Technetium-99 3.57 +/-14.3 24.7 50.0 pCi/g TXJ1 08/28/18 0521 1796304 3 U The following Prep Methods were performed: Method Date Prep Batch Description Analyst Time Dry Soil Prep Dry Soil Prep GL-RAD-A-021 CXB7 08/23/18 1796278 1614 The following Analytical Methods were performed: Method Description Analyst Comments ASTM D 2216 (Modified) DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Surrogate/Tracer Recovery Test Result Nominal Recovery% Acceptable Limits Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 74.7 (15%-125%) 101 Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" (15%-125%) Notes: Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). Column headers are defined as follows: **DF:** Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: September 6, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B7-(1-2) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 457991015 Matrix: Soil Collect Date: 21-AUG-18 14:51 23-AUG-18 Receive Date: Collector: Client Moisture: 2.14% RL Parameter Qualifier MDC Units PF Result Uncertainty DF Analyst Date Time Batch Method Gravimetric Solids ASTM D 2216 % Moisture "As Received" Moisture 2.14 percent CXB7 08/23/18 1614 1796278 1 Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 0.500 pCi/g JXR5 08/29/18 1222 1797293 2 9.68 +/-1.160.237 Uranium-235/236 0.597 +/-0.337 0.245 0.500 pCi/g Uranium-238 +/-0.615 0.500 2.70 0.198 pCi/g Rad Liquid Scintillation Analysis Liquid Scint Tc99, Soil "As Received" Technetium-99 15.4 +/-17.5 29.5 50.0 pCi/g TXJ1 08/28/18 0543 1796304 3 U The following Prep Methods were performed: Method Date Prep Batch Description Analyst Time Dry Soil Prep Dry Soil Prep GL-RAD-A-021 CXB7 08/23/18 1614 1796278 The following Analytical Methods were performed: Method Description Analyst Comments ASTM D 2216 (Modified) DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Surrogate/Tracer Recovery Result Nominal Recovery% Acceptable Limits Test Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 88.4 (15%-125%) Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" 94.6 (15%-125%) Notes: Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). Column headers are defined as follows: **DF:** Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: September 6, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B8-(1-2) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 457991016 Matrix: Soil Collect Date: 21-AUG-18 15:10 23-AUG-18 Receive Date: Collector: Client Moisture: 3.86% RL Parameter Qualifier MDC Units PF Result Uncertainty DF Analyst Date Time Batch Method Gravimetric Solids ASTM D 2216 % Moisture "As Received" Moisture 3.86 percent CXB7 08/23/18 1614 1796278 1 Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 0.500 pCi/g JXR5 08/29/18 1222 1797293 2 12.8 +/-1.450.338 Uranium-235/236 0.422 +/-0.311 0.158 0.500 pCi/g Uranium-238 2.79 +/-0.685 0.500 0.236 pCi/g Rad Liquid Scintillation Analysis Liquid Scint Tc99, Soil "As Received" Technetium-99 12.7 +/-18.3 30.9 50.0 pCi/g TXJ1 08/28/18 0604 1796304 3 U The following Prep Methods were performed: Method Date Prep Batch Description Analyst Time Dry Soil Prep Dry Soil Prep GL-RAD-A-021 CXB7 08/23/18 1796278 1614 The following Analytical Methods were performed: Method Description Analyst Comments ASTM D 2216 (Modified) DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Surrogate/Tracer Recovery Result Nominal Recovery% Acceptable Limits Test Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 79.6 (15%-125%) 99.1 Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" (15%-125%) Notes: Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). Column headers are defined as follows: **DF:** Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: September 6, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B9-(1-2) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 457991017 Matrix: Soil Collect Date: 21-AUG-18 16:17 23-AUG-18 Receive Date: Collector: Client 7.36% Moisture: RL Parameter Qualifier MDC Units PF Result Uncertainty DF Analyst Date Time Batch Method Gravimetric Solids ASTM D 2216 % Moisture "As Received" Moisture 7.36 percent CXB7 08/23/18 1614 1796278 1 Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 +/-0.546 0.500 pCi/g JXR5 08/29/18 1222 1797293 2 1.68 0.326 Uranium-235/236 U 0.146 +/-0.211 0.254 0.500 pCi/g Uranium-238 0.999 +/-0.432 0.500 0.332 pCi/g Rad Liquid Scintillation Analysis Liquid Scint Tc99, Soil "As Received" Technetium-99 10.7 +/-14.5 24.4 50.0 pCi/g TXJ1 08/28/18 0626 1796304 3 U The following Prep Methods were performed: Method Date Prep Batch Description Analyst Time Dry Soil Prep GL-RAD-A-021 CXB7 08/23/18 1796278 Dry Soil Prep 1614 The following Analytical Methods were performed: Method Description Analyst Comments ASTM D 2216 (Modified) DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Surrogate/Tracer Recovery Result Nominal Recovery% Acceptable Limits Test Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 80.5 (15%-125%) 95.6 Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" (15%-125%) Notes: Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). Column headers are defined as follows: **DF:** Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: September 6, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B9-(3-4) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 457991018 Matrix: Soil Collect Date: 21-AUG-18 16:58 23-AUG-18 Receive Date: Collector: Client 7.23% Moisture: RL Parameter Qualifier MDC Units PF Result Uncertainty DF Analyst Date Time Batch Method Gravimetric Solids ASTM D 2216 % Moisture "As Received" Moisture 7.23 percent CXB7 08/23/18 1614 1796278 1 Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 3.04 0.500 pCi/g JXR5 08/29/18 1222 1797293 2 3690 +/-69.6Uranium-235/236 202 +/-18.1 2.34 0.500 pCi/g Uranium-238 +/-28.90.500 637 2.76 pCi/g Rad Liquid Scintillation Analysis Liquid Scint Tc99, Soil "As Received" Technetium-99 23.1 +/-16.1 26.5 50.0 pCi/g TXJ1 08/28/18 0648 1796304 3 U The following Prep Methods were performed: Method Date Prep Batch Description Analyst Time Dry Soil Prep Dry Soil Prep GL-RAD-A-021 CXB7 08/23/18 1796278 1614 The following Analytical Methods were performed: Method Description Analyst Comments ASTM D 2216 (Modified) DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Surrogate/Tracer Recovery Test Result Nominal Recovery% Acceptable Limits Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 74.3 (15%-125%) 98.1 Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" (15%-125%) Notes: Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). Column headers are defined as follows: **DF:** Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: September 6, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B9-(5-6) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 457991019 Matrix: Soil Collect Date: 21-AUG-18 17:23 23-AUG-18 Receive Date: Collector: Client 11.5% Moisture: RL Parameter Qualifier MDC Units PF Result Uncertainty DF Analyst Date Time Batch Method Gravimetric Solids ASTM D 2216 % Moisture "As Received" Moisture 11.5 percent CXB7 08/23/18 1614 1796278 1 Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 +/-12.0 0.500 pCi/g JXR5 08/29/18 1222 1797293 2 478 0.600 Uranium-235/236 28.3 +/-3.25 0.291 0.500 pCi/g Uranium-238 +/-4.95 0.480 0.500 pCi/g 81.1 Rad Liquid Scintillation Analysis Liquid Scint Tc99, Soil "As Received" 7.95 Technetium-99 +/-11.1 18.7 50.0 pCi/g TXJ1 08/28/18 0709 1796304 3 U The following Prep Methods were performed: Method Date Prep Batch Description Analyst Time Dry Soil Prep Dry Soil Prep GL-RAD-A-021 CXB7 08/23/18 1796278 1614 The following Analytical Methods were performed: Method Description Analyst Comments ASTM D 2216 (Modified) DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Surrogate/Tracer Recovery Test Result Nominal Recovery% Acceptable Limits Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 71.3 (15%-125%) Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" 94.6 (15%-125%) Notes: Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). Column headers are defined as follows: **DF:** Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: September 6, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B10-(1-2) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 457991020 Matrix: Soil Collect Date: 22-AUG-18 08:40 23-AUG-18 Receive Date: Collector: Client 5.09% Moisture: RL Parameter Qualifier MDC Units PF Result Uncertainty DF Analyst Date Time Batch Method Gravimetric Solids ASTM D 2216 % Moisture "As Received" Moisture 5.09 percent CXB7 08/23/18 1614 1796278 1 Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 +/-10.1 0.500 pCi/g JXR5 08/29/18 1222 1797293 2 430 0.577 Uranium-235/236 23.4 +/-2.63 0.230 0.500 pCi/g Uranium-238 96.9 +/-4.810.481 0.500 pCi/g Rad Liquid Scintillation Analysis Liquid Scint Tc99, Soil "As Received" Technetium-99 16.1 +/-18.4 31.0 50.0 pCi/g TXJ1 08/28/18 0731 1796304 3 U The following Prep Methods were performed: Method Date Prep Batch Description Analyst Time Dry Soil Prep Dry Soil Prep GL-RAD-A-021 CXB7 08/23/18 1796278 1614 The following Analytical Methods were performed: Method Description Analyst Comments ASTM D 2216 (Modified) DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Surrogate/Tracer Recovery Test Result Nominal Recovery% Acceptable Limits Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 93.6 (15%-125%) 96.5 Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" (15%-125%) Notes: Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). Column headers are defined as follows: **DF:** Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: September 6, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B10-(3-4) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 457991021 Matrix: Soil Collect Date: 22-AUG-18 08:55 23-AUG-18 Receive Date: Collector: Client Moisture: 2.11% RL Parameter Qualifier MDC Units PF Result Uncertainty DF Analyst Date Time Batch Method Gravimetric Solids ASTM D 2216 % Moisture "As Received" Moisture 2.11 percent CXB7 08/23/18 1619 1796279 1 Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 0.500 pCi/g JXR5 08/29/18 1222 1797293 2 1460 +/-47.33.64 Uranium-235/236 74.7 +/-12.0 2.73 0.500 pCi/g Uranium-238 +/-21.12.95 0.500 pCi/g 290 Rad Liquid Scintillation Analysis Liquid Scint Tc99, Soil "As Received" Technetium-99 6.99 +/-11.6 19.7 50.0 pCi/g TXJ1 08/28/18 0753 1796304 3 U The following Prep Methods were performed: Method Date Prep Batch Description Analyst Time Dry Soil Prep Dry Soil Prep GL-RAD-A-021 CXB7 08/23/18 1796279 1619 The following Analytical Methods were performed: Method Description Analyst Comments ASTM D 2216 (Modified) DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Surrogate/Tracer Recovery Test Result Nominal Recovery% Acceptable Limits Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 71.8 (15%-125%) 97.9 Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" (15%-125%) Notes: Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). Column headers are defined as follows: **DF:** Dilution Factor Lc/LC: Critical Level PF: Prep Factor **DL:** Detection Limit MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: September 6, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B11-(1-2) Soil Boring Project: WNUC00518 Sample ID: 457991022 Client ID: WNUC007 Matrix: Soil Collect Date: 22-AUG-18 09:42 23-AUG-18 Receive Date: Collector: Client Moisture: 1.18% RL Parameter Qualifier MDC Units PF Result Uncertainty DF Analyst Date Time Batch Method Gravimetric Solids ASTM D 2216 % Moisture "As Received" Moisture 1.18 percent CXB7 08/23/18 1619 1796279 1 Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 0.500 pCi/g JXR5 08/29/18 1222 1797293 2 80.0 +/-4.360.571 Uranium-235/236 4.52 +/-1.17 0.466 0.500 pCi/g Uranium-238 +/-2.030.500 pCi/g 17.1 0.536 Rad Liquid Scintillation Analysis Liquid Scint Tc99, Soil "As Received" Technetium-99 20.5 +/-20.0 33.5 50.0 pCi/g TXJ1 08/28/18 0814 1796304 3 U The following Prep Methods were performed: Method Date Prep Batch Description Analyst Time Dry Soil Prep Dry Soil Prep GL-RAD-A-021 CXB7 08/23/18 1796279 1619 The following Analytical Methods were performed: Method Description Analyst Comments ASTM D 2216 (Modified) DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Surrogate/Tracer Recovery Test Result Nominal Recovery% Acceptable Limits Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 91.2 (15%-125%) Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" 96.1 (15%-125%) Notes: Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). Column headers are defined as follows: **DF:** Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: September 6, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B11-(3-4) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 457991023 Matrix: Soil Collect Date: 22-AUG-18 10:05 23-AUG-18 Receive Date: Collector: Client Moisture: 3.16% RL Parameter Qualifier MDC Units PF Result Uncertainty DF Analyst Date Time Batch Method Gravimetric Solids ASTM D 2216 % Moisture "As Received" Moisture 3.16 percent CXB7 08/23/18 1619 1796279 1 Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 0.500 pCi/g JXR5 08/29/18 1222 1797293 2 3300 +/-68.6 2.86 Uranium-235/236 175 +/-17.6 2.20 0.500 pCi/g Uranium-238 +/-29.7 0.500 pCi/g 618 2.27 Rad Liquid Scintillation Analysis Liquid Scint Tc99, Soil "As Received" Technetium-99 3.24 +/-14.6 25.1 50.0 pCi/g TXJ1 08/28/18 0836 1796304 3 U The following Prep Methods were performed: Method Date Prep Batch Description Analyst Time Dry Soil Prep Dry Soil Prep GL-RAD-A-021 CXB7 08/23/18 1796279 1619 The following Analytical Methods were performed: Method Description Analyst Comments ASTM D 2216 (Modified) DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Surrogate/Tracer Recovery Test Result Nominal Recovery% Acceptable Limits Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 79.2 (15%-125%) 92.4 Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" (15%-125%) Notes: Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). Column headers are defined as follows: **DF:** Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: September 6, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B11-(5-6) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 457991024 Matrix: Soil Collect Date: 22-AUG-18 10:42 23-AUG-18 Receive Date: Collector: Client 13.3% Moisture: RL Parameter Qualifier MDC Units PF Result Uncertainty DF Analyst Date Time Batch Method Gravimetric Solids ASTM D 2216 % Moisture "As Received" Moisture 13.3 percent CXB7 08/23/18 1619 1796279 1 Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 +/-215 0.500 pCi/g JXR5 08/29/18 1222 1797293 2 12500 6.05 Uranium-235/236 630 +/-53.8 5.71 0.500 pCi/g Uranium-238 2320 +/-92.7 0.500 pCi/g 7.13 Rad Liquid Scintillation Analysis Liquid Scint Tc99, Soil "As Received" Technetium-99 -1.18 +/-14.4 25.1 50.0 pCi/g TXJ1 08/28/18 0858 1796304 3 U The following Prep Methods were performed: Method Date Prep Batch Description Analyst Time Dry Soil Prep Dry Soil Prep GL-RAD-A-021 CXB7 08/23/18 1796279 1619 The following Analytical Methods were performed: Method Description Analyst Comments ASTM D 2216 (Modified) DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Surrogate/Tracer Recovery Test Result Nominal Recovery% Acceptable Limits Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 67.9 (15%-125%) 94.3 Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" (15%-125%) Notes: Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). Column headers are defined as follows: **DF:** Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: September 6, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B12-(1-2) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 457991025 Matrix: Soil Collect Date: 22-AUG-18 11:21 23-AUG-18 Receive Date: Collector: Client 2.71% Moisture: RL Parameter Qualifier MDC Units PF Result Uncertainty DF Analyst Date Time Batch Method Gravimetric Solids ASTM D 2216 % Moisture "As Received" Moisture 2.71 percent CXB7 08/23/18 1619 1796279 1 Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 +/-101 0.500 pCi/g JXR5 08/29/18 1222 1797293 2 5170 3.81 Uranium-235/236 249 +/-24.6 3.49 0.500 pCi/g Uranium-238 841 +/-40.6 0.500 pCi/g 3.58 Rad Liquid Scintillation Analysis Liquid Scint Tc99, Soil "As Received" 0.935 Technetium-99 +/-14.5 25.1 50.0 pCi/g TXJ1 08/28/18 0920 1796304 3 U The following Prep Methods were performed: Method Date Prep Batch Description Analyst Time Dry Soil Prep Dry Soil Prep GL-RAD-A-021 CXB7 08/23/18 1796279 1619 The following Analytical Methods were performed: Method Description Analyst Comments ASTM D 2216 (Modified) DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Surrogate/Tracer Recovery Test Result Nominal Recovery% Acceptable Limits Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 56 (15%-125%) 101 Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" (15%-125%) Notes: Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). Column headers are defined as follows: **DF:** Dilution Factor Lc/LC: Critical Level PF: Prep Factor **DL:** Detection Limit MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: September 6, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B12-(3-4) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 457991026 Matrix: Soil Collect Date: 22-AUG-18 11:38 23-AUG-18 Receive Date: Collector: Client 4.42% Moisture: RL Parameter Qualifier MDC Units PF Result Uncertainty DF Analyst Date Time Batch Method Gravimetric Solids ASTM D 2216 % Moisture "As Received" Moisture 4.42 percent CXB7 08/23/18 1619 1796279 1 Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 +/-125 0.500 pCi/g JXR5 08/29/18 1222 1797293 2 5900 5.29 Uranium-235/236 291 +/-31.0 4.74 0.500 pCi/g Uranium-238 978 +/-51.00.500 4.85 pCi/g Rad Liquid Scintillation Analysis Liquid Scint Tc99, Soil "As Received" Technetium-99 19.4 +/-20.0 33.5 50.0 pCi/g TXJ1 08/28/18 0941 1796304 3 U The following Prep Methods were performed: Method Date Prep Batch Description Analyst Time Dry Soil Prep Dry Soil Prep GL-RAD-A-021 CXB7 08/23/18 1796279 1619 The following Analytical Methods were performed: Method Description Analyst Comments ASTM D 2216 (Modified) DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Surrogate/Tracer Recovery Test Result Nominal Recovery% Acceptable Limits Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 74.5 (15%-125%) 98.9 Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" (15%-125%) Notes: Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). Column headers are defined as follows: **DF:** Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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QC Summary

Report Date: September 6, 2018

Page 1 of 3

Westinghouse Electric Company, LLC PO Drawer R Columbia, South Carolina Ms. Cynthia Logsdon

Workorder: 457991

Contact:

Parmname	NOM	Sample Qu	al QC	Units	RPD%	REC%	Range An	st Date Time
Rad Alpha Spec Batch 1797288								
OC1204102810 457991004 DUP								
Uranium-233/234		12.6	15.3	pCi/g	19.8		(0%-20%) JZ	XR5 08/29/18 14:22
	Uncertainty	+/-1.41	+/-1.48					
Uranium-235/236		0.638	0.812	pCi/g	24		(0% - 100%)	
	Uncertainty	+/-0.368	+/-0.392					
Uranium-238		2.96	3.44	pCi/g	14.7		(0%-20%)	
	Uncertainty	+/-0.688	+/-0.713					
QC1204102811 LCS								
Uranium-233/234			14.6	pCi/g				08/29/18 14:29
	Uncertainty		+/-1.63					
Uranium-235/236			0.969	pCi/g				
	Uncertainty		+/-0.483					
Uranium-238	12.4		15.3	pCi/g		123	(75%-125%)	
	Uncertainty		+/-1.67					
QC1204102809 MB								
Uranium-233/234	Uncertainty	U	0.0496 +/-0.159	pCi/g				08/29/18 14:22
	Oncertainty		+/-0.137					
Uranium-235/236		U	0.0736	pCi/g				
	Uncertainty		+/-0.169					
Uranium-238		U	0.0689	pCi/g				
	Uncertainty		+/-0.135					
Batch 1797293 —								
QC1204102816 457991014 DUP				<i>a</i> .,				
Uranium-233/234	T T / • /	1.16	1.05	pC1/g	10		(0% - 100%) J2	XR5 08/29/18 12:22
	Uncertainty	+/-0.482	+/-0.451					
Uranium-235/236	U	0.114 U	0.144	pCi/g	N/A		N/A	
	Uncertainty	+/-0.196	+/-0.208					
Uranium-238		0.912	0.627	pCi/g	37.1		(0% - 100%)	
	Uncertainty	+/-0.416	+/-0.357					

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QC Summary

Workorder: 45	57991		-			<u></u>					Pag	e 2 of 3
Parmname		NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Rad Alpha SpecBatch1797	293											
QC1204102817 Uranium-233/234	LCS	Uncertainty			13.8 +/-1.55	pCi/g				JXR5	08/29/	18 12:22
Uranium-235/236		Uncertainty			1.09 +/-0.495	pCi/g						
Uranium-238		13.2 Uncertainty			14.1 +/-1.56	pCi/g		107	(75%-125%)			
QC1204102815 Uranium-233/234	MB	Uncertainty		U	0.132 +/-0.228	pCi/g					08/29/	18 12:22
Uranium-235/236		Uncertainty		U	0.100 +/-0.197	pCi/g						
Uranium-238		Uncertainty		U	0.0258 +/-0.166	pCi/g						
Rad Liquid Scintillati Batch 1796	ion 5303											
QC1204100519 Technetium-99	457991001 D	UP U Uncertainty	3.85 +/-12.7	U	11.9 +/-15.1	pCi/g	N/A		N/A	TXJ1	08/28/	18 10:27
QC1204100520 Technetium-99	LCS	548 Uncertainty			507 +/-25.8	pCi/g		92.6	(75%-125%)		08/28/	18 10:49
QC1204100518 Technetium-99	MB	Uncertainty		U	-0.764 +/-13.1	pCi/g					08/28/	18 10:05
Batch 1796	5304											
QC1204100522 Technetium-99	457991014 D	JP U Uncertainty	3.57 +/-14.3	U	-4.55 +/-14.3	pCi/g	N/A		N/A	TXJ1	08/28/	18 10:25
QC1204100523 Technetium-99	LCS	467 Uncertainty			446 +/-21.7	pCi/g		95.6	(75%-125%)		08/28/	18 10:46
QC1204100521 Technetium-99	MB	Uncertainty		U	0.608 +/-10.6	pCi/g					08/28/	18 10:03

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QC Summary

Workor	rder: 457991										Pag	e 3 of 3
Parmna	me	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Notes:												
Countin	ng Uncertainty is calculat	ted at the 95% confidence	ce level (1.96	-sigma).								
The Qu	alifiers in this report are	defined as follows:										
**	Analyte is a Tracer con	npound										
<	Result is less than value	e reported										
>	Result is greater than va	alue reported										
BD	Results are either below	w the MDC or tracer reco	overy is low									
FA	Failed analysis.											
Н	Analytical holding time	e was exceeded										
J	Value is estimated											
Κ	Analyte present. Repor	ted value may be biased	high. Actual	value is e	xpected to	be lower.						
L	Analyte present. Repor	ted value may be biased	low. Actual	value is ex	pected to b	be higher.						
М	M if above MDC and le	ess than LLD										
М	REMP Result > MDC/	CL and < RDL										
N/A	RPD or %Recovery lim	nits do not apply.										
N1	See case narrative											
ND	Analyte concentration i	is not detected above the	e detection lir	nit								
NJ	Consult Case Narrative	, Data Summary packag	ge, or Project	Manager c	concerning	this qualifi	er					
Q	One or more quality co	ntrol criteria have not be	een met. Refe	er to the ap	plicable na	arrative or I	DER.					
R	Sample results are reject	cted										
U	Analyte was analyzed f	for, but not detected abo	ve the MDL,	MDA, MI	DC or LOE) .						
UI	Gamma Spectroscopy	-Uncertain identification	1									
UJ	Gamma Spectroscopy	-Uncertain identification	1									
UL	Not considered detected	d. The associated number	er is the repor	ted concer	ntration, w	hich may b	e inaccurate	due to a low	bias.			
Х	Consult Case Narrative	, Data Summary packag	e, or Project	Manager c	concerning	this qualifi	er					
Y	Other specific qualifier	s were required to prope	erly define the	e results. C	Consult case	e narrative.						
۸	RPD of sample and dup	plicate evaluated using +	-/-RL. Conce	entrations a	are <5X the	e RL. Qual	ifier Not Ap	plicable for	Radiochem	istry.		
h	Preparation or preserva	tion holding time was e	xceeded									
N/A ind ^ The R five tim RL is us	licates that spike recover telative Percent Difference tes (5X) the contract requires to evaluate the DUP	y limits do not apply where (RPD) obtained from vired detection limit (RL result.	the sample co the sample d .). In cases wi	oncentratio uplicate (l here either	n exceeds DUP) is ev the sample	spike conc. aluated aga e or duplica	by a factor of the second seco	of 4 or more eptance criter ess than 5X t	or %RPD f ria when th he RL, a co	not applica e sample i ontrol limi	able. s greater t of +/- th	than ne

* Indicates that a Quality Control parameter was not within specifications.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

Technical Case Narrative Westinghouse Electric Co, LLC (WNUC) SDG #: 457991

Metals

Product: Determination of Metals by ICP-MS Analytical Method: SW846 3050B/6020A **Analytical Procedure:** GL-MA-E-014 REV# 32 **Analytical Batch:** 1796296

<u>Preparation Method:</u> SW846 3050B <u>Preparation Procedure:</u> GL-MA-E-009 REV# 28 <u>Preparation Batch:</u> 1796295

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
457991001	HF-B1-(1-2) Soil Boring
457991002	HF-B1-(3-4) Soil Boring
457991003	HF-B1-(5-6) Soil Boring
457991004	HF-B2-(1-2) Soil Boring
457991005	HF-B3-(1-2) Soil Boring
457991006	HF-B3-(3-4) Soil Boring
457991007	HF-B3-(4.5-5) Soil Boring
457991008	HF-B4-(1-2) Soil Boring
457991009	HF-B4-(3-4) Soil Boring
457991010	HF-B4-(5-5.5) Soil Boring
457991011	HF-B5-(1-2) Soil Boring
457991012	HF-B6-(1-2) Soil Boring
457991013	HF-B6-(3-4) Soil Boring
457991014	HF-B6-(5-6) Soil Boring
457991015	HF-B7-(1-2) Soil Boring
457991016	HF-B8-(1-2) Soil Boring
457991017	HF-B9-(1-2) Soil Boring
457991018	HF-B9-(3-4) Soil Boring
457991019	HF-B9-(5-6) Soil Boring
457991020	HF-B10-(1-2) Soil Boring
1204100479	Method Blank (MB)ICP-MS
1204100480	Laboratory Control Sample (LCS)
1204100498	Laboratory Control Sample (LCS)
1204100483	457991001(HF-B1-(1-2) Soil BoringL) Serial Dilution (SD)
1204100481	457991001(HF-B1-(1-2) Soil BoringD) Sample Duplicate (DUP)
1204100482	457991001(HF-B1-(1-2) Soil BoringS) Matrix Spike (MS)
1204100499	457991001(HF-B1-(1-2) Soil BoringS) Matrix Spike (MS)

The samples in this SDG were analyzed on a "dry weight" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Calibration Information

CRDL/PQL Requirements

The CRDL standard recoveries for SW846 6020A/6020B met the advisory control limits with the exception of uranium 235. Client sample concentrations were greater than two times the CRDL; therefore the data were not adversely affected. 457991009 (HF-B4-(3-4) Soil Boring), 457991010 (HF-B4-(5-5.5) Soil Boring), 457991011 (HF-B5-(1-2) Soil Boring), 457991015 (HF-B7-(1-2) Soil Boring), 457991016 (HF-B8-(1-2) Soil Boring), 457991018 (HF-B9-(3-4) Soil Boring), 457991019 (HF-B9-(5-6) Soil Boring) and 457991020 (HF-B10-(1-2) Soil Boring).

ICSA/ICSAB Statement

For the ICP-MS analysis, the ICSA solution contains analyte concentrations which are verified trace impurities indigenous to the purchased standard.

Quality Control (QC) Information

Duplicate Relative Percent Difference (RPD) Statement

The RPD obtained from the designated sample duplicate (DUP) is evaluated based on acceptance criteria of 20% when the sample is >5X the contract required reporting limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control of +/-RL is used to evaluate the DUP results. Not all the applicable analyte RPD values were within the acceptance criteria.

Sample	Analyte	Value
1204100481 (HF-B1-(1-2) Soil BoringDUP)	Uranium	37.7* (0%-20%)
	Uranium-235	36.7* (0%-20%)
	Uranium-238	38.5* (0%-20%)

Technical Information

Preparation/Analytical Method Verification

Method SW-846 3050B is not a total digestion technique for most samples. It is a very strong acid digestion that will dissolve almost all elements that could become environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

Sample Dilutions

Dilutions may be required for many reasons, including to minimize matrix interferences or to bring over range target analyte concentrations into the linear calibration range. Samples 457991001 (HF-B1-(1-2) Soil Boring), 457991002 (HF-B1-(3-4) Soil Boring), 457991003 (HF-B1-(5-6) Soil Boring), 457991004 (HF-B2-(1-2) Soil Boring), 457991006 (HF-B3-(3-4) Soil Boring), 457991007 (HF-B3-(4.5-5) Soil Boring), 457991008 (HF-B4-(1-2) Soil Boring), 457991009 (HF-B4-(3-4) Soil Boring), 457991010 (HF-B4-(5-5.5) Soil Boring), 457991011 (HF-B5-(1-2) Soil Boring), 457991015 (HF-B7-(1-2) Soil Boring), 457991016 (HF-B8-(1-2) Soil Boring), 457991018 (HF-B9-(3-4) Soil Boring), 457991019 (HF-B9-(5-6) Soil Boring) and 457991020 (HF-B10-(1-2) Soil Boring) were diluted to ensure that the analyte concentrations were within the linear calibration range of the instrument. The ICPMS solid samples in this SDG were diluted the standard two times.

Analyta	457991												
Analyte	001	002	003	004	005	006	007	008	009	010			
Uranium	2X	2000X	2000X	2X	2X	200X	25X	200X	200X	20X			
Uranium-234	2X	20X	20X	2X	2X	2X	2X	2X	2X	2X			
Uranium-235	2X	2000X	2000X	10X	2X	200X	200X	200X	250X	200X			

Uranium-238	2X	2000X	2000X	2X	2X	200X	200X	200X	250X	20X
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A 1.		457991												
Analyte	011	012	013	014	015	016	017	018	019	020				
Uranium	20X	2X	2X	2X	2X	20X	2X	200X	25X	200X				
Uranium-234	2X	2X	2X	2X	2X	2X	2X	10X	2X	2X				
Uranium-235	20X	2X	2X	2X	5X	200X	2X	2000X	200X	200X				
Uranium-238	20X	2X	2X	2X	5X	20X	2X	200X	25X	200X				

Product: Determination of Metals by ICP-MS Analytical Method: SW846 3050B/6020A **Analytical Procedure:** GL-MA-E-014 REV# 32 **Analytical Batch:** 1796299

<u>Preparation Method:</u> SW846 3050B <u>Preparation Procedure:</u> GL-MA-E-009 REV# 28 <u>Preparation Batch:</u> 1796298

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
457991021	HF-B10-(3-4) Soil Boring
457991022	HF-B11-(1-2) Soil Boring
457991023	HF-B11-(3-4) Soil Boring
457991024	HF-B11-(5-6) Soil Boring
457991025	HF-B12-(1-2) Soil Boring
457991026	HF-B12-(3-4) Soil Boring
1204100484	Method Blank (MB)ICP-MS
1204100485	Laboratory Control Sample (LCS)
1204100500	Laboratory Control Sample (LCS)
1204100488	457991021(HF-B10-(3-4) Soil BoringL) Serial Dilution (SD)
1204100486	457991021(HF-B10-(3-4) Soil BoringD) Sample Duplicate (DUP)
1204100487	457991021(HF-B10-(3-4) Soil BoringS) Matrix Spike (MS)
1204100501	457991021(HF-B10-(3-4) Soil BoringS) Matrix Spike (MS)
1204103557	457991021(HF-B10-(3-4) Soil BoringPS) Post Spike (PS)

The samples in this SDG were analyzed on a "dry weight" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Calibration Information

ICSA/ICSAB Statement

For the ICP-MS analysis, the ICSA solution contains analyte concentrations which are verified trace impurities

indigenous to the purchased standard.

Quality Control (QC) Information

Matrix Spike (MS/MSD) Recovery Statement

The percent recoveries (%R) obtained from the MS/MSD analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The MS/MSD (See Below) did not meet the recommended quality control acceptance criteria for percent recoveries for the following applicable analyte. The post spike recovery was within the required control limits. This verifies the absence of a matrix interference in the post-spike digested sample. The recovery may be attributed to possible sample matrix interference and/or non-homogeneity.

Sample	Analyte	Value
1204100501 (HF-B10-(3-4) Soil BoringMS)	Uranium-234	156* (75%-125%)

Technical Information

Preparation/Analytical Method Verification

Method SW-846 3050B is not a total digestion technique for most samples. It is a very strong acid digestion that will dissolve almost all elements that could become environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

Sample Dilutions

Dilutions may be required for many reasons, including to minimize matrix interferences or to bring over range target analyte concentrations into the linear calibration range. Samples were diluted to ensure that the analyte concentrations were within the linear calibration range of the instrument. The ICPMS solid samples in this SDG were diluted the standard two times.

Analyte	457991					
	021	022	023	024	025	026
Uranium	200X	25X	200X	2000X	2000X	2000X
Uranium-234	10X	2X	10X	25X	10X	20X
Uranium-235	1000X	25X	2000X	4000X	4000X	2000X
Uranium-238	200X	25X	200X	2000X	2000X	2000X

General Chemistry

Product: Ion Chromatography Analytical Method: SW846 9056A Analytical Procedure: GL-GC-E-086 REV# 25 Analytical Batches: 1796414 and 1796413

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
457991002	HF-B1-(3-4) Soil Boring
457991021	HF-B10-(3-4) Soil Boring
457991022	HF-B11-(1-2) Soil Boring
457991023	HF-B11-(3-4) Soil Boring
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457991024	HF-B11-(5-6) Soil Boring
457991025	HF-B12-(1-2) Soil Boring
457991026	HF-B12-(3-4) Soil Boring
1204100740	Method Blank (MB)
1204100741	Laboratory Control Sample (LCS)
1204100742	457991026(HF-B12-(3-4) Soil Boring) Sample Duplicate (DUP)
1204100743	457991026(HF-B12-(3-4) Soil Boring) Matrix Spike (MS)

The samples in this SDG were analyzed on a "dry weight" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Technical Information

Sample Dilutions

The following samples 1204100742 (HF-B12-(3-4) Soil BoringDUP), 1204100743 (HF-B12-(3-4) Soil BoringMS), 457991002 (HF-B1-(3-4) Soil Boring), 457991023 (HF-B11-(3-4) Soil Boring), 457991024 (HF-B11-(5-6) Soil Boring) and 457991026 (HF-B12-(3-4) Soil Boring) were diluted because target analyte concentrations exceeded the calibration range. Dilutions may be required for many reasons, including to minimize matrix interferences or to bring over range target analyte concentrations into the linear calibration range.

Analyte	457991			
	002	023	024	026
Fluoride	5X	10X	25X	20X

Product: Ion Chromatography Analytical Method: SW846 9056A Analytical Procedure: GL-GC-E-086 REV# 25 Analytical Batches: 1796417 and 1796416

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
457991001	HF-B1-(1-2) Soil Boring
457991003	HF-B1-(5-6) Soil Boring
457991004	HF-B2-(1-2) Soil Boring
457991005	HF-B3-(1-2) Soil Boring
457991006	HF-B3-(3-4) Soil Boring
457991007	HF-B3-(4.5-5) Soil Boring
457991008	HF-B4-(1-2) Soil Boring
457991009	HF-B4-(3-4) Soil Boring
457991010	HF-B4-(5-5.5) Soil Boring
1204100744	Method Blank (MB)
1204100745	Laboratory Control Sample (LCS)
1204100746	457991010(HF-B4-(5-5.5) Soil Boring) Sample Duplicate (DUP)

The samples in this SDG were analyzed on a "dry weight" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Technical Information

Sample Dilutions

The following samples 457991003 (HF-B1-(5-6) Soil Boring) and 457991007 (HF-B3-(4.5-5) Soil Boring) were diluted because target analyte concentrations exceeded the calibration range. Dilutions may be required for many reasons, including to minimize matrix interferences or to bring over range target analyte concentrations into the linear calibration range.



Sample Re-analysis

Samples1204100744 (MB), 1204100745 (LCS), 457991001 (HF-B1-(1-2) Soil Boring), 457991004 (HF-B2-(1-2) Soil Boring), 457991005 (HF-B3-(1-2) Soil Boring), 457991006 (HF-B3-(3-4) Soil Boring), 457991008 (HF-B4-(1-2) Soil Boring) and 457991009 (HF-B4-(3-4) Soil Boring) were re-analyzed due to CCV failure. The reanalysis data with passing instrument QC was reported.

Product: Ion Chromatography Analytical Method: SW846 9056A Analytical Procedure: GL-GC-E-086 REV# 25 Analytical Batches: 1796420 and 1796419

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
457991011	HF-B5-(1-2) Soil Boring
457991012	HF-B6-(1-2) Soil Boring
457991013	HF-B6-(3-4) Soil Boring
457991014	HF-B6-(5-6) Soil Boring
457991015	HF-B7-(1-2) Soil Boring
457991016	HF-B8-(1-2) Soil Boring
457991017	HF-B9-(1-2) Soil Boring
457991018	HF-B9-(3-4) Soil Boring
457991019	HF-B9-(5-6) Soil Boring
457991020	HF-B10-(1-2) Soil Boring
1204100748	Method Blank (MB)
1204100749	Laboratory Control Sample (LCS)
1204100750	457991020(HF-B10-(1-2) Soil Boring) Sample Duplicate (DUP)
1204100751	457991020(HF-B10-(1-2) Soil Boring) Matrix Spike (MS)

The samples in this SDG were analyzed on a "dry weight" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Technical Information

Sample Dilutions

The following samples 457991018 (HF-B9-(3-4) Soil Boring) and 457991019 (HF-B9-(5-6) Soil Boring) were diluted because target analyte concentrations exceeded the calibration range. Dilutions may be required for many reasons, including to minimize matrix interferences or to bring over range target analyte concentrations into the linear calibration range.

Amolytta	457991	
Analyte	018	019
Fluoride	10X	5X

Product: pH Analytical Method: SW846 9045D Analytical Procedure: GL-GC-E-008 REV# 23 Analytical Batch: 1794362

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
457991001	HF-B1-(1-2) Soil Boring
457991002	HF-B1-(3-4) Soil Boring
457991003	HF-B1-(5-6) Soil Boring
457991004	HF-B2-(1-2) Soil Boring
457991005	HF-B3-(1-2) Soil Boring
457991006	HF-B3-(3-4) Soil Boring
457991007	HF-B3-(4.5-5) Soil Boring
457991008	HF-B4-(1-2) Soil Boring
1204096009	Laboratory Control Sample (LCS)
1204096010	457499001(NonSDG) Sample Duplicate (DUP)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Technical Information

Holding Times

Samples (See Below) were received by the laboratory outside of the method specified holding time. The data is

qualified.

Sample	Analyte	Value
1204096010 (Non SDG 457499001DUP)	Corrosivity	Received 16-AUG-18, out of holding 09-AUG-18
457991001 (HF-B1-(1-2) Soil Boring)	Corrosivity	Received 23-AUG-18, out of holding 20-AUG-18
457991002 (HF-B1-(3-4) Soil Boring)	Corrosivity	Received 23-AUG-18, out of holding 20-AUG-18
457991003 (HF-B1-(5-6) Soil Boring)	Corrosivity	Received 23-AUG-18, out of holding 20-AUG-18
457991004 (HF-B2-(1-2) Soil Boring)	Corrosivity	Received 23-AUG-18, out of holding 20-AUG-18
457991005 (HF-B3-(1-2) Soil Boring)	Corrosivity	Received 23-AUG-18, out of holding 21-AUG-18
457991006 (HF-B3-(3-4) Soil Boring)	Corrosivity	Received 23-AUG-18, out of holding 21-AUG-18
457991007 (HF-B3-(4.5-5) Soil Boring)	Corrosivity	Received 23-AUG-18, out of holding 21-AUG-18
457991008 (HF-B4-(1-2) Soil Boring)	Corrosivity	Received 23-AUG-18, out of holding 21-AUG-18

Product: pH Analytical Method: SW846 9045D Analytical Procedure: GL-GC-E-008 REV# 23 Analytical Batch: 1796197

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	<u>Client Sample Identification</u>
457991009	HF-B4-(3-4) Soil Boring
457991010	HF-B4-(5-5.5) Soil Boring
457991011	HF-B5-(1-2) Soil Boring
457991012	HF-B6-(1-2) Soil Boring
457991013	HF-B6-(3-4) Soil Boring
457991014	HF-B6-(5-6) Soil Boring
457991015	HF-B7-(1-2) Soil Boring
457991016	HF-B8-(1-2) Soil Boring
457991017	HF-B9-(1-2) Soil Boring
457991018	HF-B9-(3-4) Soil Boring
457991019	HF-B9-(5-6) Soil Boring
457991020	HF-B10-(1-2) Soil Boring
457991021	HF-B10-(3-4) Soil Boring
457991022	HF-B11-(1-2) Soil Boring
457991023	HF-B11-(3-4) Soil Boring
457991024	HF-B11-(5-6) Soil Boring
457991025	HF-B12-(1-2) Soil Boring
457991026	HF-B12-(3-4) Soil Boring
1204100257	Laboratory Control Sample (LCS)
1204100258	457991009(HF-B4-(3-4) Soil Boring) Sample Duplicate (DUP)
1204100259	457991010(HF-B4-(5-5.5) Soil Boring) Sample Duplicate (DUP)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Technical Information

Holding Times

Samples (See Below) were received by the laboratory outside of the method specified holding time. The data is qualified.

Sample	Analyte	Value
1204100258 (HF-B4-(3-4) Soil BoringDUP)	Corrosivity	Received 23-AUG-18, out of holding 21-AUG-18
1204100259 (HF-B4-(5-5.5) Soil BoringDUP)	Corrosivity	Received 23-AUG-18, out of holding 21-AUG-18
457991009 (HF-B4-(3-4) Soil Boring)	Corrosivity	Received 23-AUG-18, out of holding 21-AUG-18
457991010 (HF-B4-(5-5.5) Soil Boring)	Corrosivity	Received 23-AUG-18, out of holding 21-AUG-18
457991011 (HF-B5-(1-2) Soil Boring)	Corrosivity	Received 23-AUG-18, out of holding 21-AUG-18
457991012 (HF-B6-(1-2) Soil Boring)	Corrosivity	Received 23-AUG-18, out of holding 21-AUG-18
457991013 (HF-B6-(3-4) Soil Boring)	Corrosivity	Received 23-AUG-18, out of holding 21-AUG-18
457991014 (HF-B6-(5-6) Soil Boring)	Corrosivity	Received 23-AUG-18, out of holding 21-AUG-18
457991015 (HF-B7-(1-2) Soil Boring)	Corrosivity	Received 23-AUG-18, out of holding 21-AUG-18
457991016 (HF-B8-(1-2) Soil Boring)	Corrosivity	Received 23-AUG-18, out of holding 21-AUG-18
457991017 (HF-B9-(1-2) Soil Boring)	Corrosivity	Received 23-AUG-18, out of holding 21-AUG-18
457991018 (HF-B9-(3-4) Soil Boring)	Corrosivity	Received 23-AUG-18, out of holding 21-AUG-18
457991019 (HF-B9-(5-6) Soil Boring)	Corrosivity	Received 23-AUG-18, out of holding 21-AUG-18
457991020 (HF-B10-(1-2) Soil Boring)	Corrosivity	Received 23-AUG-18, out of holding 22-AUG-18
457991021 (HF-B10-(3-4) Soil Boring)	Corrosivity	Received 23-AUG-18, out of holding 22-AUG-18
457991022 (HF-B11-(1-2) Soil Boring)	Corrosivity	Received 23-AUG-18, out of holding 22-AUG-18
457991023 (HF-B11-(3-4) Soil Boring)	Corrosivity	Received 23-AUG-18, out of holding 22-AUG-18
457991024 (HF-B11-(5-6) Soil Boring)	Corrosivity	Received 23-AUG-18, out of holding 22-AUG-18
457991025 (HF-B12-(1-2) Soil Boring)	Corrosivity	Received 23-AUG-18, out of holding 22-AUG-18
457991026 (HF-B12-(3-4) Soil Boring)	Corrosivity	Received 23-AUG-18, out of holding 22-AUG-18

Radiochemistry

Product: Alphaspec U, Soil/Veg <u>Analytical Method:</u> DOE EML HASL-300, U-02-RC Modified <u>Analytical Procedure:</u> GL-RAD-A-011 REV# 26 <u>Analytical Batch:</u> 1797288

Preparation Method: Dry Soil Prep **Preparation Procedure:** GL-RAD-A-021 REV# 23 **Preparation Batch:** 1796278

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
457991001	HF-B1-(1-2) Soil Boring
457991002	HF-B1-(3-4) Soil Boring
457991003	HF-B1-(5-6) Soil Boring
457991004	HF-B2-(1-2) Soil Boring
457991005	HF-B3-(1-2) Soil Boring
457991006	HF-B3-(3-4) Soil Boring
457991007	HF-B3-(4.5-5) Soil Boring
457991008	HF-B4-(1-2) Soil Boring
457991009	HF-B4-(3-4) Soil Boring
457991010	HF-B4-(5-5.5) Soil Boring
457991011	HF-B5-(1-2) Soil Boring
457991012	HF-B6-(1-2) Soil Boring
457991013	HF-B6-(3-4) Soil Boring
1204102809	Method Blank (MB)
1204102810	457991004(HF-B2-(1-2) Soil Boring) Sample Duplicate (DUP)
1204102811	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on a "dry weight" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Technical Information

Sample Re-prep/Re-analysis

Samples were reprepped due to high relative percent difference/relative error ratio. The re-analysis is being reported.

Recounts

Sample 457991006 (HF-B3-(3-4) Soil Boring) was recounted due to detector error. The recount is reported.

Miscellaneous Information

Additional Comments

The tracer peak centroid for sample 457991001 (HF-B1-(1-2) Soil Boring) is greater than 50 keV from the expected library energy value for the tracer; however, the tracer yield requirement was met and the tracer peak is within the tracer region of interest.

Product: Alphaspec U, Soil/Veg Analytical Method: DOE EML HASL-300, U-02-RC Modified <u>Analytical Procedure:</u> GL-RAD-A-011 REV# 26 <u>Analytical Batch:</u> 1797293

Preparation Method: Dry Soil Prep **Preparation Procedure:** GL-RAD-A-021 REV# 23 **Preparation Batches:** 1796278 and 1796279

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
457991014	HF-B6-(5-6) Soil Boring
457991015	HF-B7-(1-2) Soil Boring
457991016	HF-B8-(1-2) Soil Boring
457991017	HF-B9-(1-2) Soil Boring
457991018	HF-B9-(3-4) Soil Boring
457991019	HF-B9-(5-6) Soil Boring
457991020	HF-B10-(1-2) Soil Boring
457991021	HF-B10-(3-4) Soil Boring
457991022	HF-B11-(1-2) Soil Boring
457991023	HF-B11-(3-4) Soil Boring
457991024	HF-B11-(5-6) Soil Boring
457991025	HF-B12-(1-2) Soil Boring
457991026	HF-B12-(3-4) Soil Boring
1204102815	Method Blank (MB)
1204102816	457991014(HF-B6-(5-6) Soil Boring) Sample Duplicate (DUP)
1204102817	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on a "dry weight" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Technical Information

Sample Re-prep/Re-analysis

Samples were reprepped due to high blank activity. The re-analysis is being reported.

Miscellaneous Information

Manual Integration

Manual integrations of alpha spectroscopy spectra 457991016 (HF-B8-(1-2) Soil Boring) and 457991018 (HF-B9-(3-4) Soil Boring) were performed to fully separate counts in Regions of Interest which would have been biased.

Additional Comments

The tracer peak centroid for sample 457991016 (HF-B8-(1-2) Soil Boring) is greater than 50 keV from the expected library energy value for the tracer; however, the tracer yield requirement was met and the tracer peak is within the tracer region of interest.

Product: Dry Weight <u>Analytical Method:</u> ASTM D 2216 (Modified) <u>Analytical Procedure:</u> GL-OA-E-020 REV# 13 <u>Analytical Batch:</u> 1796278

<u>Preparation Method:</u> Dry Soil Prep <u>Preparation Procedure:</u> GL-RAD-A-021 REV# 23 <u>Preparation Batch:</u> 1796278

The following samples were analyzed using the above methods and analytical procedure(s).

CEL Samula ID#	Client Comple Identification
GEL Sample ID#	<u>Client Sample Idenulication</u>
457991001	HF-B1-(1-2) Soil Boring
457991002	HF-B1-(3-4) Soil Boring
457991003	HF-B1-(5-6) Soil Boring
457991004	HF-B2-(1-2) Soil Boring
457991005	HF-B3-(1-2) Soil Boring
457991006	HF-B3-(3-4) Soil Boring
457991007	HF-B3-(4.5-5) Soil Boring
457991008	HF-B4-(1-2) Soil Boring
457991009	HF-B4-(3-4) Soil Boring
457991010	HF-B4-(5-5.5) Soil Boring
457991011	HF-B5-(1-2) Soil Boring
457991012	HF-B6-(1-2) Soil Boring
457991013	HF-B6-(3-4) Soil Boring
457991014	HF-B6-(5-6) Soil Boring
457991015	HF-B7-(1-2) Soil Boring
457991016	HF-B8-(1-2) Soil Boring
457991017	HF-B9-(1-2) Soil Boring
457991018	HF-B9-(3-4) Soil Boring
457991019	HF-B9-(5-6) Soil Boring
457991020	HF-B10-(1-2) Soil Boring
1204100452	457991001(HF-B1-(1-2) Soil Boring) Sample Duplicate (DUP)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

Product: Dry Weight Analytical Method: ASTM D 2216 (Modified) Analytical Procedure: GL-OA-E-020 REV# 13 Analytical Batch: 1796279

Preparation Method: Dry Soil Prep

Preparation Procedure: GL-RAD-A-021 REV# 23 **Preparation Batch:** 1796279

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
457991021	HF-B10-(3-4) Soil Boring
457991022	HF-B11-(1-2) Soil Boring
457991023	HF-B11-(3-4) Soil Boring
457991024	HF-B11-(5-6) Soil Boring
457991025	HF-B12-(1-2) Soil Boring
457991026	HF-B12-(3-4) Soil Boring
1204100453	457991021(HF-B10-(3-4) Soil Boring) Sample Duplicate (DUP)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

<u>Product:</u> Liquid Scint Tc99, Soil <u>Analytical Method:</u> DOE EML HASL-300, Tc-02-RC Modified <u>Analytical Procedure:</u> GL-RAD-A-059 REV# 5 <u>Analytical Batch:</u> 1796303

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
457991001	HF-B1-(1-2) Soil Boring
457991002	HF-B1-(3-4) Soil Boring
457991003	HF-B1-(5-6) Soil Boring
457991004	HF-B2-(1-2) Soil Boring
457991005	HF-B3-(1-2) Soil Boring
457991006	HF-B3-(3-4) Soil Boring
457991007	HF-B3-(4.5-5) Soil Boring
457991008	HF-B4-(1-2) Soil Boring
457991009	HF-B4-(3-4) Soil Boring
457991010	HF-B4-(5-5.5) Soil Boring
457991011	HF-B5-(1-2) Soil Boring
457991012	HF-B6-(1-2) Soil Boring
457991013	HF-B6-(3-4) Soil Boring
1204100518	Method Blank (MB)
1204100519	457991001(HF-B1-(1-2) Soil Boring) Sample Duplicate (DUP)
1204100520	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Technical Information

Recounts

Sample 457991001 (HF-B1-(1-2) Soil Boring) was recounted to verify sample results. Recount is reported. Sample 457991005 (HF-B3-(1-2) Soil Boring) was recounted due to results more negative than the three sigma TPU. The second count is reported.

Product: Liquid Scint Tc99, Soil <u>Analytical Method:</u> DOE EML HASL-300, Tc-02-RC Modified <u>Analytical Procedure:</u> GL-RAD-A-059 REV# 5 <u>Analytical Batch:</u> 1796304

The following samples were analyzed using the above methods and analytical procedure(s).

Client Sample Identification
HF-B6-(5-6) Soil Boring
HF-B7-(1-2) Soil Boring
HF-B8-(1-2) Soil Boring
HF-B9-(1-2) Soil Boring
HF-B9-(3-4) Soil Boring
HF-B9-(5-6) Soil Boring
HF-B10-(1-2) Soil Boring
HF-B10-(3-4) Soil Boring
HF-B11-(1-2) Soil Boring
HF-B11-(3-4) Soil Boring
HF-B11-(5-6) Soil Boring
HF-B12-(1-2) Soil Boring
HF-B12-(3-4) Soil Boring
Method Blank (MB)
457991014(HF-B6-(5-6) Soil Boring) Sample Duplicate (DUP)
Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

I of 7 Poject #: HF Spiking Station 2 Image: Comparison of the state of the s	GEL C GEL Work Order Nun	bain (***See ww hber:	of C w.gel.c	usto com for	dy an GEL's Sa	n d 2 amplo	An: e Acc	aly eptar	tica	nl Ree DP**	que	est			GEL 2040 Char Phon Fax:	Labor Savag leston, e: (84 (843)	atorie ze Roa , SC 2 3) 55(766-1	s, LLC ad 9407 6-8171	
Client Name: Westinghouse Electric Company	ny LLC	Phone #: 803	.647.192	0				Sa	mple	Analysis	Req	uestec	i ⁽⁵⁾ (1	Fill in	the n	umbe	r of c	contair	ners for each test)
Project/Site Name: Columbia Fuel Fabricatio	n Facility	Fax #: 803.	695.3964	1		ld this	ole be lered:	ers											< Preservative Type (6)
Address: 5801 Bluff Road, Hopkins, SC 2906	51					Shou	samj consi	ntain	E	, ICP		int							
Collected by: Jeremy Grant / Randy	Send Results: joynerdp@v	vestinghou	se.com			[ated	er of co	uraniu a spec)	ranium isotope IS)	66-	e Conte	oride	Н					Comments Note: extra sample is
Sample ID * For composites - indicate start and stop date	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code ⁽²⁾	Field Filtered ⁽³⁾	Sample Matrix ⁽⁴⁾	Radioactive	TSCA Regul	Total numb	isotopic (alpha	isotopic u individual M	Tc	Moisture	Flue	d					required for sample specific QC
HF-B1-(1-2) Soil Boring	8/20/2018	1426	G	N	so			1	x	x	x	x	x	x					
HF-B1-(3-4) Soil Boring	8/20/2018	1450	G	N	so			1	x	x	x	x	x	x					
HF-B1-(5-6) Soil Boring	8/20/2018	1530	G	N	so			1	x	X	х	x	x	x					
HF-B2-(1-2) Soil Boring	8/20/2018	1701	G	N	SO			1	x	X	x	x	x	x					
							:												
						N													
HF-B3-(1-2) Soil Boring	8/21/2018	0840	G	N	so			1	x	х	x	x	x	x					
HF-B3-(3-4) Soil Boring	8/21/2018	0858	G	N	so			1	x	х	X	x	x	x					
HF-B3-(4.5-5) Soil Boring	8/21/2018	0910	G	N	SO			<u> </u>	x	х	x	x	x	x					
TAT Requested: Normal:Rush:	_X)Specify: _ASAP_	Fax Res	ults:	Yes	1	No				C of A	. / 0	C Sun	omarv	Circl	e Deli vel 1	iverab	le: evel 2		evel 3 / Level 4
Remarks: Are there any known hazards a	pplicable to these samples	? If so, pla	ease lis	t the ha	zards			<u></u>							<u></u>		Samp East Cen Moi	<u>le Coll</u> tern tral untain	lection Time Zone Pacific Other
Ch.	ain of Custody Signatures						[S	ample	e Ship	ping	and	Deliv	ery D)etails	· · · · · · · · · · · · · · · · · · ·
Reindmished By (Signed) Date 11m	Received by (sig	ned) D	ate	Time	1000	~~	GEL	PM:	Hope	Taylor									
1 (CARLOS \$ 123/18 (0	1/1/1		123	[18	1003)	Metho	od of Sl	nipmen	t:					Date S	Shippe	<u>:d: N/</u>	A	**************************************
2	2						Airbil	1#:									<u> </u>		*****
3	3						Airbil	l #:			····								
 Chain of Custody Number = Client Determined QC Codes: N = Normal Sample, TB = Trip Blank, FD = Fi 	ield Duplicate, EB = Equipment Blank,	MS = Matrix	Spike Sam	ple, MSD =	Matrix Spike	e Dupli	cate Sa	mple, G	= Grab	, C = Compo	site							F	For Lab Receiving Use Only
 Field Filtered: For liquid matrices, indicate with a - Y - for Matrix Codes: DW=Drinking Water, GW=Groundwater, S Sample Analysis Requested: Analytical method requested (Presenting Time, HA = Hudrophorie Acid NI = Nitrie A 	yes the sample was field filtered or - N W=Surface Water, WW=Waste Water (i.e. 8260B, 6010B/7470A) and numbe	- for sample w , W=Water, M r of containers	as not field L≕Misc Li provided f	d filtered. quid, SO= S or each (i.e.	oil, SD =Sedi 8260B - 3 , 6	ment, S 5010B/5	SL=Sluc 7470A ·	ige, SS= - 1).	Solid W	/aste, O =Oil	, F=Filte	er, P=W	/ipe, U=	Urine, F	Fecal	l, N=Na	sal		Custody Seal Intact? YES NO Cooler Temp:
WHI]	$\mathbf{FE} = \mathbf{LABORATORY}$	anto Acia, AA	YELL	OW = I	FILE	1 = 50	uum 1	PI	$\mathbf{K} = \mathbf{K}$	preservative CLIENT	is adde	a = leav	e tield b	lank			Į	L	C

Project #: 2 of7 Project #: HF Spiking Station 2 GEL Quote #:	GEL C	E hain (**See ww nber:	of Ci w.gel.c	ustoc	ly an GEL's Sa	d A	An: Acc	eptan	tica	op**	que	est			GEL 2040 Charl Phone Fax: (Labora Savag leston, e: (843) (843) 7	atories e Roa SC 29 3) 556 766-1	s, LLC 1d 9407 5-8171 178	
Client Name: Westinghouse Electric Company LLC		Phone #: 803	6.647.1920)				Sa	mple	Analysis	Requ	uested	l ⁽⁵⁾ (l	Fill in	the n	umber	rofc	ontain	ers for each test)
Project/Site Name: Columbia Fuel Fabrication Facility		Fax #: 803.	695.3964			d this	lered:	ers											< Preservative Type (6)
Address: 5801 Bluff Road, Hopkins, SC 29061						Shou	sam consid	ntain	E	LCP.		a l							
Collected by: Jeremy Grant / Randy Send Res	ults: joynerdp@v	westinghou	se.com				ated	er of co	c uraniui a spec)	tranium isotope (S)	-99	e Conte	oride	H					Comments Note: extra sample is
Sample ID * For composites - indicate start and stop date/time	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code ⁽²⁾	Field Filtered ⁽³⁾	Sample Matrix ⁽⁴⁾	Radioactive	TSCA Regul	Total num!	isotopic (alph	isotopic t individual A	, T	Moistur	Flu						required for sample specific QC
HF-B4-(1-2) Soil Boring	8/21/2018	0946	G	N	so			1	x	x	x	x	x	x					
HF-B4-(3-4) Soil Boring	8/21/2018	0959	G	N	so			1	x	x	x	x	x	x					
HF-B4-(5-5.5) Soil Boring	8/21/2018	1010	G	N	so			1	x	x	x	x	x	x					
	9/21/2019	1101		N	50	 		1	v	v	v	v	v	v					
	0/21/2010	1101																	
						: : :	·												
HF-B6-(1-2) Soil Boring	8/21/2018	1127	G	N	so			1	X	x	X	x	x	x					
HF-B6-(3-4) Soil Boring	8/21/2018	1145	G	N	so			1	x	x	x	x	x	x					
HF-B6-(5-6) Soil Boring	8/21/2018	1347	G	N	so		[1	x	x	Х	x	x	x					
TAT Requested: Normal:X Specif	r: _ASAP_	Fax Re	sults.	Yes		No	*****			C of A	·····)C Sur	nmarv	Circ	le Del	iverabl	le:		vel 3 / Level 4
Remarks: Are there any known hazards applicable	to these sample.	s? If so, pl	ease lis	t the ha	zards												Samr East Cen Mou	<u>ple Coll</u> tern tral untain	ection Time Zone Pacific Other
Chain of Cu	tody Signatures										S	ampl	e Shij	pping	and	Delive	ery D)etails	
Relinquished By (Signed) Date Time	Received by (sig	gned) E	Date	Time			GEL	PM:	Hope	Taylor									
1 K CIEWS 8/23/13 COOS	1 Star	j ßan	8/2	2.3/18	7		Metho	od of S	hipmer	nt:					Date	Shippe	ed: N/	/A	
2	2						Airbil	11 #:											
3	3						Airbi	1 #:											
1.) Chain of Custody Number = Client Determined							•											F	or Lab Receiving Use Only
 QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate Field Filtered: For liquid matrices, indicate with a - Y - for yes the samp Matrix Codes: DW=Drinking Water, GW=Groundwater, SW=Surface W Sample Analysis Requested: Analytical method requested (i.e. 8260B, 6 Preservative Type: HA = Hydrochloric Acid, NI = Nitric Acid, SH = Soc WHITE = I A R 	EB = Equipment Blank e was field filtered or - 1 Yater, WW=Waste Wate 010B/7470A) and numb ium Hydroxide, SA = St ORATORY	x, MS = Matrix N - for sample v er, W=Water, N er of containers ulfuric Acid, A	Spike Sam vas not fiel L=Mise Li provided f A = Ascorb YEL J	pie, MSD = d filtered. iquid, SO= for each (i.e ic Acid, HX LOW =	= Matrix Spil Soil, SD =Sed 2. <i>8260B</i> - 3 , X = Hexane, 1 FILE	te Dupl iment, 1 6010B/ ST = Sc	icate Sa SL≕Slu 7470A odium T	imple, G dge, SS - 1). Thiosulf PI	= Gral =Solid V ate, If no NK =	o, C = Comp Waste, O=Oi o preservativ CLIEN	osite il, F=Fili e is addi F	ter, P =V ed = lea	Vipe, U [,] ve field	≂Urine, blank	F=Feca	ıl, N =Na	isal		Custody Seal Intact? YES NO Cooler Temp: C

Bige: 3of7 Project #: HF Spiking Station 2 EL Quote #: CDC Number ⁽¹⁾ :	GEL C	C hain (**See ww nber:	of Cu w.gel.co	usto(om for (ly an GEL's Sa	d A	An: e Acc	alyt	t ica ce S(DP**	que	est			GEL 2040 Charl Phone Fax: (Labora Savag leston, e: (843)	atorie: e Roa SC 2 3) 556 766-1	s, LLC ad 9407 5-8171 178	
Client Name: Westinghouse Electric Company LLC		Phone #: 803	.647.1920)				Sa	mple	Analysis	s Req	uested	l ⁽⁵⁾ (1	Fill in	the n	umbei	rofc	ontaine	ers for each test)
Project/Site Name: Columbia Fuel Fabrication Facility		Fax #: 803.	695.3964	Ļ		d this	le be ered:	s	[< Preservative Type (6)
Address: 5801 Bluff Road, Hopkins, SC 29061						Should	samp consid	ntaine	ε	LCP (by		t							
Collected by: Jeremy Grant / Randy Send Resu	lts: joynerdp@v	westinghou	se.com				ted	r of co	uraniu spec)	anium sotope S)	66	Conte	ride	F F					Comments Note: extra sample is
Sample ID * For composites - indicate start and stop date/time	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code ⁽²⁾	Field Filtered ⁽³⁾	Sample Matrix ⁽⁴⁾	Radioactive	TSCA Regula	Total numbe	isotopic 1 (alpha	isotopic ur individual is M	Tc-	Moisture	Fluo	lq					required for sample specific QC
HF-B7-(1-2) Soil Boring	8/21/2018	1451	G	N	SO			1	x	x	x	x	x	x					
HF-B8-(1-2) Soil Boring	8/21/2018	1510	G	<u>N</u>	SO SO	·				X									
						:													
HF-B9-(1-2) Soil Boring	8/21/2018	1617	G	N	SO	ĺ		1	x	x	x	x	x	x					
HF-B9-(3-4) Soil Boring	8/21/2018	1658	G	N	so			1	x	x	x	x	x	x					-
HF-B9-(5-6) Soil Boring	8/21/2018	1723	G	N	so			1	x	X	x	x	x	x					
TAT Requested: Normal:	_ASAP_	Fax Re	sults:	Yes		No				C of A	A / (QC Sur	nmary	Circ	le Del evel 1	iverabl	le: evel 2	/ Le	vel 3 / Level 4
Remarks: Are there any known hazards applicable t	o these sample.	s? If so, pl	ease lis	t the ha	zards												Samr Eas Cen Mor	ole Colle tern atral untain	ection Time Zone Pacific Other
Chain of Cust	ody Signatures										S	ampl	e Shij	pping	and	Delive	ery I	Details	· · · · · · · · · · · · · · · · · · ·
Relinquished By (Signed) Date Time	Received by (sig	gned) E	Date	Time	CAO	r	GEL	PM:	Hope	Taylor					·				
1 12 CUEUS 2/23/17 (00)	1/5-0.	~~ 8,	1231	10	10~	<i>للے</i> 	Meth	od of Sl	hipmen	ıt:					Date	Shippe	ed: N/	A	
2	2						Airbi	1#:											
3	3						Airbi	1#:										·	
 Chain of Custody Number = Chent Determined QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, F Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample Matrix Codes: DW=Drinking Water, GW=Groundwater, SW=Surface Wa Sample Analysis Requested: Analytical method requested (i.e. 8260B, 601 Preservative Type: HA = Hydrochloric Acid, NI = Nitric Acid, SH = Sodiu 	B = Equipment Blank was field filtered or - 1 ter, WW=Waste Wate 0B/7470A) and numb m Hydroxide, SA = St DRATORV	x, MS = Matrix N - for sample v er, W=Water, N er of containers alfuric Acid, AA	Spike Sam vas not fiel IL=Mise Li provided f A = Ascorb	ple, MSD = d filtered. iquid, SO=S for each (i.e ic Acid, HN LOW =	 Matrix Spik Soil, SD=Sed 8260B - 3, K = Hexane, S FULE 	te Dupl iment, i 6010B/ ST = Sc	licate Sa SL=Slu 7470A odium T	ample, C dge, SS - 1). Thiosulfa PI	G = Grat Solid V nte, If no NK =	o, C = Comp Waste, O=O o preservativ	oosite il, F=Fil ve is add T	ter, P=V ed = lea	Vipe, U [;] ve field	=Urine, blank	F=Feca	ll, N=N₽	asal		or Lab Receiving Use Only Custody Seal Intact? YES NO Cooler Temp: C

	GEL C	' hain (**See ww 1ber:	of C w.gel.c	ustoc om for (ly an GEL's Sa	d A	An: Acc	aly1 eptan	t ica ice S(DP**	que	est			GEL 2040 Char Phon Fax:	Labor Savag leston e: (84 (843)	atorie ge Roa , SC 2 3) 556 766-1	s, LLC ad 9407 5-8171 178	
Client Name: Westinghouse Electric Company LLC		Phone #: 803	.647.192)				Sa	mple	Analysis	Req	uested	⁽⁵⁾ (1	Fill in	the n	umbe	er of c	contain	ers for each test)
Project/Site Name: Columbia Fuel Fabrication Facility		Fax #: 803.	695.3964	ļ		id this	ie be lered:	ers											< Preservative Type (6)
Address: 5801 Bluff Road, Hopkins, SC 29061						Shou	samj consi	ntain	E	, ICP		at							_
Collected by: Jeremy Grant / Randy Send Resu	lts: joynerdp@v	vestinghou	se.com				ated	er of co	a spec)	ranium isotope fS)	66-	e Conte	oride	H					Comments Note: extra sample is
Sample ID * For composites - indicate start and stop date/time	Field Filtered ⁽³⁾	Sample Matrix ⁽⁴⁾	Radioactive	TSCA Regul	Total numb	isotopic (alphi	isotopic u individual N	Tc	Moistur	Flu						required for sample specific QC			
HF-B10-(1-2) Soil Boring	8/22/2018	0840	G	N	so			1	x	x	x	x	x	x			ļ		
HF-B10-(3-4) Soil Boring	8/22/2018	0855	G	N	so			1	x	x	x	x	x	x					
HF-B11-(1-2) Soil Boring	8/22/2018	0942	G	N	SO			1	x	x	x	x	x	x					
HF-B11-(3-4) Soil Boring	8/22/2018	1005	G	N	SO			1	1 X	x	x	x	x	x					
HF-B11-(5-6) Soil Boring	8/22/2018	1042	G	N	SO	2		1	x	x	x	x	x	x					
HF-B12-(1-2) Soil Boring	8/22/2018	1121	G	N	SO			1	x	x	х	x	x	x					
HF-B12-(3-4) Soil Boring	8/22/2018	1138	G	N	so			1	x	x	x	x	<u>x</u> .	x		 			
							L										[
TAT Requested: Normal:	_ASAP_	Fax Res	ulte.	Ves		No				C of A)C Sur	mary	Circ	le Del	iverat	ole:	/ [e	vel 3 / Level A
Remarks: Are there any known hazards applicable to	o these samples	s? If so, pl	ease lis	t the ha	zards			I		0.017	<u></u>	<u>(C 541</u>	<u>innary</u>	7 12		<u>, / L</u>	Samp Eas Cen Mo	<u>ole Coll</u> tern tral untain	ection Time Zone Pacific Other
Chain of Custo	ody Signatures										S	ampl	e Shiq	oping	and	Deliv	ery E	Details	
Relinquished By (Signed) Date Time	Received by (sig	(ned) D	Date	Time			GEL	PM:	Hope	Taylor					_				
1 TC Creed \$ 123/. 8 (005	1 17.	B	8	23	18	Method of Shipment: Date Shipped: N/A													
2	2						Airbil	1#:											
3	3						Airbil	l #:											
 Chain of Custody Number = Client Determined QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, E Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample v Matrix Codes: DW=Drinking Water, GW=Groundwater, SW=Surface Wat Sample Analysis Requested: Analytical method requested (i.e. 8260B, 6010 Preservative Type: HA = Hydrochloric Acid. NI = Nitric Acid. SH = Sodiu 	1.) Chain of Custody Number = Client Determined For Lab Receiving Use Only 2.) QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite For Lab Receiving Use Only 3.) Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered. Custody Seal Intact? 4.) Matrix Codes: DW=Drinking Water, GW=Groundwater, SW=Surface Water, WW=Waste Water, WL=Misc Liquid, SO=Soil, SD=Sediment, SL=Sludge, SS=Solid Waste, O=Oil, F=Filter, P=Wipe, U=Urine, F=Fecal, N=Nasal YES NO 5.) Sample Analysis Requested: Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. 8260B - 3, 6010B/7470A - 1). Cooler Temp:																		

Laboratories LC

SAMPLE RECEIPT & REVIEW FORM

Sere tet P		6		AR/COC/Work Order: 457991
ient: WNUC		-		Received: 8/23/18 HT
aceived By: STACY BOONE			Jate	Circle Applicable:
Carrier and Tracking Number				FedEx Express FedEx Ground UPS Field Services Counter Oner
•	,			the light of the Rediction Safety Group for further
uspected Hazard Information	Yes	ůŻ	*If N inves	et Counts > 100cpm on samples not marked radioactive ; contact the Radiation entry drap radiation entry drap radiatin entry entry entry entry entry entry entry entry
hipped as a DOT Hazardous? COC/Samples marked or classified as radioactive?		/	Maxi	imum Net Counts Observed* (Observed Counts - Area Background Counts): CPM / mR/Hr sified as: Rad 1 Rad 2 Rad 3 s select Hazards below, and contact the GEL Safety Group.
Is package, COC, and/or Samples marked HAZ?		/	PCB	s Flanmable Foreign Soil RCRA Asbestos Beryllium Other:
Sample Receipt Criteria	Yes	Íź	2	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and scaled?	1	橋		Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Chain of custody documents included with shipment?	1			Non Other
3 Samples requiring cold preservation within $(0 \le 6 \text{ deg. C})$?"		/		Preservation Method: Wet Ice Tee Packs Dry Ice None Other. TEMP: 210
4 Daily check performed and passed on II temperature gun?	R	版		Temperature Device Serial #: IN 3 - 1 Secondary Temperature Device Serial # (If Applicable):
5 Sample containers intact and sealed?				
6 Samples requiring chemical preservatio at proper pH?	n	/	1	Sample ID's and Containers Affected: If Preservation added, J off:
7 Do any samples require Volatile Analysis?		STATES AND A STATES		If Yes, Are Encores or Soil Kits present? Yes No (If yes, take to VOA Freezer) Do VOA vials contain acid preservation? Yes No N/A (If unknown, select N VOA vials free of headspace? Yes No N/A Sample ID's and containers affected:
8 Samples received within holding time?	,	No.		ID's and tests affected:
9 Sample ID's on COC match ID's on bottles?				Sample ID's and containers affected:
10 Date & time on COC match date & time on bottles?	ne .	1		Sample ID's affected:
11 Number of containers received match number indicated on COC?		\mathcal{A}		Sample ID's affected:
12 Are sample containers identifiable as GEL provided?		\wedge		
13 COC form is properly signed in relinquished/received sections?):			-
	~			
PM (or PMA) revi	ew: lr	nitials	-7 WC Date _ S 24/18 Page [of]

State	Certification
Alaska	17-018
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA180011
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122018-1
New Hampshire NELAP	205415
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	9904
Pennsylvania NELAP	68–00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-18-13
Utah NELAP	SC000122018-26
Vermont	VT87156
Virginia NELAP	460202
Washington	C780

List of current GEL Certifications as of 06 September 2018



a member of The GEL Group INC



PO Box 30712 Charleston, SC 29417 2040 Savage Road Charleston, SC 29407 P 843.556.8171 F 843.766.1178

gel.com

September 19, 2018

Ms. Cynthia Logsdon Westinghouse Electric Company, LLC PO Drawer R Columbia, South Carolina 29205

Re: Soil and Vegetation Analysis Work Order: 459059

Dear Ms. Logsdon:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on September 07, 2018. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4778.

Sincerely,

DROC

Hope Taylor Project Manager

Purchase Order: 4500720046 Enclosures



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Certificate of Analysis Report for

WNUC007 Westinghouse Electric Co, LLC

Client SDG: 459059 GEL Work Order: 459059

The Qualifiers in this report are defined as follows:

- * A quality control analyte recovery is outside of specified acceptance criteria
- ** Analyte is a Tracer compound
- ** Analyte is a surrogate compound
- H Analytical holding time was exceeded
- J Value is estimated
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the limit as defined in the 'U' qualifier above.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Hope Taylor.

top 00

Reviewed by

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Certificate of Analysis

	Company : Address :	Westing PO Drav	house Electric Comp ver R	oany, LLC									
	Contact: Project:	Columbi Ms. Cyn Soil and	a, South Carolina 2 thia Logsdon Vegetation Analysis	9205 S									
	Client Sample ID:	HF-B6-(7-8) Soil Boring			Pro	ject:		WNU	C00518			
	Sample ID:	4590590	01			Cli	ent ID:		WNU	C007			
	Matrix:	Soil											
	Collect Date:	06-SEP-	18 09:51										
	Receive Date:	07-SEP-	18										
	Collector:	Client											
	Moisture:	9.27%											
Parameter	Quali	fier Re	sult	DL	RL	Units	PF	DF	Analy	st Date	Time	Batch	Method
Ion Chroma	itography												
SW846 905	6A Fluoride and Ni	trate "Dry	Weight Corrected"										
Fluoride		U	ND	0.375	1.10	mg/kg	10.0	1	MAR1	09/11/18	0845	1801076	1
Nitrate-N			29.4	0.364	1.10	mg/kg	10.0	1					
Metals Ana	lysis-ICP-MS												
SW846 305	0B/6020A Uranium	n Solid "Di	ry Weight Corrected	"									
Uranium-235			28.0	2.17	15.2	ug/Kg	98.6	2	SKJ	09/17/18	1006	1800921	2
Uranium-238			1090	14.3	43.5	ug/Kg	98.6	2		00/15/10			
Uranium 224		T	1130 ND	14.3	43.5	ug/Kg	98.6	2	SKJ	09/17/18	1453	1800921	3
Titration an	d Ion Analysis	U	ND	2.12	10.0	ug/Kg	90.5	2	SKJ	09/16/18	0909	1802228	4
SW0045D	Correctivity (nU < 20)		Pagaiwad"										
SW9043D Corrosivity	contosivity (pri<20)	1>14 AS	6.18	0.010	0.100	SU		1	RXR5	09/08/18	1655	1800907	5
The fellow:	na Duan Mathada w	п ana nanfan	0.18	0.010	0.100	50		1	KADJ	09/08/18	1055	1800907	5
The followi	ng Prep Methods w	ere periori	ned:			Dete		D '	D	D . (. 1			
	Desci	ription			Analyst	Date	-	1 1me	e Pro	ep Batch			
SW846 3050B SW846 3050B	ICP-M	IS 3050BS PI	KEP DED	•	IXM8 SYW1	09/17/18	1	1321	180)2227			
SW846 9056A	SW84	6 9056A Tot	al Anions in Soil	1	MAR1	09/11/18	()813	180)1075			
The follow	ing Analytical Meth	nods were	performed:			0,,11,10		,015	100	1075			
Method	Descr	iption	-			A	Analyst	Cor	nments	5			
1	SW846	9056A											
2	SW846	5 3050B/6020	A										
3	SW846	5 3050B/6020	A										
4	SW846	5 3050B/6020	A										
5	SW846	9045D											
Notes:													
Column he	aders are defined as	follows											
DF: Dilutio	n Factor	101101101	Lc/LC: Critic	al Level									
DL: Detect	ion Limit		PF: Prep Fact	tor									
MDA: Min	imum Detectable A	ctivity	RL: Reportin	g Limit									
MDC: Min	imum Detectable C	oncentratio	on SQL: Sample	Quantitati	on Limit								

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Certificate of Analysis

	Company : Address :	We PO	stinghouse Drawer R	Electric Compar	ny, LLO									
	Contact: Project:	Col Ms. Soil	umbia, Sou Cynthia L l and Vege	ith Carolina 292 ogsdon tation Analysis	205									
	Client Sample ID:	HF-	B6-(9-10)	Soil Boring			Pro	ject:		WNU	C00518			
	Sample ID:	459	059002				Cli	ent ID:		WNU	C007			
	Matrix:	Soil	l											
	Collect Date:	06-	SEP-18 10	:24										
	Receive Date:	07-3	SEP-18											
	Collector:	Clie	ent											
	Moisture:	13%	́о											
Parameter	Qual	ifier	Result		DL	RL	Units	PF	DF	Analy	st Date	Time	Batch	Method
Ion Chroma	atography													
SW846 905	56A Fluoride and N	itrate	"Dry Weig	ht Corrected"										
Fluoride		U	ND		0.388	1.14	mg/kg	9.93	1	MAR1	09/11/18	1017	1801076	1
Nitrate-N			16.8		0.376	1.14	mg/kg	9.93	1					
Metals Ana	alysis-ICP-MS	a 1'												
SW846 303	50B/6020A Uraniur	n Soli	d "Dry We	ight Corrected"	0.12	14.0	ua/Va	02.0	n	CIZI	00/17/19	1016	1800021	2
Uranium-235		J	10.3		2.13	14.9 42.7	ug/Kg 110/Ko	92.8 92.8	2	SKJ	09/17/18	1016	1800921	Z
Uranium 250			937		14.1	42.7	ug/Kg	92.8	2	SKJ	09/17/18	1504	1800921	3
Uranium-234		U	ND		2.25	11.2	ug/Kg	97.8	2	SKJ	09/18/18	0918	1802228	4
Titration ar	nd Ion Analysis													
SW9045D	Corrosivity (pH<20	or>14)	"As Recei	ved"										
Corrosivity		Н	6.18		0.010	0.100	SU		1	RXB5	09/08/18	1658	1800907	5
The follow	ing Prep Methods v	vere pe	erformed:											
Method	Desc	ription	n			Analyst	Date		Гime	e Pr	ep Batch			
SW846 3050H	B ICP-N	AS 3050	BS PREP			JXM8	09/17/18	1	1321	180	02227			
SW846 3050E	B ICP-N	AS 3050)BS PREP A Total Amia	na in Cail		SXW1	09/08/18	()510	180	00920			
The follow	ving Analytical Met	hods v	vere perfoi	med:		MARI	09/11/18	(J815	180	51075			
Method	Desci	ription					A	Analyst	Co	nments	3			
1	SW84	6 9056A	A				1	maryse	. 001	minema	,			
2	SW84	6 3050E	B/6020A											
3	SW84	6 3050E	3/6020A											
4	SW84	6 3050E	3/6020A											
5	SW84	6 9045L)											
Notes:														
Column he DF: Dilutio DL: Detect MDA: Mir MDC: Mir	eaders are defined a on Factor tion Limit nimum Detectable A nimum Detectable C	<u>s follo</u> Activit	ws: y ntration	Lc/LC: Critical PF: Prep Factor RL: Reporting SQL: Sample Q	Level r Limit Quantita	tion Limit								

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Certificate of Analysis

Report Date: September 19, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B6-(11-12) Soil Boring Project: WNUC00518 Sample ID: 459059003 Client ID: WNUC007 Matrix: Soil Collect Date: 06-SEP-18 11:00 07-SEP-18 Receive Date: Collector: Client 12.4% Moisture: RL Qualifier DL Units PF Parameter Result DF Analyst Date Time Batch Method Ion Chromatography SW846 9056A Fluoride and Nitrate "Dry Weight Corrected" U ND 0.384 1.13 mg/kg 9.90 1 MAR1 09/11/18 1048 1801076 1 12.7 0.373 9.90 1.13 mg/kg 1 Metals Analysis-ICP-MS SW846 3050B/6020A Uranium Solid "Dry Weight Corrected" Uranium-235 13.9 2.15 15.0 ug/Kg 94.0 2 SKJ 09/17/18 1018 1800921 2 J ug/Kg Uranium-238 1030 42.9 2 14.2 94.0 992 14.2 42.9 ug/Kg 94.0 2 SKJ 09/17/18 1506 1800921 3 U ND 2.23 2 Uranium-234 11.1 ug/Kg 97.5 SKJ 09/18/18 0919 1802228 4 Titration and Ion Analysis SW9045D Corrosivity (pH<2or>14) "As Received" 5.97 0.010 0.100 SU RXB5 09/08/18 1704 1800907 5 Н 1 The following Prep Methods were performed: Prep Batch Description Date Analyst Time SW846 3050B **ICP-MS 3050BS PREP** JXM8 09/17/18 1321 1802227 **ICP-MS 3050BS PREP** SW846 3050B SXW1 09/08/18 0510 1800920 SW846 9056A Total Anions in Soil 0813 1801075 SW846 9056A MAR1 09/11/18 The following Analytical Methods were performed: Description Analyst Comments SW846 9056A SW846 3050B/6020A SW846 3050B/6020A SW846 3050B/6020A SW846 9045D

Column headers are defined as follows: DF: Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

Fluoride

Nitrate-N

Uranium

Corrosivity

Method

Method

1

2

3

4

5

Notes:

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Certificate of Analysis

	Company : Address :	Wes PO I	tinghouse Elec Drawer R	etric Company	y, LLC	2								
	Contact: Project:	Colu Ms. Soil	umbia, South C Cynthia Logsc and Vegetatio	Carolina 2920 lon n Analysis)5									
	Client Sample ID:	HF-1	R9-(7-8) Soil F	Roring			Pro	niect:		WNU	C00518			
	Sample ID:	4590)59004	Joining			Cli	ent ID		WNU	C007			
	Matrix:	Soil					en		•		0007			
	Collect Date:	06-5	EP-18 13:00											
	Receive Date:	07-5	EP-18											
	Collector:	Clie	nt											
	Moisture:	10.8	%											
Parameter	Quali	fier	Result		DL	RL	Units	PF	DF	Analy	st Date	Time	e Batch	Method
Ion Chroma	tography													
SW846 905	6A Fluoride and Ni	trate "	Dry Weight C	orrected"										
Fluoride	or r r ruoride und r tr	U	ND	oncerea	0.381	1.12	mg/kg	10.0	1	MAR1	09/11/18	1119	1801076	1
Nitrate-N			167		1.85	5.61	mg/kg	10.0	5	MAR1	09/12/18	0523	1801076	2
Metals Ana	lysis-ICP-MS													
SW846 305	0B/6020A Uranium	n Solid	l "Dry Weight	Corrected"										
Uranium-235			24.0		2.15	15.0	ug/Kg	95.8	2	SKJ	09/17/18	1019	1800921	3
Uranium-238			1240		14.2	43.0	ug/Kg	95.8	2					
Uranium			1250		14.2	43.0	ug/Kg	95.8	2	SKJ	09/17/18	1507	1800921	4
Uranium-234	d Ion Analysia	U	ND		2.22	11.1	ug/Kg	98.8	2	SKJ	09/18/18	0920	1802228	5
Thration an		. 1.4	"A D : 1"											
SW9045D C	Corrosivity (pH<201	:>14)	As Received		0.010	0 100	CII		1	DVD5	00/00/10	1705	100007	C
		н	5.81		0.010	0.100	30		1	кавэ	09/08/18	1705	1800907	0
The follows	ng Prep Methods w	ere pe	rformed:											
Method	Descr	ription	l			Analyst	Date	r	Гime	e Pr	ep Batch			
SW846 3050B	ICP-M	S 3050	BS PREP			JXM8	09/17/18		1321	18	02227			
SW846 3050B	ICP-M	S 3050.	BS PREP	Soil		SXW1 MAD1	09/08/18		0510	18	00920			
The follow	ing Analytical Meth	ods w	vere performed	:		MARI	09/11/18	,	0015	10	51075			
Method	Descri	ption	1					Analyst	Cor	nment	3			
1	SW846	9056A						maryst	. 001		,			
2	SW846	9056A												
3	SW846	3050B	/6020A											
4	SW846	3050B	/6020A											
5	SW846	3050B	/6020A											
6	SW846	9045D												
Notes:														

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Certificate of Analysis

Company : Address :	Westinghouse Electric Company, LLC PO Drawer R		
Contact: Project:	Columbia, South Carolina 29205 Ms. Cynthia Logsdon Soil and Vegetation Analysis		
Client Sample ID:	HF-B9-(7-8) Soil Boring	Project:	WNUC00518
Sample ID:	459059004	Client ID:	WNUC007

Parameter	Qualifier	Result	DL	RL	Units	PF	DF Analyst Date	Time Batch	Method

Lc/LC: Critical Level
PF: Prep Factor
RL: Reporting Limit
on SQL: Sample Quantitation Limit

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Certificate of Analysis

	Company : Address :	West PO E	tinghouse I Drawer R	Electric Compa	ny, LLC									
	Contact: Project:	Colu Ms. (Soil :	mbia, Sout Cynthia Lo and Vegeta	h Carolina 292 ogsdon ation Analysis	205									
	Client Sample ID:	HF-E	39-(9-10) \$	oil Boring			Pro	oject:		WNU	C00518			
	Sample ID:	4590	59005	C			Cli	ent ID		WNU	C007			
	Matrix:	Soil												
	Collect Date:	06-S	EP-18 13·2	7										
	Receive Date:	07-5	EP-18	.,										
	Collector:	Clier	LI IO											
	Conector.	11.00	IL N											
	Moisture:	11.29	%											
Parameter	Quali	fier	Result		DL	RL	Units	PF	DF	Analy	st Date	Time	Batch	Method
Ion Chroma	atography													
SW846 905	6A Fluoride and Ni	trate "]	Dry Weigh	t Corrected"										
Fluoride		U	ND		0.381	1.12	mg/kg	9.95	1	MAR1	09/11/18	1150	1801076	1
Nitrate-N			43.9		0.370	1.12	mg/kg	9.95	1					
Metals Ana	lysis-ICP-MS													
SW846 305	0B/6020A Uranium	n Solid	"Dry Weig	ght Corrected"										
Uranium-235			17.3		2.07	14.5	ug/Kg	91.9	2	SKJ	09/17/18	1021	1800921	2
Uranium-238			1060		13.7	41.4	ug/Kg	91.9	2	~~~~				
Uranium 224		TT	1040 ND		13.7	41.4	ug/Kg	91.9	2	SKJ	09/17/18	1509	1800921	3
Titration an	d Ion Analysis	0	ND		2.22	11.1	ug/Kg	90.4	2	SKJ	09/10/10	0922	1602226	4
	Correctivity (nH < 20)	~ 1 <i>1</i>) "		ad"										
SW9043DV Correcivity	Corrosivity (pri<20)	(>14)	AS Receiv	eu	0.010	0.100	SU		1	DVB5	00/08/18	1706	1800007	5
The Celler ?		п	0.15		0.010	0.100	30		1	кабј	09/00/10	1700	1800907	5
I ne tollowi	ng Prep Methods w	ere per	rtormed:				D (D	D (1			
Method	Desci	ription				Analyst	Date	,	Fime	e Pro	ep Batch			
SW846 3050B	ICP-M	S 3050E	SS PREP			JXM8	09/17/18		1321	180)2227			
5 W 840 3030B SW846 90564	SW84	S 3030E	55 PKEP Total Anions	in Soil		SAW1 MAR1	09/08/18		0510	180)10920)1075			
The follow	ing Analytical Meth	ods w	ere perforn	ned:		MARI	09/11/18	,	0015	100	1075			
Method	Descri	ntion	1				A	Analyst	Cor	nments	3			
1	SW846	9056A					-	<u> </u>			, 			
2	SW846	3050B/	6020A											
3	SW846	3050B/	6020A											
4	SW846	3050B/	6020A											
5	SW846	9045D												
Notes:														
Column he	aders are defined as	follow	vs:											
DF: Dilutio	on Factor		· •	Lc/LC: Critical	Level									
DL: Detect	ion Limit			PF: Prep Factor	r									
MDA: Min	imum Detectable A	ctivity		RL: Reporting	Limit									
MDC: Min	imum Detectable C	oncent	ration	SQL: Sample Q	Quantita	tion Limit								

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Certificate of Analysis

Report Date: September 19, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B9-(11-12) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 459059006 Matrix: Soil Collect Date: 06-SEP-18 13:58 07-SEP-18 Receive Date: Collector: Client 13.4% Moisture: RL Qualifier DL Units PF Parameter Result DF Analyst Date Time Batch Method Ion Chromatography SW846 9056A Fluoride and Nitrate "Dry Weight Corrected" U ND 0.392 1.15 mg/kg 9.98 1 MAR1 09/11/18 1220 1801076 1 19.3 0.380 9.98 1.15 mg/kg 1 Metals Analysis-ICP-MS SW846 3050B/6020A Uranium Solid "Dry Weight Corrected" Uranium-235 2.11 14.8 ug/Kg 91.2 2 SKJ 09/17/18 1022 1800921 2 80.4 ug/Kg Uranium-238 2970 42.1 2 13.9 91.2 2990 13.9 42.1 ug/Kg 91.2 2 SKJ 09/17/18 1511 1800921 3 U ND 2 Uranium-234 2.26 11.3 ug/Kg 98.0 SKJ 09/18/18 0923 1802228 4 Titration and Ion Analysis SW9045D Corrosivity (pH<2or>14) "As Received" Corrosivity 6.02 0.010 0.100 SU RXB5 09/08/18 1707 1800907 5 Н 1 The following Prep Methods were performed: Description Date Prep Batch Analyst Time SW846 3050B **ICP-MS 3050BS PREP** JXM8 09/17/18 1321 1802227 **ICP-MS 3050BS PREP** SW846 3050B SXW1 09/08/18 0510 1800920 SW846 9056A Total Anions in Soil 0813 1801075 SW846 9056A MAR1 09/11/18 The following Analytical Methods were performed: Analyst Comments Description SW846 9056A SW846 3050B/6020A SW846 3050B/6020A SW846 3050B/6020A SW846 9045D Column headers are defined as follows: DF: Dilution Factor Lc/LC: Critical Level

DL: Detection Limit MDA: Minimum Detectable Activity MDC: Minimum Detectable Concentration PF: Prep Factor **RL: Reporting Limit** SQL: Sample Quantitation Limit

Fluoride

Nitrate-N

Uranium

Method

Method

1

2

3

4

5

Notes:

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Certificate of Analysis

Report Date: September 19, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B11-(7-8) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 459059007 Matrix: Soil Collect Date: 07-SEP-18 09:07 07-SEP-18 Receive Date: Collector: Client Moisture: 11.9% RL PF Qualifier DL Units Parameter Result DF Analyst Date Time Batch Method Ion Chromatography SW846 9056A Fluoride and Nitrate "Dry Weight Corrected" 497 7.66 22.5 mg/kg 9.93 20 MAR1 09/12/18 0554 1801076 1 729 7.44 22.5 9.93 20 mg/kg Metals Analysis-ICP-MS SW846 3050B/6020A Uranium Solid "Dry Weight Corrected" Uranium-238 3910000 7330 22200 ug/Kg 97.8 1000 SKJ 09/17/18 1257 1800921 2 ug/Kg 1524 1800921 3630000 444 3 147 97.8 20 SKJ 09/17/18 Uranium-234 1550 21.9 110 ug/Kg 96.5 20 SKJ 09/18/18 0935 1802228 4 152000 2220 15500 5 Uranium-235 ug/Kg 97.8 2000 SKJ 09/17/18 1345 1800921 Titration and Ion Analysis SW9045D Corrosivity (pH<2or>14) "As Received" 4.06 0.010 0.100 SU RXB5 09/08/18 1708 1800907 Η 1 6 The following Prep Methods were performed: Prep Batch Date Description Analyst Time SW846 3050B ICP-MS 3050BS PREP JXM8 09/17/18 1321 1802227 **ICP-MS 3050BS PREP** SW846 3050B SXW1 09/08/18 0510 1800920 0813 1801075 SW846 9056A SW846 9056A Total Anions in Soil MAR1 09/11/18

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9056A	
2	SW846 3050B/6020A	
3	SW846 3050B/6020A	
4	SW846 3050B/6020A	
5	SW846 3050B/6020A	
6	SW846 9045D	

Notes:

Fluoride

Nitrate-N

Uranium

Corrosivity

Method

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Certificate of Analysis

Company : Address :	Westinghouse Electric Company, LLC PO Drawer R		
Contact: Project:	Columbia, South Carolina 29205 Ms. Cynthia Logsdon Soil and Vegetation Analysis		
Client Sample ID: Sample ID:	HF-B11-(7-8) Soil Boring 459059007	Project: Client ID:	WNUC00518 WNUC007

Parameter	Qualifier	Result	DL	RL	Units	PF	DF Analyst Date	Time Batch	Method

Column headers are defined as follows:	
DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	n SQL: Sample Quantitation Limit

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Certificate of Analysis

	Company : Address :	Wes PO	stinghouse Drawer R	Electric Compan	y, LLC									
	Contact: Project:	Col Ms. Soil	umbia, Sou Cynthia Lo and Vegeta	th Carolina 2920 ogsdon ation Analysis)5									
	Client Sample ID:	HF-	B11-(9-10)	Soil Boring			Pro	oject:		WNU	C00518			
	Sample ID:	459	059008				Cli	ent ID	:	WNU	C007			
	Matrix:	Soil												
	Collect Date:	07-5	SEP-18 09:4	40										
	Receive Date:	07-5	SEP-18											
	Collector:	Clie	ent											
	Moisture:	11.9	9%											
Parameter	Oual	ifier	Result		DL	RL	Units	PF	DF	Analy	st Date	Time	e Batch	Method
Ion Chroms	atography	-												
SW846 005	64 Eluoride and N	itrata '	Dry Woigh	t Corrected"										
Swo40 905	OA FIUOITUE allu N	luate	2 59	li Collected	0 384	1 13	ma/ka	9.95	1	MARI	09/11/18	1424	1801076	1
Nitrate-N			188		1.86	5.65	mg/kg	9.95	5	MAR1	09/12/18	0625	1801076	2
Metals Ana	lvsis-ICP-MS						00							
SW846 305	50B/6020A Uraniur	n Solia	1 "Drv Wei	oht Corrected"										
Uranium-238		ii boli	8180	gin conceted	15.0	45.3	ug/Kg	99.8	2	SKJ	09/17/18	1305	1800921	3
Uranium			8690		15.0	45.3	ug/Kg	99.8	2	SKJ	09/17/18	1519	1800921	4
Uranium-234		U	ND		2.11	10.6	ug/Kg	93.1	2	SKJ	09/18/18	0930	1802228	5
Uranium-235			286		11.3	79.3	ug/Kg	99.8	10	SKJ	09/17/18	1346	1800921	6
Titration an	d Ion Analysis													
SW9045D	Corrosivity (pH<2c	r>14)	"As Receiv	ved"										
Corrosivity		Н	5.83		0.010	0.100	SU		1	RXB5	09/08/18	1711	1800907	7
The followi	ing Prep Methods w	vere pe	erformed:											
Method	Desc	ription	1		-	Analyst	Date	r	Time	e Pr	ep Batch	-		
SW846 3050B	B ICP-M	1S 3050	BS PREP			JXM8	09/17/18		1321	180)2227			
SW846 3050B	B ICP-N	1S 3050	BS PREP			SXW1	09/08/18	(0510	180	00920			
SW846 9056A	A SW84	6 90564	A Total Anion	s in Soil		MAR1	09/11/18	(0813	180	01075			
The follow	ing Analytical Met	hods v	vere perform	ned:										
Method	Desci	ription					A	Analyst	Co	nments	3			
1	SW84	5 9056A	1											
2	SW84	5 9056A	X											
3	SW84	5 3050E	3/6020A											
4	SW84	5 3050E	3/6020A											
5	SW84	5 3050E	5/60/20A											
6 7	SW84	5 3050E	5/6020A											
1	SW84	5 9045L	,											
Notes:														

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Certificate of Analysis

Company : Address :	Westinghouse Electric Company, LLC PO Drawer R		
Contact: Project:	Columbia, South Carolina 29205 Ms. Cynthia Logsdon Soil and Vegetation Analysis		
Client Sample ID: Sample ID:	HF-B11-(9-10) Soil Boring 459059008	Project: Client ID:	WNUC00518 WNUC007

Parameter	Qualifier	Result	DL	RL	Units	PF	DF Analyst Date	Time Batch	Method

Column headers are defined as follows:	
DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: September 19, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B11-(11-12) Soil Boring Project: WNUC00518 Sample ID: 459059009 Client ID: WNUC007 Matrix: Soil Collect Date: 07-SEP-18 10:22 07-SEP-18 Receive Date: Collector: Client 12.2% Moisture: RL PF Qualifier DL Units Parameter Result DF Analyst Date Time Batch Method Ion Chromatography SW846 9056A Fluoride and Nitrate "Dry Weight Corrected" Fluoride U ND 0.385 1.13 mg/kg 9.95 1 MAR1 09/11/18 1455 1801076 1 34.6 0.374 9.95 Nitrate-N 1.13 mg/kg 1 Metals Analysis-ICP-MS SW846 3050B/6020A Uranium Solid "Dry Weight Corrected" Uranium-238 8620 14.8 44.8 ug/Kg 98.4 2 SKJ 09/17/18 1307 1800921 2 ug/Kg 1520 1800921 Uranium 9540 14.8 44.8 2 SKJ 09/17/18 3 98.4 Uranium-234 U ND 2.18 10.9 ug/Kg 95.6 2 SKJ 09/18/18 0932 1802228 4 5 Uranium-235 323 11.2 78.5 ug/Kg 98.4 10 SKJ 09/17/18 1348 1800921 Titration and Ion Analysis SW9045D Corrosivity (pH<2or>14) "As Received" Corrosivity 5.64 0.010 0.100 SU RXB5 09/08/18 1712 1800907 Н 1 6 The following Prep Methods were performed: Method Description Prep Batch Date Analyst Time SW846 3050B ICP-MS 3050BS PREP JXM8 09/17/18 1321 1802227 **ICP-MS 3050BS PREP** SW846 3050B SXW1 09/08/18 0510 1800920 SW846 9056A Total Anions in Soil 0813 1801075 SW846 9056A MAR1 09/11/18 The following Analytical Methods were performed: Method Description Analyst Comments SW846 9056A SW846 3050B/6020A SW846 3050B/6020A SW846 3050B/6020A SW846 3050B/6020A SW846 9045D

Notes:

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Certificate of Analysis

Company : Address :	Westinghouse Electric Company, LLC PO Drawer R				
Contact: Project:	Columbia, South Carolina 29205 Ms. Cynthia Logsdon Soil and Vegetation Analysis				
Client Sample ID: Sample ID:	HF-B11-(11-12) Soil Boring 459059009	Projec Client	t: ID:	WNUC00518 WNUC007	

Parameter	Qualifier	Result	DL	RL	Units	PF	DF Analyst Date	Time Batch	Method

Column headers are defined as follows:	
DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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Certificate of Analysis

	Company : Address :	Westinghou PO Drawer	se Electric Compa R	any, LLC	2								
	Contact: Project:	Columbia, S Ms. Cynthia Soil and Veg	outh Carolina 29 Logsdon getation Analysis	205									
	Client Sample ID: Sample ID:	HF-B1-(7-8) 459059010	Soil Boring			Pro Cli	oject: ent ID	:	WNU WNU	C00518 C007			
	Matrix:	Soil											
	Collect Date:	06-SEP-18 1	5:15										
	Receive Date:	07-SEP-18											
	Collector:	Client											
	Conector.	0.770/											
	Moisture:	9.77%											
Parameter	Quali	fier Result		DL	RL	Units	PF	DF	Analy	st Date	Time	Batch	Method
Ion Chrom	atography												
SW846 90	56A Fluoride and Ni	trate "Dry We	ight Corrected"										
Fluoride		34	1	9.30	27.4	mg/kg	9.88	25	MAR1	09/12/18	0656	1801076	1
Nitrate-N		71	7	9.03	27.4	mg/kg	9.88	25					
Metals Ana	alysis-ICP-MS												
SW846 30	50B/6020A Uranium	n Solid "Drv V	Veight Corrected"										
Uranium-235		10600	0	2190	15300	ug/Kg	98.8	2000	SKJ	09/17/18	1349	1800921	2
Uranium-238		275000	0	14500	43800	ug/Kg	98.8	2000					
Uranium		272000	0	145	438	ug/Kg	98.8	20	SKJ	09/17/18	1530	1800921	3
Uranium-234		95	4	21.6	108	ug/Kg	97.3	20	SKJ	09/18/18	0936	1802228	4
Titration a	nd Ion Analysis												
SW9045D	Corrosivity (pH<20)	r>14) "As Rec	eived"										
Corrosivity		Н 3.7	6	0.010	0.100	SU		1	RXB5	09/08/18	1713	1800907	5
The follow	ing Prep Methods w	ere performed	:										
Method	Desci	ription			Analyst	Date	r	Time	Pre	ep Batch			
SW846 30501	B ICP-M	IS 3050BS PREP			JXM8	09/17/18		1321	180)2227			
SW846 30501	B ICP-M	IS 3050BS PREP			SXW1	09/08/18	(0510	180	00920			
SW846 9056	A SW846	6 9056A Total An	ions in Soil		MAR1	09/11/18	(0813	180	01075			
The follow	ving Analytical Meth	nods were perf	ormed:										
Method	Descr	iption				A	Analyst	Cor	nments	5			
1	SW846	9056A											
2	SW846	5 3050B/6020A											
3	SW846	5 3050B/6020A											
4	SW846	5 3050B/6020A											
5	SW846	9045D											
Notes:													
Column	adam and defined	follows											
DE: Diluti	on Factor	TOHOWS:	Lo/I C. Critico	1 Lovol									
DI · Dataa	tion Limit		DE: Drop Easte										
MDA · Mi	nimum Detectable A	ctivity	RI · Reporting	л Limit									
MDC: Mi	nimum Detectable C	oncentration	SOL: Sample (Quantita	tion Limit								
			S Z L. Sumple	× ummunu									

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	Company : Address :	Wes PO I	tinghouse Elec Drawer R	etric Compan	y, LLC	2								
	Contact: Project:	Colu Ms. Soil	umbia, South C Cynthia Logsc and Vegetation	arolina 2920 Ion n Analysis	05									
	Client Sample ID:	HF-	B1-(9-10) Soil	Boring			Pro	oject:		WNU	C00518			
	Sample ID:	4590)59011	•			Cli	ient ID	:	WNU	C007			
	Matrix:	Soil												
	Collect Date:	06-S	EP-18 15:45											
	Receive Date:	07-S	EP-18											
	Collector:	Clie	nt											
	Moisture:	11.9	%											
Parameter	Quali	fier	Result		DL	RL	Units	PF	DF	Analy	st Date	Time	Batch	Method
Ion Chroma	itography													
SW846 905	6A Fluoride and Ni	trate "	Dry Weight C	orrected"										
Fluoride	or r r ruoride und r ir	iiute	5.21	oncerea	0.381	1.12	mg/kg	9.88	1	MAR1	09/11/18	1557	1801076	1
Nitrate-N			351		3.70	11.2	mg/kg	9.88	10	MAR1	09/12/18	0727	1801076	2
Metals Ana	lysis-ICP-MS													
SW846 305	0B/6020A Uranium	Solid	l "Dry Weight	Corrected"										
Uranium-235			4910		105	734	ug/Kg	92.4	100	SKJ	09/17/18	1340	1800921	3
Uranium-238			122000		692	2100	ug/Kg	92.4	100					
Uranium			117000		13.8	41.9	ug/Kg	92.4	2	SKJ	09/17/18	1532	1800921	4
Uranium-234	d Ion Analysia		12.1		2.22	11.1	ug/Kg	98.0	2	SKJ	09/18/18	0941	1802228	5
Thration an		. 1.4	"A D : 1"											
SW9045D C	Corrosivity (pH<201	:>14)	"As Received"		0.010	0.100	CLI		1	DVD5	00/00/10	1714	100007	C
Corrosivity		н	4.18		0.010	0.100	50		1	кавэ	09/08/18	1/14	1800907	6
The follows	ng Prep Methods w	ere pe	rformed:											
Method	Descr	ription	l			Analyst	Date	,	Time	e Pr	ep Batch			
SW846 3050B	ICP-M	S 3050	BS PREP			JXM8	09/17/18		1321	18)2227			
SW846 3050B	ICP-M	S 3050	BS PREP	N - 11		SXWI	09/08/18		0510	180	00920			
The follow	ing Analytical Meth	ods w	vere performed	:		MARI	09/11/18		0815	10	51075			
Method	Descri	ption						Analys	t Coi	nments	3			
1	SW846	9056A						marys			,			
2	SW846	9056A												
3	SW846	3050B	/6020A											
4	SW846	3050B	/6020A											
5	SW846	3050B	/6020A											
6	SW846	9045D												
Notes:														

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Certificate of Analysis

Company : Address :	Westinghouse Electric Company, LLC PO Drawer R			
Contact: Project:	Columbia, South Carolina 29205 Ms. Cynthia Logsdon Soil and Vegetation Analysis			
Client Sample ID: Sample ID:	HF-B1-(9-10) Soil Boring 459059011	Project: Client ID:	WNUC00518 WNUC007	

Parameter	Qualifier	Result	DL	RL	Units	PF	DF Analyst Date	Time Batch	Method

Column headers are defined as follows:	
DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentratio	n SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: September 19, 2018

Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B1-(11-12) Soil Boring Project: WNUC00518 Sample ID: 459059012 Client ID: WNUC007 Matrix: Soil Collect Date: 06-SEP-18 16:33 07-SEP-18 Receive Date: Collector: Client Moisture: 12.6% RL PF Qualifier DL Units Result DF Analyst Date Time Batch Method Ion Chromatography SW846 9056A Fluoride and Nitrate "Dry Weight Corrected" 0.384 0.400 1.13 mg/kg 9.88 1 MAR1 09/11/18 1628 1801076 1 J 104 1.87 MAR1 09/12/18 0758 1801076 2 5.65 mg/kg 9.88 5 Metals Analysis-ICP-MS SW846 3050B/6020A Uranium Solid "Dry Weight Corrected" 3600 105 734 ug/Kg 91.6 100 SKJ 09/17/18 1341 1800921 3 ug/Kg 91.6 100 91100 692 2100 86200 13.8 41.9 ug/Kg 91.6 2 SKJ 09/17/18 1533 1800921 4 2 20.5 2.16 10.8 ug/Kg 94.3 SKJ 09/18/18 0942 1802228 5 Titration and Ion Analysis SW9045D Corrosivity (pH<2or>14) "As Received" 4.78 0.010 0.100 SU RXB5 09/08/18 1715 1800907 Η 1 6 The following Prep Methods were performed: Prep Batch Date Description Analyst Time ICP-MS 3050BS PREP JXM8 09/17/18 1321 1802227 **ICP-MS 3050BS PREP** SXW1 09/08/18 0510 1800920

The following Analytical Methods were performed:

SW846 9056A Total Anions in Soil

Method	Description	Analyst Comments
1	SW846 9056A	
2	SW846 9056A	
3	SW846 3050B/6020A	
4	SW846 3050B/6020A	
5	SW846 3050B/6020A	
6	SW846 9045D	

MAR1

0813

09/11/18

1801075

Notes:

Parameter

Fluoride

Nitrate-N

Uranium-235

Uranium-238

Uranium-234

Corrosivity

Method

SW846 3050B

SW846 3050B

SW846 9056A

Uranium
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Certificate of Analysis

Report Date: September 19, 2018

Company : Address :	Westinghouse Electric Company, LLC PO Drawer R		
Contact: Project:	Columbia, South Carolina 29205 Ms. Cynthia Logsdon Soil and Vegetation Analysis		
Client Sample ID: Sample ID:	HF-B1-(11-12) Soil Boring 459059012	Project: Client ID:	WNUC00518 WNUC007

Parameter	Qualifier	Result	DL	RL	Units	PF	DF Analyst Date	Time Batch	Method

Column headers are defined as follows:	
DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	n SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: September 19, 2018

	Company : Address :	Wes PO I	tinghouse Elec Drawer R	etric Company	, LLC									
	Contact: Project:	Colı Ms. Soil	umbia, South C Cynthia Logsd and Vegetation	arolina 29205 Ion n Analysis	5									
	Client Sample ID:	HF-	B16-(1-2) Soil	Boring			Pro	ject:		WNU	C00518			
	Sample ID:	4590	059013	-			Cli	ent ID:		WNU	2007			
	Matrix:	Soil												
	Collect Date:	06-8	SEP-18 17:15											
	Receive Date:	07-8	SEP-18											
	Collector:	Clie	nt											
	Moisture:	5.77	%											
Parameter	Quali	fier	Result		DL	RL	Units	PF	DF	Analy	st Date	Time	Batch	Method
Ion Chroma	tography									-				
SW846 905	6A Fluoride and N	itrate "	Dry Weight Co	orrected"										
Fluoride			33.7	().357	1.05	mg/kg	9.90	1	MAR1	09/11/18	1658	1801076	1
Nitrate-N			236		3.47	10.5	mg/kg	9.90	10	MAR1	09/12/18	0829	1801076	2
Metals Anal	lysis-ICP-MS													
SW846 305	0B/6020A Uraniun	n Solic	l "Dry Weight	Corrected"										
Uranium-238			284000		688	2080	ug/Kg	98.2	100	SKJ	09/17/18	1344	1800921	3
Uranium			276000		13.8	41.7	ug/Kg	98.2	2	SKJ	09/17/18	1535	1800921	4
Uranium-234			86.7		1.98	9.92	ug/Kg	93.5	2	SKJ	09/18/18	0943	1802228	5
Uranium-235	17 4 1 1		9690		208	1460	ug/Kg	98.2	200	SKJ	09/17/18	1605	1800921	6
Titration and	d Ion Analysis													
SW9045D (Corrosivity (pH<20	r>14)	"As Received"											
Corrosivity The followi	ng Prep Methods w	H ere pe	4.26 erformed:	(0.010	0.100	SU		1	RXB5	09/08/18	1715	1800907	7
Method	Desc	riptior	1			Analyst	Date	r	Fime	e Pro	ep Batch			
SW846 3050B	ICP-M	IS 3050	BS PREP			JXM8	09/17/18		1321	180)2227			
SW846 3050B	ICP-M	IS 3050	BS PREP			SXW1	09/08/18	(0510	180	0920			
SW846 9056A	SW84	6 9056A	A Total Anions in S	Soil		MAR1	09/11/18	(0813	180	01075			
The follow	ing Analytical Metl	nods w	vere performed	:										
Method	Descr	iption					A	Analyst	Cor	nments				
1	SW846	6 9056A												
2	SW846	5 9056A												
3	SW846	3050B	/6020A											
4 5	SW846	3050B	/6020A											
э с	SW840	3050B	/0020A											
0 7	SW840	0045DB	/0020A											
	5 W 840	7043D												

Notes:

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Certificate of Analysis

Report Date: September 19, 2018

Company : Address :	Westinghouse Electric Company, LLC PO Drawer R			
Contact: Project:	Columbia, South Carolina 29205 Ms. Cynthia Logsdon Soil and Vegetation Analysis			
Client Sample ID: Sample ID:	HF-B16-(1-2) Soil Boring 459059013	Project: Client ID:	WNUC00518 WNUC007	
Sumple ID.	+57057015	Cheft ID.	W100007	

Parameter	Qualifier	Result	DL	RL	Units	PF	DF Analyst Date	Time Batch	Method

Column headers are defined as follows:	
DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: September 19, 2018

	Company : Address :	Westinghouse PO Drawer R	Electric Company, I	LLC	2					1	1		,
	Contact: Project:	Columbia, So Ms. Cynthia I Soil and Vege	uth Carolina 29205 ogsdon tation Analysis										
	Client Sample ID: Sample ID:	HF-B16-(3-4) 459059014	Soil Boring			Pro	ject: ent ID:	:	WNU WNU	C00518 C007			
	Matrix:	Soil											
	Collect Date:	06-SEP-18 17	:29										
	Receive Date:	07-SEP-18											
	Collector:	Client											
	Moisture:	8.38%											
Deremeter	Quali	fior Degult	T	<u> </u>	DI	Unita	DE	DE	Analy	st Data	Time	Dotah	Mathad
	Quan	nei Kesuit	1	L	KL	Units	ГГ	DF	Analy	st Date	Ime	Batch	Method
Ion Chroma	atography												
SW846 905	56A Fluoride and Ni	trate "Dry Weig	ht Corrected"										
Fluoride		122	1	.83	5.38	mg/kg	9.85	5	MAR1	09/12/18	0900	1801076	1
Nitrate-N	India ICD MC	114	1	.77	5.38	mg/kg	9.85	5					
Metals Ana			. 1 . 0										
SW846 30:	50B/6020A Uranium	i Solid "Dry We	ight Corrected"	10	14100	/17	02.2	2000	avi	00/17/10	1051	1000021	2
Uranium-235		140000	20	200	14100	ug/Kg	92.3	2000	SKJ	09/17/18	1351	1800921	2
Uranium		3600000	153	133	40300	ug/Kg	92.5	2000	SKI	09/17/18	1539	1800921	3
Uranium-234		1230	2	0.6	103	ug/Kg	94.3	20	SKJ	09/18/18	0945	1802228	4
Titration ar	nd Ion Analysis												
SW9045D	Corrosivity (nH o</td <td>r>14) "As Recei</td> <td>ved"</td> <td></td>	r>14) "As Recei	ved"										
Corrosivity	conositity (pir (20)	Н 4.53	0.0	010	0.100	SU		1	RXB5	09/08/18	1716	1800907	5
The follow	ing Prep Methods w	ere performed											
Method	Desci	ription			Analyst	Date	-	Fime	Pr	en Batch			
SW846 3050F	B ICP-M	S 3050BS PREP			IXM8	09/17/18		1321	180	02227			
SW846 30501	B ICP-M	S 3050BS PREP			SXW1	09/08/18		0.510	180)0920			
SW846 9056A	A SW84	5 9056A Total Anio	ns in Soil		MAR1	09/11/18	(0813	180	01075			
The follow	ving Analytical Meth	nods were perfor	med:										
Method	Descr	iption				А	nalvst	Cor	nments	3			
1	SW846	9056A											
2	SW846	3050B/6020A											
3	SW846	3050B/6020A											
4	SW846	3050B/6020A											
5	SW846	9045D											
Notes:													
Column be	adars are defined as	follows											
DE: Diluti	on Factor	TOHOWS.	I c/I C: Critical I a	1مر									
DI · Dates	tion Limit		DE: Pren Factor	v CI									
MDA · Mir	nimum Detectable A	ctivity	RL: Reporting I im	it									
MDC: Mir	nimum Detectable C	oncentration	SQL: Sample Quan	itita	tion Limit								

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QC Summary

Report Date: September 19, 2018

Westinghouse Electric Company, LLC PO Drawer R Columbia, South Carolina Ms. Cynthia Logsdon

Page 1 of 4

Workorder: 459059

Contact:

Parmname			NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Ion Chromatograph Batch 180	y 01076												
QC1204110890 Fluoride	459059001	DUP		U	ND	U	ND	mg/kg	N/A			MAR1	09/11/18 09:15
Nitrate-N					29.4		29.2	mg/kg	0.983		(0%-20%)		
QC1204110891 Fluoride	459059014	DUP			122		124	mg/kg	1.34		(0%-20%)		09/12/18 09:31
Nitrate-N					114		113	mg/kg	0.417		(0%-20%)		
QC1204110889 Fluoride	LCS		25.0				25.0	mg/kg		100	(90%-110%)		09/11/18 07:59
Nitrate-N			25.0				23.8	mg/kg		95.3	(90%-110%)		
QC1204110888 Fluoride	MB					U	ND	mg/kg					09/11/18 07:29
Nitrate-N						U	ND	mg/kg					
QC1204111773 Fluoride	459059001	MS	27.4	U	ND		7.92	mg/kg		28.9*	(30%-135%)		09/11/18 09:46
Nitrate-N			27.4		29.4		55.8	mg/kg		96.1	(70%-125%)		
QC1204111774 Fluoride	459059014	MS	27.1		122		148	mg/kg		N/A	(30%-135%)		09/12/18 10:01
Nitrate-N			27.1		114		133	mg/kg		N/A	(70%-125%)		

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QC Summary

Workorder: 2	59059											Page 2	of 4
Parmname			NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Tin	ne
Metals Analysis - IC Batch 180	CPMS 00921												
QC1204110210 Uranium	459059001	DUP		1130		984	ug/Kg	13.8		(0%-20%)	SKJ	09/17/18 14	4:55
Uranium-235				28.0		19.7	ug/Kg	34.9	^	(+/-14.9))	09/17/18 10):07
Uranium-238				1090		939	ug/Kg	15.3		(0%-20%)			
QC1204110209 Uranium	LCS		4700			4730	ug/Kg		101	(80%-120%)		09/17/18 14	4:51
Uranium-235			33.8			32.0	ug/Kg		94.5	(80%-120%)		09/17/18 10):04
Uranium-238			4670			4580	ug/Kg		98.1	(80%-120%)			
QC1204110208 Uranium	MB				U	ND	ug/Kg					09/17/18 14	4:50
Uranium-235					U	ND	ug/Kg					09/17/18 10):03
Uranium-238					U	ND	ug/Kg						
QC1204110211 Uranium	459059001	MS	5460	1130		6130	ug/Kg		91.7	(75%-125%)		09/17/18 14	4:56
Uranium-235			39.3	28.0		54.3	ug/Kg		66.8*	(75%-125%)		09/17/18 10):09
Uranium-238			5420	1090		5960	ug/Kg		89.9	(75%-125%)			
QC1204113112 Uranium-235	459059001	PS	0.180	0.129		0.299	ug/L		94.7	(80%-120%)		09/17/18 10):10
QC1204110212 Uranium	459059001	SDILT		5.20		1.06	ug/L	1.64		(0%-10%)		09/17/18 14	4:59

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QC Summary

Workorder:	459059												Pag	e 3 of 4
Parmname			NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Metals Analysis - IC Batch 18	C PMS 00921													
Uranium-235					0.129	J	0.0274	ug/L	6.28		(0%-10%)) SKJ	09/17/1	8 10:12
Uranium-238					5.04		1.04	ug/L	3.36		(0%-10%))		
Batch 18	02228													
QC1204113125 Uranium-234	459059001	DUP		U	ND	U	ND	ug/Kg	N/A			SKJ	09/18/1	8 09:10
QC1204113124 Uranium-234	LCS		54.9				57.6	ug/Kg		105	(80%-120%))	09/18/1	8 09:08
QC1204113123 Uranium-234	MB					U	ND	ug/Kg					09/18/1	8 09:06
QC1204113126 Uranium-234	459059001	MS	58.9	U	ND		61.8	ug/Kg		105	(75%-125%))	09/18/1	8 09:12
QC1204113127 Uranium-234	459059001	SDILT		U	ND	U	ND	ug/L	N/A				09/18/1	8 09:13
Titration and Ion A Batch 18	nalysis 00907													
QC1204110171 Corrosivity	459059001	DUP		Н	6.18	Н	6.19	SU	0.162		(0%-10%)) RXB5	09/08/1	8 16:56
QC1204110172 Corrosivity	459059002	DUP		н	6.18	Н	6.22	SU	0.645		(0%-10%))	09/08/1	8 16:59
QC1204110170 Corrosivity	LCS		7.00				7.02	SU		100	(95%-105%))	09/08/1	8 15:24

Notes:

The Qualifiers in this report are defined as follows:

< Result is less than value reported

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QC Summary

Dowmoor		NOM	Comple	Onal	00	Tinita		DEC9/	Dongo	Anlat	Pag	$\frac{1}{1}$
rarmnai	Regult is greater the		Sample	Quai	ŲĽ.	Units	KPD%	KEU %	Kange	Anist	Date	Time
> D	The target analyte u	in value reported	d blonk									
D	V difference of serve	vas detected in the associate	u Dialik.	on must a	ant floorie	a anitania						
E	% difference of samp	pie and SD is $>10\%$. Samp										
E	General Chemistry-	-Concentration of the target	analyte exce	eds the in	strument ca	uibration ra	ange					
FB	Mercury was found invalid for reporting	present at quantifiable cond to regulatory agencies	centrations in	field blan	ks received	l with these	e samples. I	Data associate	ed with the	blank are	deemed	
Н	Analytical holding t	ime was exceeded										
J	Value is estimated											
Ν	MetalsThe Matrix	spike sample recovery is no	ot within spec	ified cont	rol limits							
N/A	RPD or %Recovery	limits do not apply.										
N1	See case narrative											
ND	Analyte concentration	on is not detected above the	detection lin	nit								
NJ	Consult Case Narrat	tive, Data Summary packag	e, or Project	Manager o	concerning	this qualifi	er					
Q	One or more quality	control criteria have not be	een met. Refe	r to the ap	plicable na	rrative or I	DER.					
R	Per section 9.3.4.1 c purposes.	of Method 1664 Revision E	B, due to matr	ix spike re	ecovery iss	ues, this res	sult may not	be reported	or used for	regulator	y complia	ance
R	Sample results are r	ejected										
U	Analyte was analyze	ed for, but not detected abo	ve the MDL,	MDA, MI	DC or LOE).						
Х	Consult Case Narrat	tive, Data Summary packag	e, or Project	Manager o	concerning	this qualifi	er					
Y	Other specific quality	fiers were required to prope	erly define the	results. C	Consult case	e narrative.						
Ζ	Paint Filter TestPa	urticulates passed through th	ne filter, howe	ever no fre	e liquids w	vere observ	ed.					
٨	RPD of sample and	duplicate evaluated using +	-/-RL. Conce	ntrations a	are <5X the	RL. Qual	ifier Not Ap	plicable for	Radiochem	istry.		
d	5-day BODThe 2:	1 depletion requirement wa	s not met for	this samp	le							
e	5-day BODTest re reporting purposes	plicates show more than 30	% difference	between l	nigh and lo	w values. 7	The data is q	ualified per t	he method	and can b	e used fo	or
h	Preparation or prese	ervation holding time was ex	xceeded									

[^] The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

* Indicates that a Quality Control parameter was not within specifications.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

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Certificate of Analysis

Report Date: September 19, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B6-(7-8) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 459059001 Matrix: Soil Collect Date: 06-SEP-18 09:51 07-SEP-18 Receive Date: Collector: Client 9.27% Moisture: RL Qualifier MDC Units PF Result Uncertainty DF Analyst Date Time Batch Method Gravimetric Solids ASTM D 2216 % Moisture "As Received" 9.27 percent CXC1 09/11/18 1103 1801055 Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 +/-0.260 0.500 pCi/g MXS2 09/17/18 2315 1801082 1.28 0.105 Uranium-235/236 U 0.0785 +/-0.0799 0.079 0.500 pCi/g 0.444 +/-0.1580.103 0.500 pCi/g Rad Liquid Scintillation Analysis Liquid Scint Tc99, Soil "As Received" Technetium-99 13.5 +/-16.0 26.9 50.0 pCi/g CXS7 09/18/18 0346 1801311 U The following Prep Methods were performed: Date Prep Batch Description Analyst Time Dry Soil Prep GL-RAD-A-021 09/11/18 1801055 CXC1 1103 The following Analytical Methods were performed: Description Analyst Comments ASTM D 2216 (Modified) DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Surrogate/Tracer Recovery Test Result Nominal Recovery% Acceptable Limits Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 101 (15%-125%) 102 Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" (15%-125%) Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). Column headers are defined as follows: **DF:** Dilution Factor Lc/LC: Critical Level PF: Prep Factor **DL:** Detection Limit MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

1

2

3

Parameter

Moisture

Uranium-238

Method

Method

Notes:

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Dry Soil Prep

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Certificate of Analysis

Report Date: September 19, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B6-(9-10) Soil Boring Project: WNUC00518 Sample ID: 459059002 Client ID: WNUC007 Matrix: Soil Collect Date: 06-SEP-18 10:24 07-SEP-18 Receive Date: Collector: Client Moisture: 13% RL Parameter Qualifier MDC Units PF Result Uncertainty DF Analyst Date Time Batch Method Gravimetric Solids ASTM D 2216 % Moisture "As Received" Moisture 13.0 percent CXC1 09/11/18 1103 1801055 1 Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 +/-0.228 0.500 pCi/g MXS2 09/17/18 2315 1801082 2 0.907 0.115 Uranium-235/236 U 0.0969 +/-0.0922 0.0972 0.500 pCi/g Uranium-238 +/-0.1790.105 0.500 pCi/g 0.548 Rad Liquid Scintillation Analysis Liquid Scint Tc99, Soil "As Received" Technetium-99 16.5 +/-23.9 40.5 50.0 pCi/g CXS7 09/18/18 0403 1801311 3 U The following Prep Methods were performed: Method Date Prep Batch Description Analyst Time Dry Soil Prep Dry Soil Prep GL-RAD-A-021 09/11/18 1801055 CXC1 1103 The following Analytical Methods were performed: Method Description Analyst Comments ASTM D 2216 (Modified) DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Surrogate/Tracer Recovery Test Result Nominal Recovery% Acceptable Limits Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 80.1 (15%-125%) Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" 94 (15%-125%) Notes: Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). Column headers are defined as follows: **DF:** Dilution Factor Lc/LC: Critical Level PF: Prep Factor **DL:** Detection Limit MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

1

2

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Certificate of Analysis

Report Date: September 19, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B6-(11-12) Soil Boring Project: WNUC00518 Sample ID: 459059003 Client ID: WNUC007 Matrix: Soil Collect Date: 06-SEP-18 11:00 07-SEP-18 Receive Date: Collector: Client 12.4% Moisture: RL Parameter Qualifier MDC Units PF Result Uncertainty DF Analyst Date Time Batch Method Gravimetric Solids ASTM D 2216 % Moisture "As Received" Moisture 12.4 percent CXC1 09/11/18 1103 1801055 1 Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 +/-0.259 0.0978 0.500 pCi/g MXS2 09/17/18 2315 1801082 2 1.43 Uranium-235/236 0.142 +/-0.0952 0.0699 0.500 pCi/g Uranium-238 +/-0.244 0.0827 0.500 1.28 pCi/g Rad Liquid Scintillation Analysis Liquid Scint Tc99, Soil "As Received" 2.94 Technetium-99 +/-26.5 46.0 50.0 pCi/g CXS7 09/18/18 0419 1801311 3 U The following Prep Methods were performed: Method Date Prep Batch Description Analyst Time Dry Soil Prep Dry Soil Prep GL-RAD-A-021 09/11/18 1801055 CXC1 1103 The following Analytical Methods were performed: Method Description Analyst Comments ASTM D 2216 (Modified) DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Surrogate/Tracer Recovery Result Nominal Recovery% Acceptable Limits Test Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 97.3 (15%-125%) Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" 89.7 (15%-125%) Notes: Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). Column headers are defined as follows: **DF:** Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

1

2

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Certificate of Analysis

Report Date: September 19, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B9-(7-8) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 459059004 Matrix: Soil Collect Date: 06-SEP-18 13:00 07-SEP-18 Receive Date: Collector: Client 10.8% Moisture: RL Parameter Qualifier MDC Units PF Result Uncertainty DF Analyst Date Time Batch Method Gravimetric Solids ASTM D 2216 % Moisture "As Received" Moisture 10.8 percent CXC1 09/11/18 1103 1801055 1 Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 +/-0.277 0.500 pCi/g MXS2 09/17/18 2315 1801082 2 1.65 0.0981 Uranium-235/236 U 0.0806 +/-0.0767 0.0809 0.500 pCi/g Uranium-238 +/-0.186 0.0874 0.500 pCi/g 0.728 Rad Liquid Scintillation Analysis Liquid Scint Tc99, Soil "As Received" Technetium-99 11.0 +/-20.0 34.1 50.0 pCi/g CXS7 09/18/18 0435 1801311 3 U The following Prep Methods were performed: Method Date Prep Batch Description Analyst Time Dry Soil Prep Dry Soil Prep GL-RAD-A-021 09/11/18 1801055 CXC1 1103 The following Analytical Methods were performed: Method Description Analyst Comments ASTM D 2216 (Modified) DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Surrogate/Tracer Recovery Test Result Nominal Recovery% Acceptable Limits Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 104 (15%-125%) 93.7 Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" (15%-125%) Notes: Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). Column headers are defined as follows: **DF:** Dilution Factor Lc/LC: Critical Level PF: Prep Factor **DL:** Detection Limit MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

1

2

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Certificate of Analysis

Report Date: September 19, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B9-(9-10) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 459059005 Matrix: Soil Collect Date: 06-SEP-18 13:27 07-SEP-18 Receive Date: Collector: Client 11.2% Moisture: RL Parameter Qualifier MDC Units PF Result Uncertainty DF Analyst Date Time Batch Method Gravimetric Solids ASTM D 2216 % Moisture "As Received" 11.2 percent CXC1 09/11/18 1103 1801055 1 Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 0.500 pCi/g MXS2 09/17/18 2315 1801082 2 1.56 +/-0.2730.120 Uranium-235/236 0.147 +/-0.101 0.0965 0.500 pCi/g Uranium-238 0.576 +/-0.1700.500 pCi/g 0.115 Rad Liquid Scintillation Analysis Liquid Scint Tc99, Soil "As Received" -3.91 Technetium-99 +/-14.4 25.5 50.0 pCi/g CXS7 09/18/18 0452 1801311 3 U The following Prep Methods were performed: Method Date Prep Batch Description Analyst Time Dry Soil Prep Dry Soil Prep GL-RAD-A-021 09/11/18 1801055 CXC1 1103 The following Analytical Methods were performed: Method Description Analyst Comments ASTM D 2216 (Modified) DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Surrogate/Tracer Recovery Test Result Nominal Recovery% Acceptable Limits Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 106 (15%-125%) 94.9 Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" (15%-125%) Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). Column headers are defined as follows: **DF:** Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

Moisture

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Notes:

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Report Date: September 19, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B9-(11-12) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 459059006 Matrix: Soil Collect Date: 06-SEP-18 13:58 07-SEP-18 Receive Date: Collector: Client 13.4% Moisture: RL Parameter Qualifier MDC Units PF Result Uncertainty DF Analyst Date Time Batch Method Gravimetric Solids ASTM D 2216 % Moisture "As Received" Moisture 13.4 percent CXC1 09/11/18 1103 1801055 1 Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 0.500 pCi/g MXS2 09/17/18 2315 1801082 2 6.60 +/-0.5620.105 Uranium-235/236 0.527 +/-0.180 0.0845 0.500 pCi/g Uranium-238 +/-0.3300.104 0.500 pCi/g 2.25 Rad Liquid Scintillation Analysis Liquid Scint Tc99, Soil "As Received" Technetium-99 2.81 +/-15.8 27.4 50.0 pCi/g CXS7 09/18/18 0508 1801311 3 U The following Prep Methods were performed: Method Date Prep Batch Description Analyst Time Dry Soil Prep Dry Soil Prep GL-RAD-A-021 09/11/18 1801055 CXC1 1103 The following Analytical Methods were performed: Method Description Analyst Comments ASTM D 2216 (Modified) DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Surrogate/Tracer Recovery Test Result Nominal Recovery% Acceptable Limits Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 86.1 (15%-125%) 95.2 Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" (15%-125%) Notes: Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). Column headers are defined as follows: **DF:** Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

1

2

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Certificate of Analysis

Report Date: September 19, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B11-(7-8) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 459059007 Matrix: Soil Collect Date: 07-SEP-18 09:07 07-SEP-18 Receive Date: Collector: Client 11.9% Moisture: RL Parameter Qualifier MDC Units PF Result Uncertainty DF Analyst Date Time Batch Method High Rad Testing ASTM D 2216 % Moisture "As Received" Moisture 11.9 percent CXC1 09/11/18 1103 1801055 1 Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 +/-189 0.500 pCi/g HAKB 09/19/18 0946 1802589 2 6650 8.85 Uranium-235/236 343 +/-47.8 7.37 0.500 pCi/g Uranium-238 1170 +/-79.4 0.500 pCi/g 5.96 Rad Liquid Scintillation Analysis Liquid Scint Tc99, Soil "As Received" Technetium-99 13.9 +/-21.7 36.9 50.0 pCi/g CXS7 09/18/18 0525 1801311 3 U The following Prep Methods were performed: Method Date Prep Batch Description Analyst Time Dry Soil Prep Dry Soil Prep GL-RAD-A-021 09/11/18 1801055 CXC1 1103 The following Analytical Methods were performed: Method Description Analyst Comments ASTM D 2216 (Modified) DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Surrogate/Tracer Recovery Test Result Nominal Recovery% Acceptable Limits Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 82.5 (15%-125%) 91.3 Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" (15%-125%) Notes: Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). Column headers are defined as follows: **DF:** Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: September 19, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B11-(9-10) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 459059008 Matrix: Soil Collect Date: 07-SEP-18 09:40 07-SEP-18 Receive Date: Collector: Client 11.9% Moisture: RL Parameter Qualifier MDC Units PF Result Uncertainty DF Analyst Date Time Batch Method Gravimetric Solids ASTM D 2216 % Moisture "As Received" Moisture 11.9 percent CXC1 09/11/18 1103 1801055 1 Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 +/-0.725 0.500 pCi/g MXS2 09/17/18 2315 1801082 2 11.4 0.0937 Uranium-235/236 0.523 +/-0.176 0.0815 0.500 pCi/g Uranium-238 +/-0.358 0.0571 0.500 pCi/g 2.78 Rad Liquid Scintillation Analysis Liquid Scint Tc99, Soil "As Received" Technetium-99 11.5 +/-18.5 31.4 50.0 pCi/g CXS7 09/18/18 0541 1801311 3 U The following Prep Methods were performed: Method Date Prep Batch Description Analyst Time Dry Soil Prep Dry Soil Prep GL-RAD-A-021 09/11/18 1801055 CXC1 1103 The following Analytical Methods were performed: Method Description Analyst Comments ASTM D 2216 (Modified) DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Surrogate/Tracer Recovery Test Result Nominal Recovery% Acceptable Limits Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 85.2 (15%-125%) 95.1 Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" (15%-125%) Notes: Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). Column headers are defined as follows: **DF:** Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: September 19, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B11-(11-12) Soil Boring Project: WNUC00518 Sample ID: 459059009 Client ID: WNUC007 Matrix: Soil Collect Date: 07-SEP-18 10:22 07-SEP-18 Receive Date: Collector: Client 12.2% Moisture: RL Parameter Qualifier MDC Units PF Result Uncertainty DF Analyst Date Time Batch Method Gravimetric Solids ASTM D 2216 % Moisture "As Received" Moisture 12.2 percent CXC1 09/11/18 1103 1801055 1 Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 +/-1.25 0.104 0.500 pCi/g MXS2 09/17/18 2315 1801082 2 36.0 Uranium-235/236 2.06 +/-0.334 0.0852 0.500 pCi/g Uranium-238 7.19 +/-0.559 0.500 pCi/g 0.069 Rad Liquid Scintillation Analysis Liquid Scint Tc99, Soil "As Received" Technetium-99 -1.17 +/-13.9 24.3 50.0 pCi/g CXS7 09/18/18 0558 1801311 3 U The following Prep Methods were performed: Method Date Prep Batch Description Analyst Time Dry Soil Prep Dry Soil Prep GL-RAD-A-021 09/11/18 1801055 CXC1 1103 The following Analytical Methods were performed: Method Description Analyst Comments ASTM D 2216 (Modified) DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Surrogate/Tracer Recovery Test Result Nominal Recovery% Acceptable Limits Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 95.4 (15%-125%) 91.7 Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" (15%-125%) Notes: Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). Column headers are defined as follows: **DF:** Dilution Factor Lc/LC: Critical Level PF: Prep Factor **DL:** Detection Limit MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: September 19, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B1-(7-8) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 459059010 Matrix: Soil Collect Date: 06-SEP-18 15:15 07-SEP-18 Receive Date: Collector: Client 9.77% Moisture: RL Parameter Qualifier MDC Units PF Result Uncertainty DF Analyst Date Time Batch Method High Rad Testing ASTM D 2216 % Moisture "As Received" Moisture 9.77 percent CXC1 09/11/18 1103 1801055 1 Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 +/-200 0.500 pCi/g HAKB 09/19/18 0946 1802589 2 5650 13.2 Uranium-235/236 267 +/-48.5 10.9 0.500 pCi/g Uranium-238 1030 +/-85.10.500 pCi/g 9.53 Rad Liquid Scintillation Analysis Liquid Scint Tc99, Soil "As Received" Technetium-99 24.7 +/-21.1 35.1 50.0 pCi/g CXS7 09/18/18 0614 1801311 3 U The following Prep Methods were performed: Method Date Prep Batch Description Analyst Time Dry Soil Prep Dry Soil Prep GL-RAD-A-021 09/11/18 1801055 CXC1 1103 The following Analytical Methods were performed: Method Description Analyst Comments ASTM D 2216 (Modified) DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Surrogate/Tracer Recovery Test Result Nominal Recovery% Acceptable Limits Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 53.1 (15%-125%) Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" 81.6 (15%-125%) Notes: Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). Column headers are defined as follows: **DF:** Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: September 19, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B1-(9-10) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 459059011 Matrix: Soil Collect Date: 06-SEP-18 15:45 07-SEP-18 Receive Date: Collector: Client 11.9% Moisture: RL Parameter Qualifier MDC Units PF Result Uncertainty DF Analyst Date Time Batch Method Gravimetric Solids ASTM D 2216 % Moisture "As Received" Moisture 11.9 percent CXC1 09/11/18 1103 1801055 1 Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 0.500 pCi/g HAKB 09/19/18 0946 1802589 2 417 +/-36.25.74 Uranium-235/236 22.1 +/-9.45 3.02 0.500 pCi/g Uranium-238 73.4 +/-15.3 4.97 0.500 pCi/g Rad Liquid Scintillation Analysis Liquid Scint Tc99, Soil "As Received" 0.685 Technetium-99 +/-24.2 42.2 50.0 pCi/g CXS7 09/18/18 0631 1801311 3 U The following Prep Methods were performed: Method Date Prep Batch Description Analyst Time Dry Soil Prep Dry Soil Prep GL-RAD-A-021 09/11/18 1801055 CXC1 1103 The following Analytical Methods were performed: Method Description Analyst Comments ASTM D 2216 (Modified) DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Surrogate/Tracer Recovery Test Result Nominal Recovery% Acceptable Limits Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 91.1 (15%-125%) 93.7 Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" (15%-125%) Notes: Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). Column headers are defined as follows: **DF:** Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: September 19, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B1-(11-12) Soil Boring Project: WNUC00518 Sample ID: 459059012 Client ID: WNUC007 Matrix: Soil Collect Date: 06-SEP-18 16:33 07-SEP-18 Receive Date: Collector: Client 12.6% Moisture: RL Parameter Qualifier MDC Units PF Result Uncertainty DF Analyst Date Time Batch Method Gravimetric Solids ASTM D 2216 % Moisture "As Received" Moisture 12.6 percent CXC1 09/11/18 1103 1801055 1 Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 0.500 pCi/g HAKB 09/19/18 0946 1802589 2 316 +/-31.45.22 Uranium-235/236 17.8 +/-8.52 4.26 0.500 pCi/g Uranium-238 +/-14.00.500 pCi/g 61.3 5.13 Rad Liquid Scintillation Analysis Liquid Scint Tc99, Soil "As Received" Technetium-99 4.91 +/-17.3 29.8 50.0 pCi/g CXS7 09/18/18 0647 1801311 3 U The following Prep Methods were performed: Method Date Prep Batch Description Analyst Time Dry Soil Prep Dry Soil Prep GL-RAD-A-021 09/11/18 1801055 CXC1 1103 The following Analytical Methods were performed: Method Description Analyst Comments ASTM D 2216 (Modified) DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Surrogate/Tracer Recovery Test Result Nominal Recovery% Acceptable Limits Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 96.6 (15%-125%) Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" 96.3 (15%-125%) Notes: Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). Column headers are defined as follows: **DF:** Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: September 19, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B16-(1-2) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 459059013 Matrix: Soil Collect Date: 06-SEP-18 17:15 07-SEP-18 Receive Date: Collector: Client 5.77% Moisture: RL Parameter Qualifier MDC Units PF Result Uncertainty DF Analyst Date Time Batch Method Gravimetric Solids ASTM D 2216 % Moisture "As Received" 5.77 percent CXC1 09/11/18 1103 1801055 1 Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 +/-30.6 0.500 pCi/g HAKB 09/19/18 0946 1802589 2 450 3.72 Uranium-235/236 23.2 +/-7.87 3.21 0.500 pCi/g Uranium-238 99.1 +/-14.4 3.31 0.500 pCi/g Rad Liquid Scintillation Analysis Liquid Scint Tc99, Soil "As Received" Technetium-99 13.2 +/-14.2 23.8 50.0 pCi/g CXS7 09/18/18 0704 1801311 3 U The following Prep Methods were performed: Method Date Prep Batch Description Analyst Time Dry Soil Prep Dry Soil Prep GL-RAD-A-021 09/11/18 1801055 CXC1 1103 The following Analytical Methods were performed: Method Description Analyst Comments ASTM D 2216 (Modified) DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Surrogate/Tracer Recovery Test Result Nominal Recovery% Acceptable Limits Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 102 (15%-125%) 96.3 Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" (15%-125%) Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). Column headers are defined as follows: **DF:** Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

Moisture

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Notes:

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Certificate of Analysis

Report Date: September 19, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B16-(3-4) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 459059014 Matrix: Soil Collect Date: 06-SEP-18 17:29 07-SEP-18 Receive Date: Collector: Client 8.38% Moisture: RL Parameter Qualifier MDC Units PF Result Uncertainty DF Analyst Date Time Batch Method High Rad Testing ASTM D 2216 % Moisture "As Received" Moisture 8.38 percent CXC1 09/11/18 1103 1801055 1 Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 +/-225 10.7 0.500 pCi/g HAKB 09/19/18 0946 1802589 2 7980 Uranium-235/236 409 +/-56.9 8.74 0.500 pCi/g Uranium-238 1420 +/-95.00.500 pCi/g 9.68 Rad Liquid Scintillation Analysis Liquid Scint Tc99, Soil "As Received" Technetium-99 17.2 +/-20.9 35.3 50.0 pCi/g CXS7 09/18/18 0720 1801311 3 U The following Prep Methods were performed: Method Date Prep Batch Description Analyst Time Dry Soil Prep Dry Soil Prep GL-RAD-A-021 09/11/18 1801055 CXC1 1103 The following Analytical Methods were performed: Method Description Analyst Comments ASTM D 2216 (Modified) DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Surrogate/Tracer Recovery Test Result Nominal Recovery% Acceptable Limits Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 58.9 (15%-125%) 92.8 Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" (15%-125%) Notes: Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). Column headers are defined as follows: **DF:** Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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QC Summary

Report Date: September 19, 2018

Page 1 of 3

Westinghouse Electric Company, LLC PO Drawer R Columbia, South Carolina

Ms. Cynthia Logsdon

Workorder: 459059

Contact:

Parmname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range Anlst	Date Time
Rad Alpha Spec								
Batch 1801082 —								
QC1204110610 459059001 DUP		4.00		<i></i>				
Uranium-233/234	T T . • .	1.28	1.18	pCı/g	7.84		(0%-20%) MXS2	09/17/18 23:15
	Uncertainty	+/-0.260	+/-0.266					
Uranium-235/236	U	0.0785	0.0739	pCi/g	6.66		(0% - 100%)	
	Uncertainty	+/-0.0799	+/-0.0815					
Uranium 228		0 444	0.610	nCi/a	21.5*		(00/200/)	
Oranium-238	Uncertainty	+/-0.158	+/-0.193	pc1/g	51.5		(0%-20%)	
	5							
QC1204110611 LCS Uranium_233/234			4 71	nCi/a				09/17/18 23:15
01aniuni-255/254	Uncertainty		+/-0.491	pc1/g				0717/18 25:15
	2							
Uranium-235/236			0.294	pCi/g				
	Uncertainty		+/-0.140					
Uranium-238	4.81		5.06	pCi/g		105	(75%-125%)	
	Uncertainty		+/-0.507					
OC1204110609 MB								
Uranium-233/234		U	0.0775	pCi/g				09/17/18 23:15
	Uncertainty		+/-0.0722					
Uranium 235/236		II	0.0532	nCi/a				
01amum-233/230	Uncertainty	0	+/-0.0627	pc1/g				
	Checklandy							
Uranium-238		U	0.0101	pCi/g				
	Uncertainty		+/-0.0541					
Batch 1802589 —								
QC1204113963 459059011 DUP								
Uranium-233/234		417	519	pCi/g	21.9*		(0%-20%) HAKB	09/19/18 09:46
	Uncertainty	+/-36.2	+/-37.1					
Uranium-235/236		22.1	26.4	pCi/g	17.6		(0%-20%)	
	Uncertainty	+/-9.45	+/-9.44	1 0			× ,	
Uranium 229		72 4	00.0	nC: /-	0 66		(00/200/)	
Utanium-238	Uncertainty	/ 3.4 +/-15 3	80.8 +/-14 7	pC1/g	9.00		(0%-20%)	
	Uncertainty	17-10.0	1/-1-1./					

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QC Summary

Workorder: 459059		-								Page 2 o	of 3
Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range An	lst	Date Tim	ne
Rad Alpha SpecBatch1802589											
QC1204113964 LCS Uranium-233/234	Uncertainty			146 +/-19.4	pCi/g			HA	AKB	09/19/18 09	:46
Uranium-235/236	Uncertainty		U	4.46 +/-4.25	pCi/g						
Uranium-238	143 Uncertainty			161 +/-20.3	pCi/g		112	(75%-125%)			
QC1204113962 MB Uranium-233/234	Uncertainty		U	1.84 +/-2.90	pCi/g					09/19/18 09	:46
Uranium-235/236	Uncertainty		U	2.21 +/-3.19	pCi/g						
Uranium-238	Uncertainty		U	2.76 +/-3.18	pCi/g						
Rad Liquid Scintillation Batch 1801311											_
QC1204111163 459059001 DUP Technetium-99	U Uncertainty	13.5 +/-16.0	U	7.55 +/-17.2	pCi/g	N/A		N/A C	XS7	09/18/18 07	:53
QC1204111164 LCS Technetium-99	445 Uncertainty			396 +/-25.3	pCi/g		89	(75%-125%)		09/18/18 08	:10
QC1204111162 MB Technetium-99	Uncertainty		U	5.42 +/-14.2	pCi/g					09/18/18 07	:37

Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). The Qualifiers in this report are defined as follows:

- ** Analyte is a Tracer compound
- Result is less than value reported <
- Result is greater than value reported >
- Results are either below the MDC or tracer recovery is low BD

FA Failed analysis.

- Н Analytical holding time was exceeded
- J Value is estimated

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QC Summary

Workor	r: 459059 Page 3 of 3
Parmna	NOM Sample Qual QC Units RPD% REC% Range Anlst Date Time
Κ	nalyte present. Reported value may be biased high. Actual value is expected to be lower.
L	nalyte present. Reported value may be biased low. Actual value is expected to be higher.
М	I if above MDC and less than LLD
М	EMP Result > MDC/CL and < RDL
N/A	PD or %Recovery limits do not apply.
N1	ee case narrative
ND	nalyte concentration is not detected above the detection limit
NJ	onsult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Q	one or more quality control criteria have not been met. Refer to the applicable narrative or DER.
R	ample results are rejected
U	nalyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
UI	amma SpectroscopyUncertain identification
UJ	amma SpectroscopyUncertain identification
UL	lot considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias.
Х	consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y	ther specific qualifiers were required to properly define the results. Consult case narrative.
^	PD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
h	reparation or preservation holding time was exceeded
N/A ind ^ The R five tim	ates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable. ative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the

RL is used to evaluate the DUP result.

* Indicates that a Quality Control parameter was not within specifications.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

Technical Case Narrative Westinghouse Electric Co, LLC (WNUC) SDG #: 459059

Metals

Product: Determination of Metals by ICP-MS Analytical Method: SW846 3050B/6020A **Analytical Procedure:** GL-MA-E-014 REV# 33 **Analytical Batch:** 1800921

<u>Preparation Method:</u> SW846 3050B <u>Preparation Procedure:</u> GL-MA-E-009 REV# 28 <u>Preparation Batch:</u> 1800920

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
459059001	HF-B6-(7-8) Soil Boring
459059002	HF-B6-(9-10) Soil Boring
459059003	HF-B6-(11-12) Soil Boring
459059004	HF-B9-(7-8) Soil Boring
459059005	HF-B9-(9-10) Soil Boring
459059006	HF-B9-(11-12) Soil Boring
459059007	HF-B11-(7-8) Soil Boring
459059008	HF-B11-(9-10) Soil Boring
459059009	HF-B11-(11-12) Soil Boring
459059010	HF-B1-(7-8) Soil Boring
459059011	HF-B1-(9-10) Soil Boring
459059012	HF-B1-(11-12) Soil Boring
459059013	HF-B16-(1-2) Soil Boring
459059014	HF-B16-(3-4) Soil Boring
1204110208	Method Blank (MB)ICP-MS
1204110209	Laboratory Control Sample (LCS)
1204110212	459059001(HF-B6-(7-8) Soil BoringL) Serial Dilution (SD)
1204110210	459059001(HF-B6-(7-8) Soil BoringD) Sample Duplicate (DUP)
1204110211	459059001(HF-B6-(7-8) Soil BoringS) Matrix Spike (MS)
1204113112	459059001(HF-B6-(7-8) Soil BoringPS) Post Spike (PS)

The samples in this SDG were analyzed on a "dry weight" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Calibration Information

CRDL/PQL Requirements

The CRDL standard recoveries for SW846 6020A/6020B met the advisory control limits with the exception of uranium and U-235. Client sample concentrations were greater than two times the CRDL; therefore the data were not adversely affected. 459059007 (HF-B11-(7-8) Soil Boring), 459059008 (HF-B11-(9-10) Soil Boring),

459059009 (HF-B11-(11-12) Soil Boring), 459059010 (HF-B1-(7-8) Soil Boring), 459059011 (HF-B1-(9-10) Soil Boring), 459059012 (HF-B1-(11-12) Soil Boring), 459059013 (HF-B16-(1-2) Soil Boring) and 459059014 (HF-B16-(3-4) Soil Boring).

ICSA/ICSAB Statement

For the ICP-MS analysis, the ICSA solution contains analyte concentrations which are verified trace impurities indigenous to the purchased standard.

Quality Control (QC) Information

Matrix Spike (MS/MSD) Recovery Statement

The percent recoveries (%R) obtained from the MS/MSD analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The MS/MSD (See Below) did not meet the recommended quality control acceptance criteria for percent recoveries for the following applicable analyte. The post spike recovery was within the required control limits. This verifies the absence of a matrix interference in the post-spike digested sample. The recovery may be attributed to possible sample matrix interference and/or non-homogeneity.

Sample	Analyte	Value
1204110211 (HF-B6-(7-8) Soil BoringMS)	Uranium-235	66.8* (75%-125%)

Technical Information

Preparation/Analytical Method Verification

Method SW-846 3050B is not a total digestion technique for most samples. It is a very strong acid digestion that will dissolve almost all elements that could become environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

Sample Dilutions

Dilutions may be required for many reasons, including to minimize matrix interferences or to bring over range target analyte concentrations into the linear calibration range. Samples 459059007 (HF-B11-(7-8) Soil Boring), 459059008 (HF-B11-(9-10) Soil Boring), 459059009 (HF-B11-(11-12) Soil Boring), 459059010 (HF-B1-(7-8) Soil Boring), 459059011 (HF-B1-(9-10) Soil Boring), 459059012 (HF-B1-(11-12) Soil Boring), 459059013 (HF-B16-(1-2) Soil Boring) and 459059014 (HF-B16-(3-4) Soil Boring) were diluted to ensure that the analyte concentrations were within the linear calibration range of the instrument. The ICPMS solid samples in this SDG were diluted the standard two times.

A		459059										
Analyte	001	002	003	004	005	006	007	008	009	010		
Uranium	2X	2X	2X	2X	2X	2X	20X	2X	2X	20X		
Uranium-235	2X	2X	2X	2X	2X	2X	2000X	10X	10X	2000X		
Uranium-238	2X	2X	2X	2X	2X	2X	1000X	2X	2X	2000X		

A	459059							
Analyte	011	012	013	014				
Uranium	2X	2X	2X	20X				
Uranium-235	100X	100X	200X	2000X				
Uranium-238	100X	100X	100X	2000X				

Product: Determination of Metals by ICP-MS Analytical Method: SW846 3050B/6020A Analytical Procedure: GL-MA-E-014 REV# 33 Analytical Batch: 1802228

Preparation Method: SW846 3050B **Preparation Procedure:** GL-MA-E-009 REV# 28 **Preparation Batch:** 1802227

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
459059001	HF-B6-(7-8) Soil Boring
459059002	HF-B6-(9-10) Soil Boring
459059003	HF-B6-(11-12) Soil Boring
459059004	HF-B9-(7-8) Soil Boring
459059005	HF-B9-(9-10) Soil Boring
459059006	HF-B9-(11-12) Soil Boring
459059007	HF-B11-(7-8) Soil Boring
459059008	HF-B11-(9-10) Soil Boring
459059009	HF-B11-(11-12) Soil Boring
459059010	HF-B1-(7-8) Soil Boring
459059011	HF-B1-(9-10) Soil Boring
459059012	HF-B1-(11-12) Soil Boring
459059013	HF-B16-(1-2) Soil Boring
459059014	HF-B16-(3-4) Soil Boring
1204113123	Method Blank (MB)ICP-MS
1204113124	Laboratory Control Sample (LCS)
1204113127	459059001(HF-B6-(7-8) Soil BoringL) Serial Dilution (SD)
1204113125	459059001(HF-B6-(7-8) Soil BoringD) Sample Duplicate (DUP)
1204113126	459059001(HF-B6-(7-8) Soil BoringS) Matrix Spike (MS)

The samples in this SDG were analyzed on a "dry weight" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Calibration Information

ICSA/ICSAB Statement

For the ICP-MS analysis, the ICSA solution contains analyte concentrations which are verified trace impurities indigenous to the purchased standard.

Technical Information

Preparation/Analytical Method Verification

Method SW-846 3050B is not a total digestion technique for most samples. It is a very strong acid digestion that will dissolve almost all elements that could become environmentally available. By design, elements bound in

silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

Sample Dilutions

Dilutions may be required for many reasons, including to minimize matrix interferences or to bring over range target analyte concentrations into the linear calibration range. Samples 459059007 (HF-B11-(7-8) Soil Boring), 459059010 (HF-B1-(7-8) Soil Boring) and 459059014 (HF-B16-(3-4) Soil Boring) were diluted to ensure that the analyte concentrations were within the linear calibration range of the instrument. The ICPMS solid samples in this SDG were diluted the standard two times.

Analyta					459	059		008 009		
Analyte	001	002	003	004	005	006	007	008	009	010
Uranium-234	2X	2X	2X	2X	2X	2X	20X	2X	2X	20X

Amaluta		459059					
Analyte	011	012	013	014			
Uranium-234	2X	2X	2X	20X			

General Chemistry

Product: Ion Chromatography Analytical Method: SW846 9056A Analytical Procedure: GL-GC-E-086 REV# 25 Analytical Batches: 1801076 and 1801075

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
459059001	HF-B6-(7-8) Soil Boring
459059002	HF-B6-(9-10) Soil Boring
459059003	HF-B6-(11-12) Soil Boring
459059004	HF-B9-(7-8) Soil Boring
459059005	HF-B9-(9-10) Soil Boring
459059006	HF-B9-(11-12) Soil Boring
459059007	HF-B11-(7-8) Soil Boring
459059008	HF-B11-(9-10) Soil Boring
459059009	HF-B11-(11-12) Soil Boring
459059010	HF-B1-(7-8) Soil Boring
459059011	HF-B1-(9-10) Soil Boring
459059012	HF-B1-(11-12) Soil Boring
459059013	HF-B16-(1-2) Soil Boring
459059014	HF-B16-(3-4) Soil Boring
1204110888	Method Blank (MB)
1204110889	Laboratory Control Sample (LCS)
1204110890	459059001(HF-B6-(7-8) Soil Boring) Sample Duplicate (DUP)
1204110891	459059014(HF-B16-(3-4) Soil Boring) Sample Duplicate (DUP)
1204111773	459059001(HF-B6-(7-8) Soil Boring) Matrix Spike (MS)
1204111774	459059014(HF-B16-(3-4) Soil Boring) Matrix Spike (MS)

The samples in this SDG were analyzed on a "dry weight" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Quality Control (QC) Information

Matrix Spike (MS)/Post Spike (PS) Recovery Statement

The percent recoveries (%R) obtained from the spike analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The matrix spike recovered outside of the established acceptance limits due to matrix interference and/or non-homogeneity. 1204111773 (HF-B6-(7-8) Soil BoringMS).

Technical Information

Sample Dilutions

The following samples 1204110890 (HF-B6-(7-8) Soil BoringDUP), 1204110891 (HF-B16-(3-4) Soil BoringDUP), 1204111773 (HF-B6-(7-8) Soil BoringMS), 1204111774 (HF-B16-(3-4) Soil BoringMS), 459059004 (HF-B9-(7-8) Soil Boring), 459059007 (HF-B11-(7-8) Soil Boring), 459059008 (HF-B11-(9-10) Soil Boring), 459059010 (HF-B1-(7-8) Soil Boring), 459059011 (HF-B1-(9-10) Soil Boring), 459059012 (HF-B1-(11-12) Soil Boring), 459059013 (HF-B16-(1-2) Soil Boring) and 459059014 (HF-B16-(3-4) Soil Boring) were diluted because target analyte concentrations exceeded the calibration range. Dilutions may be required for many reasons, including to minimize matrix interferences or to bring over range target analyte concentrations into the linear calibration range.

A				459	059			
Analyte	004	007	008	010	011	012	013	014
Fluoride	1X	20X	1X	25X	1X	1X	1X	5X
Nitrate	5X	20X	5X	25X	10X	5X	10X	5X

Miscellaneous Information

Manual Integrations

Samples 459059002 (HF-B6-(9-10) Soil Boring), 459059003 (HF-B6-(11-12) Soil Boring), 459059005 (HF-B9-(9-10) Soil Boring), 459059006 (HF-B9-(11-12) Soil Boring) and 459059009 (HF-B11-(11-12) Soil Boring) were manually integrated to correctly position the baseline as set in the calibration standards.

Product: pH Analytical Method: SW846 9045D Analytical Procedure: GL-GC-E-008 REV# 23 Analytical Batch: 1800907

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
459059001	HF-B6-(7-8) Soil Boring
459059002	HF-B6-(9-10) Soil Boring

459059003	HF-B6-(11-12) Soil Boring
459059004	HF-B9-(7-8) Soil Boring
459059005	HF-B9-(9-10) Soil Boring
459059006	HF-B9-(11-12) Soil Boring
459059007	HF-B11-(7-8) Soil Boring
459059008	HF-B11-(9-10) Soil Boring
459059009	HF-B11-(11-12) Soil Boring
459059010	HF-B1-(7-8) Soil Boring
459059011	HF-B1-(9-10) Soil Boring
459059012	HF-B1-(11-12) Soil Boring
459059013	HF-B16-(1-2) Soil Boring
459059014	HF-B16-(3-4) Soil Boring
1204110170	Laboratory Control Sample (LCS)
1204110171	459059001(HF-B6-(7-8) Soil Boring) Sample Duplicate (DUP)
1204110172	459059002(HF-B6-(9-10) Soil Boring) Sample Duplicate (DUP)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Technical Information

Holding Times

Samples (See Below) were received by the laboratory outside of the method specified holding time. The data is qualified.

Sample	Analyte	Value
1204110171 (HF-B6-(7-8) Soil BoringDUP)	Corrosivity	Received 07-SEP-18, out of holding 06-SEP-18
1204110172 (HF-B6-(9-10) Soil BoringDUP)	Corrosivity	Received 07-SEP-18, out of holding 06-SEP-18
459059001 (HF-B6-(7-8) Soil Boring)	Corrosivity	Received 07-SEP-18, out of holding 06-SEP-18
459059002 (HF-B6-(9-10) Soil Boring)	Corrosivity	Received 07-SEP-18, out of holding 06-SEP-18
459059003 (HF-B6-(11-12) Soil Boring)	Corrosivity	Received 07-SEP-18, out of holding 06-SEP-18
459059004 (HF-B9-(7-8) Soil Boring)	Corrosivity	Received 07-SEP-18, out of holding 06-SEP-18
459059005 (HF-B9-(9-10) Soil Boring)	Corrosivity	Received 07-SEP-18, out of holding 06-SEP-18
459059006 (HF-B9-(11-12) Soil Boring)	Corrosivity	Received 07-SEP-18, out of holding 06-SEP-18
459059007 (HF-B11-(7-8) Soil Boring)	Corrosivity	Received 07-SEP-18, out of holding 07-SEP-18
459059008 (HF-B11-(9-10) Soil Boring)	Corrosivity	Received 07-SEP-18, out of holding 07-SEP-18
459059009 (HF-B11-(11-12) Soil Boring)	Corrosivity	Received 07-SEP-18, out of holding 07-SEP-18
459059010 (HF-B1-(7-8) Soil Boring)	Corrosivity	Received 07-SEP-18, out of holding 06-SEP-18
459059011 (HF-B1-(9-10) Soil Boring)	Corrosivity	Received 07-SEP-18, out of holding 06-SEP-18
459059012 (HF-B1-(11-12) Soil Boring)	Corrosivity	Received 07-SEP-18, out of holding 06-SEP-18
459059013 (HF-B16-(1-2) Soil Boring)	Corrosivity	Received 07-SEP-18, out of holding 06-SEP-18
459059014 (HF-B16-(3-4) Soil Boring)	Corrosivity	Received 07-SEP-18, out of holding 06-SEP-18

Radiochemistry

Product: Alphaspec U, Soil/Veg <u>Analytical Method:</u> DOE EML HASL-300, U-02-RC Modified <u>Analytical Procedure:</u> GL-RAD-A-011 REV# 26 <u>Analytical Batch:</u> 1801082

Preparation Method: Dry Soil Prep **Preparation Procedure:** GL-RAD-A-021 REV# 23 **Preparation Batch:** 1801055

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
459059001	HF-B6-(7-8) Soil Boring
459059002	HF-B6-(9-10) Soil Boring
459059003	HF-B6-(11-12) Soil Boring
459059004	HF-B9-(7-8) Soil Boring
459059005	HF-B9-(9-10) Soil Boring
459059006	HF-B9-(11-12) Soil Boring
459059008	HF-B11-(9-10) Soil Boring
459059009	HF-B11-(11-12) Soil Boring
1204110609	Method Blank (MB)
1204110610	459059001(HF-B6-(7-8) Soil Boring) Sample Duplicate (DUP)
1204110611	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on a "dry weight" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Quality Control (QC) Information

Duplication Criteria between QC Sample and Duplicate Sample

The Sample and the Duplicate, (See Below), did not meet the relative percent difference requirement; however, they do meet the relative error ratio requirement with the value listed below.

Sample	Analyte	Value
1204110610 (HF-B6-(7-8) Soil BoringDUP)	Uranium-238	RPD 31.5* (0.00%-20.00%) RER 1.2 (0-3)

<u>Product:</u> Alphaspec U, Soil/Veg <u>Analytical Method:</u> DOE EML HASL-300, U-02-RC Modified <u>Analytical Procedure:</u> GL-RAD-A-011 REV# 26 <u>Analytical Batch:</u> 1802589

<u>Preparation Method:</u> Dry Soil Prep <u>Preparation Procedure:</u> GL-RAD-A-021 REV# 23 <u>Preparation Batch:</u> 1801055

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
459059007	HF-B11-(7-8) Soil Boring
459059010	HF-B1-(7-8) Soil Boring
459059011	HF-B1-(9-10) Soil Boring
459059012	HF-B1-(11-12) Soil Boring
459059013	HF-B16-(1-2) Soil Boring
459059014	HF-B16-(3-4) Soil Boring
1204113962	Method Blank (MB)
1204113963	459059011(HF-B1-(9-10) Soil Boring) Sample Duplicate (DUP)
1204113964	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on a "dry weight" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Quality Control (QC) Information

Duplication Criteria between QC Sample and Duplicate Sample

The Sample and the Duplicate, (See Below), did not meet the relative percent difference requirement; however, they do meet the relative error ratio requirement with the value listed below.

Sample	Analyte	Value
1204113963 (HF-B1-(9-10) Soil BoringDUP)	Uranium-233/234	RPD 21.9* (0.00%-20.00%) RER 1.6 (0-3)

RDL Met

The blank (See Below) did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots.

Sample	Analyte	Value
1204113962 (MB)	Uranium-233/234	Result 1.84 < MDA 4.4 > RDL 0.5 pCi/g
	Uranium-235/236	Result 2.21 < MDA 3.88 > RDL 0.5 pCi/g
	Uranium-238	Result 2.76 < MDA 4 > RDL 0.5 pCi/g

Technical Information

Sample Re-prep/Re-analysis

Samples 459059007 (HF-B11-(7-8) Soil Boring), 459059010 (HF-B1-(7-8) Soil Boring), 459059011 (HF-B1-(9-10) Soil Boring), 459059012 (HF-B1-(11-12) Soil Boring), 459059013 (HF-B16-(1-2) Soil Boring) and 459059014 (HF-B16-(3-4) Soil Boring) were repreped due to low tracer yield recoveries caused by high levels of activity in the samples. The re-analysis is being reported.

Product: Dry Weight <u>Analytical Method:</u> ASTM D 2216 (Modified) <u>Analytical Procedure:</u> GL-OA-E-020 REV# 13 <u>Analytical Batch:</u> 1801055

Preparation Method: Dry Soil Prep **Preparation Procedure:** GL-RAD-A-021 REV# 23 **Preparation Batch:** 1801055

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
459059001	HF-B6-(7-8) Soil Boring
459059002	HF-B6-(9-10) Soil Boring
459059003	HF-B6-(11-12) Soil Boring
459059004	HF-B9-(7-8) Soil Boring
459059005	HF-B9-(9-10) Soil Boring
459059006	HF-B9-(11-12) Soil Boring
459059007	HF-B11-(7-8) Soil Boring
459059008	HF-B11-(9-10) Soil Boring
459059009	HF-B11-(11-12) Soil Boring
459059010	HF-B1-(7-8) Soil Boring
459059011	HF-B1-(9-10) Soil Boring
459059012	HF-B1-(11-12) Soil Boring
459059013	HF-B16-(1-2) Soil Boring
459059014	HF-B16-(3-4) Soil Boring
1204110571	459059001(HF-B6-(7-8) Soil Boring) Sample Duplicate (DUP)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

<u>Product:</u> Liquid Scint Tc99, Soil <u>Analytical Method:</u> DOE EML HASL-300, Tc-02-RC Modified <u>Analytical Procedure:</u> GL-RAD-A-059 REV# 5

Analytical Batch: 1801311

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
459059001	HF-B6-(7-8) Soil Boring
459059002	HF-B6-(9-10) Soil Boring
459059003	HF-B6-(11-12) Soil Boring
459059004	HF-B9-(7-8) Soil Boring
459059005	HF-B9-(9-10) Soil Boring
459059006	HF-B9-(11-12) Soil Boring
459059007	HF-B11-(7-8) Soil Boring
459059008	HF-B11-(9-10) Soil Boring
459059009	HF-B11-(11-12) Soil Boring
459059010	HF-B1-(7-8) Soil Boring
459059011	HF-B1-(9-10) Soil Boring
459059012	HF-B1-(11-12) Soil Boring
459059013	HF-B16-(1-2) Soil Boring
459059014	HF-B16-(3-4) Soil Boring
1204111162	Method Blank (MB)
1204111163	459059001(HF-B6-(7-8) Soil Boring) Sample Duplicate (DUP)
1204111164	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

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Client Name: Westinghouse Electric Company LLC Phone #: 803.647.1920								Sample Analysis Requested ⁽⁵⁾ (Fill in the number of containers for each test)											
oject/Site Name: Columbia Fuel Fabrication Facility		Fax #: 803.0	695.3964	ļ		d this	ered:	ers											< Preservative Type (6)
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ollected by: Jeremy Grant / Randy Crews Send Resu	ılts: joynerdp@v	vestinghous	e.com				ated	er of e	urani 1 spec	raniun Il isote -MS)	66-	c Cont	oride	H	rate				Note: extra sample is
Sample ID * For composites - indicate start and stop date/time	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code ⁽²⁾	Field Filtered ⁽³⁾	Sample Matrix ⁽⁴⁾	Radioactive	TSCA Regul	Total numb	isotopic (alpha	isotopic un individue ICP-	Tc	Moisture	Fluc	đ	Nit				required for sample specific QC
HF-B6-(7-8) Soil Boring	9/6/2018	0951	G	N	so			1	x	x	x	x	x	x	x				
HF-B6-(9-10) Soil Boring	9/6/2018	1024	G	N	so			1	x	x	x	x	x	x	x			ļ	
HF-B6-(11-12) Soil Boring	9/6/2018	1100	G	N	so	ļ		1	x	x	х	x	x	x	x				
HF-B9-(7-8) Soil Boring	9/6/2018	1300	G	N	so			1	x	x	x	x	x	x	x				
HF-B9-(9-10) Soil Boring	9/6/2018	1327	G	N	so		 	1	x	x	x	x	x	x	x				
HF-B9-(11-12) Soil Boring	9/6/2018	1358	G	N	so	L	ļ	1	x	x	x	x	x	x	x			ļ	
HF-B11-(7-8) Soil Boring	9/7/2018	0907	G	N	so			1	x	x	x	x	x	x	x				
HF-B11-(9-10) Soil Boring	9/7/2018	0940	G	N	so		ļ	1	x	x	x	x	x	x	x				
HF-B11-(11-12) Soil Boring	9/7/2018	1022	G	N	SO			1	x	x	х	x	x	x	x				
TAT Requested: Normal: Rush:X_ Specify: (Subject to Surcharge)	_ASAP_	Fax Res	ults:	Yes	1	No				C of A	<u> </u>	C Sur	nmary	Circ / L	ele Deli evel 1	iverab / L	le: evel 2	/ Le	evel 3 / Level 4
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Chain of Cust	ody Signatures	med) F	ate	Time			ļ				S	ampl	e Shij	oping	and	Deliv	ery D	Details	6
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	3	**********					Airbil	l #:											
Chain of Custody Number = Client Determined QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, l Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample detric Codes: DW =Duiking Water GW =Groundwater SW =Surface Wa	E B = Equipment Blank was field filtered or - I ater WW =Waste Wate	, MS = Matrix N - for sample v r W=Water M	Spike San /as not fiel L=Misc L	nple, MSD ld filtered.	= Matrix Spi Soil SD =Sec	ke Dup	licate St	ample, (G = Gra	ib, $\mathbf{C} = \text{Comp}$ Waste, $\mathbf{O} = \mathbf{O}$	oosite il. F =Fil	ter P=	Vine U	-Urine	F=Fec	al N=N	iasal	<i>I</i>	For Lab Receiving Use Only Custody Seal Intact? YES NO
Sample Analysis Requested: Analytical method requested (i.e. 8260B , 60) Preservative Type: HA = Hydrochloric Acid, NI = Nitric Acid, SH = Sodii WHITE = I A B ((0B/7470A) and numb um Hydroxide, $SA = Si$	er of containers Ilfuric Acid, A/	provided = Ascort	for each (i.e	2. 8260B - 3, X = Hexane,	6010B ST = S	7470A odium T	- 1). hiosulf	ate, If r	io preservativ	ve is add	led = lea	ve field	blank	,				Cooler Temp: C
Page: 2 of 7 Project #: HF Spiking Station 2 GEL Quote #:	GEL C	" hain (**See www nber:	of Cu w.gel.co	ustoc om for (ly an GEL's Sa	d A	Ana Acc	eptan	ce So	al Rec	Jue	st			GEL 2040 Charl Phone Fax: (Labora Savag eston, e: (843 (843) 7	atories e Road SC 29 3) 556- 766-11	e, LLC d 9407 -8171 178	
--	--	--	---	--	--	--	---------------------------	--	-------------------------------	--	------------------------------------	--------------	-----------------------------	----------------------	---	---	---	---	---
Client Name: Westinghouse Electric Company LLC		Phone #: 803	.647.1920)				Sa	mple	Analysis	Requ	lested	l ⁽⁵⁾ (l	Fill in	the n	umbe	r of co	ontain	ers for each test)
Project/Site Name: Columbia Fuel Fabrication Facility		Fax #: 803.0	595.3964			ld this	ple be dered:	ners											< Preservative Type (6)
Address: 5801 Bluff Road, Hopkins, SC 29061						Shou	consi	contai	m (n (by ope,		tent							Comments
Collected by: Jeremy Grant/Randy Crews Send Re	sults: joynerdp@	westinghou	se.com				ated	er of	urani 1 spec	raniur 11 isot -MS)	66-	e Con	oride	H	rate				Note: extra sample is
Sample ID * For composites - indicate start and stop date/time	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code ⁽²⁾	Field Filtered ⁽³⁾	Sample Matrix ⁽⁴⁾	Radioactive	TSCA Regul	Total numb	isotopic (alpha	isotopic u individua ICP	Tc	Moisture	Flu		Nit				required for sample specific QC
HF-B1-(7-8) Soil Boring	9/6/2018	1515	G	N	so			1	x	x	x	x	x	x	x				
HF-B1-(9-10) Soil Boring	9/6/2018	1545	G	N	so			1	x	x	x	x	x	x	x				
HF-B1-(11-12) Soil Boring	9/6/2018	1633	G	N	so			1	x	x	x	x	x	x	x				
HF-B16-(1-2) Soil Boring	9/6/2018	1715	G	N	so			1	x	x	x	x	x	x	x				
HF-B16-(3-4) Soil Boring	9/6/2018	1729	G	N	so			1	x	x	x	x	x	x	x				
								-											
TAT Requested: Normal: Rush:X_Speci	fy: _ASAP_	East Da		Voa		No				C of A			nman	Circ	le Del	iverab	le: evel 2	/ 1.6	vel 3 / Level 4
(Subject to Surcharge) Remarks: Are there any known hazards applicabl	e to these sample	Fax Re	sults: lease lis	<u>Yes</u> st the ha	/ izards	NO		<u>I</u>		<u> </u>	<u>, / (</u>	<u>e sur</u>	nmary	<u>/ L</u>	ever 1	<u> </u>	Ever 2 Samp East Cen Mou	<u>f Le</u> ble Coll tern tral untain	lection Time Zone Pacific Other
Chain of Cu	stody Signatures						<u> </u>				S	ampl	e Shij	pping	, and	Deliv	ery D	Details	
Relinquished By (Signed) Date Time 131	Received by (si	gned) I	Date 9	12/1C	, 12	70	GEL	. PM:	Hope	e Taylor				1.4.11.11.1.1.1.1.1.	T				
K (MUSS 9/2/13 1640	in	\rightarrow				den den	Meth	od of S	hipme	nt:					Date	Shipp	ed: N/	'A	
	2	/					Airbi	1#:											
) Chain of Custody Number = Client Determined) QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplica	3 e, EB = Equipment Blan	k, MS = Matrix	Spike Sar	nple, MSD	= Matrix Sp	ke Dup	Airbi	l #: ample, 4	G = Gra	ab, C = Comp	osite							F	For Lab Receiving Use Only
 B.) Field Filtered: For liquid matrices, indicate with a - Y - for yes the sam a.) Matrix Codes: DW=Drinking Water, GW=Groundwater, SW=Surface Sample Analysis Requested: Analytical method requested (i.e. 8260B, 5.) Preservative Type: HA = Hydrochloric Acid, NI = Nitric Acid, SH = Som WHITE = LA 	ple was field filtered or - Water, WW=Waste Wat 6010B/7470A) and numł odium Hydroxide, SA = S BORATORY	N - for sample - er, W=Water, N per of container Sulfuric Acid, A	was not fie 1L=Misc L s provided A = Ascort YEL	ld filtered. .iquid, SO= for each (i.e bic Acid, H LOW =	Soil, SD=Se e. 8260B - 3 X = Hexane, FILE	diment, , <i>6010E</i> ST = S	SL=Sh 7470A odium '	idge, SS - 1). Thiosuli PI	i=Solid fate, If 1 NK =	Waste, O= O no preservativ = CLIEN	il, F=Fil /e is add Г	lter, P=1	Wipe, U ave field	J=Urine I blank	, F=Fec	al, N=N	łasal		Custody Seal Intact? YES NO Cooler Temp: C

Laboratories LLC

SAMPLE RECEIPT & REVIEW FORM

Clie	nt: WNUC			SDG	/AR/COC/Work Order: 459859
Rec	eived By: STACY BOON			Date	Received: 9/7/18 HT
	Carrier and Tracking Number		-		Circle Applicable: FedEx Express FedEx Ground UPS Field Services Courier Other
Susp	ected Hazard Information	Yes	ů	*If N inve	let Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further stigation.
Ship	ped as a DOT Hazardous?		/	Haza	rd Class Shipped: UN#:
COC radio	Wamples marked or classified as vactive?		/	Max Clas	imum Net Counts Observed* (Observed Counts - Area Background Counts):CPM / mR/Hr sified as: Rad 1 Rad 2 Rad 3
ls pa	ckage, COC, and/or Samples marked HAZ?		/	и уе РСВ	s, select Hazards below, and contact the GEL Safety Group. 's Flammable Foreign Soil RCRA Asbestos Beryllium Other.
<u> </u>	Sample Receipt Criteria	Ycs	Z	v	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	/			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Chain of custody documents included with shipment?	/			
3	Samples requiring cold preservation within $(0 \le 6 \text{ deg. C})$?*	/			Preservation Method: Wei Ice Ice Packs Dry ice None Other: *all temperatures are recorded in Celsius TEMP:
4	Daily check performed and passed on IR temperature gun?	/			Temperature Device Serial #: 1R.3 - 17 Secondary Temperature Device Serial # (If Applicable):
5	Sample containers intact and sealed?				Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6	Samples requiring chemical preservation at proper pH?		/	-	Sample ID's and Containers Affected:
7	Do any samples require Volatile Analysis?			/	If Yes, Are Encores or Soil Kits present? Yes No (If yes, take to VOA Freezer) Do VOA vials contain acid preservation? Yes No N/A (If unknown, select No) VOA vials free of headspace? Yes No N/A · Sample ID's and containers affected:
8	Samples received within holding time?	/			ID's and tests affected:
9	Sample ID's on COC match ID's on bottles?	/			Sample ID's and containers affected:
10	Date & time on COC match date & time on bottles?	/	•		Sample ID's affected:
11	Number of containers received match number indicated on COC?				Sample ID's affected:
12	Are sample containers identifiable as GEL provided?			X,	B 9/7/18
13	COC form is properly signed in relinquished/received sections?	/			
Con	ments (Use Continuation Form if needed):		itials		Date 9/10/19 Page / of 1
					GL-CHL-SR-001 Rev 5

State	Certification
Alaska	17-018
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA180011
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122018-1
New Hampshire NELAP	205415
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	9904
Pennsylvania NELAP	68–00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-18-13
Utah NELAP	SC000122018-26
Vermont	VT87156
Virginia NELAP	460202
Washington	C780

List of current GEL Certifications as of 19 September 2018



a member of The GEL Group INC



PO Box 30712 Charleston, SC 29417 2040 Savage Road Charleston, SC 29407 P 843.556.8171 F 843.766.1178

gel.com

September 21, 2018

Ms. Cynthia Logsdon Westinghouse Electric Company, LLC PO Drawer R Columbia, South Carolina 29205

Re: Soil and Vegetation Analysis Work Order: 459278

Dear Ms. Logsdon:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on September 17, 2018. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4778.

Sincerely,

<1&(M)

Taylor Cannon for Hope Taylor Project Manager

Purchase Order: 4500720046 Enclosures



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Certificate of Analysis Report for

WNUC007 Westinghouse Electric Co, LLC

Client SDG: 459278 GEL Work Order: 459278

The Qualifiers in this report are defined as follows:

- * A quality control analyte recovery is outside of specified acceptance criteria
- ** Analyte is a Tracer compound
- ** Analyte is a surrogate compound
- H Analytical holding time was exceeded
- J Value is estimated
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the limit as defined in the 'U' qualifier above.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Hope Taylor.

TRINDG

Reviewed by

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Certificate of Analysis

Report Date: September 21, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B14-(1-2) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 459278001 Matrix: Soil Collect Date: 12-SEP-18 09:35 17-SEP-18 Receive Date: Collector: Client 1.31% Moisture: RL PF Qualifier DL Units DF Analyst Date Parameter Result Time Batch Method Ion Chromatography SW846 9056A Fluoride and Nitrate "Dry Weight Corrected" U ND 0.342 1.01 mg/kg 9.93 1 MAR1 09/18/18 1403 1802566 1 6.90 0.332 9.93 1.01 mg/kg 1 Metals Analysis-ICP-MS SW846 3050B/6020A Uranium Solid "Dry Weight Corrected" 13.0 39.4 ug/Kg 97.3 2 SKJ 09/19/18 1031 1802353 2 356 ug/Kg Uranium-235 1.97 13.8 2 09/19/18 1242 1802353 3 J 4 85 97.3 SKJ Uranium-238 346 13.0 39.4 ug/Kg 97.3 2 U ND 1.97 2 SKJ 1425 1802353 Uranium-234 9.86 ug/Kg 97.3 09/19/18 4 Titration and Ion Analysis SW9045D Corrosivity (pH<2or>14) "As Received" 5.88 0.010 0.100 SU RXB5 09/19/18 1758 1802818 5 Н 1 The following Prep Methods were performed: Date Prep Batch Description Analyst Time SW846 3050B ICP-MS 3050BS PREP JXM8 09/18/18 1250 1802352 SW846 9056A Total Anions in Soil 1802565 SW846 9056A MAR1 09/18/18 0901 The following Analytical Methods were performed: Description Analyst Comments SW846 9056A SW846 3050B/6020A SW846 3050B/6020A SW846 3050B/6020A SW846 9045D

Column headers are defined as follows: Lc/LC: Critical Level DF: Dilution Factor **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL:** Reporting Limit MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

Fluoride

Nitrate-N

Uranium

Corrosivity

Method

Method

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Notes:

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Certificate of Analysis

	Company : Address :	Westing PO Dra	ghouse H wer R	Electric Compar	ny, LLC	C								
	Contact: Project:	Columb Ms. Cy Soil and	oia, Sout nthia Lo 1 Vegeta	h Carolina 292 gsdon ttion Analysis	205									
	Client Sample I	D: HF-B14	4-(3-4) S	oil Boring			Pro	ject:		WNU	C00518			
	Sample ID:	459278	002				Cli	ent ID:		WNU	C007			
	Matrix:	Soil												
	Collect Date:	12-SEP	-18 09:4	5										
	Receive Date:	17-SEP	-18											
	Collector:	Client	10											
	Maintana	1 170/												
	Moisture:	1.17%												
Parameter	Qu	alifier R	esult		DL	RL	Units	PF	DF	Analy	st Date	Time	Batch	Method
Ion Chromat	tography													
SW846 9050	6A Fluoride and	Nitrate "Dr	v Weigh	t Corrected"										
Fluoride			2.51	e concerce	0.342	1.01	mg/kg	9.95	1	MAR1	09/18/18	1536	1802566	1
Nitrate-N			8.34		0.332	1.01	mg/kg	9.95	1					
Metals Anal	ysis-ICP-MS													
SW846 3050	0B/6020A Urani	um Solid "E	Dry Weig	ght Corrected"										
Uranium			33800		12.7	38.4	ug/Kg	94.9	2	SKJ	09/19/18	1042	1802353	2
Uranium-238			33200		63.4	192	ug/Kg	94.9	10	SKJ	09/19/18	1254	1802353	3
Uranium-234			12.3		1.92	9.60	ug/Kg	94.9	2	SKJ	09/19/18	1434	1802353	4
Uranium-235			1340		38.4	269	ug/Kg	94.9	40	SKJ	09/19/18	1255	1802353	5
l'itration and	d Ion Analysis													
SW9045D C	Corrosivity (pH<	2or>14) "As	s Receiv	ed"										
Corrosivity		Н	5.09		0.010	0.100	SU		1	RXB5	09/19/18	1759	1802818	6
The followi	ng Prep Methods	s were perfor	rmed:											
Method	De	escription				Analyst	Date		Гime	e Pro	ep Batch			
SW846 3050B	ICI	P-MS 3050BS I	PREP			JXM8	09/18/18		1250	180)2352			
SW846 9056A	SW	/846 9056A To	tal Anions	s in Soil		MAR1	09/18/18	()901	180)2565			
The followi	ng Analytical M	ethods were	perform	ned:										
Method	Dea	scription					A	nalyst	Cor	nments	5			
1	SW	846 9056A												
2	SW	846 3050B/602	20A											
3	SW	846 3050B/602	20A											
4 5	SW	846 3050B/602	20A											
5	SW	840 3030B/002 846 9045D	ΰA											
0	5 **	040 904JD												
Notes:														
Column hea	ders are defined	as follows.												
DF: Dilutio	n Factor		· .	Lc/LC: Critical	Level									
DL: Detecti	on Limit			PF: Prep Factor	•									
MDA: Mini	imum Detectable	e Activity		RL: Reporting l	Limit									
MDC: Mini	mum Detectable	Concentrat	ion	SQL: Sample Q	Quantita	tion Limit								

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Certificate of Analysis

	Company : Address :	Westin PO Dra	ighouse H awer R	Electric Compan	ıy, LLC	2								
	Contact: Project:	Colum Ms. Cy Soil an	bia, Sout ynthia Lo id Vegeta	h Carolina 292 gsdon ttion Analysis	05									
	Client Sample	ID: HF-B1	4-(5-5.3)	Soil Boring			Pro	ject:		WNU	C00518			
	Sample ID:	459278	8003	-			Clie	ent ID:		WNU	2007			
	Matrix:	Soil												
	Collect Date:	12-SEI	P_18 1∩·1	4										
	Pocoivo Dato:	12 SEI 17 SEI	D 18	-										
	Cellerte Dale.	Client	-10											
	Collector:	Client												
	Moisture:	1.82%												
Parameter	Q	ualifier F	Result		DL	RL	Units	PF	DF	Analy	st Date	Time	Batch	Method
Ion Chroma	atography													
SW846 905	56A Fluoride and	l Nitrate "Di	ry Weigh	t Corrected"										
Fluoride			139		1.72	5.05	mg/kg	9.93	5	MAR1	09/19/18	1556	1802566	1
Nitrate-N			57.8		1.67	5.05	mg/kg	9.93	5					
Metals Ana	lysis-ICP-MS													
SW846 305	50B/6020A Uran	ium Solid "l	Dry Weig	ght Corrected"										
Uranium			172000		12.9	39.0	ug/Kg	95.6	2	SKJ	09/19/18	1044	1802353	2
Uranium-238			168000		129	390	ug/Kg	95.6	20	SKJ	09/19/18	1257	1802353	3
Uranium-234			58.2		1.95	9.74	ug/Kg	95.6	2	SKJ	09/19/18	1440	1802353	4
Titration on	d Ion Analysis		6160		97.4	682	ug/Kg	95.6	100	SKJ	09/19/18	1258	1802353	3
		2 1 4 A	. D !	111										
SW9045D	Corrosivity (pH<	<20r>14) "A	Is Receiv	ed	0.010	0.100	CLI		1	DVD5	00/10/10	1000	1002010	6
		н	4.04		0.010	0.100	50		1	кавэ	09/19/18	1800	1802818	0
The follows	ing Prep Method	ls were perfo	ormed:											
Method	D	escription				Analyst	Date		Гітє	e Pro	ep Batch			
SW846 3050B	B IC	P-MS 3050BS	PREP			JXM8	09/18/18		1250	180	02352			
SW846 9056A	A SV	W846 9056A T	otal Anions	s in Soil		MARI	09/18/18	()901	180	2565			
The follow	ing Analytical N	Aethods wer	e perforn	ned:										
Method	De	escription					A	nalyst	Cor	nments				
1	SW	V846 9056A												
2	SW	V846 3050B/60	20A											
3	SV	V846 3050B/60	20A											
4	SV	V846 3050B/60	20A											
5	5 V S V	V 840 3030D/00	20A											
Nataa	51	040 00450												
Notes:														
Column he DF: Dilutio DL: Detect MDA: Min MDC: Min	aders are defined on Factor ion Limit iimum Detectabl iimum Detectabl	d as follows: le Activity e Concentra	tion	Lc/LC: Critical PF: Prep Factor RL: Reporting I SQL: Sample Q	Level Limit uantita	tion Limit								

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Certificate of Analysis

Report Date: September 21, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B15-(1-2) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 459278004 Matrix: Soil Collect Date: 12-SEP-18 11:02 17-SEP-18 Receive Date: Collector: Client .958% Moisture: RL PF Qualifier DL Units DF Analyst Date Parameter Result Time Batch Method Ion Chromatography SW846 9056A Fluoride and Nitrate "Dry Weight Corrected" 1.18 0.341 1.00 mg/kg 9.93 1 MAR1 09/18/18 1638 1802566 1 24.7 0.331 9.93 1.00 mg/kg 1 Metals Analysis-ICP-MS SW846 3050B/6020A Uranium Solid "Dry Weight Corrected" 519 12.4 377 ug/Kg 93.3 2 SKJ 09/19/18 1046 1802353 2 ug/Kg Uranium-235 7.70 13.2 2 1344 1802353 3 J 1.88 93.3 SKJ 09/19/18 Uranium-238 479 12.4 37.7 ug/Kg 93.3 2 U ND 2 SKJ 1441 1802353 Uranium-234 1.88 9.42 ug/Kg 93.3 09/19/18 4 Titration and Ion Analysis SW9045D Corrosivity (pH<2or>14) "As Received" Corrosivity 0.010 0.100 SU RXB5 09/19/18 1803 1802818 5 Н 8.17 1 The following Prep Methods were performed: Date Prep Batch Description Analyst Time SW846 3050B ICP-MS 3050BS PREP JXM8 09/18/18 1250 1802352 SW846 9056A SW846 9056A Total Anions in Soil 1802565 MAR1 09/18/18 0901 The following Analytical Methods were performed: Description Analyst Comments SW846 9056A SW846 3050B/6020A SW846 3050B/6020A SW846 3050B/6020A SW846 9045D Column headers are defined as follows:

DF: Dilution Factor **DL:** Detection Limit MDA: Minimum Detectable Activity MDC: Minimum Detectable Concentration

Lc/LC: Critical Level PF: Prep Factor **RL:** Reporting Limit SQL: Sample Quantitation Limit

Fluoride

Nitrate-N

Uranium

Method

Method

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Notes:

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Certificate of Analysis

Report Date: September 21, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B15-(3-4) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 459278005 Matrix: Soil Collect Date: 12-SEP-18 11:28 17-SEP-18 Receive Date: Collector: Client 6.88% Moisture: RL PF Qualifier DL Units Parameter Result DF Analyst Date Time Batch Method Ion Chromatography SW846 9056A Fluoride and Nitrate "Dry Weight Corrected" 201 3.63 10.7 mg/kg 9.95 10 MAR1 09/19/18 1627 1802566 1 382 3.53 10.7 mg/kg 9.95 10 Metals Analysis-ICP-MS SW846 3050B/6020A Uranium Solid "Dry Weight Corrected" 1580000 137 414 ug/Kg 96.3 20 SKJ 09/19/18 1047 1802353 2 1301 1802353 Uranium-235 116000 2070 14500 3 ug/Kg 96.3 2000 SKI 09/19/18 Uranium-238 3260000 13700 41400 ug/Kg 96.3 2000 Uranium-234 529 20.7 103 ug/Kg 96.3 20 SKJ 09/19/18 1509 1802353 4 Titration and Ion Analysis SW9045D Corrosivity (pH<2or>14) "As Received" 4.46 0.010 0.100 SU RXB5 09/19/18 1803 1802818 5 Н 1 The following Prep Methods were performed: Date Prep Batch Description Analyst Time SW846 3050B ICP-MS 3050BS PREP JXM8 09/18/18 1250 1802352 SW846 9056A Total Anions in Soil 1802565 SW846 9056A MAR1 09/18/18 0901 The following Analytical Methods were performed: Description Analyst Comments SW846 9056A SW846 3050B/6020A SW846 3050B/6020A SW846 3050B/6020A SW846 9045D Column headers are defined as follows:

DF: Dilution Factor **DL:** Detection Limit MDA: Minimum Detectable Activity MDC: Minimum Detectable Concentration

Lc/LC: Critical Level PF: Prep Factor **RL:** Reporting Limit SQL: Sample Quantitation Limit

Fluoride

Nitrate-N

Uranium

Corrosivity

Method

Method

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Notes:

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Certificate of Analysis

	Company : Address :	Westinghous PO Drawer R	e Electric Compa	ny, LLC									
	Contact: Project:	Columbia, So Ms. Cynthia Soil and Veg	outh Carolina 292 Logsdon etation Analysis	205									
	Client Sample ID: Sample ID: Matrix:	HF-B15-(5-6 459278006 Soil) Soil Boring			Pro Cli	oject: ent ID:		WNU WNU	C00518 C007			
	Collect Date	12-SEP-18 12	2.08										
	Receive Date:	17-SEP-18	2.00										
	Collector:	Client											
	Moisture:	7.97%											
Parameter	Quali	fier Result		DL	RL	Units	PF	DF	Analy	st Date	Time	Batch	Method
Ion Chroma	atography												
SW846 905	6A Fluoride and Ni	trate "Dry Wei	ght Corrected"										
Fluoride		288		7.32	21.5	mg/kg	9.90	20	MAR1	09/19/18	1658	1802566	1
Nitrate-N		384		7.10	21.5	mg/kg	9.90	20					
Metals Ana	IVSIS-ICP-MS		. 1 . 0										
SW846 305	0B/6020A Uranium	n Solid "Dry W	eight Corrected"	140	424	ua/Va	07.5	20	CIVI	00/10/19	1040	1000252	2
Uranium Uranium-235		1690000		2120	424 14800	ug/Kg ug/Kg	97.5	200	SKJ	09/19/18	1049	1802353	2
Uranium-238		3450000		14000	42400	ug/Kg ug/Kg	97.5	2000	SIL	07/17/10	1507	1002355	5
Uranium-234		531		21.2	106	ug/Kg	97.5	20	SKJ	09/19/18	1510	1802353	4
Titration an	d Ion Analysis												
SW9045D (Corrosivity (pH<2or	r>14) "As Rece	vived"										
Corrosivity		Н 4.41		0.010	0.100	SU		1	RXB5	09/19/18	1804	1802818	5
The followi	ng Prep Methods w	ere performed:											
Method	Desci	ription			Analyst	Date	7	Гime	Pro	ep Batch			
SW846 3050B	ICP-M	IS 3050BS PREP			JXM8	09/18/18	1	1250	180)2352			
SW846 9056A	SW840	6 9056A Total Ani	ons in Soil		MAR1	09/18/18	()901	180)2565			
The follow	ing Analytical Meth	nods were perfo	ormed:										
Method	Descr	iption				A	Analyst	Con	nments	5			
1	SW846	5 9056A											
2	SW846	5 3050B/6020A											
3	SW846	5 3050B/6020A											
4	SW846	5 3050B/6020A											
5	SW846	9045D											
Notes:													
Column he	aders are defined as	follows:											
DF: Dilutio	on Factor		Lc/LC: Critical	l Level									
DL: Detect	ion Limit		PF: Prep Facto	r									
MDA: Min	imum Detectable A	ctivity	RL: Reporting	Limit									
MDC: Min	imum Detectable C	oncentration	SQL: Sample (Quantita	tion Limit								

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Certificate of Analysis

	Company : Address :	Wes PO l	tinghouse Elec Drawer R	etric Company	y, LLC									
		Colu	umbia. South C	Carolina 2920	5									
	Contact:	Ms.	Cvnthia Logs	lon										
	Project:	Soil	and Vegetatio	n Analysis										
	Client Sample ID:	HF-	B15-(7-8) Soil	Boring			Pro	iect:		WNU	C00518			
	Sample ID:	4592	278007	201118			Cli	ent ID		WNU	C007			
	Matrix:	Soil					en		•		2007			
	Collect Date:	12_9	SEP-18 13.22											
	Paceiva Date:	17 \$	SEP 18											
	Callastar	Clia	DLF-10											
	Collector:	Cite	nt or											
	Moisture:	9.61	%											
Parameter	Quali	fier	Result		DL	RL	Units	PF	DF	Analy	st Date	Time	Batch	Method
Ion Chroma	atography									-		-		
SW846 905	6A Fluoride and Ni	trate "	Dry Weight C	orrected"										
Fluoride		J	0.800		0.372	1.09	mg/kg	9.88	1	MAR1	09/18/18	1912	1802566	1
Nitrate-N			111		1.80	5.46	mg/kg	9.88	5	MAR1	09/19/18	1729	1802566	2
Metals Ana	lysis-ICP-MS													
SW846 305	0B/6020A Uranium	n Solid	l "Dry Weight	Corrected"										
Uranium			31800		13.6	41.1	ug/Kg	92.9	2	SKJ	09/19/18	1055	1802353	3
Uranium-238			31100		67.9	206	ug/Kg	92.9	10	SKJ	09/19/18	1308	1802353	4
Uranium-234		J	10.1		2.06	10.3	ug/Kg	92.9	2	SKJ	09/19/18	1446	1802353	5
Uranium-235			1160		20.6	144	ug/Kg	92.9	20	SKJ	09/19/18	1310	1802353	6
Titration an	d Ion Analysis													
SW9045D (Corrosivity (pH<20)	r>14)	"As Received"	,										
Corrosivity		Н	5.12		0.010	0.100	SU		1	RXB5	09/19/18	1805	1802818	7
The followi	ng Prep Methods w	ere pe	rformed:											
Method	Desci	ription	1			Analyst	Date	r	Time	e Pr	ep Batch			
SW846 3050B	ICP-M	S 3050	BS PREP			JXM8	09/18/18		1250	180)2352			
SW846 9056A	SW846	5 9056A	A Total Anions in S	Soil		MAR1	09/18/18	(0901	180)2565			
The follow	ing Analytical Meth	nods w	vere performed	:										
Method	Descri	iption					A	nalyst	Cor	nments				
1	SW846	9056A												
2	SW846	9056A												
3	SW846	3050B	/6020A											
4	SW846	3050B	/6020A											
5	SW846	3050B	/6020A											
6	SW846	3050B	/6020A											
/	SW846	9045D)											
Notes:														

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Certificate of Analysis

Company : Address :	Westinghouse Electric Company, LLC PO Drawer R		
Contact: Project:	Columbia, South Carolina 29205 Ms. Cynthia Logsdon Soil and Vegetation Analysis		
Client Sample ID:	HF-B15-(7-8) Soil Boring	Project:	WNUC00518 WNUC007
Sample ID.	437210001	Chefit ID.	WINUCOU/

Parameter	Qualifier	Result	DL	RL	Units	PF	DF Analyst Date	Time Batch	Method

Column headers are defined as follows:	
DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	n SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: September 21, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis HF-B15-(9-10) Soil Boring Client Sample ID: Project: WNUC00518 Sample ID: Client ID: WNUC007 459278008 Matrix: Soil Collect Date: 12-SEP-18 14:09 17-SEP-18 Receive Date: Collector: Client 12.9% Moisture: RL PF Qualifier DL Units Parameter Result DF Analyst Date Time Batch Method Ion Chromatography SW846 9056A Fluoride and Nitrate "Dry Weight Corrected" U ND 0.389 1.15 mg/kg 9.98 1 MAR1 09/18/18 1943 1802566 1 40.1 0.378 9.98 Nitrate-N 1.15 mg/kg 1 Metals Analysis-ICP-MS SW846 3050B/6020A Uranium Solid "Dry Weight Corrected" 1590 14.5 44.0 ug/Kg 95.8 2 SKJ 09/19/18 1057 1802353 2 ug/Kg Uranium-235 34.4 2 09/19/18 1311 1802353 3 2.20 15.4 95.8 SKJ Uranium-238 1580 14.5 44.0 ug/Kg 95.8 2 U ND 2 SKJ 1512 1802353 Uranium-234 2.20 11.0 ug/Kg 95.8 09/19/18 4 Titration and Ion Analysis SW9045D Corrosivity (pH<2or>14) "As Received" 5.10 0.010 0.100 SU RXB5 09/19/18 1806 1802818 5 Corrosivity Н 1 The following Prep Methods were performed: Method Date Prep Batch Description Analyst Time SW846 3050B ICP-MS 3050BS PREP JXM8 09/18/18 1250 1802352 SW846 9056A Total Anions in Soil 1802565 SW846 9056A MAR1 09/18/18 0901 The following Analytical Methods were performed: Method Description Analyst Comments SW846 9056A SW846 3050B/6020A SW846 3050B/6020A SW846 3050B/6020A SW846 9045D Column headers are defined as follows: Lc/LC: Critical Level DF: Dilution Factor

DL: Detection Limit MDA: Minimum Detectable Activity MDC: Minimum Detectable Concentration PF: Prep Factor **RL:** Reporting Limit SQL: Sample Quantitation Limit

Fluoride

Uranium

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Notes:

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Certificate of Analysis

Report Date: September 21, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B15-(11-12) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 459278009 Matrix: Soil Collect Date: 12-SEP-18 14:31 17-SEP-18 Receive Date: Collector: Client 14.1% Moisture: RL PF Qualifier DL Units Parameter Result DF Analyst Date Time Batch Method Ion Chromatography SW846 9056A Fluoride and Nitrate "Dry Weight Corrected" U ND 0.389 1.14 mg/kg 9.83 1 MAR1 09/18/18 2014 1802566 1 14.5 0.378 9.83 1.14 mg/kg 1 Metals Analysis-ICP-MS SW846 3050B/6020A Uranium Solid "Dry Weight Corrected" 20200 14.9 45.2 ug/Kg 97.1 2 SKJ 09/19/18 1058 1802353 2 1313 1802353 Uranium-238 19500 14.9 45.2 ug/Kg 2 3 971 SKJ 09/19/18 Uranium-234 J 6.01 2.26 11.3 ug/Kg 97.1 2 SKJ 09/19/18 1513 1802353 4 Uranium-235 642 22.6 158 ug/Kg 97.1 20 SKJ 09/19/18 1314 1802353 5 Titration and Ion Analysis SW9045D Corrosivity (pH<2or>14) "As Received" 5.29 0.010 0.100 SU RXB5 09/19/18 1816 1802818 Н 1 6 The following Prep Methods were performed: Date Prep Batch Description Analyst Time SW846 3050B ICP-MS 3050BS PREP JXM8 09/18/18 1250 1802352 SW846 9056A SW846 9056A Total Anions in Soil 1802565 MAR1 09/18/18 0901 The following Analytical Methods were performed: Description Analyst Comments SW846 9056A SW846 3050B/6020A SW846 3050B/6020A SW846 3050B/6020A SW846 3050B/6020A SW846 9045D Column headers are defined as follows: DF: Dilution Factor Lc/LC: Critical Level

DL: Detection Limit

Fluoride

Nitrate-N

Uranium

Corrosivity

Method

Method

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Notes:

MDA: Minimum Detectable Activity

MDC: Minimum Detectable Concentration

PF: Prep Factor **RL: Reporting Limit** SQL: Sample Quantitation Limit

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	Company : Address :	Wes PO I	tinghouse Drawer R	Electric Con	mpany, LLC									
	Contact: Project:	Colu Ms. Soil	imbia, Soi Cynthia L and Vege	uth Carolina ogsdon tation Analy	29205 rsis									
	Client Sample II Sample ID:	D: HF-I 4592	B13-(1-2)	Soil Boring			Pro	oject: ent ID [.]		WNU WNU	C00518			
	Matrix:	Soil	270010				Ch				0007			
	Collect Detay	12 6	ED 10 15	.40										
	Collect Date.	12-3	EF-10 13	.40										
	Receive Date:	17-3	EP-18											
	Collector:	Cliei	nt											
	Moisture:	8.69	%											
Parameter	Qu	alifier	Result		DL	RL	Units	PF	DF	Analy	st Date	Time	Batch	Method
Ion Chroma	tography													
SW846 905	6A Fluoride and	Nitrate "	Dry Weig	ht Corrected	l"									
Fluoride		U	ND		0.371	1.09	mg/kg	9.98	1	MAR1	09/18/18	2045	1802566	1
Nitrate-N			70.8		0.721	2.18	mg/kg	9.98	2	MAR1	09/19/18	1800	1802566	2
Metals Ana	lysis-ICP-MS													
SW846 305	0B/6020A Urani	um Solid	l "Dry We	ight Correct	ed"									
Uranium-235		J	11.4		2.09	14.7	ug/Kg	95.6	2	SKJ	09/19/18	1350	1802353	3
Uranium-238			1140		13.8	41.9	ug/Kg	95.6	2					
Uranium-234		U	ND		2.09	10.5	ug/Kg	95.6	2	SKJ	09/19/18	1515	1802353	4
Uranium Tituatian an	d Tan Analasia		1180		13.8	41.9	ug/Kg	95.6	2	SKJ	09/19/18	1100	1802353	5
Thrahon an	a ion Analysis	2 14		1.1										
SW9045D (Corrosivity (pH<.	2or>14)	"As Recei	ved	0.010	0.100				DVD 5	00/10/10	1010	1002010	
Corrosivity		Н	6.18		0.010	0.100	SU		1	RXB5	09/19/18	1818	1802818	6
The followi	ng Prep Methods	were pe	rformed:											
Method	De	scription				Analyst	Date	-	Гime	e Pr	ep Batch			
SW846 3050B	ICP	-MS 30501	BS PREP			JXM8	09/18/18	1	1250	180)2352			
SW846 9056A	SW SW	846 9056A	Total Anio	ns in Soil		MAR1	09/18/18	()901	180)2565			
The follow	ing Analytical M	ethods w	ere perfoi	med:										
Method	Des	cription					A	Analyst	Co	nments	3			
1	SW8	846 9056A												
2	SW8	846 9056A												
3	SW8	846 3050B	/6020A											
4	SW8	846 3050B	/6020A											
5	SW8	846 3050B	/6020A											
6	SW8	346 9045D												
Notes:														
Column he	aders are defined	<u>as fo</u> llov	vs:											
DF: Dilutio	on Factor			Lc/LC: Cri	tical Level									
DL: Detect	ion Limit			PF: Prep Fa	actor									
MDA: Min	imum Detectable	Activity	· .	RL: Report	ting Limit									
MDC: Min	imum Detectable	Concent	tration	SQL: Samj	ple Quantita	tion Limit								

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Certificate of Analysis

	Company : Address :	West PO E	inghouse Drawer R	Electric Com	npany, LLC	C								
	Contact: Project:	Colu Ms. 0 Soil a	mbia, Sou Cynthia L and Vege	ith Carolina 2 ogsdon tation Analyst	29205 is									
	Client Sample II	D: HF-E	313-(3-4)	Soil Boring			Pro	oject:		WNU	C00518			
	Sample ID:	4592	78011				Cli	ent ID:		WNU	2007			
	Matrix:	Soil												
	Collect Date:	12-S	EP-18 16:	00										
	Receive Date:	17-S	EP-18											
	Collector:	Clier	nt											
	Moisture:	7 830)/a											
	Wolsture.	7.057	/0											
Parameter	Qua	alifier	Result		DL	RL	Units	PF	DF	Analy	st Date	Time	Batch	Method
Ion Chroma	tography													
SW846 905	6A Fluoride and 1	Nitrate "I	Drv Weig	ht Corrected"	,									
Fluoride		J	0.990	in conceted	0.366	1.08	mg/kg	9.93	1	MAR1	09/18/18	2116	1802566	1
Nitrate-N		U	67.0		0.711	2.15	mg/kg	9.93	2	MAR1	09/19/18	1831	1802566	2
Metals Anal	ysis-ICP-MS													
SW846 305	0B/6020A Uraniı	ım Solid	"Dry We	ight Corrected	d"									
Uranium			1000	0	14.3	43.2	ug/Kg	99.6	2	SKJ	09/19/18	1102	1802353	3
Uranium-235		J	10.3		2.16	15.1	ug/Kg	99.6	2	SKJ	09/19/18	1351	1802353	4
Uranium-238			985		14.3	43.2	ug/Kg	99.6	2					
Uranium-234	17 . 1 .	U	ND		2.16	10.8	ug/Kg	99.6	2	SKJ	09/19/18	1516	1802353	5
l'itration and	d Ion Analysis													
SW9045D C	Corrosivity (pH<2	2or>14) "	As Recei	ved"										
Corrosivity		Н	4.67		0.010	0.100	SU		1	RXB5	09/19/18	1819	1802818	6
The following	ng Prep Methods	were per	formed:											
Method	Des	scription				Analyst	Date]	Гime	e Pro	ep Batch			
SW846 3050B	ICP	-MS 3050E	S PREP			JXM8	09/18/18	1	250	180	02352			
SW846 9056A	SW8	846 9056A	Total Anio	is in Soil		MAR1	09/18/18	()901	180)2565			
The followi	ing Analytical Me	ethods we	ere perfor	med:										
Method	Des	cription					A	Analyst	Cor	nments				
1	SW8	46 9056A												
2	SW8	46 9056A												
3	SW8	46 3050B/	6020A											
4	SW8	46 3050B/	6020A											
5	5 W 8 SW 8	40 3030D/ 46 9045D	0020A											
0	500	HU 7043D												
Notes:														
Column hea	aders are defined	as follow	/s:											
DF: Dilutio	n Factor			Lc/LC: Criti	cal Level									
DL: Detecti	on Limit			PF: Prep Fac	ctor									
MDA: Mini	imum Detectable	Activity		RL: Reportin	ng Limit									
MDC: Mini	imum Detectable	Concent	ration	SQL: Sampl	e Quantita	tion Limit								

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Certificate of Analysis

	Company : Address :	West PO E	inghouse Drawer R	Electric Cor	mpany, LLC									
	Contact: Project:	Colu Ms. 0 Soil a	mbia, Sou Cynthia L and Vege	uth Carolina ogsdon tation Analy	29205 sis									
	Client Sample II Sample ID: Matrix:	D: HF-E 4592 Soil	313-(5-6) 78012	Soil Boring			Pro Cli	oject: ent ID:		WNU WNU	C00518 C007			
	Collect Date:	12-S	EP-18 16	:24										
	Receive Date:	17-S	EP-18											
	Collector:	Clien	nt											
	Moisture:	8.7%												
Parameter	Qua	alifier	Result		DL	RL	Units	PF	DF	Analy	st Date	Time	Batch	Method
Ion Chroma	tography													
SW846 905	6A Fluoride and 1	Nitrate "I	Dry Weig	ht Corrected	["									
Fluoride		U	ND		0.371	1.09	mg/kg	9.95	1	MAR1	09/18/18	2147	1802566	1
Nitrate-N			57.4		0.719	2.18	mg/kg	9.95	2	MAR1	09/19/18	1901	1802566	2
Metals Anal	ysis-ICP-MS													
SW846 305	0B/6020A Uraniu	ım Solid	"Dry We	ight Correct	ed"									
Uranium		_	1100		13.9	42.0	ug/Kg	96.0	2	SKJ	09/19/18	1107	1802353	3
Uranium-235		J	11.0		2.10	14.7	ug/Kg	96.0	2	SKJ	09/19/18	1353	1802353	4
Uranium-238		I	1090 ND		2 10	42.0	ug/Kg	96.0 96.0	2	SKI	00/10/18	1520	1802353	5
Titration and	d Ion Analysis	0	ND		2.10	10.5	ug/Kg	90.0	2	5105	0)/1)/10	1520	1002555	5
SW9045D (Corrosivity (nH-2	2 or 14	As Recei	ved"										
Corrosivity		-01/14) Н	5 50	veu	0.010	0.100	SU		1	RXB5	09/19/18	1819	1802818	6
The following	ng Prop Mothoda	woro por	formad		0.010	0.100	50			iuibs	0)/1)/10	1017	1002010	0
Mathad	ng riep Methous	were per	Tormeu.			A	Data	7	.	Dm	n Dotoh			
	Des	scription				Analyst		1	1 me	e Pro	ep Batch			
SW846 3050B SW846 90564	ICP- SWS	-IVIS 3030E 846 90564	55 PKEP Total Anio	ns in Soil		JAM8 MAR1	09/18/18	1	250	180)2565			
The feller:		41. a d a					07/10/10	, c	//01	100	2303			
The followi	ing Analytical Me	ethods we	ere perior	med:					<u> </u>					
Method	Dese	cription					A	alyst	Cor	nments				
1	SW8 SW8	40 9050A												
3	SW8	46 3050R	6020A											
4	SW8	46 3050B/	6020A											
5	SW8	46 3050B/	6020A											
6	SW8	46 9045D												
Notes:														
Column hea	aders are defined	as follow	/s:											
DF: Dilutio	n Factor			Lc/LC: Cri	tical Level									
DL: Detecti	on Limit	A		PF: Prep Fa	actor									
MDC: Mini	mum Detectable	Activity	ration	KL: Keport	nng Limit	tion Limit								
MDC: Mini	mum Detectable	Concent	auon	SQL: Samp	ne Quantita	uon Limit								

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Certificate of Analysis

Report Date: September 21, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B13-(7-8) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 459278013 Matrix: Soil Collect Date: 12-SEP-18 17:09 17-SEP-18 Receive Date: Collector: Client 11.9% Moisture: RL PF Qualifier DL Units DF Analyst Date Parameter Result Time Batch Method Ion Chromatography SW846 9056A Fluoride and Nitrate "Dry Weight Corrected" U ND 0.382 1.12 mg/kg 9.90 1 MAR1 09/18/18 2218 1802566 1 33.6 0.371 9.90 1.12 mg/kg 1 Metals Analysis-ICP-MS SW846 3050B/6020A Uranium Solid "Dry Weight Corrected" 888 14.5 44.1 ug/Kg 97.1 2 SKJ 09/19/18 1108 1802353 2 ug/Kg 1354 1802353 Uranium-235 2 09/19/18 3 J 8.28 2.20 15.4 97.1 SKJ Uranium-238 914 14.5 44.1 ug/Kg 97.1 2 U ND 2 SKJ 1522 1802353 Uranium-234 2.20 11.0 ug/Kg 97.1 09/19/18 4 Titration and Ion Analysis SW9045D Corrosivity (pH<2or>14) "As Received" 5.05 0.010 0.100 SU RXB5 09/19/18 1820 1802818 5 Η 1 The following Prep Methods were performed: Date Prep Batch Description Analyst Time ICP-MS 3050BS PREP SW846 3050B JXM8 09/18/18 1250 1802352 SW846 9056A Total Anions in Soil 1802565 SW846 9056A MAR1 09/18/18 0901 The following Analytical Methods were performed: Description Analyst Comments

1	SW846 9056A
2	SW846 3050B/6020A
3	SW846 3050B/6020A
4	SW846 3050B/6020A
5	SW846 9045D

Notes:

Fluoride

Nitrate-N

Uranium

Corrosivity

Method

Method

Column headers are defined as follows: Lc/LC: Critical Level DF: Dilution Factor **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL:** Reporting Limit MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: September 21, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis HF-B13-(9-10) Soil Boring Client Sample ID: Project: WNUC00518 Sample ID: Client ID: WNUC007 459278014 Matrix: Soil Collect Date: 12-SEP-18 17:41 17-SEP-18 Receive Date: Collector: Client 12.9% Moisture: RL PF Qualifier DL Units DF Analyst Date Parameter Result Time Batch Method Ion Chromatography SW846 9056A Fluoride and Nitrate "Dry Weight Corrected" Fluoride U ND 0.389 1.14 mg/kg 9.95 1 MAR1 09/18/18 2249 1802566 1 29.0 0.377 9.95 Nitrate-N 1.14 mg/kg 1 Metals Analysis-ICP-MS SW846 3050B/6020A Uranium Solid "Dry Weight Corrected" Uranium 781 14.4 43.7 ug/Kg 95.1 2 SKJ 09/19/18 1110 1802353 2 ug/Kg Uranium-235 7.34 15.3 2 1356 1802353 3 J 2.18 95.1 SKJ 09/19/18 Uranium-238 759 14.4 43.7 ug/Kg 95.1 2 U ND 2 SKJ 1523 1802353 Uranium-234 2.18 10.9 ug/Kg 95.1 09/19/18 4 Titration and Ion Analysis SW9045D Corrosivity (pH<2or>14) "As Received" Corrosivity 4.52 0.010 0.100 SU RXB5 09/19/18 1823 1802818 5 Н 1 The following Prep Methods were performed: Method Date Prep Batch Description Analyst Time SW846 3050B ICP-MS 3050BS PREP JXM8 09/18/18 1250 1802352 SW846 9056A SW846 9056A Total Anions in Soil 1802565 MAR1 09/18/18 0901 The following Analytical Methods were performed: Method Description Analyst Comments SW846 9056A SW846 3050B/6020A SW846 3050B/6020A SW846 3050B/6020A SW846 9045D Notes: Column headers are defined as follows: Lc/LC: Critical Level DF: Dilution Factor

DL: Detection Limit MDA: Minimum Detectable Activity MDC: Minimum Detectable Concentration PF: Prep Factor **RL:** Reporting Limit SQL: Sample Quantitation Limit

1

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Certificate of Analysis

Report Date: September 21, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B13-(11-12) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 459278015 Matrix: Soil Collect Date: 12-SEP-18 18:18 17-SEP-18 Receive Date: Collector: Client 12.8% Moisture: RL PF Qualifier DL Units DF Analyst Date Parameter Result Time Batch Method Ion Chromatography SW846 9056A Fluoride and Nitrate "Dry Weight Corrected" Fluoride U ND 0.389 1.14 mg/kg 9.98 1 MAR1 09/19/18 0021 1802566 1 0.378 9.98 Nitrate-N 14.6 1.14 mg/kg 1 Metals Analysis-ICP-MS SW846 3050B/6020A Uranium Solid "Dry Weight Corrected" Uranium 830 13.9 42.2 ug/Kg 91.9 2 SKJ 09/19/18 1111 1802353 2 ug/Kg 1357 1802353 Uranium-235 14.8 2 09/19/18 3 J 13.8 2.11 91.9 SKJ Uranium-238 824 13.9 42.2 ug/Kg 91.9 2 U ND 2 SKJ Uranium-234 2.11 10.5 ug/Kg 91.9 09/19/18 1524 1802353 4 Titration and Ion Analysis SW9045D Corrosivity (pH<2or>14) "As Received" Corrosivity 5.22 0.010 0.100 SU RXB5 09/19/18 1825 1802818 5 Н 1 The following Prep Methods were performed: Method Date Prep Batch Description Analyst Time SW846 3050B ICP-MS 3050BS PREP JXM8 09/18/18 1250 1802352 SW846 9056A SW846 9056A Total Anions in Soil 1802565 MAR1 09/18/18 0901 The following Analytical Methods were performed: Method Description Analyst Comments SW846 9056A SW846 3050B/6020A SW846 3050B/6020A SW846 3050B/6020A SW846 9045D Notes: Column headers are defined as follows: Lc/LC: Critical Level DF: Dilution Factor **DL:** Detection Limit PF: Prep Factor

MDA: Minimum Detectable Activity MDC: Minimum Detectable Concentration **RL:** Reporting Limit SQL: Sample Quantitation Limit

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QC Summary

Report Date: September 21, 2018

Westinghouse Electric Company, LLC PO Drawer R Columbia, South Carolina Ms. Cynthia Logsdon

Page 1 of 4

Workorder: 459278

Contact:

Parmname			NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Ion Chromatograph Batch 180	y)2566												
QC1204113926 Fluoride	459278001	DUP		U	ND	U	ND	mg/kg	N/A			MAR1	09/18/18 14:34
Nitrate-N					6.90		6.94	mg/kg	0.6		(0%-20%)		
QC1204113927 Fluoride	459278015	DUP		U	ND	U	ND	mg/kg	N/A				09/19/18 00:52
Nitrate-N					14.6		14.5	mg/kg	0.844		(0%-20%)		
QC1204113925 Fluoride	LCS		25.0				24.4	mg/kg		97.7	(90%-110%)		09/18/18 13:33
Nitrate-N			25.0				23.7	mg/kg		94.8	(90%-110%)		
QC1204113924 Fluoride	MB					U	ND	mg/kg					09/18/18 13:02
Nitrate-N						U	ND	mg/kg					
QC1204113928 Fluoride	459278001	MS	25.3	U	ND		22.2	mg/kg		87.7	(30%-135%)		09/18/18 15:05
Nitrate-N			25.3		6.90		32.5	mg/kg		101	(70%-125%)		
QC1204113929 Fluoride	459278015	MS	28.6	U	ND		8.88	mg/kg		31.1	(30%-135%)		09/19/18 01:23
Nitrate-N			28.6		14.6		44.4	mg/kg		104	(70%-125%)		

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QC Summary

Workorder: 459278 Page 2 of										
Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Metals Analysis - ICPMS Batch 1802353										
QC1204113504 459278001 DUP Uranium		356		412	ug/Kg	14.5		(0%-20%)	SKJ	09/19/18 10:33
Uranium-234	U	ND	U	ND	ug/Kg	N/A				09/19/18 14:27
Uranium-235	J	4.85	J	4.75	ug/Kg	2.13	^	(+/-13.1))	09/19/18 12:43
Uranium-238		346		390	ug/Kg	11.9		(0%-20%)		
QC1204113503 LCS Uranium	4850			4900	ug/Kg		101	(80%-120%)		09/19/18 10:29
Uranium-235	35.0			32.6	ug/Kg		93.3	(80%-120%)		09/19/18 12:40
Uranium-238	4820			4550	ug/Kg		94.4	(80%-120%)		
QC1204113507 LCS Uranium-234	54.8			55.3	ug/Kg		101	(80%-120%)		09/19/18 14:24
QC1204113502 MB Uranium			U	ND	ug/Kg					09/19/18 10:28
Uranium-234			U	ND	ug/Kg					09/19/18 14:22
Uranium-235			U	ND	ug/Kg					09/19/18 12:39
Uranium-238			U	ND	ug/Kg					
QC1204113505 459278001 MS Uranium	4740	356		5040	ug/Kg		98.7	(75%-125%)		09/19/18 10:34
Uranium-235	34.2 J	4.85		35.1	ug/Kg		88.6	(75%-125%)		09/19/18 12:45

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QC Summary

Workorder: 459278											Page	3 of 4
Parmname	NOM	S	ample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date '	Time
Metals Analysis - ICPMSBatch1802353												
Uranium-238	4710		346		4790	ug/Kg		94.3	(75%-125%)	SKJ	09/19/18	3 12:45
QC1204113508 459278001 MS Uranium-234	50.9	U	ND		53.6	ug/Kg		105	(75%-125%)		09/19/18	3 14:28
QC1204113506 459278001 SDILT Uranium			1.81		0.369	ug/L	2.16		(0%-10%)		09/19/18	3 10:37
Uranium-234		U	ND	U	ND	ug/L	N/A				09/19/18	3 14:31
Uranium-235		J	0.0246	U	ND	ug/L	N/A		(0%-10%)		09/19/18	3 12:48
Uranium-238			1.76		0.351	ug/L	.148		(0%-10%)			
Titration and Ion Analysis Batch 1802818												
QC1204114455 459278015 DUP Corrosivity		Н	5.22	Н	5.22	SU	0		(0%-10%)	RXB5	09/19/18	8 18:26
QC1204114454 LCS Corrosivity	7.00				7.04	SU		101	(95%-105%)		09/19/18	3 17:51

Notes:

The Qualifiers in this report are defined as follows:

< Result is less than value reported

> Result is greater than value reported

B The target analyte was detected in the associated blank.

E %difference of sample and SD is >10%. Sample concentration must meet flagging criteria

E General Chemistry--Concentration of the target analyte exceeds the instrument calibration range

FB Mercury was found present at quantifiable concentrations in field blanks received with these samples. Data associated with the blank are deemed invalid for reporting to regulatory agencies

H Analytical holding time was exceeded

J Value is estimated

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QC Summary

Workor	der: 459278 Page 4 of 4								
Parmnai	ne NOM Sample Qual QC Units RPD% REC% Range Anlst Date Time								
Ν	MetalsThe Matrix spike sample recovery is not within specified control limits								
N/A	RPD or %Recovery limits do not apply.								
N1	See case narrative								
ND	Analyte concentration is not detected above the detection limit								
NJ	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier								
Q	One or more quality control criteria have not been met. Refer to the applicable narrative or DER.								
R	Per section 9.3.4.1 of Method 1664 Revision B, due to matrix spike recovery issues, this result may not be reported or used for regulatory compliance purposes.								
R	Sample results are rejected								
U	Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.								
Х	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier								
Y	Other specific qualifiers were required to properly define the results. Consult case narrative.								
Ζ	Paint Filter TestParticulates passed through the filter, however no free liquids were observed.								
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.								
d	5-day BODThe 2:1 depletion requirement was not met for this sample								
e	5-day BODTest replicates show more than 30% difference between high and low values. The data is qualified per the method and can be used for reporting purposes								
h	Preparation or preservation holding time was exceeded								
N/A ind ^ The Ra five time RL is us	icates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable. elative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than es (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the ed to evaluate the DUP result.								

* Indicates that a Quality Control parameter was not within specifications.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

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Certificate of Analysis

Report Date: September 21, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B14-(1-2) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 459278001 Matrix: Soil Collect Date: 12-SEP-18 09:35 17-SEP-18 Receive Date: Collector: Client 1.31% Moisture: RL Qualifier MDC Units PF Result Uncertainty DF Analyst Date Time Batch Method Gravimetric Solids ASTM D 2216 % Moisture "As Received" 1.31 percent CXC1 09/17/18 1440 1802382 1 Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 +/-0.380 0.500 pCi/g HAKB 09/21/18 0952 1803412 2 0.709 0.348 Uranium-235/236 U 0.205 +/-0.242 0.261 0.500 pCi/g 0.454 +/-0.3020.500 pCi/g 0.269 Rad Liquid Scintillation Analysis Liquid Scint Tc99, Soil "As Received" Technetium-99 7.11 +/-12.9 22.0 50.0 pCi/g CXS7 09/19/18 2012 1802475 3 U The following Prep Methods were performed: Date Prep Batch Description Analyst Time Dry Soil Prep GL-RAD-A-021 09/17/18 1440 1802382 CXC1 The following Analytical Methods were performed: Description Analyst Comments ASTM D 2216 (Modified) DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Surrogate/Tracer Recovery Test Result Nominal Recovery% Acceptable Limits Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 67.6 (15%-125%) 98.5 Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" (15%-125%) Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). Column headers are defined as follows: **DF:** Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

Parameter

Moisture

Uranium-238

Method

Method

Notes:

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Dry Soil Prep

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Certificate of Analysis

Report Date: September 21, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B14-(3-4) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 459278002 Matrix: Soil Collect Date: 12-SEP-18 09:45 17-SEP-18 Receive Date: Collector: Client 1.17% Moisture: RL Qualifier MDC Units PF Result Uncertainty DF Analyst Date Time Batch Method Gravimetric Solids ASTM D 2216 % Moisture "As Received" 1.17 percent CXC1 09/17/18 1440 1802382 1 Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 +/-5.42 0.500 pCi/g HAKB 09/20/18 1420 1803412 2 94.4 0.517 Uranium-235/236 5.00 +/-1.40 0.300 0.500 pCi/g Uranium-238 +/-2.42 0.500 pCi/g 18.7 0.388 Rad Liquid Scintillation Analysis Liquid Scint Tc99, Soil "As Received" -0.389 Technetium-99 +/-13.5 23.5 50.0 pCi/g CXS7 09/19/18 2029 1802475 3 U The following Prep Methods were performed: Date Prep Batch Description Analyst Time Dry Soil Prep Dry Soil Prep GL-RAD-A-021 09/17/18 1440 1802382 CXC1 The following Analytical Methods were performed: Description Analyst Comments ASTM D 2216 (Modified) DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Surrogate/Tracer Recovery Test Result Nominal Recovery% Acceptable Limits Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 83.1 (15%-125%) Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" 97 (15%-125%) Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). Column headers are defined as follows: **DF:** Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

Parameter

Moisture

Method

Method

Notes:

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Certificate of Analysis

Report Date: September 21, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B14-(5-5.3) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 459278003 Matrix: Soil Collect Date: 12-SEP-18 10:14 17-SEP-18 Receive Date: Collector: Client 1.82% Moisture: RL Parameter Qualifier MDC Units PF Result Uncertainty DF Analyst Date Time Batch Method Gravimetric Solids ASTM D 2216 % Moisture "As Received" Moisture 1.82 percent CXC1 09/17/18 1440 1802382 1 Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 +/-10.7 0.554 0.500 pCi/g HAKB 09/21/18 0952 1803412 2 366 Uranium-235/236 21.3 +/-2.87 0.299 0.500 pCi/g Uranium-238 +/-4.66 0.500 pCi/g 69.8 0.387 Rad Liquid Scintillation Analysis Liquid Scint Tc99, Soil "As Received" Technetium-99 -2.65 +/-17.029.8 50.0 pCi/g CXS7 09/19/18 2046 1802475 3 U The following Prep Methods were performed: Method Date Prep Batch Description Analyst Time Dry Soil Prep Dry Soil Prep GL-RAD-A-021 09/17/18 1440 1802382 CXC1 The following Analytical Methods were performed: Method Description Analyst Comments ASTM D 2216 (Modified) DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Surrogate/Tracer Recovery Test Result Nominal Recovery% Acceptable Limits Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 77.2 (15%-125%) Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" 99.8 (15%-125%) Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). Column headers are defined as follows: **DF:** Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Notes:

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Certificate of Analysis

Report Date: September 21, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B15-(1-2) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 459278004 Matrix: Soil Collect Date: 12-SEP-18 11:02 17-SEP-18 Receive Date: Collector: Client .958% Moisture: RL Qualifier MDC Units PF Result Uncertainty DF Analyst Date Time Batch Method Gravimetric Solids ASTM D 2216 % Moisture "As Received" 0.958 percent CXC1 09/17/18 1440 1802382 Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 +/-0.515 0.500 pCi/g HAKB 09/20/18 1420 1803412 1.59 0.281 Uranium-235/236 U 0.280 +/-0.266 0.281 0.500 pCi/g 0.390 +/-0.269 0.500 pCi/g 0.227 Rad Liquid Scintillation Analysis Liquid Scint Tc99, Soil "As Received" Technetium-99 6.64 +/-28.0 48.3 50.0 pCi/g CXS7 09/19/18 2103 1802475 U The following Prep Methods were performed: Date Prep Batch Description Analyst Time Dry Soil Prep GL-RAD-A-021 09/17/18 1440 1802382 CXC1 The following Analytical Methods were performed: Description Analyst Comments ASTM D 2216 (Modified) DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Surrogate/Tracer Recovery Test Result Nominal Recovery% Acceptable Limits Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 86.1 (15%-125%) 79.5 Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" (15%-125%) Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). Column headers are defined as follows: **DF:** Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

1

2

3

Parameter

Moisture

Uranium-238

Method

Method

Notes:

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Dry Soil Prep

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Certificate of Analysis

Report Date: September 21, 2018 Company : Westinghouse Electric Company, LLC PO Drawer R Address : Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B15-(3-4) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 459278005 Matrix: Soil Collect Date: 12-SEP-18 11:28 17-SEP-18 Receive Date: Collector: Client Moisture: 6.88% RL PF Parameter Qualifier MDC Units DF Analyst Date Time Batch Method Result Uncertainty Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 4760 +/-1015.03 0.500 pCi/g HAKB 09/21/18 0952 1803412 1 Uranium-235/236 268 +/-26.8 5.59 0.500 pCi/g Uranium-238 989 +/-46.2 5.16 0.500 pCi/g **Rad Liquid Scintillation Analysis** Liquid Scint Tc99, Soil "As Received" Technetium-99 31.6 +/-20.533.5 50.0 pCi/g CXS7 09/19/18 2120 1802475 2 U The following Prep Methods were performed: Method Date Prep Batch Description Analyst Time Dry Soil Prep GL-RAD-A-021 Dry Soil Prep CXC1 09/17/18 1440 1802382 The following Analytical Methods were performed: Method Description Analyst Comments DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Surrogate/Tracer Recovery Result Nominal Recovery% Acceptable Limits Test Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 59.2 (15% - 125%)Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" 96.1 (15% - 125%)Notes: Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). Column headers are defined as follows:

DF: Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL:** Reporting Limit MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: September 21, 2018 Company : Westinghouse Electric Company, LLC PO Drawer R Address : Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B15-(5-6) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 459278006 Matrix: Soil Collect Date: 12-SEP-18 12:08 17-SEP-18 Receive Date: Collector: Client Moisture: 7.97% RL PF Parameter Qualifier MDC Units DF Analyst Date Time Batch Method Result Uncertainty Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 6560 +/-157 7.48 0.500 pCi/g HAKB 09/20/18 1420 1803412 1 Uranium-235/236 +/-44.0 5.78 0.500 416 pCi/g Uranium-238 1480 +/-74.6 2.93 0.500 pCi/g **Rad Liquid Scintillation Analysis** Liquid Scint Tc99, Soil "As Received" Technetium-99 +/-15.3 27.2 50.0 pCi/g CXS7 09/19/18 2136 1802475 2 U -6.56 The following Prep Methods were performed: Method Date Prep Batch Description Analyst Time Dry Soil Prep GL-RAD-A-021 Dry Soil Prep CXC1 09/17/18 1440 1802382 The following Analytical Methods were performed: Method Description Analyst Comments DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Surrogate/Tracer Recovery Result Nominal Recovery% Acceptable Limits Test Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 57.6 (15% - 125%)Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" 95.5 (15% - 125%)Notes: Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). Column headers are defined as follows:

DF: Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL:** Reporting Limit MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: September 21, 2018

Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B15-(7-8) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 459278007 Matrix: Soil Collect Date: 12-SEP-18 13:22 17-SEP-18 Receive Date: Collector: Client 9.61% Moisture: RL Qualifier MDC Units PF Result Uncertainty DF Analyst Date Time Batch Method Gravimetric Solids ASTM D 2216 % Moisture "As Received" 9.61 percent CXC1 09/17/18 1440 1802382 1 Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 +/-5.43 0.500 pCi/g HAKB 09/20/18 1643 1803412 2 101 0.584 Uranium-235/236 6.84 +/-1.59 0.450 0.500 pCi/g +/-2.64 0.500 pCi/g 23.7 0.589 Rad Liquid Scintillation Analysis Liquid Scint Tc99, Soil "As Received" 10.4 +/-19.1 32.5 50.0 pCi/g CXS7 09/19/18 2153 1802475 3 U The following Prep Methods were performed: Date Prep Batch Description Analyst Time Dry Soil Prep GL-RAD-A-021 09/17/18 1440 1802382 CXC1 The following Analytical Methods were performed: Description Analyst Comments ASTM D 2216 (Modified) DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Surrogate/Tracer Recovery Test Result Nominal Recovery% Acceptable Limits Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 85.6 (15%-125%) 82.5 Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" (15%-125%)

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows: **DF:** Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

Parameter

Moisture

Uranium-238

Technetium-99

Method

Method

Notes:

1

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Dry Soil Prep

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Certificate of Analysis

Report Date: September 21, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B15-(9-10) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 459278008 Matrix: Soil Collect Date: 12-SEP-18 14:09 17-SEP-18 Receive Date: Collector: Client 12.9% Moisture: RL Parameter Qualifier MDC Units PF Result Uncertainty DF Analyst Date Time Batch Method Gravimetric Solids ASTM D 2216 % Moisture "As Received" Moisture 12.9 percent CXC1 09/17/18 1440 1802382 1 Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 +/-1.03 0.500 pCi/g HAKB 09/20/18 1643 1803412 2 8.04 0.278 Uranium-235/236 0.359 +/-0.264 0.234 0.500 pCi/g Uranium-238 +/-0.5280.500 pCi/g 2.03 0.252 Rad Liquid Scintillation Analysis Liquid Scint Tc99, Soil "As Received" Technetium-99 -1.57 +/-17.8 31.2 50.0 pCi/g CXS7 09/19/18 2210 1802475 3 U The following Prep Methods were performed: Method Date Prep Batch Description Analyst Time Dry Soil Prep Dry Soil Prep GL-RAD-A-021 09/17/18 1440 1802382 CXC1 The following Analytical Methods were performed: Method Description Analyst Comments ASTM D 2216 (Modified) DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Surrogate/Tracer Recovery Result Nominal Recovery% Acceptable Limits Test Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 82.9 (15%-125%) 95.2 Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" (15%-125%) Notes: Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). Column headers are defined as follows: **DF:** Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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2

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Certificate of Analysis

Report Date: September 21, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B15-(11-12) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 459278009 Matrix: Soil Collect Date: 12-SEP-18 14:31 17-SEP-18 Receive Date: Collector: Client 14.1% Moisture: RL Parameter Qualifier MDC Units PF Result Uncertainty DF Analyst Date Time Batch Method Gravimetric Solids ASTM D 2216 % Moisture "As Received" Moisture 14.1 percent CXC1 09/17/18 1440 1802382 1 Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 +/-1.77 0.500 pCi/g HAKB 09/20/18 1643 1803412 2 23.8 0.278 Uranium-235/236 2.14 +/-0.598 0.202 0.500 pCi/g Uranium-238 +/-0.931 0.500 pCi/g 6.52 0.240 Rad Liquid Scintillation Analysis Liquid Scint Tc99, Soil "As Received" Technetium-99 3.30 +/-12.2 21.1 50.0 pCi/g CXS7 09/19/18 2227 1802475 3 U The following Prep Methods were performed: Method Date Prep Batch Description Analyst Time Dry Soil Prep Dry Soil Prep GL-RAD-A-021 09/17/18 1440 1802382 CXC1 The following Analytical Methods were performed: Method Description Analyst Comments ASTM D 2216 (Modified) DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Surrogate/Tracer Recovery Test Result Nominal Recovery% Acceptable Limits Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 84.2 (15%-125%) 92.1 Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" (15%-125%) Notes: Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). Column headers are defined as follows: **DF:** Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

1

2

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Certificate of Analysis

Report Date: September 21, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B13-(1-2) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 459278010 Matrix: Soil Collect Date: 12-SEP-18 15:40 17-SEP-18 Receive Date: Collector: Client 8.69% Moisture: RL Parameter Qualifier MDC Units PF Result Uncertainty DF Analyst Date Time Batch Method Gravimetric Solids ASTM D 2216 % Moisture "As Received" 8.69 percent CXC1 09/17/18 1440 1802382 1 Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 +/-0.436 0.500 pCi/g HAKB 09/20/18 1643 1803412 2 1.17 0.305 Uranium-235/236 0.353 +/-0.278 0.260 0.500 pCi/g Uranium-238 +/-0.4300.281 0.500 pCi/g 1.16 Rad Liquid Scintillation Analysis Liquid Scint Tc99, Soil "As Received" Technetium-99 11.7 +/-21.4 36.4 50.0 pCi/g CXS7 09/19/18 2244 1802475 3 U The following Prep Methods were performed: Date Prep Batch Description Analyst Time Dry Soil Prep Dry Soil Prep GL-RAD-A-021 09/17/18 1440 1802382 CXC1 The following Analytical Methods were performed: Description Analyst Comments ASTM D 2216 (Modified) DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Surrogate/Tracer Recovery Test Result Nominal Recovery% Acceptable Limits Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 80.6 (15%-125%) 94.5 Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" (15%-125%) Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). Column headers are defined as follows: **DF:** Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

Moisture

Method

Method

Notes:

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Certificate of Analysis

Report Date: September 21, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B13-(3-4) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 459278011 Matrix: Soil Collect Date: 12-SEP-18 16:00 17-SEP-18 Receive Date: Collector: Client 7.83% Moisture: RL Qualifier MDC Units PF Result Uncertainty DF Analyst Date Time Batch Method Gravimetric Solids ASTM D 2216 % Moisture "As Received" 7.83 percent CXC1 09/17/18 1440 1802382 1 Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 +/-0.332 0.500 pCi/g HAKB 09/20/18 1643 1803412 2 0.689 0.277 Uranium-235/236 0.178 +/-0.196 0.133 0.500 pCi/g +/-0.406 0.500 pCi/g 1.11 0.252 Rad Liquid Scintillation Analysis Liquid Scint Tc99, Soil "As Received" Technetium-99 -7.42 +/-15.9 28.4 50.0 pCi/g CXS7 09/19/18 2301 1802475 3 U The following Prep Methods were performed: Date Prep Batch Description Analyst Time Dry Soil Prep Dry Soil Prep GL-RAD-A-021 09/17/18 1440 1802382 CXC1 The following Analytical Methods were performed: Description Analyst Comments ASTM D 2216 (Modified) DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Surrogate/Tracer Recovery Test Result Nominal Recovery% Acceptable Limits Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 78 (15%-125%) 92.3 Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" (15%-125%) Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). Column headers are defined as follows: **DF:** Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

Parameter

Moisture

Uranium-238

Method

Method

Notes:

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Certificate of Analysis

Report Date: September 21, 2018

1

Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B13-(5-6) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 459278012 Matrix: Soil Collect Date: 12-SEP-18 16:24 17-SEP-18 Receive Date: Collector: Client 8.7% Moisture: RL PF Parameter Qualifier MDC Units DF Analyst Date Result Uncertainty Time Batch Method Gravimetric Solids ASTM D 2216 % Moisture "As Received" 8.70 percent CXC1 09/17/18 1440 1802382 Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 0.379 2 +/-0.484 0.500 pCi/g HAKB 09/20/18 1643 1803412 1.39 Uranium-235/236 0.427 +/-0.311 0.312 0.500 pCi/g Uranium-238 0.981 +/-0.416 0.500 pCi/g 0.372 Rad Liquid Scintillation Analysis Liquid Scint Tc99, Soil "As Received" Technetium-99 -1.48 +/-16.5 28.9 50.0 pCi/g CXS7 09/19/18 2318 1802475 3 U The following Prep Methods were performed: Date Prep Batch Description Analyst Time Dry Soil Prep Dry Soil Prep GL-RAD-A-021 09/17/18 1440 1802382 CXC1 The following Analytical Methods were performed: Description Analyst Comments ASTM D 2216 (Modified) DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Nominal Surrogate/Tracer Recovery Test Result Recovery% Acceptable Limits Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 81.8 (15%-125%) 97.3 Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" (15%-125%) Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	on SQL: Sample Quantitation Limit

Moisture

Method

Method

Notes:

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Certificate of Analysis

Report Date: September 21, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B13-(7-8) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 459278013 Matrix: Soil Collect Date: 12-SEP-18 17:09 17-SEP-18 Receive Date: Collector: Client 11.9% Moisture: RL Qualifier MDC Units PF Result Uncertainty DF Analyst Date Time Batch Method Gravimetric Solids ASTM D 2216 % Moisture "As Received" 11.9 percent CXC1 09/17/18 1440 1802382 1 Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 +/-0.533 0.500 pCi/g HAKB 09/20/18 2156 1803412 2 1.43 0.354 Uranium-235/236 0.452 +/-0.345 0.279 0.500 pCi/g 0.581 +/-0.363 0.500 pCi/g 0.365 Rad Liquid Scintillation Analysis Liquid Scint Tc99, Soil "As Received" 0.736 Technetium-99 +/-12.9 22.5 50.0 pCi/g CXS7 09/19/18 2335 1802475 3 U The following Prep Methods were performed: Date Prep Batch Description Analyst Time Dry Soil Prep Dry Soil Prep GL-RAD-A-021 09/17/18 1440 1802382 CXC1 The following Analytical Methods were performed: Description Analyst Comments ASTM D 2216 (Modified) DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Surrogate/Tracer Recovery Test Result Nominal Recovery% Acceptable Limits Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 71.4 (15%-125%) Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" 98 (15%-125%) Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). Column headers are defined as follows: **DF:** Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

Parameter

Moisture

Uranium-238

Method

Method

Notes:

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Certificate of Analysis

Report Date: September 21, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B13-(9-10) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 459278014 Matrix: Soil Collect Date: 12-SEP-18 17:41 17-SEP-18 Receive Date: Collector: Client 12.9% Moisture: RL Parameter Qualifier MDC Units PF Result Uncertainty DF Analyst Date Time Batch Method Gravimetric Solids ASTM D 2216 % Moisture "As Received" Moisture 12.9 percent CXC1 09/17/18 1440 1802382 1 Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 0.294 +/-0.459 0.500 pCi/g HAKB 09/20/18 2156 1803412 2 1.38 Uranium-235/236 U 0.203 +/-0.219 0.249 0.500 pCi/g Uranium-238 +/-0.4000.500 pCi/g 1.04 0.269 Rad Liquid Scintillation Analysis Liquid Scint Tc99, Soil "As Received" -0.00596 Technetium-99 U +/-12.2 21.3 50.0 pCi/g CXS7 09/19/18 2352 1802475 3 The following Prep Methods were performed: Method Date Prep Batch Description Analyst Time Dry Soil Prep Dry Soil Prep GL-RAD-A-021 09/17/18 1440 1802382 CXC1 The following Analytical Methods were performed: Method Description Analyst Comments ASTM D 2216 (Modified) DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Surrogate/Tracer Recovery Test Result Nominal Recovery% Acceptable Limits Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 77.3 (15%-125%) Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" 96.8 (15%-125%) Notes: Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). Column headers are defined as follows: **DF:** Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: September 21, 2018 Company : Westinghouse Electric Company, LLC Address : PO Drawer R Columbia, South Carolina 29205 Contact: Ms. Cynthia Logsdon Project: Soil and Vegetation Analysis Client Sample ID: HF-B13-(11-12) Soil Boring Project: WNUC00518 Sample ID: Client ID: WNUC007 459278015 Matrix: Soil Collect Date: 12-SEP-18 18:18 17-SEP-18 Receive Date: Collector: Client 12.8% Moisture: RL Parameter Qualifier MDC Units PF Result Uncertainty DF Analyst Date Time Batch Method Gravimetric Solids ASTM D 2216 % Moisture "As Received" Moisture 12.8 percent CXC1 09/17/18 1440 1802382 1 Rad Alpha Spec Analysis Alphaspec U, Soil/Veg "Dry Weight Corrected" Uranium-233/234 +/-0.479 0.500 pCi/g HAKB 09/20/18 2156 1803412 2 1.48 0.300 Uranium-235/236 0.540 +/-0.326 0.220 0.500 pCi/g Uranium-238 +/-0.4200.500 pCi/g 1.14 0.260 Rad Liquid Scintillation Analysis Liquid Scint Tc99, Soil "As Received" Technetium-99 2.49+/-11.9 20.7 50.0 pCi/g CXS7 09/20/18 0009 1802475 3 U The following Prep Methods were performed: Method Date Prep Batch Description Analyst Time Dry Soil Prep Dry Soil Prep GL-RAD-A-021 09/17/18 1440 1802382 CXC1 The following Analytical Methods were performed: Method Description Analyst Comments ASTM D 2216 (Modified) DOE EML HASL-300, U-02-RC Modified DOE EML HASL-300, Tc-02-RC Modified Surrogate/Tracer Recovery Test Result Nominal Recovery% Acceptable Limits Uranium-232 Tracer Alphaspec U, Soil/Veg "Dry Weight Corrected" 78.2 (15%-125%) Technetium-99m Tracer Liquid Scint Tc99, Soil "As Received" 96.9 (15%-125%) Notes: Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma). Column headers are defined as follows: **DF:** Dilution Factor Lc/LC: Critical Level **DL:** Detection Limit PF: Prep Factor MDA: Minimum Detectable Activity **RL: Reporting Limit** MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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QC Summary

Report Date: September 21, 2018

Westinghouse Electric Company, LLC PO Drawer R Columbia, South Carolina Ms. Cynthia Logsdon

Page 1 of 3

Workorder: 459278

Contact:

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range Anlst	Date Time
Rad Alpha Spec									
Batch 1803412 —									
QC1204115915 459278001 DUP									
Uranium-233/234		0.709		0.531	pCi/g	28.8		(0% - 100%) HAKB	09/20/18 21:56
	Uncertainty	+/-0.380		+/-0.305					
Uranium-235/236	U	0.205		0.232	pCi/g	12.1		(0% - 100%)	
	Uncertainty	+/-0.242		+/-0.223					
Uranium-238		0 454		0 405	nCi/g	11.4		(0% - 100%)	
	Uncertainty	+/-0.302		+/-0.268	peng	11.1		(0/0 100/0)	
OC1204115916 LCS									
Uranium-233/234				12.7	pCi/g				09/20/18 21:56
	Uncertainty			+/-1.27	1 0				
Uranium-235/236				1.38	pCi/g				
	Uncertainty			+/-0.479	1 0				
Uranium-238	12.7			14.4	pCi/g		113	(75%-125%)	
	Uncertainty			+/-1.35	1 - 8			(,	
QC1204115914 MB									
Uranium-233/234			U	0.112	pCi/g				09/21/18 09:52
	Uncertainty			+/-0.253					
Uranium-235/236				0.498	pCi/g				
	Uncertainty			+/-0.367					
Uranium-238			U	0.177	pCi/g				
	Uncertainty			+/-0.224					
Rad Liquid Scintillation									
Batch 1802475 —									
QC1204113745 459278001 DUP									
Technetium-99	U	7.11	U	-7.88	pCi/g	N/A		N/A CXS7	09/20/18 00:42
	Uncertainty	+/-12.9		+/-12.6					
QC1204113746 LCS									
Technetium-99	404			375	pCi/g		92.7	(75%-125%)	09/20/18 00:59
	Uncertainty			+/-23.6					

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QC Summary

Workorder: 459278									Page 2 of 3
Parmname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Liquid ScintillationBatch1802475									
QC1204113744 MB Technetium-99	Uncertainty	U	-9.44 +/-12.1	pCi/g				CXS7	09/20/18 00:26

Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

- The Qualifiers in this report are defined as follows: ** Analyte is a Tracer compound
 - < Result is less than value reported
 - > Result is greater than value reported
 - BD Results are either below the MDC or tracer recovery is low
 - FA Failed analysis.
 - H Analytical holding time was exceeded
 - J Value is estimated
 - K Analyte present. Reported value may be biased high. Actual value is expected to be lower.
 - L Analyte present. Reported value may be biased low. Actual value is expected to be higher.
 - M M if above MDC and less than LLD
 - M REMP Result > MDC/CL and < RDL
 - $N\!/\!A$ $\,$ RPD or %Recovery limits do not apply.
 - N1 See case narrative
 - ND Analyte concentration is not detected above the detection limit
 - NJ Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
 - Q One or more quality control criteria have not been met. Refer to the applicable narrative or DER.
 - R Sample results are rejected
 - U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
 - UI Gamma Spectroscopy--Uncertain identification
 - UJ Gamma Spectroscopy--Uncertain identification
 - UL Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias.
 - X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
 - Y Other specific qualifiers were required to properly define the results. Consult case narrative.
 - ^ RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
 - h Preparation or preservation holding time was exceeded

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QC Summary

Workorder:	459278									Page 3 of 3
Parmname		NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable. ^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the

RL is used to evaluate the DUP result.

* Indicates that a Quality Control parameter was not within specifications.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

Technical Case Narrative Westinghouse Electric Co, LLC (WNUC) SDG #: 459278

Metals

Product: Determination of Metals by ICP-MS Analytical Method: SW846 3050B/6020A **Analytical Procedure:** GL-MA-E-014 REV# 33 **Analytical Batch:** 1802353

<u>Preparation Method:</u> SW846 3050B <u>Preparation Procedure:</u> GL-MA-E-009 REV# 28 <u>Preparation Batch:</u> 1802352

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
459278001	HF-B14-(1-2) Soil Boring
459278002	HF-B14-(3-4) Soil Boring
459278003	HF-B14-(5-5.3) Soil Boring
459278004	HF-B15-(1-2) Soil Boring
459278005	HF-B15-(3-4) Soil Boring
459278006	HF-B15-(5-6) Soil Boring
459278007	HF-B15-(7-8) Soil Boring
459278008	HF-B15-(9-10) Soil Boring
459278009	HF-B15-(11-12) Soil Boring
459278010	HF-B13-(1-2) Soil Boring
459278011	HF-B13-(3-4) Soil Boring
459278012	HF-B13-(5-6) Soil Boring
459278013	HF-B13-(7-8) Soil Boring
459278014	HF-B13-(9-10) Soil Boring
459278015	HF-B13-(11-12) Soil Boring
1204113502	Method Blank (MB)ICP-MS
1204113503	Laboratory Control Sample (LCS)
1204113507	Laboratory Control Sample (LCS)
1204113506	459278001(HF-B14-(1-2) Soil BoringL) Serial Dilution (SD)
1204113504	459278001(HF-B14-(1-2) Soil BoringD) Sample Duplicate (DUP)
1204113505	459278001(HF-B14-(1-2) Soil BoringS) Matrix Spike (MS)
1204113508	459278001(HF-B14-(1-2) Soil BoringS) Matrix Spike (MS)

The samples in this SDG were analyzed on a "dry weight" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Calibration Information

CRDL/PQL Requirements

The CRDL standard recoveries for SW846 6020A/6020B met the advisory control limits with the exception of

uranium-235. Client sample concentrations were less than the MDL or greater than two times the CRDL; therefore the data were not adversely affected. 459278002 (HF-B14-(3-4) Soil Boring), 459278003 (HF-B14-(5-5.3) Soil Boring), 459278005 (HF-B15-(3-4) Soil Boring), 459278006 (HF-B15-(5-6) Soil Boring), 459278007 (HF-B15-(7-8) Soil Boring), 459278008 (HF-B15-(9-10) Soil Boring) and 459278009 (HF-B15-(11-12) Soil Boring).

ICSA/ICSAB Statement

For the ICP-MS analysis, the ICSA solution contains analyte concentrations which are verified trace impurities indigenous to the purchased standard.

Technical Information

Preparation/Analytical Method Verification

Method SW-846 3050B is not a total digestion technique for most samples. It is a very strong acid digestion that will dissolve almost all elements that could become environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

Sample Dilutions

Dilutions may be required for many reasons, including to minimize matrix interferences or to bring over range target analyte concentrations into the linear calibration range. Samples 459278002 (HF-B14-(3-4) Soil Boring), 459278003 (HF-B14-(5-5.3) Soil Boring), 459278005 (HF-B15-(3-4) Soil Boring), 459278006 (HF-B15-(5-6) Soil Boring), 459278007 (HF-B15-(7-8) Soil Boring) and 459278009 (HF-B15-(11-12) Soil Boring) were diluted to ensure that the analyte concentrations were within the linear calibration range of the instrument. The ICPMS solid samples in this SDG were diluted the standard two times.

Analyta					4592					
Analyte	001	002	003	004	005	006	007	008	009	010
Uranium	2X	2X	2X	2X	20X	20X	2X	2X	2X	2X
Uranium-234	2X	2X	2X	2X	20X	20X	2X	2X	2X	2X
Uranium-235	2X	40X	100X	2X	2000X	2000X	20X	2X	20X	2X
Uranium-238	2X	10X	20X	2X	2000X	2000X	10X	2X	2X	2X

A	459278									
Analyte	011	012	013	014	015					
Uranium	2X	2X	2X	2X	2X					
Uranium-234	2X	2X	2X	2X	2X					
Uranium-235	2X	2X	2X	2X	2X					
Uranium-238	2X	2X	2X	2X	2X					

General Chemistry

Product: Ion Chromatography Analytical Method: SW846 9056A **Analytical Procedure:** GL-GC-E-086 REV# 25 **Analytical Batches:** 1802566 and 1802565 The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
459278001	HF-B14-(1-2) Soil Boring
459278002	HF-B14-(3-4) Soil Boring
459278003	HF-B14-(5-5.3) Soil Boring
459278004	HF-B15-(1-2) Soil Boring
459278005	HF-B15-(3-4) Soil Boring
459278006	HF-B15-(5-6) Soil Boring
459278007	HF-B15-(7-8) Soil Boring
459278008	HF-B15-(9-10) Soil Boring
459278009	HF-B15-(11-12) Soil Boring
459278010	HF-B13-(1-2) Soil Boring
459278011	HF-B13-(3-4) Soil Boring
459278012	HF-B13-(5-6) Soil Boring
459278013	HF-B13-(7-8) Soil Boring
459278014	HF-B13-(9-10) Soil Boring
459278015	HF-B13-(11-12) Soil Boring
1204113924	Method Blank (MB)
1204113925	Laboratory Control Sample (LCS)
1204113926	459278001(HF-B14-(1-2) Soil Boring) Sample Duplicate (DUP)
1204113927	459278015(HF-B13-(11-12) Soil Boring) Sample Duplicate (DUP)
1204113928	459278001(HF-B14-(1-2) Soil Boring) Matrix Spike (MS)
1204113929	459278015(HF-B13-(11-12) Soil Boring) Matrix Spike (MS)

The samples in this SDG were analyzed on a "dry weight" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Technical Information

Sample Dilutions

The following samples 459278003 (HF-B14-(5-5.3) Soil Boring), 459278005 (HF-B15-(3-4) Soil Boring), 459278006 (HF-B15-(5-6) Soil Boring), 459278007 (HF-B15-(7-8) Soil Boring), 459278010 (HF-B13-(1-2) Soil Boring), 459278011 (HF-B13-(3-4) Soil Boring) and 459278012 (HF-B13-(5-6) Soil Boring) were diluted because target analyte concentrations exceeded the calibration range. Dilutions may be required for many reasons, including to minimize matrix interferences or to bring over range target analyte concentrations into the linear calibration range.

A	459278							
Analyte 00	003	005	006	007	010	011	012	
Fluoride	5X	10X	20X	1X	1X	1X	1X	
Nitrate	5X	10X	20X	5X	2X	2X	2X	

Product: pH Analytical Method: SW846 9045D Analytical Procedure: GL-GC-E-008 REV# 23

Analytical Batch: 1802818

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
459278001	HF-B14-(1-2) Soil Boring
459278002	HF-B14-(3-4) Soil Boring
459278003	HF-B14-(5-5.3) Soil Boring
459278004	HF-B15-(1-2) Soil Boring
459278005	HF-B15-(3-4) Soil Boring
459278006	HF-B15-(5-6) Soil Boring
459278007	HF-B15-(7-8) Soil Boring
459278008	HF-B15-(9-10) Soil Boring
459278009	HF-B15-(11-12) Soil Boring
459278010	HF-B13-(1-2) Soil Boring
459278011	HF-B13-(3-4) Soil Boring
459278012	HF-B13-(5-6) Soil Boring
459278013	HF-B13-(7-8) Soil Boring
459278014	HF-B13-(9-10) Soil Boring
459278015	HF-B13-(11-12) Soil Boring
1204114454	Laboratory Control Sample (LCS)
1204114455	459278015(HF-B13-(11-12) Soil Boring) Sample Duplicate (DUP)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Technical Information

Holding Times

Samples (See Below) were received by the laboratory outside of the method specified holding time. The data is qualified.

Sample	Analyte	Value
1204114455 (HF-B13-(11-12) Soil BoringDUP)	Corrosivity	Received 17-SEP-18, out of holding 12-SEP-18
459278001 (HF-B14-(1-2) Soil Boring)	Corrosivity	Received 17-SEP-18, out of holding 12-SEP-18
459278002 (HF-B14-(3-4) Soil Boring)	Corrosivity	Received 17-SEP-18, out of holding 12-SEP-18
459278003 (HF-B14-(5-5.3) Soil Boring)	Corrosivity	Received 17-SEP-18, out of holding 12-SEP-18
459278004 (HF-B15-(1-2) Soil Boring)	Corrosivity	Received 17-SEP-18, out of holding 12-SEP-18
459278005 (HF-B15-(3-4) Soil Boring)	Corrosivity	Received 17-SEP-18, out of holding 12-SEP-18
459278006 (HF-B15-(5-6) Soil Boring)	Corrosivity	Received 17-SEP-18, out of holding 12-SEP-18
459278007 (HF-B15-(7-8) Soil Boring)	Corrosivity	Received 17-SEP-18, out of holding 12-SEP-18
459278008 (HF-B15-(9-10) Soil Boring)	Corrosivity	Received 17-SEP-18, out of holding 12-SEP-18
459278009 (HF-B15-(11-12) Soil Boring)	Corrosivity	Received 17-SEP-18, out of holding 12-SEP-18
459278010 (HF-B13-(1-2) Soil Boring)	Corrosivity	Received 17-SEP-18, out of holding 12-SEP-18
459278011 (HF-B13-(3-4) Soil Boring)	Corrosivity	Received 17-SEP-18, out of holding 12-SEP-18

459278012 (HF-B13-(5-6) Soil Boring)	Corrosivity	Received 17-SEP-18, out of holding 12-SEP-18
459278013 (HF-B13-(7-8) Soil Boring)	Corrosivity	Received 17-SEP-18, out of holding 12-SEP-18
459278014 (HF-B13-(9-10) Soil Boring)	Corrosivity	Received 17-SEP-18, out of holding 12-SEP-18
459278015 (HF-B13-(11-12) Soil Boring)	Corrosivity	Received 17-SEP-18, out of holding 12-SEP-18

Miscellaneous Information

Additional Comments

5g used due to the highly radioactive and/or hazardous matrix of samples. 459278005 (HF-B15-(3-4) Soil Boring) and 459278006 (HF-B15-(5-6) Soil Boring).

Radiochemistry

Product: Alphaspec U, Soil/Veg Analytical Method: DOE EML HASL-300, U-02-RC Modified Analytical Procedure: GL-RAD-A-011 REV# 26 Analytical Batch: 1803412

Preparation Method: Dry Soil Prep **Preparation Procedure:** GL-RAD-A-021 REV# 23 **Preparation Batch:** 1802382

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
459278001	HF-B14-(1-2) Soil Boring
459278002	HF-B14-(3-4) Soil Boring
459278003	HF-B14-(5-5.3) Soil Boring
459278004	HF-B15-(1-2) Soil Boring
459278005	HF-B15-(3-4) Soil Boring
459278006	HF-B15-(5-6) Soil Boring
459278007	HF-B15-(7-8) Soil Boring
459278008	HF-B15-(9-10) Soil Boring
459278009	HF-B15-(11-12) Soil Boring
459278010	HF-B13-(1-2) Soil Boring
459278011	HF-B13-(3-4) Soil Boring
459278012	HF-B13-(5-6) Soil Boring
459278013	HF-B13-(7-8) Soil Boring
459278014	HF-B13-(9-10) Soil Boring
459278015	HF-B13-(11-12) Soil Boring
1204115914	Method Blank (MB)
1204115915	459278001(HF-B14-(1-2) Soil Boring) Sample Duplicate (DUP)
1204115916	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on a "dry weight" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where

applicable, with the following exceptions.

Quality Control (QC) Information

Method Blank Criteria

The blank result (See Below) is greater than the MDC but less than the required detection limit.

Sample	Analyte	Value
1204115914 (MB)	Uranium-235/236	Result: 0.498 pCi/g > MDA: 0.187 pCi/g <= RDL: 0.500 pCi/g

Technical Information

Sample Re-prep/Re-analysis

Samples were reprepped due to high blank activity. The re-analysis is being reported.

Recounts

Sample 1204115914 (MB) was recounted due to a suspected blank false positive. The recount is reported. Samples 459278001 (HF-B14-(1-2) Soil Boring), 459278003 (HF-B14-(5-5.3) Soil Boring) and 459278005 (HF-B15-(3-4) Soil Boring) were recounted due to a peak shift. The recounts are reported.

Product: Dry Weight <u>Analytical Method:</u> ASTM D 2216 (Modified) <u>Analytical Procedure:</u> GL-OA-E-020 REV# 13 <u>Analytical Batch:</u> 1802382

<u>Preparation Method:</u> Dry Soil Prep <u>Preparation Procedure:</u> GL-RAD-A-021 REV# 23 <u>Preparation Batch:</u> 1802382

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
459278001	HF-B14-(1-2) Soil Boring
459278002	HF-B14-(3-4) Soil Boring
459278003	HF-B14-(5-5.3) Soil Boring
459278004	HF-B15-(1-2) Soil Boring
459278005	HF-B15-(3-4) Soil Boring
459278006	HF-B15-(5-6) Soil Boring
459278007	HF-B15-(7-8) Soil Boring
459278008	HF-B15-(9-10) Soil Boring
459278009	HF-B15-(11-12) Soil Boring
459278010	HF-B13-(1-2) Soil Boring
459278011	HF-B13-(3-4) Soil Boring
459278012	HF-B13-(5-6) Soil Boring
459278013	HF-B13-(7-8) Soil Boring
459278014	HF-B13-(9-10) Soil Boring
459278015	HF-B13-(11-12) Soil Boring
1204113562	459278001(HF-B14-(1-2) Soil Boring) Sample Duplicate (DUP)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

Product: Liquid Scint Tc99, Soil <u>Analytical Method:</u> DOE EML HASL-300, Tc-02-RC Modified <u>Analytical Procedure:</u> GL-RAD-A-059 REV# 5 <u>Analytical Batch:</u> 1802475

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
459278001	HF-B14-(1-2) Soil Boring
459278002	HF-B14-(3-4) Soil Boring
459278003	HF-B14-(5-5.3) Soil Boring
459278004	HF-B15-(1-2) Soil Boring
459278005	HF-B15-(3-4) Soil Boring
459278006	HF-B15-(5-6) Soil Boring
459278007	HF-B15-(7-8) Soil Boring
459278008	HF-B15-(9-10) Soil Boring
459278009	HF-B15-(11-12) Soil Boring
459278010	HF-B13-(1-2) Soil Boring
459278011	HF-B13-(3-4) Soil Boring
459278012	HF-B13-(5-6) Soil Boring
459278013	HF-B13-(7-8) Soil Boring
459278014	HF-B13-(9-10) Soil Boring
459278015	HF-B13-(11-12) Soil Boring
1204113744	Method Blank (MB)
1204113745	459278001(HF-B14-(1-2) Soil Boring) Sample Duplicate (DUP)
1204113746	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the

requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

Image: 1 of 7 Image: Image: 7 1 Image: Image: 1 1 1 Image: Image: 1 1 1 1 Image: Image: 1 <	GEL C	Chain (**See ww nber: L	of C ^{w.gel.c}	usto com for 127	dy ar GEL's Sa S	ample	An: Acc	aly eptar	tica	nl Re	que	est			GEL 2040 Char Phor Fax:	Labor Savag leston le: (84 (843)	ratoric ge Ro , SC 2 -3) 550 766-1	es, LLC ad 29407 6-8171	2
Client Name: Westinghouse Electric Company LLC		Phone #: 803	8.647.192	0				Sa	mple	Analysi	s Requ	uestea	1 ⁽⁵⁾ (Fill in	the r	umbe	er of c	contair	ners for each test)
Project/Site Name: Columbia Fuel Fabrication Facility		Fax #: 803.	695.3964	1		this	e be red:	~			1	Τ	Τ		[Γ	Τ	1	< Preservative Type (6)
Address: 5801 Bluff Road, Hopkins, SC 29061																			
Collected by: Jeremy Grant / Diana Joyner Send Rest	Collected by: Jeremy Grant / Diana Joyner Send Results: joynerdp@westinghouse.com										60	Conter	ide		fe				Comments
Sample ID * For composites - indicate start and stop date/time	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code ⁽²⁾	Field Filtered ⁽³⁾	Sample Matrix ⁽⁴⁾	Radioactive	TSCA Regulat	Total number	isotopic u (alpha :	isotopic ura individual is MS	Tc-9	Moisture (Fluor	Hq	Nitra				required for sample specific QC
HF-B14-(1-2) Soil Boring	9/12/2018	0935	G	N	SO			1	x	х	x	x	x	x	x				
HF-B14-(3-4) Soil Boring	9/12/2018	0945	G	N	SO			1	x	x	x	x	x	x	x				
HF-B14-(5-5.3) Soil Boring	9/12/2018	1014	G	N	SO			1	x	х	x	x	x	x	x				
HF-B15-(1-2) Soil Boring	9/12/2018	1102	G	N	SO	1		1	x	v	v		v	v	v			<u> </u>	·
HF-B15-(3-4) Soil Boring	9/12/2018	1128	G	N	50			- 1	v	. <u>n</u>					 				
HF-B15-(5-6) Soil Boring	9/12/2018	1208	G	NI NI	50			1		 	<u>л</u>		<u> </u>	<u> </u>	<u></u>				
HF-B15-(7-8) Soil Boring	9/12/2018	1322	6	N	- 30			1		X	X	X	<u> </u>	<u> </u>	<u>X</u>				
HF-B15-(9-10) Soil Boring	0/12/2018	1400		N N	. 30		<u></u>	1		X	_X	<u>X</u>	<u> </u>	<u>X</u>	<u></u>				
HF-B15-(11-12) Soil Boring	9/12/2018	1431	G	N	so			1	X	x	x x	x x	x x	 X	x x				
TAT Requested: Normal: Rush:X_Specify: (Subject to Surcharge)	_ASAP_	Fax Res	ults:	Yes		No				CofA	(0	C 6		Circl	e Deli	verabl	le:	L	
Remarks: Are there any known hazards applicable to ****5 STRAIGHT day turnaround*****	o these samples	? If so, ple	ease lisi	the haz	ards		I				<u> </u>	<u>-</u>	mary	<u>/ L¢</u>		/ Le	Samp East Cent Mon	<u>/ Le</u> le Coll ern tral	ection Time Zone Pacific Other
Chain of Custo	ody Signatures										Sa	mple	Ship	ping	and I	Delive	ery D	etails	
Noniquisited By (Signed) Date Time	Received by (sign	ned) Da	ite	Time			GEL	PM: I	lope	Faylor									
1 Diana Joyner 9/13/2018 1300	1 Randy Crews	KUB		9/13/201	8 1300	l	Method	l of Shi	ipment:]	Date S	hippe	d: N//	4	
2 R Chars I 9/17/13 1001	2 <i>[] , []]</i>	men		<u>L7/1</u>	8.10	:ØØ	kirbill	#:						A 6.01.00					
	3					/	Airbill	#:											
Chain of Custody Number = Client Determined QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered. Matrix Codes: DW=Drinking Water, GW=Groundwater, SW=Surface Water, WW=Water, ML=Misc Liquid, SO=Soil, SD=Sediment, SL=Sludge, SS=Solid Waste, O=Oil, F=Filter, P=Wipe, U=Urine, F=Fecal, N=Nasal Sample Analysis Requested: Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. 8260B - 3, 6010B/7470A - 1). Preservative Type: HA = Hydrochloric Acid, SH = Sodium Hydroxide, SA = Sulfuric Acid, AA = Ascorbic Acid, HX = Hexane, ST = Sodium Thiosulfate. If no preservative is added = leave field black																			

Pare: 2 of7 Pare: 7 Pare: 7	GEL C	Chain (**See ww nber:	of C w.gel.c	usto om for	dy an GEL's Sa	n d A ample	An: Acc	aly eptar	tica nce S(nl Ree	dne	est			GEL 2040 Char Phon Fax:	Labor Savag leston e: (84 (843)	ratorio ge Ro , SC 2 3) 55 766-1	es, LLC ad 29407 6-8171 1178	
Client Name: Westinghouse Electric Company LLC	lectric Company LLC Phone #: 803.647.1920						Sample Analysis Requested ⁽⁵⁾ (Fill in the number of containers for each test)									ers for each test)			
Project/Site Name: Columbia Fuel Fabrication Facility Fax #: 803.695.3964																			< Preservative Type (6)
Address: 5801 Bluff Road, Hopkins, SC 29061									E	i (by c, ICP.		ent							
Collected by: Jeremy Grant/Diana Joyner Send Rest	ults: joynerdp@	westinghou	se.com				ted	erofc	uranii spec)	aniun sotop(S)	66	Cont	ride	-	ate				Note: extra sample is
Sample ID * For composites - indicate start and stop date/time	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code ⁽²⁾	Field Filtered ⁽³⁾	Sample Matríx ⁽⁴⁾	Radioactive	TSCA Regula	Total numbe	isotopic (alpha	isotopic ur individual i: M:	Tc-	Moisture	Fluo	lq	Nitr				required for sample specific QC
HF-B13-(1-2) Soil Boring	9/12/2018	1540	G	N	SO			1	x	x	х	x	x	x	x				
HF-B13-(3-4) Soil Boring	9/12/2018	1600	G	N	so	l		1	x	x	X	x	x	x	х				
HF-B13-(5-6) Soil Boring	9/12/2018	1624	G	N	SO			1	x	x	х	x	х	x	х				
HF-B13-(7-8) Soil Boring	9/12/2018	1709	G	N	so			1	x	x	х	x	x	x	x				
HF-B13-(9-10) Soil Boring	9/12/2018	1741	G	N	so			1	x	x	x	x	x	x	x				
HF-B13-(11-12) Soil Boring	9/12/2018	1818	G	N	SO			I	x	x	x	x	x	x	x				
,															******				
TAT Requested: Normal: Rush:X_ Specify: (Subject to Surcharge) Remarks: Are there any known hazards applicable to	_ASAP	Fax Res	ults:	Yes	//	No				C of A	/ Q	C Sun	nmary	Circl	e Deli evel 1	iverab	le: evel 2	/ Le	vel 3 / Level 4
****5 STRAIGHT day turnaround*****		s: 1j s0, pre		i ine na.	ui us												Eas Cen Mor	tern tral untain	Pacific Other
Chain of Cust	ody Signatures										S	ample	Ship	ping	and 1	Delive	ery D	Details	
Reiniquisited By (signed) Date Time	Received by (sig	nea) D	ate	Time			GEL	PM:	Hope	Taylor									
1 Diana Joyner 0/13/2018 1300	1 Randy Crews	Pho	128	9/13/20	18 1300		Metho	dofSh	ipment	•					Date S	Shippe	ed: N/	A	
ER (1215) 19/17/18 1001	2 U , M	men	_ 9/	<u>7/18</u>	<u>10:0</u>	V	Airbill	#:											
3	3		•1	/-			Airbill	#:											
1.) Chain of Custody Number = Client Determined $P_{i} = 0.0000000000000000000000000000000000$																		F	or Lah Receiving Use Only
3.) Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample :	B = Equipment Blank, was field filtered or - N	$MS \approx Matrix$	Spike Samj as not field	ple, MSD ≕ I filtered	Matrix Spike	e Duplic	cate Sar	nple, G	= Grab,	C = Compo	site								C + 1 C 11 + C
 Matrix Codes: DW=Drinking Water, GW=Groundwater, SW=Surface Water 	er, WW=Waste Water	, W=Water, MI	L=Misc Lie	quid, SO=S	oil, SD=Sedi	ment, S	L=Slud	ge, SS≕	Solid W	∕aste, O =Oil	F=Filte	er, P=W	ipe, U=	Urine #	e=Fecal	N=No	sal		UISIOAY SEAL Intact? YES NO
5.) Sample Analysis Requested: Analytical method requested (i.e. 8260B, 601	0B/7470A) and numbe	r of containers	provided for	or each (i.e.	8260B - 3, 6	010B/7	4704 -	1).		, o on,			.pc, 0.~		- ccal	, or mail	.541		Cooler Temp
5.) Preservative Type: $HA = Hydrochloric Acid, NI = Nitric Acid, SH = Sodiu$	m Hydroxide, SA = Su	lfuric Acid, AA	= Ascorbi	e Acid, HX	= Hexane, S	r = Soc	lium Tł	iosulfat	te, lf no	preservative	is addeo	d = leav	e field b	lank					C
WHITE = LABO	RATORY		YELL	OW = F	TILE			PIN	K = (CLIENT									

	C	ient: WNU()			SI	DG/AR/COC/Work Order: 4592.70	
	R	ceived By: AA			D	ate Received: 9/12/18	14] *
		Carrier and Tracking Number				Gircle Applicable: FedEx Express FedEx Ground UPS Field Services	Courier Other
	Su	pected Hazard Information	Yes	°Z	*If inv	Net Counts > 100cpm on samples not marked "radioactive", contact the Radiati estigation.	ion Safety Group for fur
	Shi	pped as a DOT Hazardous?		V	Ha	zard Class Shipped: UN#:	
	CC rad	C/Samples marked or classified as loactive?				Iximum Net Counts Observed* (Observed Counts - Area Background Counts):	CPM / mR/)
	ls p	ackage, COC, and/or Samples marked HAZ?			PC	res, select Hazards below, and contact the GEL Safety Group. B's Flammable Foreign Soil RCRA Asbestos Beryllium (Other:
	ļ	Sample Receipt Criteria	Yes	NN NN	⁹ Z	Comments/Qualifiers (Required for Non-Conforming	Items)
	1	Shipping containers received intact and sealed?				Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
	2	Chain of custody documents included with shipment?					
	3	Samples requiring cold preservation within $(0 \le 6 \text{ deg. C})$?*		CONC.		*all temperatures are recorded in Celsius	TEMP:
	4	temperature gun?				Temperature Device Serial #:	
	5	Sample containers intact and sealed?	Ц			Chere Applicable: Seals broken Damaged container Leaking container Other (Jescribe)
	6	at proper pH?		\checkmark		If Preservation added, Lot#:	
	7	Do any samples require Volatile Analysis?				Do VOA vials contain acid preservation? Yes No (If yes, the Do VOA vials contain acid preservation? Yes No N/A VOA vials free of headspace? Yes No N/A Sample ID's and containers affected:	ike to VOA Freezer) (If unknown, select
	8	Samples received within holding time?	$\overline{\mathcal{A}}$			ID's and tests affected:	ter and termination of the second sec
	9	Sample ID's on COC match ID's on bottles?	\checkmark			Sample ID's and containers affected:	
-	10	Date & time on COC match date & time on bottles?	\checkmark			Sample ID's affected:	
	11	Number of containers received match number indicated on COC?	\int			Sample ID's affected:	5
	12	Are sample containers identifiable as GEL provided?	$\sqrt{1}$				
	13	COC form is properly signed in relinquished/received sections?	\int				ž te

State	Certification
Alaska	17-018
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA180011
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122018-1
New Hampshire NELAP	205415
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	9904
Pennsylvania NELAP	68–00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-18-13
Utah NELAP	SC000122018–26
Vermont	VT87156
Virginia NELAP	460202
Washington	C780

List of current GEL Certifications as of 21 September 2018

Technical Basis Document

Site-Specific Target Clean-up Levels for Uranium in Soil at HF Spiking Station #2 at the Westinghouse Columbia Fuel Fabrication Facility (WCFFF)

Prepared for:

Westinghouse Columbia Fuel Fabrication Facility 5801 Bluff Road Hopkins, South Carolina 29061-9121

Prepared by:



13397 Lakefront Drive, Suite 100 Earth City, Missouri 63045

Kevin M Harris, PE Sr. Environmental Engineer

November 30, 2018

PURPOSE

The purpose of this Technical Basis Document (TBD) is to establish pre-decommissioning target clean-up levels for residual uranium (U) in soil originating from HF Spiking Station #2.

Since the WCFFF is an operating manufacturing plant, the levels do not need to be reflective of an unrestricted use (10 CFR 20.1402), as would be required for decommissioning, but rather, should be established to protect the workers, be as low as reasonably achievable (ALARA), and prevent leaching of residual uranium into the groundwater or migration offsite.

HF Spiking Station #2:

In June of 2018, a system leak occurred at HF Spiking Station #2. As part of corrective measures, the polypropylene liner was removed for repair work. At that time, a crack was noticed in the coating covering the diked area. Upon further investigation of the crack and degraded concrete, soil sampling in this location was performed by WCFFF with analysis performed by the GEL laboratories. The laboratory analysis indicated the presence of U in soil.

WCFFF then removed portions of the concrete flooring in the HF Spiking Station area to facilitate additional investigation and repairs. WCFFF retained AECOM to conduct additional soil sampling. Results of the sampling are reported in the *HF Spiking Station #2 Assessment Report*, dated November 30, 2018 by AECOM.

TARGET CLEAN-UP LEVELS

Target clean-up levels have been calculated for the residual U based upon the mass, location, configuration, and accessibility of the U. For HF Spiking Station #2, the release occurred within the diked area, through and beneath the concrete floor. The target clean-up level is based upon the reasonable maximum exposure (RME) scenario of an industrial worker. Within the manufacturing building, where HF Spiking Station #2 is located, the industrial worker scenario is considered the RME, as there is not a foreseeable situation where a utility worker would be in contact with the sub-surface soil without proper controls. The exposure pathways applicable to the radiological risk and dose assessment are external gamma, inhalation, soil ingestion, and drinking water. Drinking water is included as a pathway in order to estimate the vertical migration of uranium from the release point to the groundwater. Although drinking water at the site does not originate from the site groundwater, and therefore this the drinking water is not a complete pathway for a site worker, the scenario will give an indication of when the uranium could potentially impact groundwater beneath the manufacturing building.

RESRAD-ONSITE Version 7.2 was used to calculate potential risk and dose to the evaluated receptor. RESRAD-ONSITE (formerly RESRAD) is a computer model developed by the Argonne National Laboratory (ANL) for the U.S. Department of Energy (DOE). RESRAD-ONSITE calculates site-specific risk and dose to various future hypothetical on-site receptors at sites with residual radioactive materials. The use of the RESRAD family of codes for modeling risk and dose has become an acceptable regulatory standard. RESRAD-ONSITE Version 7.2 incorporates recently (2014) updated dose conversion and morbidity slope factors calculated by Oak Ridge National Laboratory (ORNL). These updated factors are presented in the ORNL document entitled Calculation of Slope Factors and Dose Coefficients (ORNL 2014) and are included in the DCFPAK 3.02 library of the RESRAD-ONSITE Version 7.2 model. The derivations of these factors are based on updated decay chain and nuclide energy data presented in International Commission on Radiological Protection Publication (ICRP)-107, Nuclear Decay Data for Dosimetric Calculations (ICRP 2008).

The primary radiological contaminant of concern at HF Spiking Station #2 is U. For the purposes of this TBD, concentrations will be discussed as parts per million (ppm) of total U, where 1 ppm is equivalent to 1 milligram (mg) of U in 1 kilogram (kg) of soil. Where appropriate, U reported as picoCuries (pCi) per gram (g) will be converted to ppm assuming 4.95% enrichment, corresponding to the highest enrichment handled at the CFFF.

To calculate the nominal activities for 1 mg/kg of Total U, specific activity values from 49 CFR 173.435 and the Rad Pro Calculator were used to obtain a U-234 to U-238 activity ratio of 8.2155, a U-235 to U-238 activity ratio of 0.33583, and resulting mass fractions of 0.0004221 for U-234, 0.0495 for U-235, and 0.9500779 for U-238.

Default Target Clean-up Levels

Default target clean-up levels (concentrations) for U have been established by various agencies for different risk scenarios. As the WCFFF is an operating facility, the target levels are based on a restricted use, industrial work scenario.

The EPA Regional Screening Level (RSL) for U is based on U as a soluble salt. Using the target risk of $1(10)^{-6}$ (equating to an increased lifetime cancer risk of 1 in 1 million) and a Hazard Quotient of 1, the RSL for industrial soil is 230 ppm. This target level does not consider engineering controls to protect workers, but assumes a complete pathway between the contaminated soil and the worker. While this target level is not directly applicable to WCFFF, it is useful in establishing a baseline for clean-up levels.

The EPA also establishes Soil Screening Levels (SSLs) that are protective of groundwater. These SSLs are based on a source directly leaching into the groundwater used for drinking water. These limits are calculated based on the drinking water standard (maximum contaminant level [MCL] for U=30 parts per billion [ppb]). This limit is not directly applicable to WCFFF since the residual concentrations of U at the HF Spiking Station #2 are in the unsaturated zone and not the drinking water. However, the MCL based SSL is 14 ppm.

Within NRC Consolidated Decommissioning Guidance (NUREG-1757, Vol 2. Appendix H), there is a Memorandum of Understanding between the EPA and the NRC, which establishes levels of residual U that require consultation with the EPA. Specifically, the NRC has agreed to consult with EPA on the appropriate approach in responding to the circumstances at particular sites with groundwater impact at the time of license termination in excess of EPA's MCLs or those sites for which NRC contemplates either restricted release or the use of alternate criteria for license termination, or if the radioactive impact at the time of license termination exceeds the corresponding levels from the associated table. While WCFFF is

not contemplating license termination at this time, the levels from NUREG-1757, Appendix H, Table H-1 are useful for comparison purposes and in determining at what concentrations EPA requires consultation. For the industrial/commercial soil, the concentration level for total U is 1,230 ppm. Since the CFFF is not undergoing license termination and is not seeking final clean-up levels for U, this number is not directly applicable at this time.

Site-Specific Target Clean-up Level Scenarios:

The target clean-up levels described above do not consider site specific conditions, such as a protective cover material, the migration parameters for the contaminant, the thickness of the unsaturated zone and other factors that reduce the potential threat to human health and the environment. The contaminant release location being evaluated in this TBD has unique characteristics that mitigate the risk of residual contamination. Within this TBD, site-specific target clean-up levels for total U will be established specific to the conditions at HF Spiking Station #2. The RME receptor scenario applicable to WCFFF Spiking Station is the industrial worker receptor scenario. The industrial worker is selected to provide remediation levels that are protective during continued operations of WCFFF. The values are not intended to predetermine remediation levels for eventual decommissioning.

Protective Cover

At HF Spiking Station #2, the residual concentrations of U are beneath a minimum 6-inch layer of concrete. This, coupled with the fact that the spiking station itself is contained within a building structure, prevents any precipitation from providing a migration driver for the residual contamination to the underlying groundwater. The floor of the spiking station is raised approximately 4 feet above the natural ground surface, providing approximately 12 feet of unsaturated material between the base of the spiking station and the groundwater. With no mode of force driving the residual uranium vertically, the building and concrete floor provide an impervious engineered barrier. The concrete floor covering also provides a protective barrier between the industrial worker and the residual U, lowering any potential risk. If conditions change, such that sub-slab excavation and work becomes necessary, the utility worker scenario will require evaluation. WCFFF is establishing controls to monitor these conditions and is developing a risk based decision making protocol should conditions change and/or leaks or spills occur. This protocol is based on the Groundwater and Soil Remediation Guidelines for Nuclear Power Plants, 2011 Technical Report, developed by the Electric Power Research Institute (EPRI 2011).

Migration Parameters

The primary mechanism for contaminant transport is migration with water. Contaminants generally move as a solution in water, based on solubility, and their rates of migration are controlled by both water migration rates and by sorption and desorption reactions involving the surrounding soils. Some contaminants are strongly sorbed on soils, thus migration is significantly retarded. The equilibrium distribution coefficient (K_d [cm³/g]) is defined as the amount of contaminant absorbed into soil divided by the amount remaining in solution. Contaminants with a low K_d are more readily transported through the soil than those with a high K_d .

Site-specific K_d values for contaminants at WCFFF have not been established. It may be prudent to conduct site-specific studies prior to the final decommissioning, when unrestricted release criteria will be met, but in the interim, literature values, combined with knowledge of site geology will be sufficient as they are generally lower (more conservative) than the site-specific values and therefore predict greater mobility than would actually occur.

Soil type has a significant impact on the published values of K_d . NUREG/CR-6697 separates K_d values by soil type based on Sheppard and Thibault (1990). The Sheppard and Thibault ranges grouped by soil type for uranium are: Sand – 0.03 to 2,200 cm³/g (mean 35); Loam – 0.22 to 4,500 cm³/g (mean 15); Clay – 46-395,100 cm³/g (mean 1,600); and Organic – 33 to 7,350 cm³/g (mean 410).

Further literature review provided the following distribution coefficients (K_d) for Uranium across all soil types. (Source Table 3-13, EPA 402-R-96-011A).

- EPA Best Case $15 \text{ cm}^3/\text{g}$
- RESRAD Version 7.2 Default $-50 \text{ cm}^3/\text{g}$
- NUREG/CR-5512 Default $15 \text{ cm}^3/\text{g}$
- Proposed EPA Median Value 220 cm³/g

Based on the Remedial Investigation Report (AECOM 2013), the uppermost geologic formation is composed of a stratified, but poorly sorted, mixture of alluvial clay, silt, sand, and gravel. These layers can generally be differentiated into an upper firm clay/silty sand and a lower loose sand/silty sand unit. Potentiometric surface maps indicate that the unsaturated zone is the firm clay/silty sand with the saturated zone being primarily the loose sand/silty sand layers. Based on this interpretation, the residual impact at WCFFF is within the clay/silty sand and would need to migrate downward into the saturated zone to have a detrimental impact on the groundwater within the loose sand/silty sand layer. Due to the spiking station being beneath a building roof and concrete floor, there is not infiltration from precipitation creating a mode of force. Using the RESRAD default K_d for uranium is appropriate until the site enters into decommissioning, at which time a site-specific study may be performed.

The oxidizing and pH conditions also affect the mobility of contamination with the subsurface. Under oxidizing conditions, anticipated to be similar to the surface soils at WCFFF, dissolved U is predicted to exist as a cation up to a pH of approximately 6; as a neutral hydroxide species from a pH of 6 to 8, and as an anionic carbonate above a pH of 8 (PNL 1995). U will also form neutral or anionic species with fluoride. This suggests that U would sorb, via cation exchange, under acidic conditions (resulting in a higher K_d), and sorb very poorly under neutral and basic conditions (resulting in a lower K_d).

The majority of soil sampling results in the vicinity of HF Spiking Station #2 have shown acidic conditions, with pH values ranging between 4 and 6. However, there are some exceptions, mainly in the 1-2 foot depth range where the pH is over 8. This variation in pH is likely an indication of various non-homogeneous fill material or the effects of an unintended release altering the pH of the soil. Therefore, the pH values may not be indicative of the native soil at the WCFFF, however, for HF Spiking Station #2, a site specific K_d value for U based on pH would indicate lower mobility of the contaminant.

TARGET CLEAN-UP LEVEL HF Spiking Station #2

A RESRAD-ONSITE model was compiled to evaluate the residual contamination scenario at HF Spiking Station #2. Default RESRAD-ONSITE input parameters where appropriate, and site-specific data used are documented in Table 1 at the end of this TBD. The model was run using a concentration of 1 ppm. The resulting maximum dose and maximum risk were normalized to 15 mrem for dose and $1x10^{-6}$ and $1x10^{-4}$ increased lifetime cancer risk (the lower and upper range of the CERCLA target risk range), consistent with *Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual, Part A* (EPA 1989) Concentrations below the increased cancer risk of $1x10^{-6}$ do not require any actions or controls, concentrations within the CERCLA target risk range will required controls and restrictions, and concentrations above the upper limit of $1x10^{-4}$ may require remedial actions.

Based on the industrial worker scenario, the maximum estimated dose for 1 ppm of Total U is 0.00036 mrem/yr, which would occur at 40 years. Assuming a dose of 15 mrem/yr, the corresponding Total U is 41,667 ppm. The maximum estimated risk for 1 mg/kg of Total U is 6.7×10^{-9} . While CERCLA is not applicable to this remediation, the CERLCA risk range of 1×10^{-6} to 1×10^{-4} is used as a regulatory standard for comparison of the estimated risks. Normalizing the results to an increased cancer risk of 1×10^{-6} and 1×10^{-4} , which are the low and high limits of the CERCLA risk range, the corresponding concentration is 149.2 ppm (corresponding to 1×10^{-6}) and 14,920 ppm of Total U (corresponding to 1×10^{-4}).

These site-specific target clean up levels are higher in magnitude than default values, but given the unique scenario of the HF Spiking Station #2, they are reasonable. At HF Spiking Station #2, the residual U contamination will be under a liner and concrete slab. The model assumed the impact was located directly below the concrete floor and does not account for the additional cover and shielding of an un-impacted soil layer. In addition, the entire spiking station is inside the manufacturing building. Therefore, there are limited pathways for the residual U concentrations to impact an industrial worker. The airborne and direct contact pathways are eliminated for normal operations because the soil is beneath the concrete slab. Transport of the U in the soil vertically into the groundwater is extremely limited, due to the multiple impervious surfaces (building roof and the concrete floor). Also, since the area is raised above the natural ground surface, there is no lateral movement of groundwater to potentially mobilize the U. The only remaining mode of transport would be potential future releases of liquids infiltrating into the same area and mobilizing the U.

MONITORING AND INSPECTION

To evaluate the effectiveness of the removal and the target clean-up level, monitoring of the groundwater downgradient from HF Spiking Station #2 should be conducted. The monitoring should focus on the potential migration of U from the HF Spiking Station #2 and be performed on a regular basis to detect any increases in U that could be attributable to the residual release. WCFFF should implement a groundwater monitoring program that is sufficient for migration detection from a release beneath the process building. The groundwater detection network associated with the process building should include the installation and monitoring of wells around the east, south, and west sides of the building to ensure that the wells are downgradient of any potential releases. These wells can serve as an early detection system of groundwater impacts from the HF Spiking Station #2 release as well as any potential future releases. The

monitoring data can then be used, as necessary, to evaluate sources of groundwater contamination, if any, and to evaluate potential mitigation efforts to protect groundwater.

A monitoring and inspection program should also be instituted to inspect the status of engineered controls at the HF Spiking Stations to evaluate the integrity of the cover materials. The program criteria should be established based on the new design for the improved spiking station.

RESIDUAL URANIUM AND ENGINEERING CONTROL REGISTRY

A registry of residual U should be kept until the time of site decommissioning. This registry can be included in the WCFFF site procedure (RA-137 Decommissioning Recordkeeping) and should conform to the requirements of 10 CFR 20.1501. At a minimum, the registry should include a description of the location and nature of the residual U, the concentrations remaining, an estimate of the mass remaining, the controls necessary to retain protectiveness, and a list of the downgradient wells used to monitor for potential migration. The registry and inspection process can be incorporated into the policies and programs utilized at WCFFF.

CONCLUSIONS AND RECOMMENDATIONS

Based on the operating configuration of the HF Spiking Stations, the subsurface soil and concrete floor slab provide an adequate barrier between the residual U and an industrial worker. The target clean-up level for U based on a 15 mrem/yr dose would be 41,667 ppm. During the sampling of the spiking station release, levels of U were well below this limit. Based on the future risk scenarios, the target clean-up levels that correspond to the CERCLA target risk range were calculated to be 149.2 to 14,920 ppm. Sampling at HF Spiking Station #2 did indicate U concentrations above the $1x10^{-6}$ limit, but below the $1x10^{-4}$ limit. Although the residual U at these levels do not require immediate action, the soil was removed as a remedial action to eliminate this potential future risk.

Spiking Station #2 Scenario	Dose –Based Target Level (15mRem/yr)	Risk-Based Target Level (CR=10 ⁻⁶)	Risk-Based Target Level (CR=10 ⁻⁴)	Maximum Soil Detection
Inside – Industrial Worker	41,667 ppm	149 ppm	14,920 ppm	10,186 ppm

In this scenario, the risk based calculations drive the target clean-up levels (i.e., lower residual ppm). This is due to the model calculating the dose on an annual basis (mRem/yr) while the risk is based on an increased lifetime cancer risk.

One sample, HF-B15, indicated U concentrations above the 1×10^{-6} risk based site-specific target clean-up level but below the 1×10^{-4} clean-up level. This sample location was outside the HF Spiking Station #2 footprint. There is no foreseeable sub-surface activity in this area and therefore the risk due to exposure is eliminated and excavation is not warranted. However, since excavation of the soil is not required based on the current configuration of the impact and the protective cover that exists, the residual impact will require monitoring to ensure conditions do not change and the groundwater is not impacted. A

monitoring well network should be established to monitor the groundwater in the vicinity of the process building as described in the monitoring and surveillance section above. The soil beneath the building should be treated as a potential source, regardless of whether a release has occurred. Results of the monitoring can then be used as an ongoing evaluation of the effectiveness of the protective cover material in limiting the mobility of the residual U. A registry of residual U should be kept until the time of site decommissioning. This registry can be included in the WCFFF site procedure (RA-137 Decommissioning Recordkeeping) and should conform to the requirements of 10 CFR 20.1501.

This evaluation considered the industrial worker as the RME, due to limited future sub-slab work. If conditions change, such that sub-slab excavation and work becomes necessary, the utility worker scenario will require evaluation. WCFFF is establishing controls to monitor these conditions and is developing a risk based decision making protocol should conditions change and/or leaks or spills occur. This protocol is based on the Groundwater and Soil Remediation Guidelines for Nuclear Power Plants, 2011 Technical Report, developed by the Electric Power Research Institute (EPRI).

In addition, this evaluation assumes that the cover material will remain intact. To verify this assumption, a monitoring and inspection program should be instituted to inspect the status of engineered controls at the HF Spiking Stations to evaluate the integrity of the cover materials. The program criteria should be established based on the new design for the improved spiking station.

Category	Parameter	Industrial	Basis for Value					
		worker value	Deced on electeds of Critician Stations					
	Area of Contaminated Zone (m ²)	21	sample locations using 15 ft by 15 ft.					
	Thickness of Contaminated Zone (m)	0.75	Average depth of contamination 2.5 ft based on sampling.					
	Length Parallel to Aquifer Flow (m)	4.5	Based on side of Area of Contaminated Zone.					
	Cover Depth (m)	0.15	6 inches of concrete cover.					
Physical Parameters	Density of Cover Material (g/cm ³)	2.4	Building foundation material density in Data Collection Handbook to Support Modeling Impacts of Radioactive Material in Soil and Building Structures (ANL 2015).					
	Cover Erosion Rate (m/yr)	0	Building foundation provides cover					
	Density of Contaminated Zone (g/cm ³)	1.51	ANL 2015 identifies NUREG-6697 this value for silty clay loam, which is the site soil type.					
	Evapotranspiration Coefficient	0	Building foundation provides cover.					
	Wind Speed (m/second)	0.0001	Minimum allowed value. Building foundation provides cover.					
Hudrological	Precipitation (m/year) ^e	0.001	Conservatively assumes some source of moisture even though the building foundation provides cover.					
Data	Irrigation (m/year)	0	Building foundation provides cover.					
	Runoff Coefficient	0	Building foundation provides cover.					
	Contaminated Zone Erosion Rate (m/year) ^g	0	Building foundation provides cover.					
	Unsaturated Zone Thickness (m)	2.7	Based on location-specific depth of 9 ft to saturated soil at high water table.					
Exposure	Inhalation Rate (m ³ /year)	10,550	The inhalation rate of 1.2 m ³ per hour is from Table 6.23 of Volume 1 of NUREG/CR-5512 (NRC 1992). The annual inhalation rate = 1.2 m^3 /hour x 8,760 hours/year = 10,550 m ³ /year.					
	Mass Loading for Inhalation (g/m ³)	0.0002	Section 35.2 of the Data Collection Handbook to Support Modeling Impacts Of Radioactive Material in Soil (ANL 1993).					

Table 1. RESRAD-ONSITE Non-Default Input Parameters

Category	Parameter	Industrial Worker Value	Basis for Value
			EPA OSWER Directive 9285.6-03
	Exposure Duration (year)	25	established an exposure duration of 25
			years for the industrial receptor.
			Assumed to annually spend 1,600 hours
			indoors and 400 hours outdoors, plus
			250 hours (1 hours/day x 250 days)
			indoors to account for eating lunch on
	Indoor Time Fraction	0.2112	site, early daily arrival, and late daily
			departure. The fraction of time indoors
			per year for the industrial worker =
			(1,850 hours/year) / (24 hours/day x 365
			days/year) = 0.1969.
			Assume 400 hrs time outdoors per year
	Outdoor Time Fraction	0.04566	for the industrial worker = (400
			hours/year) / (24 hours/day x 365
			days/year) = 0.04566.
			ANL 2015 identifies EPA documentation
			for 50 mg/d for adults (50 mg/d x 365
	Soil Ingestion (g/year)	18.25	d/yr x 0.001 g/mg = 18.25 g/yr).
			Conservatively ignores concrete slab
			over the contaminated soil.

Table 1. RESRAD-ONSITE Non-Default Input Parameters

References

- ANL 1993. Argonne National Laboratory, Environmental Assessment and Information Sciences Division. Data Collection Handbook to Support Modeling Impacts Of Radioactive Material in Soil. April 1993.
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